CLARK

Industrial Truck Division

OPERATORS MANUAL

C500 100-120 (D)

C500 Y100-150 (D)

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Battle Creek, Michigan 49016

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ILLUSTRATION OF MACHINE

C500 (H) 100 C500 (H) 120

C500 (H) Y100 C500 (H) Y130 C500 (H) Y150

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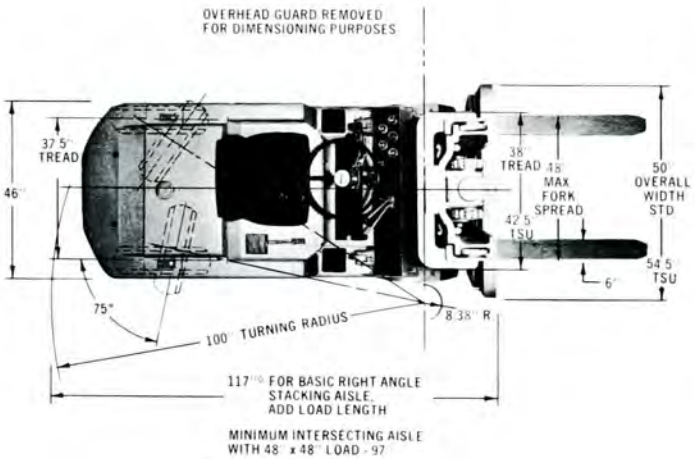
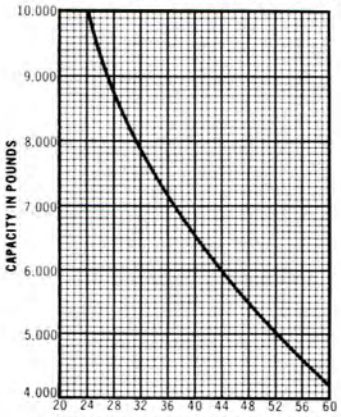
C500-(H) 100D

Rated for 10000 Lbs.
24" Load Center

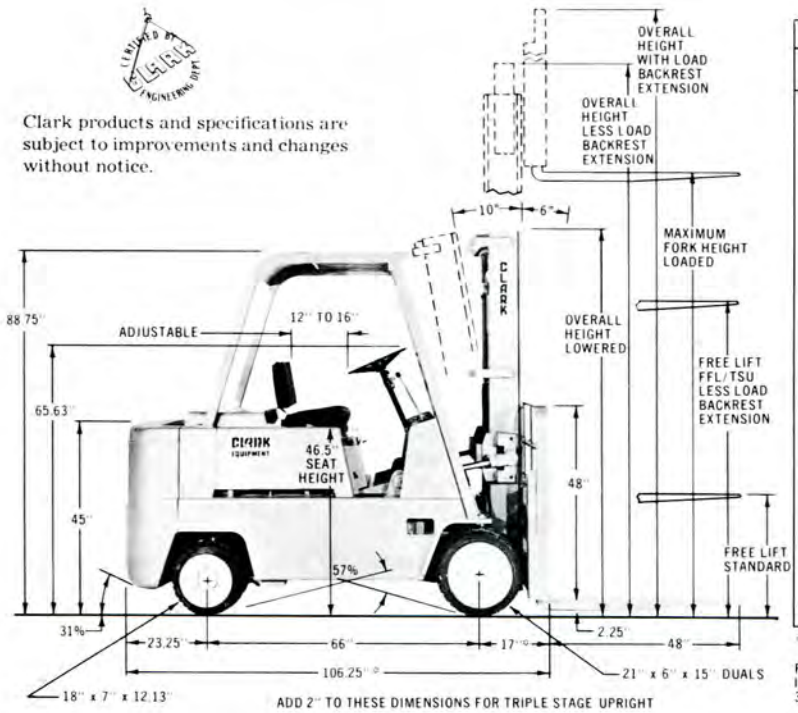


CAPACITY CHART WITH UPRIGHT VERTICAL



Load center in inches from front face of forks - Capacities shown above are computed with uprights in vertical position. Lifts above 162" on Standard - 140" on TSU maximum fork height contact factory. Specific capacities will be shown on truck nameplate.

Clark products and specifications are subject to improvements and changes without notice.



UPRIGHT DIMENSION TABLE

MAX. FORK HEIGHT		OVERALL HEIGHT LOWERED	FREE LIFT	
STD.	FFL/TSU		STD.	FFL/TSU
78	—	65	16.75	—
84	—	68	16.75	—
*90	126	71	16.75	41.25
96	135	74	16.75	44.25
102	*144	77	16.75	47.25
108	153	80	16.75	50.25
*114	162	83	16.75	53.25
120	—	86	16.75	—
—	171	88	—	58.25
—	*180	91	16.75	61.25
132	—	92	16.75	—
—	189	96	—	66.25
*138	—	95	16.75	—
—	198	99	—	69.25
144	—	99	16.75	—
—	207	104	—	74.25
150	—	102	16.75	—
—	*216	107	—	77.25
156	—	106	16.75	—
—	225	112	—	82.25
*162	—	109	16.75	—
—	234	115	—	85.25
168	—	112	16.75	—
—	243	120	—	90.25
174	—	116	16.75	—
—	252	123	—	93.25
180	—	119	16.75	—
—	261	128	—	98.25
186	—	124	16.75	—
—	270	131	—	101.25
192	—	127	16.75	—
—	279	136	—	106.25
198	—	130	16.75	—
—	288	139	—	109.25
204	—	135	16.75	—
210	—	138	16.75	—
216	—	143	16.75	—

*Preferred standard heights.

For overall height raised less load backrest extension, add the following to maximum fork height: 31.5" for standard upright and 31.88" for FFL/TSU.

UNDERCLEARANCES

Upright	3.44"	Frame	8.13"
Drive Axle	5.75"	Counterweight	4.25"
Steer Axle	3.63"	Grade Clearance	31%

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INDUSTRIAL TRUCK DIVISION

SPECIFICATIONS

GENERAL:

Vehicle.... C500(H)100D

Draw Bar Pull:

	HYDRATORK	HYDRACOOL
Drawbar pull @ .9 c.f. - loaded	7,900 lbs.	6,900 lbs.
Drawbar pull @ .9 c.f. - empty	4,340 lbs.	4,340 lbs.

Travel Speeds (Loaded):

Hydratork ..... 9.5 MPH
Hydracool ..... 10.1 MPH

Gradeability Hydracool (Loaded):

Either Trans. W/O Load.... 25.2 %
@ .9 coefficient of friction.

Lifting & Lowering Speeds (FPM):

Lift	STANDARD	FFL-TSU
Loaded	70	74
Empty	75	84
Lower		
Loaded	60	60
Empty	80	80

TILT CYLINDER DRIFT:

.38(9,6) of tilt cylinder drift, maximum allowable, in 5 minutes with rated load, starting with load raised 12.00(304,8) from floor and upright in full back tilt position.

Value is with 120 Deg. F. oil temperature and Clark MS 68 oil.

TILT SPEED:

4 to 6 degrees per second rate of tilt at maximum engine R.P.M. and rated load.

TILT RANGE	TOTAL TILT TIME LIMITS FWD (SEC.)		REAR (SEC.)	
16 Deg.	3.89	3.26	3.30	2.77
9 Deg.	2.19	1.83	1.86	1.56
7 Deg.	1.70	1.43	1.45	1.21

NOTE: Specific High Lift Uprights may have slower rate of Tilt Speed.

ENGINE:

Model.... 4.236
Type..... 4 cycle diesel
Number of cylinders.... 4
Bore.... 3.875"
Stroke.... 5"
Displacement.... 235.9 cu. in.
Governed Speed (No Load).... 2600 RPM
Maximum H.P. @ 2600 RPM... 87
Maximum torque @ 1500 RPM 216 lb. ft.
Firing Order.... 1-3-4-2

Crankcase Capacity:

With Filter.... 8 Qts.

Lubrication System....(Type) Full Pressure

Fuel Tank Capacity.... 18 Gal.

Cooling System Capacity.... 15 Qts.

Fan Belt Deflection.... .50 in.

Torque Converter:

Diameter.... 11 in.
Torque Multiplication.... 2 to 1

Transmission (Standard):

Speeds.... 3 FWD/REV
Gear Ratio (Forward)
First.... 2.24 to 1
Second.... 1.26 to 1
Third..... .737 to 1
Gear Ratio (Reverse)
First.... 2.13 to 1
Second.... 1.20 to 1
Third..... .70 to 1
Bevel Gears (diff).... 5.286 to 1

Transmission Capacity.... 12.5 Qts.

Steer Axle:

Axle Alignment;
Toe-in.... 0 deg.
Camber Angle.... 1 deg.
Caster..... 0 deg.

HYDRATORK TRANSMISSION:

Speeds.... 2 FWD/REV
Fwd. Lo 1.44:1
Fwd. Hi .737:1
Rev. Lo 1.357:1
Rev. Hi .695:1
Axle Adaptor/Transmission/Power Steering Reservoir (Common Sump).... 18 Qts.

WHEELS AND TIRES:

Size, Drive.... 21x6x15 Dual
Size, Steer.... 18x7x12-1/8

SPLIT RIM WHEELS (Torque Specifications):

	(Dry Thread)	
Drive Wheel....	450-500	lb.ft.
Steer Wheel....	290-350	lb.ft.

Steering Gear Pitman Arm Lock Nut,
Torque to: 120-130 lbs.ft.

Steering Gear Mounting Bolts,
Torque to: 75-90 lbs.ft.

HYDRAULIC SYSTEM:

Sump Tank Capacity.... 20 gal.
Sump Tank Filter (Replaceable) 10 micron
Sump Tank Breather (Replaceable) 5 micron

Hydraulic Pumps:
Main Pump, (Type).... Vane
17 GPM @ 1200 Engine RPM @ 100 PSI

Steer Pump, (Type).. Vane
4.7 GPM @ 575 RPM, Idle
(Max.) 6 GPM @ 710
Engine RPM System Pressure Relief Valve
Setting.... 1500 PSI
Both at 500 PSI. 6 GPM Flow Control.

Hydraulic Valve:
System Pressure Relief Valve Setting....
.... 2000 PSI

PEDAL FREE TRAVEL:

Brake Pedal.... .19 to .50 in.
Clutch Pedal.... .60 in.

ELECTRICAL SYSTEM:

Distributor:
Rotation (viewed from cap end)....
.... cc
Point Opening.... .021 in. (nominal)
Start Advance (Degrees):
Degree (Dist.) .3 to 2.3 deg.
Maximum Advance;
Degree (Dist.) 7.5 to 9.5 deg.
Cam Angle Range.... 22 to 26 deg.

Distributor Brush Spring Tension (ounces):
Measured @ Center of Contact....
.... 17 to 21 oz.
Measured @ Back Edge of Contact....
.... 19 to 23 oz.

Spark Plugs:
Gap, Standard (New).... .025 in.
Resistor.... .035 in.

Battery:
Volts.... 12
Number of Cells.... 6
Number of Plates.... 23
172 Hour Rate 172 Ampere Hours

Starting Motor:
No Load Test:
Draw Current (Amps.) 50 to 80
Volts.... 9
Speed (RPM) 5500 min. 9000 max.

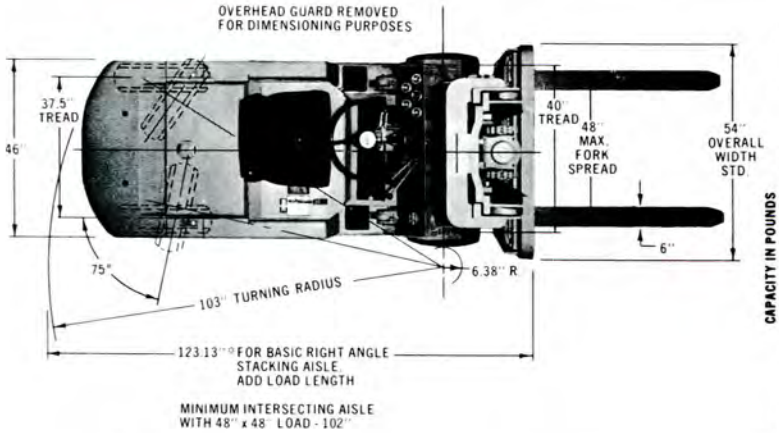
Alternator:
Volts.... 14
Field Coil Draw @ 80 deg. F. @ 12
Volts 2.2 to 2.6 AMPS.
Rated Output.... 22 AMPS.
Cold Charge @ 80 deg. F., @ 2000
Engine RPM.... 21 AMPS.

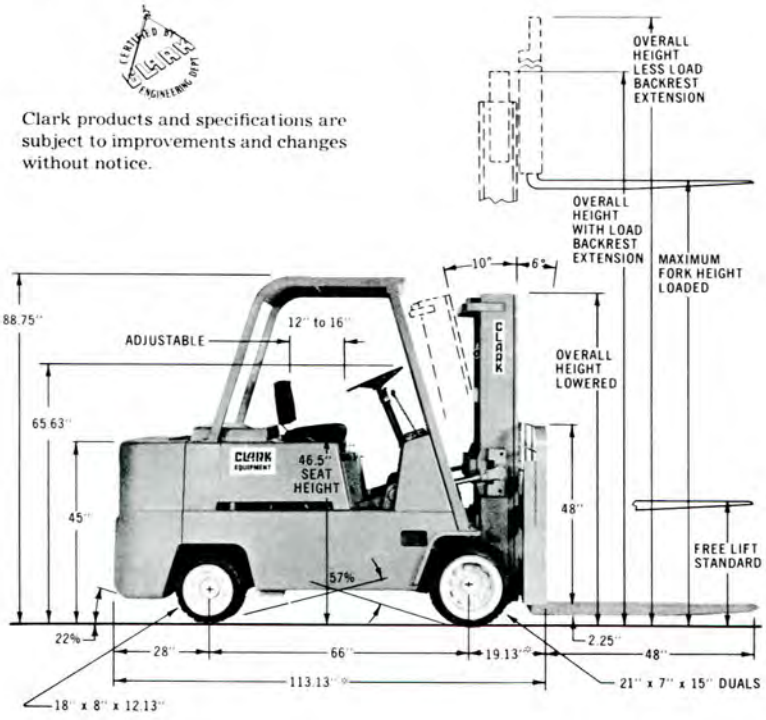
DIMENSIONAL SPECIFICATIONS

CLARKLIFT® 500

C500-(H) 120D

Rated for 12000 Lbs.
24" Load Center





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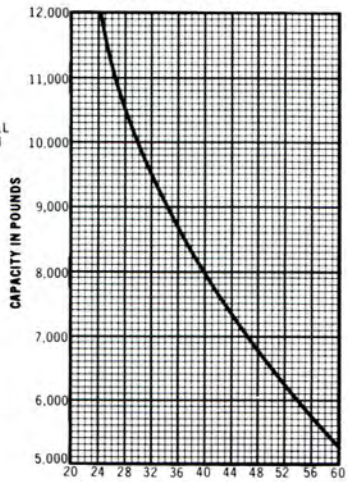
CAPACITY CHART WITH UPRIGHT VERTICAL



Load center in inches from front face of forks - Capacities shown above are computed with uprights in vertical position. Lifts above 162" maximum fork height, contact factory. Specific capacities will be shown on truck nameplate.

UPRIGHT DIMENSION TABLE

MFH	OVERALL HEIGHT LOWERED	FREE LIFT
84	70	17.5
90	73	17.5
96	76	17.5
102	79	17.5
108	82	17.5
*114	85	17.5
120	88	17.5
126	91	17.5
132	94	17.5
*138	97	17.5
144	100	17.5
150	103	17.5
156	106	17.5
*162	109	17.5
168	112	17.5
174	115	17.5

* Preferred standard heights.

For overall height raised less load backrest extension, add 35.75" to maximum fork height.

UNDERCLEARANCES

Upright	3.44"	Frame	8.13"
Drive Axle	5.75"	Counterweight	4.25"
Steer Axle	3.63"	Grade Clearance	22%

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INDUSTRIAL TRUCK DIVISION

SPECIFICATIONS

GENERAL:

Vehicle.... C500(H)120D

Draw Bar Pull:

	HYDRATORK	HYDRACOOL
Drawbar pull @ .9 c.f. - loaded.....	7,800 lbs.	6,800 lbs.
Drawbar pull @ .9 c.f. - empty.....	4,530 lbs.	4,530 lbs.

Travel Speeds (Loaded):

Hydratork ..... 9.5 MPH
Hydracool ..... 10.1 MPH

Gradeability Hydracool (Loaded):

Either Trans. W/O Load.... 22.3 %
@ .9 coefficient of friction.

Lifting & Lowering Speeds (FPM):

Lift	STANDARD
Loaded	70
Empty	75
Lower	
Loaded	60
Empty	80

TILT CYLINDER DRIFT:

.38(9,6) of tilt cylinder drift, maximum allowable, in 5 minutes with rated load, starting with load raised 12.00(304,8) from floor and upright in full back tilt position.

Value is with 120 Deg. F. oil temperature and Clark MS 68 oil.

TILT SPEED:

4 to 6 degrees per second rate of tilt at maximum engine R.P.M. and rated load.

TILT RANGE	TOTAL TILT TIME LIMITS FWD (SEC.)		REAR (SEC.)	
16 Deg.	3.89	3.26	3.30	2.77
9 Deg.	2.19	1.83	1.86	1.56
7 Deg.	1.70	1.43	1.45	1.21

NOTE: Specific High Lift Uprights may have slower rate of Tilt Speed.

ENGINE:

Model.... 4.236
Type..... 4 cycle diesel
Number of cylinders.... 4
Bore.... 3.875"
Stroke.... 5"
Displacement.... 235.9 cu. in.
Governed Speed (No Load).... 2600 RPM
Maximum H.P. @ 2600 RPM..... 87
Maximum torque @ 1500 RPM 216 lb. ft.
Firing Order.... 1-3-4-2

Crankcase Capacity:

With Filter.... 8 Qts.

Lubrication System....(Type) Full Pressure

Fuel Tank Capacity.... 18 Gal.

Cooling System Capacity.... 15 Qts.

Fan Belt Deflection.... .50 in.

Torque Converter:

Diameter.... 11 in.
Torque Multiplication.... 2 to 1

Transmission (Standard):

Speeds.... 3 FWD/REV
Gear Ratio (Forward)
First.... 2.24 to 1
Second.... 1.26 to 1
Third..... .737 to 1
Gear Ratio (Reverse)
First.... 2.13 to 1
Second.... 1.20 to 1
Third..... .70 to 1
Bevel Gears (diff)..... 5.286 to 1

Transmission Capacity.... 12.5 Qts.

Steer Axle:

Axle Alignment;
Toe-in.... 0 deg.
Camber Angle.... 1 deg.
Caster..... 0 deg.

HYDRATORK TRANSMISSION:

Speeds.... 2 FWD/REV
Fwd. Lo 1.44:1
Fwd. Hi .737:1
Rev. Lo 1.357:1
Rev. Hi .695:1
Axle Adaptor/Transmission/Power Steering Reservoir (Common Sump).... 18 Qts.

WHEELS AND TIRES:

Size, Drive.... 21x7x15 Dual
Size, Steer... 18x8x12-1/8

SPLIT RIM WHEELS (Torque Specifications):

	(Dry Thread)	
Drive Wheel....	450-500	lb.ft.
Steer Wheel....	290-350	lb.ft.

Steering Gear Pitman Arm Lock Nut,
Torque to: 120-130 lbs.ft.

Steering Gear Mounting Bolts,
Torque to: 75-90 lbs.ft.

HYDRAULIC SYSTEM:

Sump Tank Capacity.... 20 gal.
Sump Tank Filter (Replaceable) 10 micron
Sump Tank Breather (Replaceable) 5 micron

Hydraulic Pumps:
Main Pump, (Type).... Vane
17 GPM @ 1200 Engine RPM @ 100 PSI

Steer Pump, (Type)... Vane
4.7 GPM @ 575 RPM, Idle
(Max.) 6 GPM @ 710
Engine RPM System Pressure Relief Valve
Setting.... 1500 PSI
Both at 500 PSI. 6 GPM Flow Control.

Hydraulic Valve:
System Pressure Relief Valve Setting....
.... 2000 PSI

PEDAL FREE TRAVEL:

Brake Pedal.... .19 to .50 in.
Clutch Pedal.... .60 in.

ELECTRICAL SYSTEM:

Distributor:
Rotation (viewed from cap end)....
.... cc
Point Opening.... .021 in. (nominal)
Start Advance (Degrees):
Degree (Dist.) .3 to 2.3 deg.
Maximum Advance;
Degree (Dist.) 7.5 to 9.5 deg.
Cam Angle Range.... 22 to 26 deg.

Distributor Brush Spring Tension (ounces):
Measured @ Center of Contact....
.... 17 to 21 oz.
Measured @ Back Edge of Contact....
.... 19 to 23 oz.

Spark Plugs:
Gap, Standard (New).... .025 in.
Resistor.... .035 in.

Battery:
Volts.... 12
Number of Cells.... 6
Number of Plates.... 23
172 Hour Rate 172 Ampere Hours

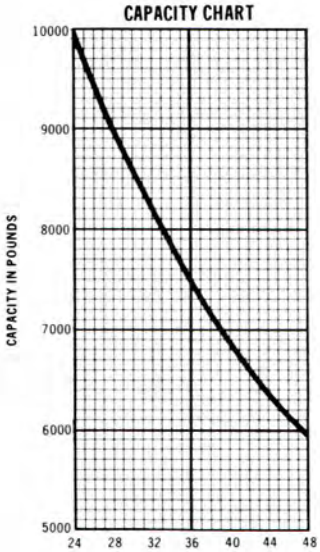
Starting Motor:
No Load Test:
Draw Current (Amps.) 50 to 80
Volts.... 9
Speed (RPM) 5500 min. 9000 max.

Alternator:
Volts.... 14
Field Coil Draw @ 80 deg. F. @ 12
Volts 2.2 to 2.6 AMPS.
Rated Output.... 22 AMPS.
Cold Charge @ 80 deg. F., @ 2000
Engine RPM.... 21 AMPS.

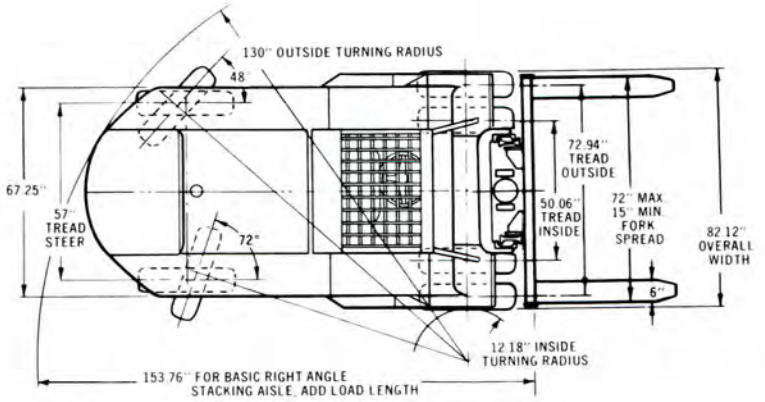
CLARKLIFT® 500 C500-(H)Y 100

10,000 pounds rated capacity at 24 inches load center

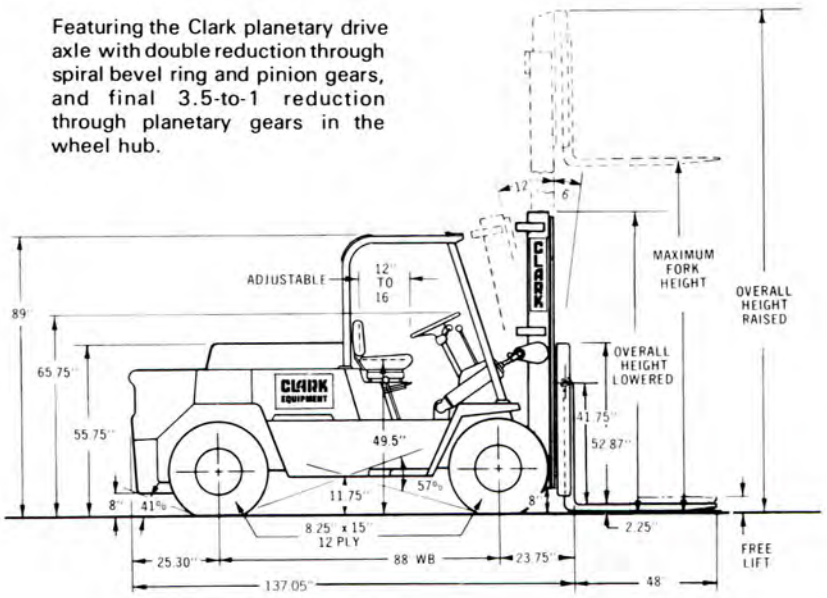
CAPACITY CHART



LOAD CENTER IN INCHES FROM FRONT FACE OF FORKS - Capacities shown above are computed with upright in vertical position - up to and including 212" MFH. Lifts above 212" maximum fork height, contact factory.



Featuring the Clark planetary drive axle with double reduction through spiral bevel ring and pinion gears, and final 3.5-to-1 reduction through planetary gears in the wheel hub.



UPRIGHT DIMENSION TABLE

MFH	OVERALL HEIGHT LOWERED	FREE LIFT	OVERALL HEIGHT RAISED
113"	94.0"	5.75"	167.62"
137"	106.0"	5.75"	191.62"
161"	118.0"	5.75"	215.62"
182"	129.5"	5.75"	236.62"
212"	145.5"	5.75"	266.62"

Intermediate heights available in increments of 3" MFH

INDUSTRIAL TRUCK DIVISION

SPECIFICATIONS

GENERAL:

Vehicle.... C500(H)Y100(D)

N O T E

For machines equipped with Diesel Engines, refer to your Diesel Engine Manual for Engine Specifications.

DRAWBAR PULL (in first gear-loaded):

	Diesel	Gas
CHY100 (at max. torque) (lbs.)	7,926	8,329
CY100 (at 1 MPH) (lbs.).....	8,040	8,475
CY100 (at converter stall) (lbs.)	10,304	10,783

SPEEDS AND GRADES:

Travel speed, MPH, diesel and gasoline powered.

Gear	1	2	3	4	5	6
CHY100 (Loaded)...	2.7	4.8	5.9	8.2	10.4	17.6
CY100 (Loaded)....	4.2	8.1	9.0	17.2	--	--
Gear	1	2	3	4	5	6
CHY100 (Empty)...	2.8	5.1	6.2	8.7	11.0	18.7
CY100 (Empty)....	4.4	8.6	9.6	18.4	--	--

GRADEABILITY (%) first gear-loaded:

	Diesel	Gas
CHY100 (at max. torque).....	31.0	33.1
CY100 (at 1 MPH).....	31.5	33.8
CY100 (at converter stall).....	40.4	40.5

Lifting & Lowering Speeds (FPM):

Lift and lowering speeds, diesel and gasoline powered.

	Loaded	Empty
Lift speeds (FPM).....	70	75
Lowering speeds (FPM).....	60	80

TILT CYLINDER DRIFT:

.56 (14,2) of tilt cylinder drift, maximum allowable, in 5 minutes with rated load, starting with load raised 12.00 (304,8) from floor and upright in full back tilt position.

Value is with 120 Deg. F. oil temperature and Clark MS 68 oil.

TILT SPEED:

5 to 8 degrees per second rate of tilt at maximum engine R.P.M. and rated load.

TILT RANGE	TOTAL TILT TIME LIMITS FWD (SEC.)		REAR (SEC.)	
18 Deg.	3.45	2.84	2.94	2.41
9 Deg.	2.61	3.17	3.06	3.73
7 Deg.	2.03	2.46	2.38	2.90

NOTE: Specific High Lift Uprights may have slower rate of Tilt Speed.

ENGINE:

Model..... F-245
Type..... L-Head
Number of cylinders..... 6
Bore..... 3.438"
Stroke..... 4.375"
Displacement.... 244 cu. in.
Governed Speed (No Load)..... 2600 RPM
Maximum H.P. @ Governed RPM.... 84
Maximum torque @ 1400 RPM 194 lb.ft.
Firing Order..... 1-5-3-6-2-4

Crankcase Capacity:

With Filter..... 5 Qts.

Lubrication System....(Type) Full Pressure

Fuel Tank Capacity..... 30 Gal.

Cooling System Capacity..... 15 Qts.

Fan Belt Deflection..... .50

Torque Converter:

Diameter..... 11 in.
Torque Multiplication..... 2 to 1

Transmission (Standard):

Speeds..... 6 FWD/REV

Fwd. 1st	2.243:1
Fwd. 2nd	1.263:1
Fwd. 3rd	2.243:1
Fwd. 4th	.736:1
Fwd. 5th	1.263:1
Fwd. 6th	.736:1
Rev. 1st	2.131:1
Rev. 2nd	1.200:1
Rev. 3rd	2.131:1
Rev. 4th	.700:1
Rev. 5th	1.200:1
Rev. 6th	.700:1

Steer Axle:

Axle Alignment;
Toe-in.... 0 deg.
Camber Angle.... 1 deg.
Caster.... 0 deg.

Drive Axle:

Diff. Ratio..... 3.889 to 1
Diff. Capacity..... 17 pints
Wheel End Ratio..... 3.529 to 1
Wheel End Capacity (Each).... 8 pints

CLUTCH PUMP:

Type..... Gear
Capacity..... 2 GPM

HYDRATORK TRANSMISSION:

Speeds..... 4 FWD/REV
Axle Adaptor/Transmission/Power Steering Reservoir (Common Sump).... 18 Qts.

WHEELS AND TIRES:

Size, Drive.....	8.25x15	12 PLY
Size, Steer.....	8.25x15	12 PLY
Air Pressures:	SINGLE DRIVE	DUAL DRIVE
Drive Tires:	100	100
Steer Tires:	100	

SPLIT RIM WHEELS (Torque Specifications): (Dry Thread)

Drive Wheel..... 105-120 lb.ft.
Steer Wheel..... 450-500 lb.ft.

Steering Gear Pitman Arm Lock Nut,
Torque to: 120-130 lbs.ft.

Steering Gear Mounting Bolts,
Torque to: 75-90 lbs.ft.

HYDRAULIC SYSTEM:

Sump Tank Capacity.... 30 gal.
Sump Tank Filter (Replaceable) 10 micron
Sump Tank Breather (Replaceable) 5 micron

Hydraulic Pumps:
Main Pump, (Type).... Vane
17 GPM @ 1200 engine RPM @ 100 PSI

Steer Pump, (Type)..... Vane
3.5 GPM @ 575 engine RPM, Idle
(Max.) 4 GPM @ 740 Engine RPM.
System Pressure Relief Valve Setting: 2250
Both at 500 PSI, 4 GPM Flow Control.

Hydraulic Valve:
System Pressure Relief Valve Setting....
..... 2300 PSI

PEDAL FREE TRAVEL:

Brake Pedal..... .19 - .50
Clutch Pedal..... .60

ELECTRICAL SYSTEM:

Distributor:
Rotation (viewed from cap end)....
.... CC
Point Opening..... .021 in. (nominal)
Start Advance (Degrees):
Degree (Dist.) .3 to 2.3 deg.
Maximum Advance;
Degree (Dist.) 7.5 to 9.5 deg.
Cam Angle Range.... 22 to 26 deg.

Distributor Brush Spring Tension (ounces);
Measured @ Center of Contact.....
.... 17 to 21 oz.
Measured @ Back Edge of Contact.....
.... 19 to 23 oz.

Spark Plugs:
Gap, Standard (New) ..... .025 in.
Resistor..... .035 in.

Battery:
Negative Ground (Volts)..... 12
Number of Cells..... 6
Number of Plates..... 11
60 Hour Rate 60 Ampere Hours

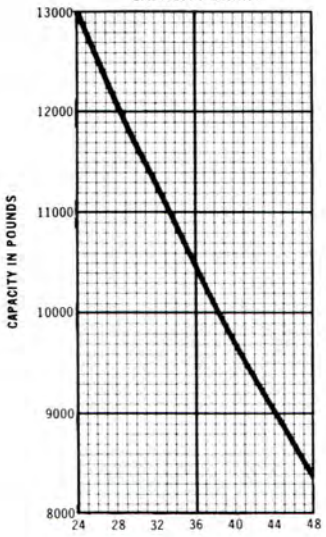
Starting Motor:
No Load Test:
Draw Current (Amps.) 50 to 80
Volts..... 9
Speed (RPM) 5500 min. 9000 max.

Alternator:
Volts..... 14
Field Coil Draw @ 80 deg. F @ 12
volts 2.2 to 2.6 AMPS.
Rated Output..... 32 AMPS
Cold Charge @ 80 deg. F., @ 2000 Engine RPM..... 39 AMPS.

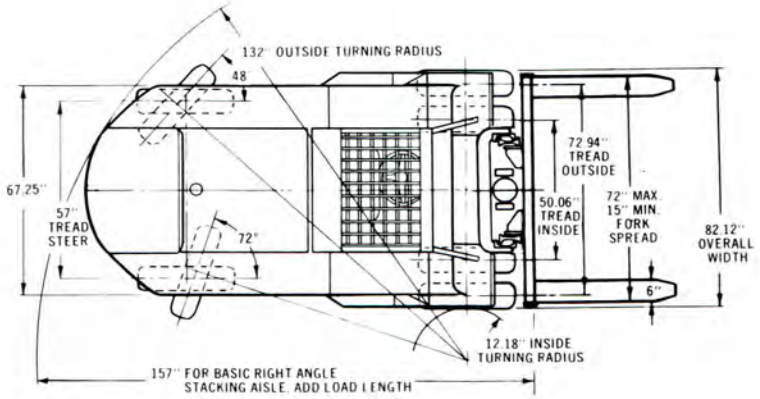
CLARKLIFT® 500 C500-(H)Y 130

13,000 pounds rated capacity at 24 inches load center

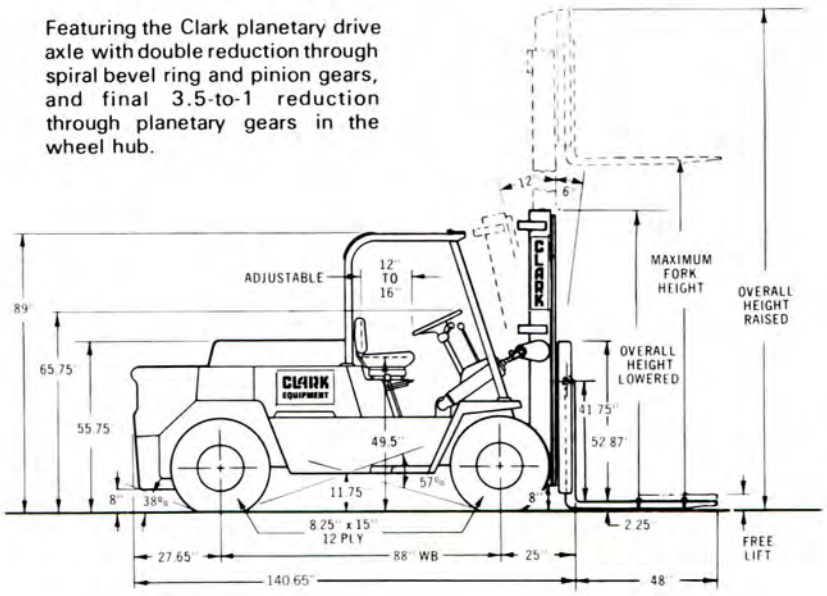
CAPACITY CHART



LOAD CENTER IN INCHES FROM FRONT FACE OF FORKS - Capacities shown above are computed with upright in vertical position - up to and including 212" MFH. Lifts above 212" maximum fork height, contact factory



Featuring the Clark planetary drive axle with double reduction through spiral bevel ring and pinion gears, and final 3.5-to-1 reduction through planetary gears in the wheel hub.



UPRIGHT DIMENSION TABLE

MFH	OVERALL HEIGHT LOWERED	FREE LIFT	OVERALL HEIGHT RAISED
113"	94.0"	5.75"	167.62"
137"	106.0"	5.75"	191.62"
161"	118.0"	5.75"	215.62"
182"	129.5"	5.75"	236.62"
212"	145.5"	5.75"	266.62"

Intermediate heights available in increments of 3" MFH

INDUSTRIAL TRUCK DIVISION

SPECIFICATIONS

GENERAL:

Vehicle....C500(H)Y130(D)

N O T E

For machines equipped with Diesel Engines, refer to your Diesel Engine Manual for Engine Specifications.

DRAWBAR PULL (in first gear-loaded):

	Diesel	Gas
CHY130 (at max. torque) (lbs.)	8,138	8,558
CY130 (at 1 MPH) (lbs.).....	8,150	8,601
CY130 (at converter stall) (lbs.)	10,612	11,110

SPEEDS AND GRADES:

Travel speed, MPH, diesel and gasoline powered.

Gear	1	2	3	4	5	6
CHY130 (Loaded)...	2.7	4.6	5.7	8.0	10.1	17.0
CY130 (Loaded)....	4.0	7.8	8.7	16.5	--	--
Gear	1	2	3	4	5	6
CHY130 (Empty)...	2.8	4.9	6.0	8.5	10.7	18.2
CY130 (Empty)....	4.3	8.4	9.4	17.9	--	--

GRADEABILITY (%) first gear-loaded:

	Diesel	Gas
CHY130 (at max. torque).....	25.3	26.9
CY130 (at 1 MPH).....	25.3	27.1
CY130 (at converter stall).....	33.8	35.9

Lifting & Lowering Speeds (FPM):

Lift and lowering speeds, diesel and gasoline powered.

	Loaded	Empty
Lift speeds (FPM).....	70	75
Lowering speeds (FPM).....	75	75

TILT CYLINDER DRIFT:

.56 (14,2) of tilt cylinder drift, maximum allowable, in 5 minutes with rated load, starting with load raised 12.00 (304,8) from floor and upright in full back tilt position.

Value is with 120 Deg. F. oil temperature and Clark MS 68 oil.

TILT SPEED:

5 to 8 degrees per second rate of tilt at maximum engine R.P.M. and rated load.

TILT RANGE	TOTAL TILT TIME LIMITS FWD (SEC.)		REAR (SEC.)	
18 Deg.	3.45	2.84	2.94	2.41
9 Deg.	2.61	3.17	3.06	3.73
7 Deg.	2.03	2.46	2.38	2.90

NOTE: Specific High Lift Uprights may have slower rate of Tilt Speed.

ENGINE:

Model.....F-245
Type.....L-Head
Number of cylinders.....6
Bore.....3.438"
Stroke.....4.375"
Displacement....244 cu. in.
Governed Speed (No Load).....2600 RPM
Maximum H.P. @ Governed RPM....84
Maximum torque @ 1400 RPM 194 lb.ft.
Firing Order.....1-5-3-6-2-4

Crankcase Capacity:

With Filter.....5 Qts.

Lubrication System....(Type) Full Pressure

Fuel Tank Capacity.....30 Gal.

Cooling System Capacity.....15 Qts.

Fan Belt Deflection.....50

Torque Converter:

Diameter.....11 in.
Torque Multiplication.....2 to 1

Transmission (Standard):

Speeds.....6 FWD/REV

Fwd. 1st	2.243:1
Fwd. 2nd	1.263:1
Fwd. 3rd	2.243:1
Fwd. 4th	.736:1
Fwd. 5th	1.263:1
Fwd. 6th	.736:1
Rev. 1st	2.131:1
Rev. 2nd	1.200:1
Rev. 3rd	2.131:1
Rev. 4th	.700:1
Rev. 5th	1.200:1
Rev. 6th	.700:1

Steer Axle:

Axle Alignment;
Toe-in....0 deg.
Camber Angle....1 deg.
Caster....0 deg.

Drive Axle:

Diff. Ratio.....3.889 to 1
Diff. Capacity.....17 pints
Wheel End Ratio.....3.529 to 1
Wheel End Capacity (Each)....8 pints

CLUTCH PUMP:

Type.....Gear
Capacity.....2 GPM

HYDRATORK TRANSMISSION:

Speeds..... 4 FWD/REV
Axle Adaptor/Transmission/Power Steering Reservoir (Common Sump).... 18 Qts.

WHEELS AND TIRES:

Size, Drive.....	8.25x15	12 PLY
Size, Steer.....	8.25x15	12 PLY

Air Pressures:	SINGLE DRIVE	DUAL DRIVE
Drive Tires:	100	100
Steer Tires:	100	

SPLIT RIM WHEELS (Torque Specifications): (Dry Thread)

Drive Wheel..... 105-120 lb.ft.
Steer Wheel..... 450-500 lb.ft.

Steering Gear Pitman Arm Lock Nut, Torque to: 120-130 lbs.ft.

Steering Gear Mounting Bolts, Torque to: 75-90 lbs.ft.

HYDRAULIC SYSTEM:

Sump Tank Capacity.... 30 gal.
Sump Tank Filter (Replaceable) 10 micron
Sump Tank Breather (Replaceable) 5 micron

Hydraulic Pumps:

Main Pump, (Type).... Vane
17 GPM @ 1200 engine RPM @ 100 PSI

Steer Pump, (Type)..... Vane
3.5 GPM @ 575 engine RPM, Idle
(Max.) 4 GPM @ 740 Engine RPM.
System Pressure Relief Valve Setting: 2250
Both at 500 PSI, 4 GPM Flow Control.

Hydraulic Valve:

System Pressure Relief Valve Setting.... ..... 2300 PSI

PEDAL FREE TRAVEL:

Brake Pedal..... .19 - .50
Clutch Pedal..... .60

ELECTRICAL SYSTEM:

Distributor:

Rotation (viewed from cap end).... CC
Point Opening..... .021 in. (nominal)
Start Advance (Degrees):
Degree (Dist.) .3 to 2.3 deg.
Maximum Advance;
Degree (Dist.) 7.5 to 9.5 deg.
Cam Angle Range.... 22 to 26 deg.

Distributor Brush Spring Tension (ounces);
Measured @ Center of Contact..... .... 17 to 21 oz.
Measured @ Back Edge of Contact..... .... 19 to 23 oz.

Spark Plugs:

Gap, Standard (New) ..... .025 in.
Resistor..... .035 in.

Battery:

Negative Ground (Volts)..... 12
Number of Cells..... 6
Number of Plates..... 11
60 Hour Rate 60 Ampere Hours

Starting Motor:

No Load Test:
Draw Current (Amps.) 50 to 80
Volts..... 9
Speed (RPM) 5500 min. 9000 max.

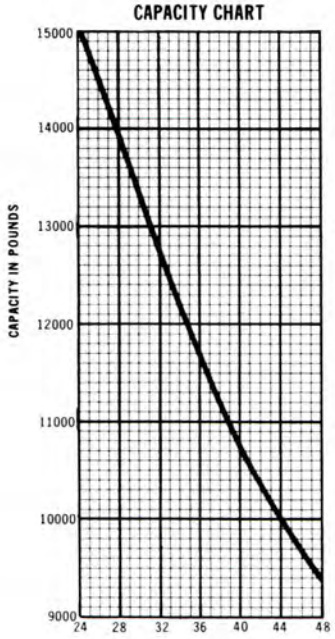
Alternator:

Volts..... 14
Field Coil Draw @ 80 deg. F @ 12 volts 2.2 to 2.6 AMPS.
Rated Output..... 32 AMPS
Cold Charge @ 80 deg. F., @ 2000 Engine RPM..... 39 AMPS.

CLARKLIFT® 500 C500-(H)Y 150

15,000 pounds rated capacity at 24 inches load center

CAPACITY CHART



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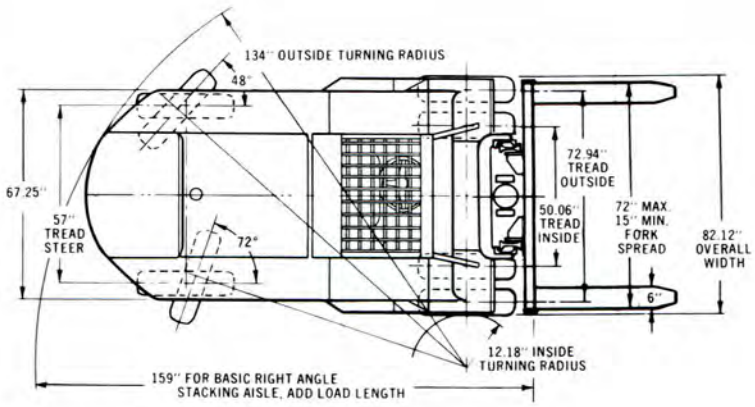

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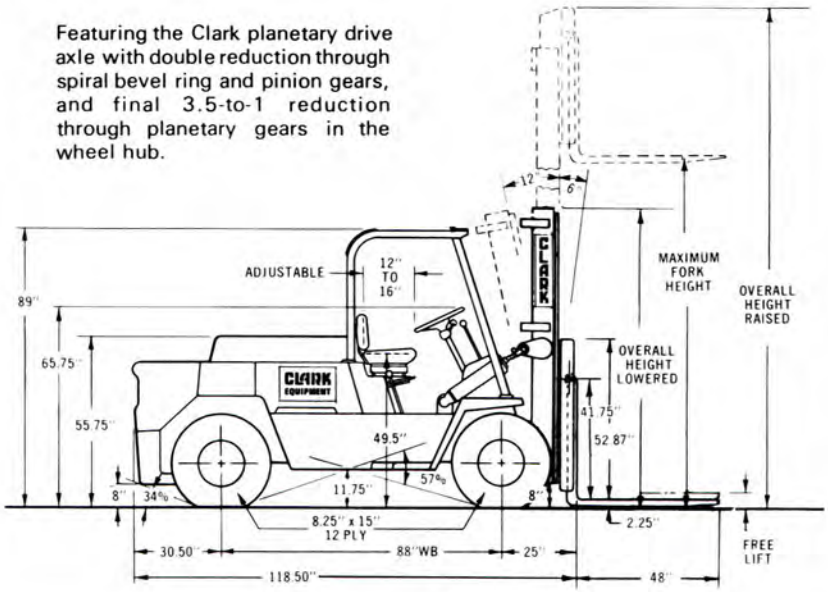

INDUSTRIAL TRUCK DIVISION

SPECIFICATIONS

GENERAL:

Vehicle....C500(H)Y150(D)

N O T E

For machines equipped with Diesel Engines, refer to your Diesel Engine Manual for Engine Specifications.

DRAWBAR PULL (in first gear-loaded):

	Diesel	Gas
CHY150 (at max. torque) (lbs.)	8,135	8,216
CY150 (at 1 MPH) (lbs.).....	8,128	8,582
CY150 (at converter stall) (lbs.)	10,626	11,127

SPEEDS AND GRADES:

Travel speed, MPH, diesel and gasoline powered.

Gear	1	2	3	4	5	6
CHY150 (Loaded)...	2.6	4.6	5.6	7.9	10.0	16.8
CY150 (Loaded)....	4.0	7.7	8.6	16.1	--	--
Gear	1	2	3	4	5	6
CHY150 (Empty)...	2.8	4.9	6.0	8.5	10.7	18.2
CY150 (Empty)....	4.3	8.4	9.3	17.8	--	--

GRADEABILITY (%) first gear-loaded:

	Diesel	Gas
CHY150 (at max. torque).....	23.0	24.4
CY150 (at 1 MPH).....	23.0	24.5
CY150 (at converter stall).....	30.6	32.5

Lifting & Lowering Speeds (FPM):

Lift and lowering speeds, diesel and gasoline powered.

	Loaded	Empty
Lift speeds (FPM).....	65	75
Lowering speeds (FPM).....	70	75

TILT CYLINDER DRIFT:

.56 (14,2) of tilt cylinder drift, maximum allowable, in 5 minutes with rated load, starting with load raised 12.00 (304,8) from floor and upright in full back tilt position.

Value is with 120 Deg. F. oil temperature and Clark MS 68 oil.

TILT SPEED:

5 to 8 degrees per second rate of tilt at maximum engine R.P.M. and rated load.

TILT RANGE	TOTAL TILT TIME LIMITS FWD (SEC.)		REAR (SEC.)	
18 Deg.	3.45	2.84	2.94	2.41
9 Deg.	2.61	3.17	3.06	3.73
7 Deg.	2.03	2.46	2.38	2.90

NOTE: Specific High Lift Uprights may have slower rate of Tilt Speed.

ENGINE:

Model.....F-245
Type.....L-Head
Number of cylinders.....6
Bore.....3.438"
Stroke.....4.375"
Displacement....244 cu. in.
Governed Speed (No Load).....2600 RPM
Maximum H.P. @ Governed RPM....84
Maximum torque @ 1400 RPM 194 lb.ft.
Firing Order.....1-5-3-6-2-4

Crankcase Capacity:

With Filter.....5 Qts.

Lubrication System....(Type) Full Pressure

Fuel Tank Capacity.....30 Gal.

Cooling System Capacity.....15 Qts.

Fan Belt Deflection.....50

Torque Converter:

Diameter.....11 in.
Torque Multiplication.....2 to 1

Transmission (Standard):

Speeds.....6 FWD/REV

Fwd. 1st	2.243:1
Fwd. 2nd	1.263:1
Fwd. 3rd	2.243:1
Fwd. 4th	.736:1
Fwd. 5th	1.263:1
Fwd. 6th	.736:1
Rev. 1st	2.131:1
Rev. 2nd	1.200:1
Rev. 3rd	2.131:1
Rev. 4th	.700:1
Rev. 5th	1.200:1
Rev. 6th	.700:1

Steer Axle:

Axle Alignment;
Toe-in....0 deg.
Camber Angle....1 deg.
Caster....0 deg.

HYDRATORK TRANSMISSION:

Speeds.....4 FWD/REV
Axle Adaptor/Transmission/Power Steering Reservoir (Common Sump)....18 Qts.

WHEELS AND TIRES:

Size, Drive..... 8.25x15 12 PLY
Size, Steer..... 8.25x15 12 PLY

Air Pressures:	SINGLE DRIVE	DUAL DRIVE
Drive Tires:	100	100
Steer Tires:	100	

SPLIT RIM WHEELS (Torque Specifications):
(Dry Thread)
Drive Wheel..... 105-120 lb.ft.
Steer Wheel..... 450-500 lb.ft.

Steering Gear Pitman Arm Lock Nut,
Torque to: 120-130 lbs.ft.

Steering Gear Mounting Bolts,
Torque to: 75-90 lbs.ft.

HYDRAULIC SYSTEM:

Sump Tank Capacity.... 30 gal.
Sump Tank Filter (Replaceable) 10 micron
Sump Tank Breather (Replaceable) 5 micron

Hydraulic Pumps:
Main Pump, (Type).... Vane
17 GPM @ 1200 engine RPM @ 100 PSI

Steer Pump, (Type)..... Vane
3.5 GPM @ 575 engine RPM, Idle
(Max.) 4 GPM @ 740 Engine RPM.
System Pressure Relief Valve Setting: 2250
Both at 500 PSI, 4 GPM Flow Control.

Hydraulic Valve:
System Pressure Relief Valve Setting....
..... 2300 PSI

PEDAL FREE TRAVEL:

Brake Pedal..... .19 - .50
Clutch Pedal..... .60

ELECTRICAL SYSTEM:

Distributor:
Rotation (viewed from cap end)....
.... cc
Point Opening..... .021 in. (nominal)
Start Advance (Degrees):
Degree (Dist.) .3 to 2.3 deg.
Maximum Advance;
Degree (Dist.) 7.5 to 9.5 deg.
Cam Angle Range.... 22 to 26 deg.

Distributor Brush Spring Tension (ounces);
Measured @ Center of Contact.....
.... 17 to 21 oz.
Measured @ Back Edge of Contact.....
.... 19 to 23 oz.

Spark Plugs:
Gap, Standard (New) ..... .025 in.
Resistor..... .035 in.

Battery:
Negative Ground (Volts)..... 12
Number of Cells..... 6
Number of Plates..... 11
60 Hour Rate 60 Ampere Hours

Starting Motor:
No Load Test:
Draw Current (Amps.) 50 to 80
Volts..... 9
Speed (RPM) 5500 min. 9000 max.

Alternator:
Volts..... 14
Field Coil Draw @ 80 deg. F @ 12
volts 2.2 to 2.6 AMPS.
Rated Output..... 32 AMPS
Cold Charge @ 80 deg. F., @ 2000 Engine
RPM..... 39 AMPS.

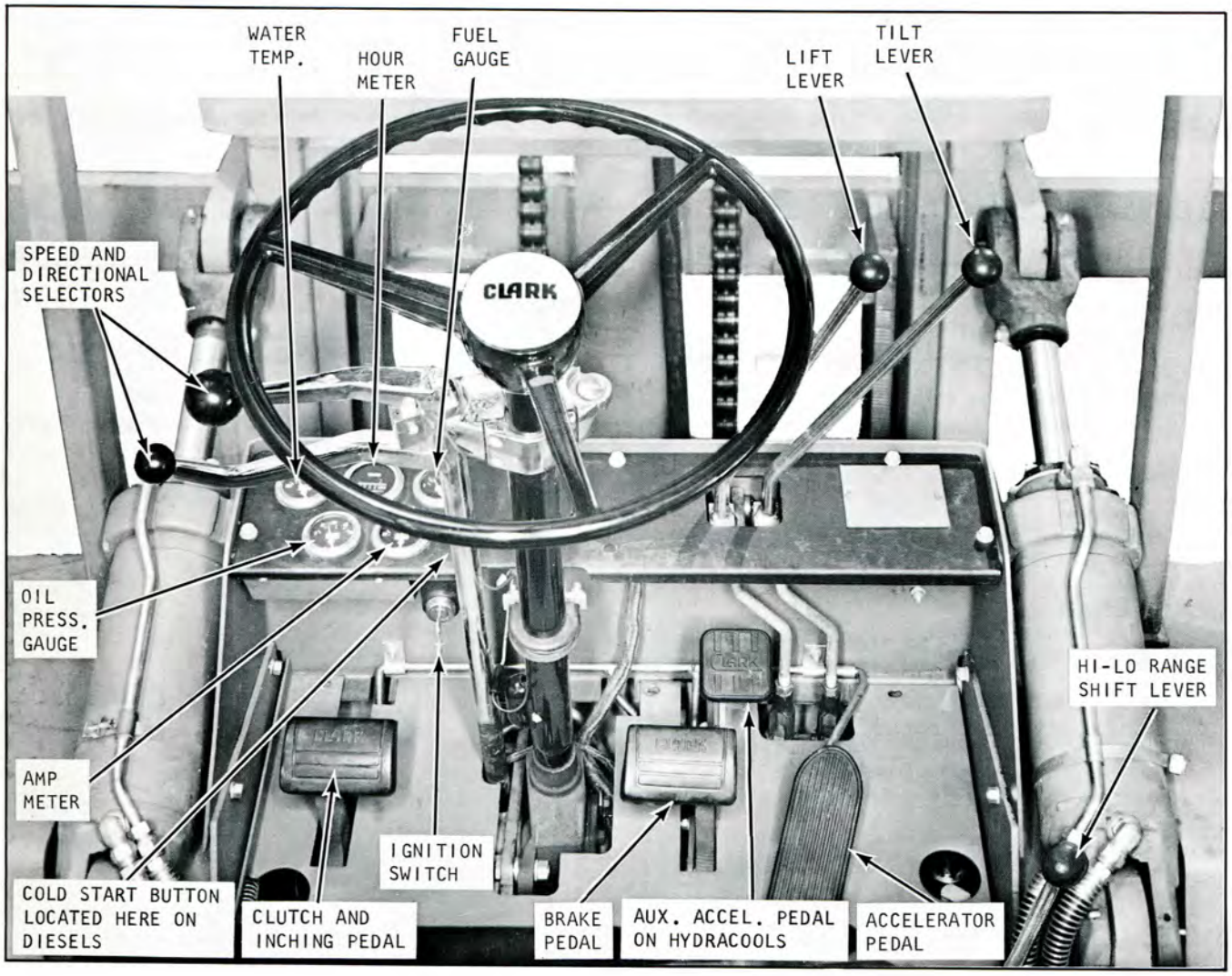

Plate 11516. Typical Overall Controls

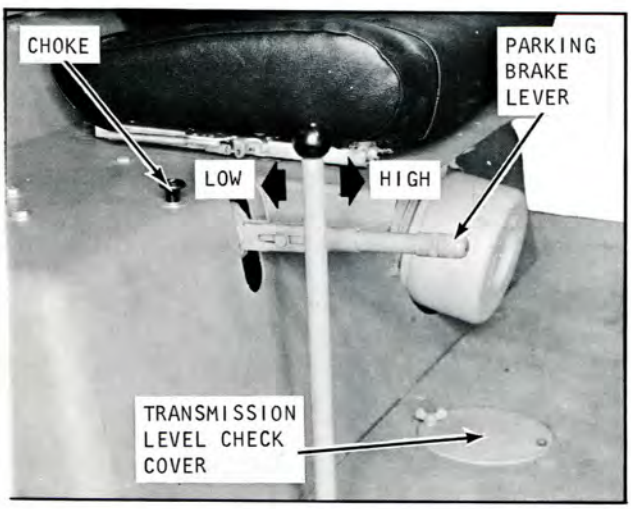

Plate 11517. Typical Gas Machine Controls

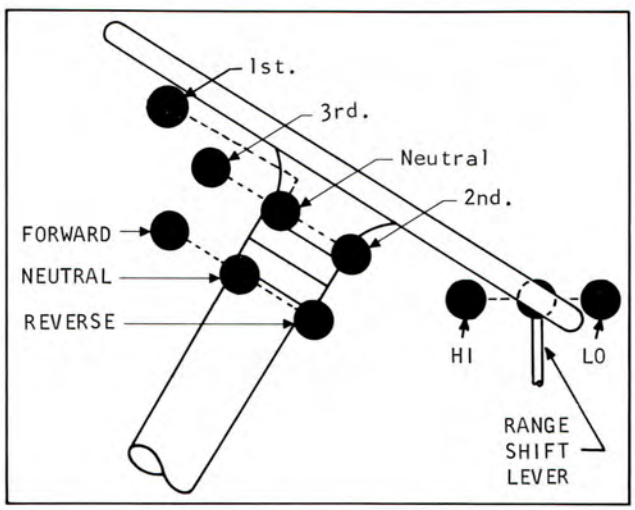

Plate 7694. Three Speed Standard Transmission

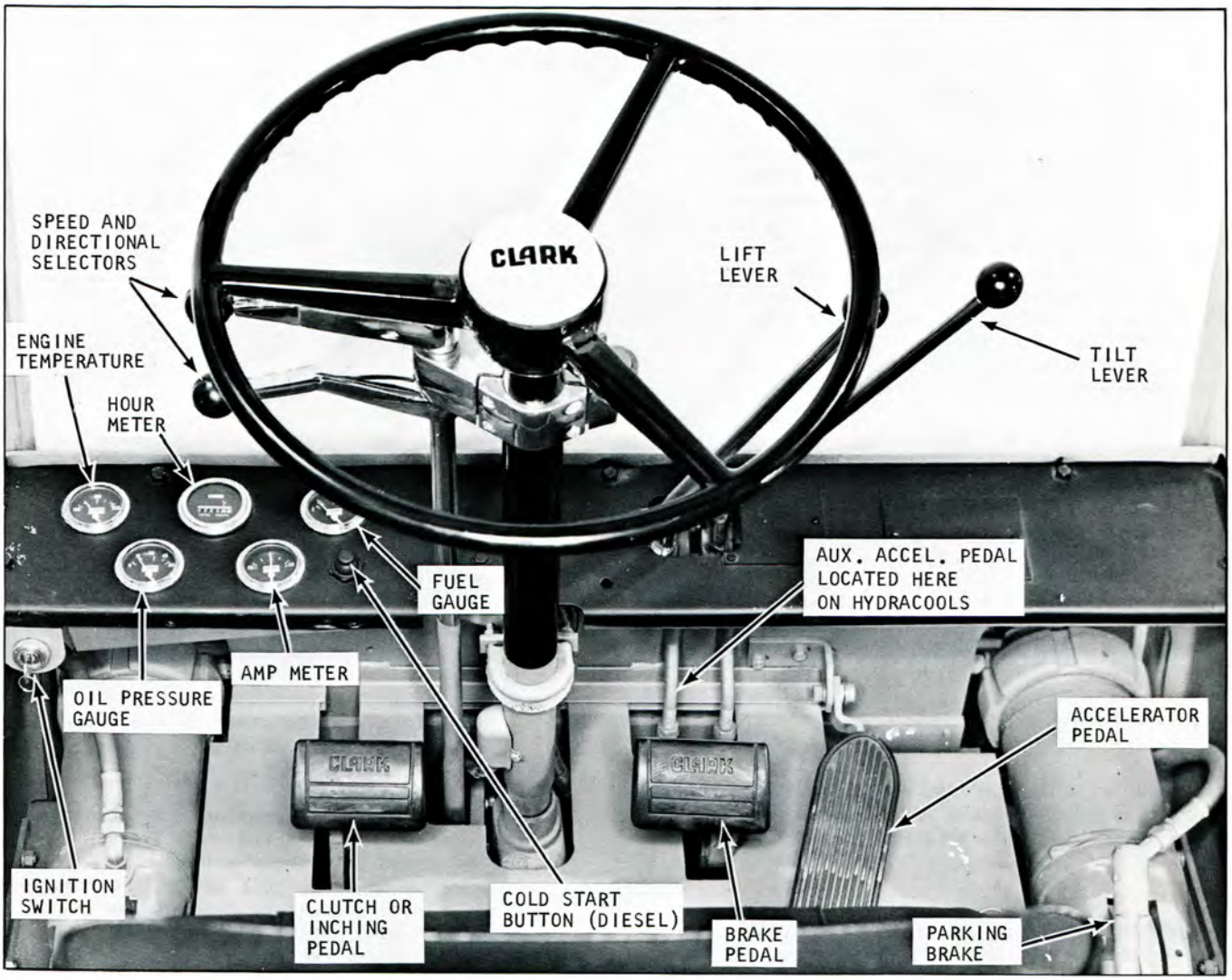

Plate 11540. Typical Overall Controls

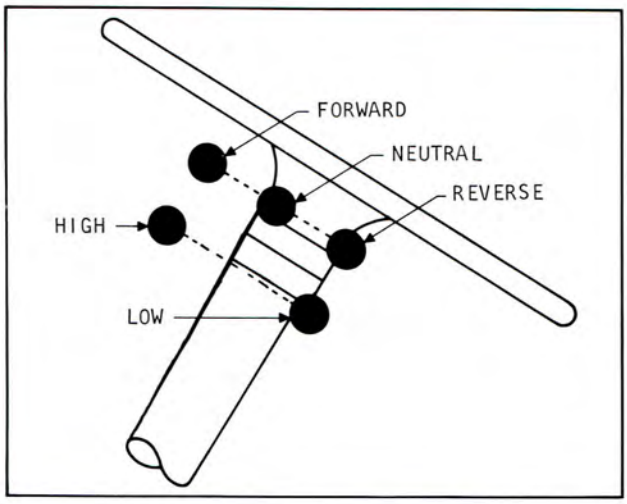

Plate 7496. Typical Two Speed Hydratork

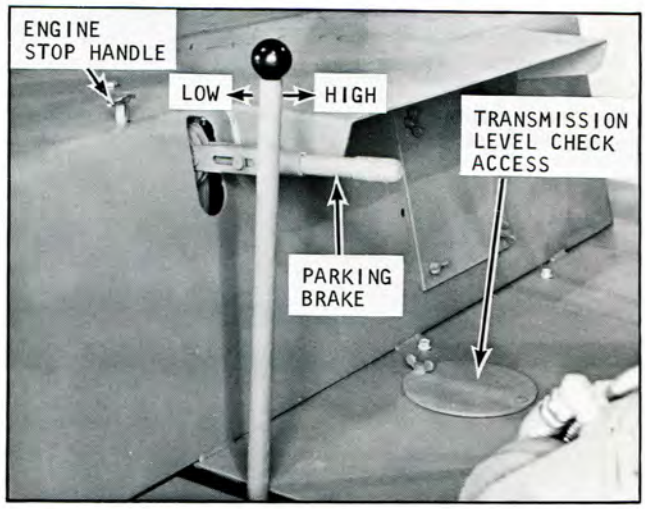

Plate 11541. Typical Diesel Machine Controls

KNOW YOUR TRUCK ...

INSTRUMENT PANEL AND INDICATORS

The instruments, indicators and hour meter are designed to tell you at a glance many important things about the performance of your vehicle. The information on this and the following pages will enable you to more quickly understand and properly interpret these instruments. Familiarize yourself with their location and purpose and make it a practice to scan the instrument cluster as you start the engine ... after it starts ... and periodically as you drive.

N O T E

When the key switch is turned off, the indicator needle(s) will not necessarily return to any given position.

GASOLINE AND DIESEL MODELS

Fuel Indicator

The electrically operated indicator registers correctly only when the key switch is in the on position ... and registers the amount of fuel in the tank.

LIQUEFIED PETROLEUM GAS (L.P. GAS MODELS)

Fuel Indicator

This indicator is mechanically operated ... located on the end of the L.P.G. Fuel Tank and registers the amount of fuel in the tank.

The indicator will register correctly only when the tank is in its proper operating position.

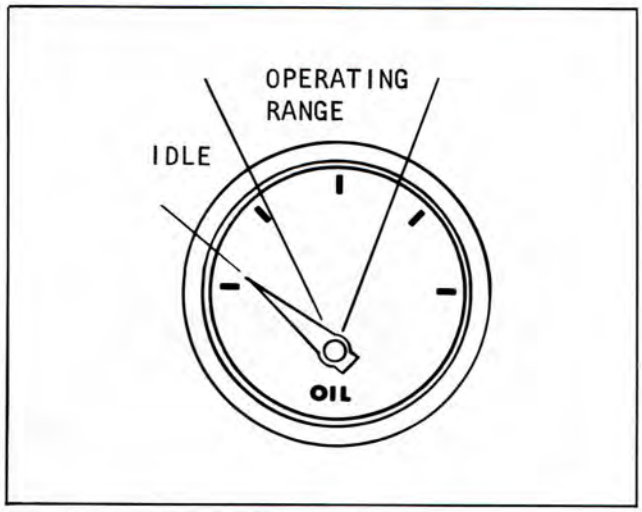

Plate 11059

ENGINE OIL PRESSURE INDICATOR

The electrically operated indicator registers correctly only when the key switch is in the on position.

1. Immediately after starting the engine ... the indicator should register in the OPERATING RANGE.

2. With engine at operating temperature and running at idle speed (APPROX. 550 to 650 RPM) ... the oil pressure should never drop below IDLE RANGE. Shut engine down if oil pressure drops below the normal idle point for your truck. Low oil pressure can cause serious engine damage.

IF THE INDICATOR READS ERRATIC, OR THERE IS NO PRESSURE INDICATED ... SHUT THE ENGINE DOWN AND REPORT CONDITION TO THE PROPER AUTHORITY FOR CORRECTION.

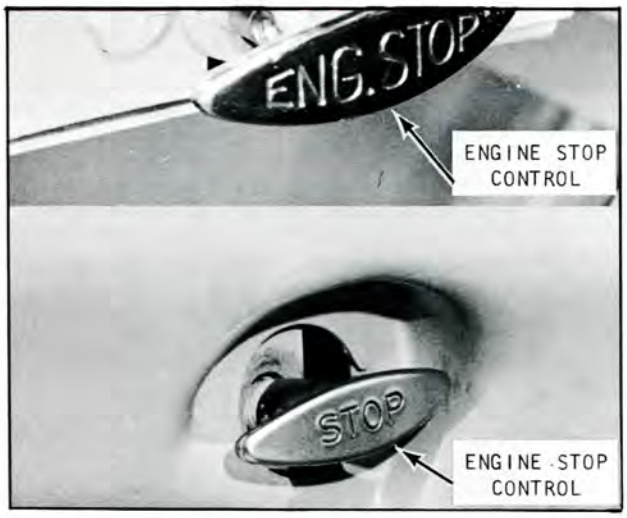

Plate 11411. Typical Shut-Down Handle

STARTING PROCEDURE FOR PERKINS DIESEL ENGINE:

1. Place transmission control levers in neutral position and set parking brake.

2. Turn ignition switch key to start position. The starter is engaged when the key is held in this position.

CAUTION

DO NOT ENGAGE THE STARTER LONGER THAN 15 SECONDS AT A TIME AND ALLOW A MINUTE OR SO INTERVAL BETWEEN TRIALS.

3. If the engine does not start after the first two attempts.....

a. Open the engine compartment door, lift the fuel pump priming lever a few times and then try starting the engine. Repeat priming operation until engine starts.

4. After engine has started...check instrument panel to see that all indicators are registering normal engine operation. If not, shut engine down so that cause can be determined.

NOTE

Run engine a few minutes to warm oil before putting machine to work...expecially in cold operating conditions.

COLD STARTING AID:

See next page.

ENGINE SHUT DOWN CONTROL:

To shut down the engine, allow the engine to idle a few moments, then pull out on the STOP lever until the engine stops. Pulling on the STOP lever manually places the injection racks in a no-fuel position.

After the engine stops the control should be pushed back to its original position.

Plate 11021. Typical Priming Lever

TO OPERATE MACHINE:

1. Place transmission control levers in neutral position and start the engine.

2. Move Hi and Lo range lever and gear selector for desired position.

3. Now move forward and reverse lever out of neutral and into position for desired direction. Accelerate as required.

4. Inching Operation on HYDRATORKS; To inch the machine into a load, depress the left foot combination inching-brake pedal only far enough to permit gradual disengagement of power from the drive wheels. The master cylinder operated by the left foot pedal is do designed that after the inching mechanism has fully actuated, a further depresion of the pedal will cause the brakes to become applied. The right foot pedal is not connected to the inching mechanism and has its separate master cylinder which serves to operate the brakes as on a conventional automobile. After the operator becomes familiar with the foot pedal controls and a definite feel is developed, inching may be accomplished in a smooth manner even when the engine is running at governed R.P.M. for fast lifting.

Continued....

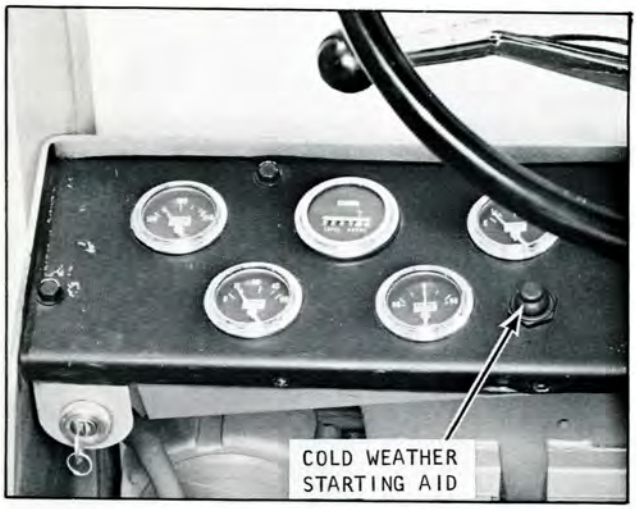

Plate 12084. Typical Cold Start Button
(On machines so equipped.)

C A U T I O N

TO PROLONG TRANSMISSION LIFE IT IS BEST TO COME TO A COMPLETE STOP BEFORE SHIFTING TO THE OPPOSITE DIRECTION. ALLOW FOOT TO REST ON BRAKE PEDAL ONLY WHEN INCHING IS DESIRED.

TO STOP MACHINE:

Remove foot from accelerator pedal and depress brake pedal. If machine is to be parked, place transmission control levers in neutral position, apply hand brake and shut engine off.

C A U T I O N

IF THE ENGINE HAS BEEN OPERATING AT OR NEAR FULL LOAD, IT SHOULD BE ALLOWED TO RUN AT FAST IDLE (600 TO 800 R.P.M.) FOR ONE OR TWO MINUTES AFTER LOAD IS REMOVED BEFORE BEING STOPPED. THIS ALLOWS INTERNAL ENGINE TEMPERATURES TO EQUALIZE.

COLD STARTING AID:

To help start a cold engine, push cold start button in and hold for 20 seconds before engaging the starter.

If the engine doesn't start push button in for another 10 seconds and try starting again.

If this doesn't work, report to the designated authority.

STARTING AND OPERATING INSTRUCTIONS FOR VEHICLES EQUIPPED WITH OC-100 SERIES (CATALYTIC PURIFIER) MUFFLER

N O T E

The initial reaction of the OC-100 Series muffler is brought about by heating the *catalyst to proper temperature (reaction range 300 Deg. F. and above). This temperature is shown on the **pyrometer indicator as NORMAL range.

* Elements in the muffler are coated with a film of catalyst. Catalyst is a chemical which reacts continuously with hot exhaust gases to reduce the amount of carbon monoxide and organic material to a safer condition when the engine is running under normal carburetion conditions.

** The pyrometer is wired to a thermocouple which is housed in a stainless steel tube (called a thermowell). This tube is installed in the path of the outlet stream of the exhaust gases in the muffler. When the heat of the exhaust gases penetrate to the wires of the thermocouple, the thermocouple transfers the heat energy into electrical impulses. The impulses indicate the temperature of the outlet and register this indication on the meter. Thus, the vehicle operator can tell at a glance whether or not the catalyst is functioning by observing where the needle is in respect to the range on the pyrometer. Any deviation from proper operation in the NORMAL range of the indicator should be investigated.

N O T E

When the catalyst activity has declined and it is no longer reducing the exhaust fumes to your specifications and needs, the catalyst can be replaced.

The selection of the method and timing of replacement is entirely at the user's descretion. In this way the user can determine his own needs for fume reduction based on his own particular operating conditions.

The OC-Muffler can be brought back to full activity by removal of old catalyst and replacement with new catalyst through the OC-Muffler fill plug. Refer to the typical illustration shown on the following page.

When starting engines equipped with a catalytic (purifier) muffler, it is absolutely essential to start and operate the engine for the first few minutes in the following manner.

1. Start engine normally and operate for 30 seconds to allow oil to circulate.

C A U T I O N

VEHICLE PARKED OUT-OF-DOORS: ALLOW THE ENGINE TO WARM-UP TO AT LEAST 120 DEG. F. (ESPECIALLY IF WEATHER CONDITIONS ARE COLD ---- 50 DEG. F. OR BELOW).

Make certain the pyrometer registers in the GREEN or NORMAL range before taking vehicle indoors. The temperature of the exhaust gases must be at least 500 Deg. F. before the muffler begins to function properly.

Vehicle Parked Indoors: If the indoor temperature is 50 Deg. F. or below, then the normal precautions against carbon monoxide (and other exhaust gases) should be taken and the engine allowed to warm-up to at least 120 Deg. F.

When starting engine in an enclosed area, it is extremely important that the muffler be brought up to the proper operating temperature as soon after the engine has been started as possible. Operating the engine while the indicator needle shows below the NORMAL range can be dangerous (especially in small enclosed areas) because of the high concentrations of carbon monoxide emitted before the muffler has a chance to reach its proper operating temperature.

W A R N I N G

DO NOT RELAX ALL OTHER NORMAL PRECAUTIONS AGAINST CARBON MONOXIDE AND OTHER EXHAUST GASES.

2. Run engine at 3/4 throttle until the needle of the pyrometer indicator climbs into the GREEN or NORMAL range on the pyrometer indicator. This procedure should take approximately 7 to 10 minutes.

W A R N I N G

OPERATOR (OR MECHANIC) PLEASE READ THE FOLLOWING:

The OC-Muffler is designed to reduce the amount of OC and odors from the engine exhaust to safer conditions when the engine is running under normal carburetion conditions.

Operating the engine while the indicator needle shows BELOW the NORMAL range can be dangerous because of the high concentrations of carbon monoxide emitted when the OC-Muffler is not functioning at the proper temperature range. Operating the engine while the indicator shows in the OVERLOAD range tells the operator that he is wasting fuel and that it is possible that the catalytic exhaust is not reducing to safety conditions because of the extra load imposed on the system. If any of these conditions exist, the

operator should report to the designated authority; and, the mechanic should adjust air-fuel ratio using normal settings (maintain correct engine carburetion and ignition timing).

Normal carburetion conditions can vary from 11:1 to 12:1, air fuel ratio by weight at idling speed and 14:1 to 15:1 at governed speed. If the engine is not tuned to the proper conditions, the OC-Muffler will continue to function; however, the reduction may not be as complete as possible. The indicator measures only the temperature of the OC-Muffler. The concentration of carbon monoxide and combustible fumes in the exhaust of an internal combustion engine is a function of the air-fuel ratio adjustment of the carburetor. This concentration in the exhaust of the engine will determine the temperature of the catalyst once the reaction has started. The higher the concentration of combustibles in the exhaust stream, the higher the temperature of the catalyst. For this reason, the operator (if authorized) or mechanic should maintain a constant check on the engine adjustment using the following recommendation.

The air-fuel ratio at both idling and governed speeds can be accurately checked by using a combustion meter or similar instrument for measuring exhaust gas concentrations.

OC-SERIES REPLACEMENT CATALYST:

Model	Poundage
101	1 lb.
102	2 lbs.
103	3-1/2 lbs.
104	5 lbs.
105	6-1/2 lbs.
106	8 lbs.

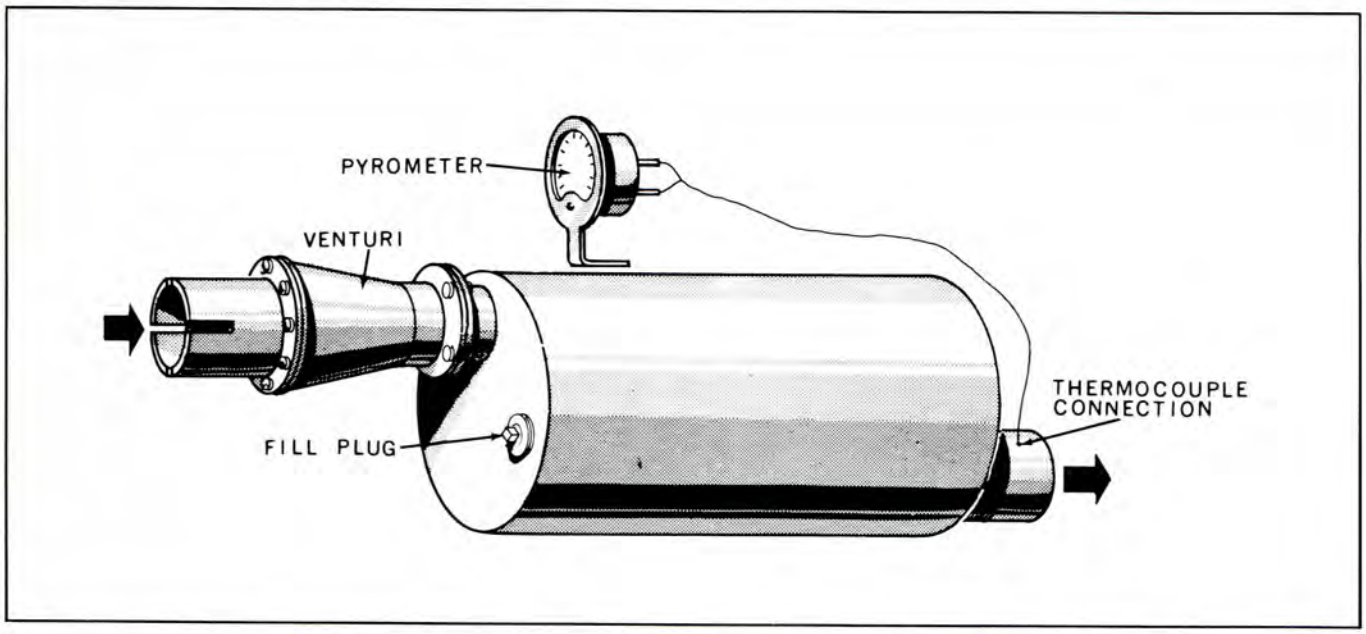

Plate 9394. Typical Illustration ----- OC-Series (Catalytic Purifier) Muffler

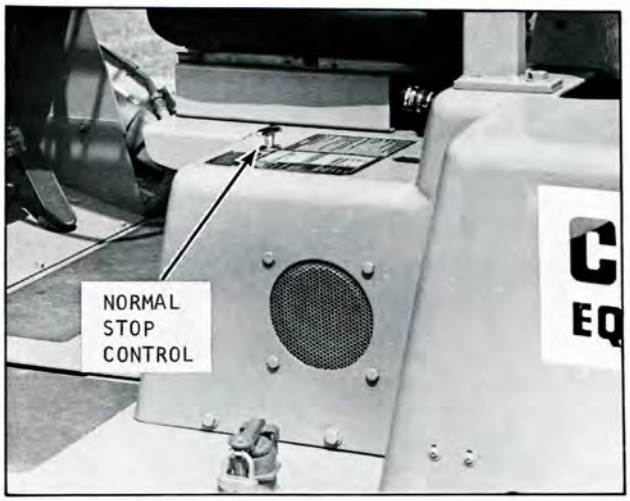

Plate 12090. Typical Engine Stop Contol

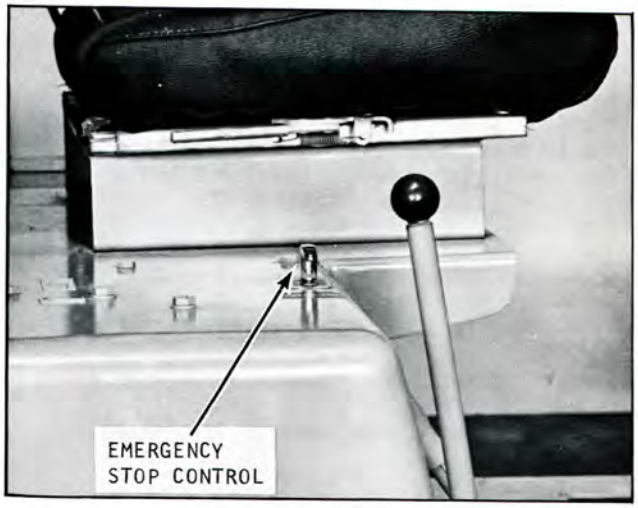

Plate 12091. Typical Engine Emergency Stop

STARTING PROCEDURE FOR G.M. DIESEL ENGINES:

1. Place transmission control levers in neutral position and set parking brake.

2. Turn ignition switch key to start position. The starter is engaged when the key is held in this position.

C A U T I O N

DO NOT ENGAGE THE STARTER LONGER THAN 15 SECONDS AT A TIME AND ALLOW A MINUTE OR SO INTERVAL BETWEEN TRIALS.

3. After the engine has started, check the instrument panel to see that all indicators are registering normal engine operation. If not, shut down the engine so that cause can be determined.

N O T E

Run engine a few minutes to warm oil before putting machine to work, especially in cold operating conditions.

ENGINE SHUT DOWN CONTROL:

To shut the engine down, allow engine to idle a few moments, then pull out on the STOP lever until the engine stops. Pulling on the STOP lever manually places the injection racks in a no fuel position.

After the engine stops, the control should be pushed back to its original position.

EMERGENCY STOP:

If the normal stop procedure does not stop the engine, pull up on the emergency stop control.

Emergency Stop Reset:

In order to restart the engine after the emergency stop button has been pulled, it is necessary to reset the release mechanism. See next page for illustration.

TO OPERATE MACHINE:

1. Place transmission control levers in neutral position and start engine.

2. Move Hi and Lo range lever or gear selector for desired position.

3. Now move forward and reverse lever out of neutral and into position for desired direction. Accelerate as required. (See next page.)

4. Inching Operation on HYDRATORKS: To inch the machine into a load, depress the left foot combination inching-brake pedal only far enough to permit gradual disengagement of power from the drive wheels. This permits the machine to move forward. Further depression of the left pedal actuates the service brakes.

C A U T I O N

TO PROLONG TRANSMISSION LIFE IT IS BEST TO COME TO A COMPLETE STOP BEFORE SHIFTING TO THE OPPOSITE DIRECTION. ALLOW FOOT TO REST ON BRAKE PEDAL ONLY WHEN INCHING IS DESIRED.

TO STOP MACHINE:

Remove foot from accelerator pedal and depress brake pedal. If machine is to be parked, place transmission control levers in neutral position, apply hand brake and shut engine off.

C A U T I O N

IF THE ENGINE HAS BEEN OPERATING AT OR NEAR FULL LOAD, IT SHOULD BE ALLOWED TO RUN AT FAST IDLE (600 TO 800 RPM) FOR ONE OR TWO MINUTES AFTER LOAD IS REMOVED BEFORE BEING STOPPED. THIS ALLOWS INTERNAL ENGINE TEMPERATURES TO EQUALIZE.

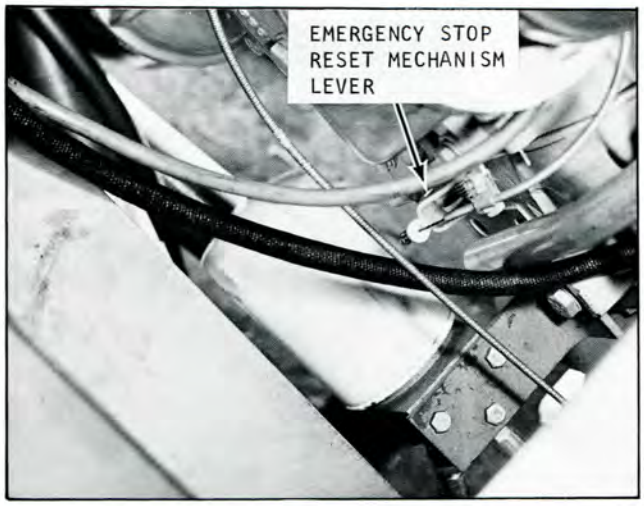

Plate 12092. Typical Reset Mechanism

To Move A Load.

The forks should be adjusted sidewise on the fork bars to obtain firm support and maximum balance of the load. Raise or lower the forks to the proper level and engage the load by driving forward. Tilt the upright backward sufficiently to adequately cradle the load, and raise load sufficiently to clear obstructions, accelerating engine slightly at the same time. Back away from stack.

The operator should have clear vision ahead when moving in a forward direction. When this is not possible, the operator should drive in reverse and turn in his seat to obtain clear vision backward.

When the load is to be deposited, enter the area squarely, especially when placing one load on top of another, in order that all piles will be square and secure. Place load directly over desired area and slowly lower into position. Disengage forks from the load by using necessary lift-tilt and then back away.

Loads will vary in size, shape, method of packaging, stacking procedures, etc. The best way to handle a load will depend on these factors. If in doubt, consult with your supervisor.

I M P O R T A N T

EVERY 8 OPERATING HOURS (OR EVERY SHIFT) ELEVATE UPRIGHT TO THE UPPER LIMIT. THIS WILL PROVIDE LUBRICATION TO THE TOP PORTION OF THE LIFT CYLINDER. CHECK FOR NORMAL SEQUENCE OF OPERATION.

OPERATING SAFETY RULES AND PRACTICES.

1. Operators of powered industrial trucks should be physically qualified. An examination should be made on an annual basis and include such things as field of vision, hearing, depth perception and reaction timing.

2. Only trained and authorized operators should be permitted to operate a powered industrial truck. Methods should be devised to train operators in the safe operation of powered industrial trucks. It is recommended that badges or other visual indication of the operator's authorization should be displayed at all times during work period.

GENERAL.

1. Safeguard the pedestrians at all times. Do not drive a truck up to anyone standing in front of a bench or other fixed object.

2. Do not allow anyone to stand or pass under the elevated portion of any truck, whether loaded or empty.

3. Unauthorized personnel should not be permitted to ride on powered industrial trucks. A safe place to ride should be provided where riding of trucks is authorized.

4. Do not put arms or legs between the uprights of the mast or outside the running lines of the truck.

5. When leaving a powered industrial truck unattended, load engaging means should be fully lowered, controls should be neutralized, power shut off, brakes set, key or connector plug removed. Block wheels if truck is parked on an incline.

6. Maintain a safe distance from the edge of ramps or platforms and do not, while on any elevated dock or platform, push freight cars. Do not use trucks for opening or closing freight doors.

7. Have brakes set and wheel blocks in place to prevent movement of trucks, trailers, or railroad cars while loading or unloading. Fixed jacks may be necessary to support a semi-trailer during loading or unloading when the trailer is not coupled to a tractor. Check the flooring of trucks, trailers, and railroad cars for breaks and weakness before driving onto them.

8. Be sure of sufficient headroom under overhead installations, lights, pipes, sprinkler system, etc.

9. Use an Overhead Guard and Load Backrest Extension unless conditions prevent their use.

```
x x x x x x x x x x x x x x x x x x x x x x x x x x x
x                                                   x
x                   W A R N I N G                   x
x                                                   x
x  AN OVERHEAD GUARD IS INTENDED TO OFFER           x
x                                                   x
x  PROTECTION FROM THE IMPACT OF SMALL              x
x                                                   x
x  PACKAGES, BOXES, BAGGED MATERIAL, ETC.,          x
x                                                   x
x  REPRESENTATIVE OF THE JOB APPLICATION,           x
x                                                   x
x  BUT NOT TO WITHSTAND THE IMPACT OF A             x
x                                                   x
x  FALLING CAPACITY LOAD.                           x
x                                                   x
x x x x x x x x x x x x x x x x x x x x x x x x x x x
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10. Use only approved industrial trucks in hazardous locations.

11. Elevate personnel only on an approved safety platform firmly secured to the lifting carriage and/or forks.

12. Report all accidents involving personnel, building structures, and equipment.

13. Fire aisles, access to stairways, and fire equipment should be kept clear.

TRAVELING.

1. Observe all traffic regulations including authorized plant speed limits. Under normal traffic conditions, keep to the right. Maintain a safe distance, approximately three truck lengths from the truck ahead, and keep the truck under control at all times. Use of truck on public roads should conform to local traffic regulations.

2. Yield the right of way to ambulances, fire trucks, or other vehicles in emergency situations.

3. Do not pass another truck traveling in the same direction at intersections, blind spots, or at other dangerous locations.

4. Slow down and sound horn at cross aisles and other locations where vision is obstructed. If the load being carried obstructs forward view travel with the load trailing.

5. Cross railroad tracks diagonally wherever possible. Do not park closer than 8 feet from center of railroad tracks.

6. Look in the direction of, and keep a clear view of the path of travel.

7. Ascend or descend grades slowly.

When ascending or descending grades in excess of 10%, loaded trucks should be driven with the load upgrade.

Unloaded trucks should be operated on all grades with the load engaging means downgrade.

On all grades the load and load engaging means should be tilted back if applicable, and raised only as far as necessary to clear the road surface.

8. Under all travel conditions the truck should be operated at a speed that will permit it to be brought to a stop in a safe manner.

9. Travel with load engaging means or load low and, where possible, tilted back. Do not elevate the load except during stacking.

10. Make starts, stops, turns or direction reversals in a smooth manner so as not to shift load and/or overturn the truck.

11. Stunt driving and horseplay should not be permitted.

12. Slow down for wet and slippery floors.

13. Before driving over a dockboard or bridgeplate, be sure that it is properly secured. Drive carefully and slowly across the dockboard or bridgeplate and never exceed its rated capacity.

14. Do not run vehicles onto any elevator unless specifically authorized to do so. Approach elevators slowly, and then enter squarely after the elevator car is properly leveled. Once on the elevator, neutralize the controls, shut off power, and set brakes. It is advisable that all personnel leave the elevator before a truck is allowed to enter or leave.

15. Avoid running over loose objects on the roadway surface.

LOADING.

1. Handle only stable or safely arranged loads. When handling off-center loads which cannot be centered, operate with caution.

2. Handle only loads within the rated capacity of the truck.

3. Adjust for long or high (including multiple tiered) loads which may affect capacity.

4. When attachments are used, particular care should be taken in securing, manipulating, positioning, and transporting the load. Operate trucks equipped with attachments as partially loaded trucks when not handling a load.

5. Place load engaging means under the load as far as possible and carefully tilt the mast backward to stabilize the load. Caution should be used in tilting backward with high or segmented loads.

6. Use extreme care when tilting load forward or backward particularly when high tiering. Do not tilt forward with load engaging means elevated except to pick up a load. Do not tilt an elevated load forward except when the load is in a deposit position over a rack or stack. When stacking or tiering use only enough backward tilt to stabilize the load.

OPERATOR CARE OF THE TRUCK.

1. Give special consideration to the proper functioning of tires, horn, lights, battery, controller, lift system (including load engaging means, chains, cable, and limit switches), brakes and steering mechanism. If at any time

OPERATOR CARE OF THE TRUCK (CONT.).

a powered industrial truck is found to be in need of repair, defective, or in any way unsafe, the matter should be reported immediately to the designated authority, and the truck should be taken out of service until it has been restored to safe operating condition.

2. Do not make repairs or adjustments unless specifically authorized to do so.

3. Do not fill fuel tanks while engine is running and avoid spillage.

4. Spilliage of oil or fuel should be carefully washed away or completely evaporated and fuel tank cap replaced before restarting engine.

5. Do not operate a truck with a leak in the fuel system until the leak has been corrected.

6. Do not use open flames for checking electrolyte level in storage batteries or gasoline level in fuel tanks.

NOTE

The preceding is reproduced from:

American National Standard ... Safety Standard for Powered Industrial Trucks. B56.1 - 1969

INDUSTRIAL TRUCK DIVISION

TO ELEVATE DRIVE WHEELS

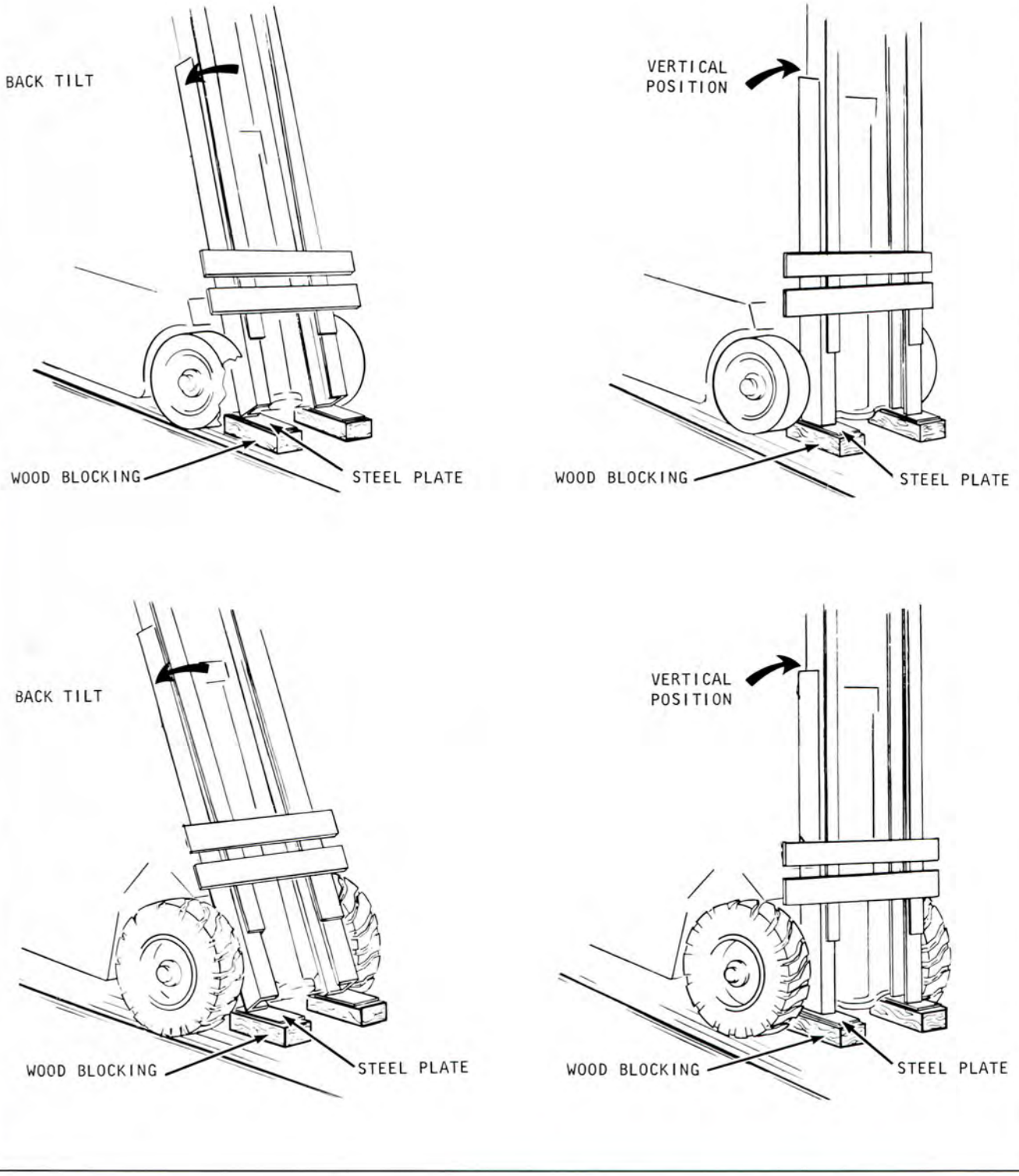


PLATE 10317. TO ELEVATE DRIVE WHEELS, PLACE UPRIGHT BLOCKING AS SHOWN ABOVE.

SAFETY INSTRUCTIONS FOR MAINTAINING INDUSTRIAL TRUCKS

Powered industrial trucks may become hazardous if adequate maintenance is neglected. Therefore, adequate maintenance facilities, personnel and procedures should be provided.

Maintenance and inspection of all powered industrial trucks should be performed in conformance with the recommendation in this manual and the following practices.

1. A scheduled preventive maintenance, lubrication, and inspection system should be followed.

2. Only qualified and authorized personnel should be permitted to maintain, repair, adjust, and inspect industrial trucks.

3. Before Leaving The Truck:

   A. Stop truck.

   B. Fully lower the load engaging means.

   C. Place directional controls in neutral.

   D. Apply the parking brake.

   E. Stop the engine or turn off power.

   F. Lock the control or ignition circuit.

   G. Block the wheels if truck is on a ramp, or being worked on.

4. Before Working On Truck:

   A. Raise wheels free of floor or disconnect power source.

   B. Use chocks or other positive truck positioning devices.

   C. Block load engaging means, innermast(s), or chassis before working under them.

   Before working on engine fuel system of gasoline powered trucks with gravity feed fuel systems, be sure fuel shutoff valve is closed.

   Before working on engine fuel system of LP gas powered trucks, close LP gas cylinder valve and run engine until fuel in system is depleted and engine stops running.

   Operation to check performance of the truck or attachments should be conducted in an authorized, safe clearance area.

5. Before Starting To Operate The Truck:

   A. Be in operating position.

   B. Depress clutch (or brake pedal on automatic transmission and electric trucks).

   C. Place directional controls in neutral.

   D. Start engine or turn on power.

   E. Before operating truck, check functioning of lift and tilt systems, directional and speed controls, steering, warning devices, brakes, and any attachment. (If used)

   F. Release parking brake.

- continued -

SAFETY INSTRUCTIONS FOR MAINTAINING INDUSTRIAL TRUCKS

6. Avoid fire hazards and have fire protection equipment present. Do not use an open flame to check level, or for leakage, of fuel, electrolyte or coolant. Do not use open pans of fuel or flammable cleaning fluids for cleaning parts.

7. Properly ventilate work area, vent exhaust fumes and keep shop clean and floor dry.

8. Handle LP gas cylinders with care. Do not drop, dent, or damage in any way.

9. Brakes, steering mechanisms, control mechanisms, warning devices, lights, governors, lift overload devices, guards and safety devices should be inspected regularly and maintained in a safe operating condition.

10. All parts of lift and tilt mechanisms and frame members should be carefully and regularly inspected and maintained in a safe operating condition.

11. Special trucks or devices designed and approved for hazardous area operation should receive special attention to ensure that maintenance preserves the original, approved safe operating features.

12. Fuel systems should be checked for leaks and condition of parts. Extra special consideration should be given in the case of a leak in the fuel system. Action should be taken to prevent the use of the truck until the leak has been corrected.

13. All hydraulic systems should be regularly inspected and maintained in conformance with good practice. Tilt cylinders, valves, and other similar parts should be checked to assure that "drift" has not developed to the extent that it would create a hazard.

14. Capacity, operation and maintenance instructions plates, tags, or decals should be maintained in legible condition.

15. Batteries, motors, controllers, limit switches, protective devices, electrical conductors and connections should be inspected and maintained in conformance with good practice. Special attention should be paid to the condition of electrical insulation.

16. Industrial trucks should be kept in a clean condition to minimize fire hazards and facilitate detection of loose or defective parts.

17. Modifications and additions which affect capacity and safe truck operation should not be performed by the customer or user without manufacturers prior written approval. Capacity, operation and maintenance instruction plates, tags or decals should be changed accordingly.

18. Care should be taken to assure that all replacement parts are interchangeable with the original parts and of a quality equal to that provided in the original equipment.

SERVICE RECORDER:

The service recorder records number of productive lifts in addition to busy and idle time of each truck. The records are made on a 6-inch diameter chart, revolving once. This model records the raising or lowering of a predetermined load. The limits generally are between 5% of the truck's capacity and a full load. Minimums may be established, and the chart will show only those lifts of the minimum weight or greater. Selective load records are made by using an adjustable pressure switch. This switch fits into the hydraulic system between the lift control and the cylinder. It is sensitive to system pressure changes but insensitive to surges or vibration. Switch setting can be adjusted externally and then sealed. The load recording stylus is always in contact with the chart. When the predetermined load or more is lifted, an electrical circuit is closed and this stylus is lifted up, making a record. A surge dampener is recommended particularly when lift trucks are in service where rough or uneven floors occur.

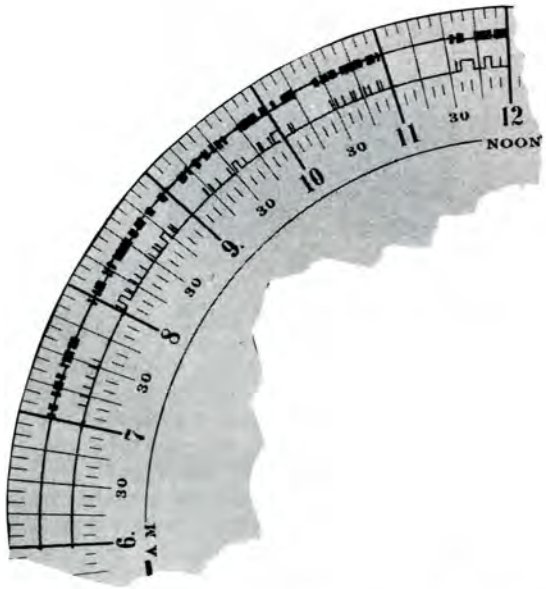


Plate 10161. Service Recorder Chart

HOW TO OPERATE SERVICE RECORDERS

Wind the Clock Movement: No key is needed. Turn the star-shaped winding disc clockwise until the movement is wound fairly tight. Do not over-wind. It is a good practice to wind the clock each time a chart is changed even if it is not run down.

Plate 10164

Place Chart in the Recorder: Snap up the two finger-like clamps. Slip the chart down over the now vertical clamps to the face of the winding disc.

Plate 10165

To Set the Chart: Before clamping it down, turn the chart so that the place on it that corresponds to the present time of the day is at the little white spot on rim of Recorder case. If this is not done correctly, the recorder will be "that much off" all day.

Plate 10166

Fasten the Chart in Place By snapping down the two clamping fingers. Now close and lock the Recorder and it is ready to operate for its full cycle, the length of time depending on the model and clock speed.

Plate 10167

HOW TO READ THE CHART:

This section of chart shows a typical record. The wide marks in the outer record band show when the truck was in motion. The fine line shows down time.

Inner record band shows lifts. Load recording stylus normally rests at lower or inner position. When activated by pressure switch, it is moved outward to record each lift.

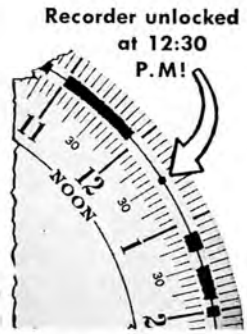


Plate 10162. Service Recorder Chart

When the key is turned to lock or unlock the Recorder, the stylus makes a round dot at the exact time of locking or unlocking. The mark appears on the face of the chart, and it is also embossed on the back. It is unmistakable.

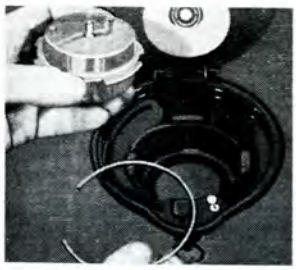


Plate 10163. Clock Exchange

HOW TO EXCHANGE CLOCK MOVEMENTS:

A clock movement is inherently a delicate mechanism that should receive reasonably good care. We have tried to make the clocks in Servis Recorders as rugged as possible to withstand the rough use they sometimes get. If the clock should fail, it can be easily lifted out and mailed in for repair or replacement. Merely unscrew the winding disc by turning it counter-clockwise and pry out wire retaining ring.

To replace the clock movement, first notice that one of the four retaining lugs in the Recorder case is wider than the rest. Match this wide space in movement top and settle movement into place. Then force wire retaining ring into place securely under lugs.

It is a good policy to have a spare clock movement in stock to insure uninterrupted service. Extra clocks are inexpensive.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

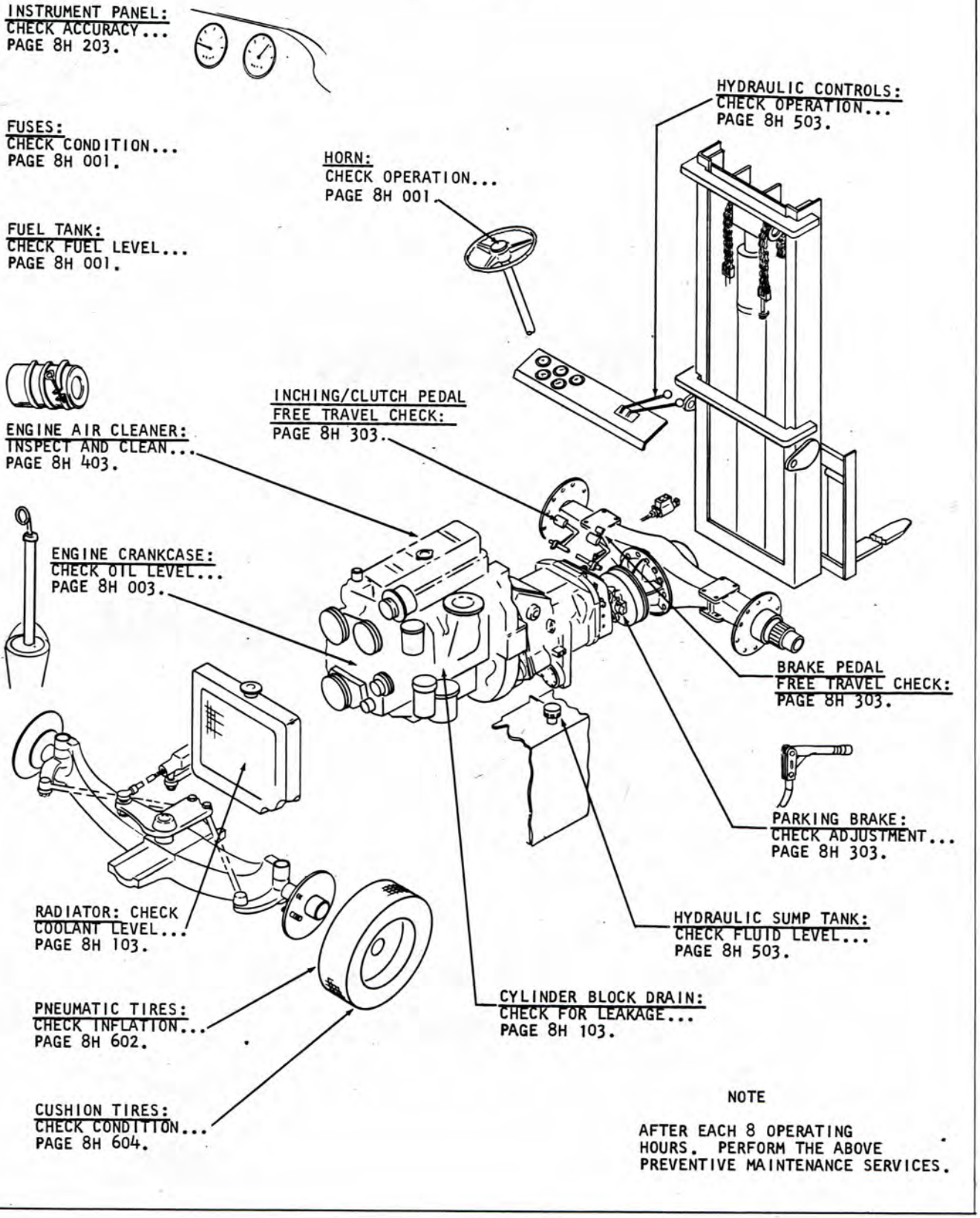
ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

8 HOUR INDEX



NOTE

AFTER EACH 8 OPERATING HOURS. PERFORM THE ABOVE PREVENTIVE MAINTENANCE SERVICES.

FUEL HANDLING AND STORAGE SAFETY

(Gasoline Powered Trucks)

Liquid Fuels. (Such as Gasoline and Diesel Fuel).

1. The storage and handling of liquid fuels should be in accordance with the Flammable and Combustible Liquids Code. (NFPA No. 30).

2. Trucks using liquid fuels should be refueled only at locations designated for that purpose. Safe outdoor locations are preferable to those indoors. The Flammable and Combustible Liquids Code (NFPA No. 30), Paragraph 7211, outlines recommendations for arranging safe indoor fueling facilities.

3. Engines should be stopped and operator off the truck during refueling.

4. Liquid fuels not handled in approved dispensing pumps should be transported in safety cans. Safety cans should be inspected regularly for damage to closures and for leaks; faulty cans repaired or replaced. Care should be exercised in handling of safety cans to avoid damage.

5. Reasonable care should be exercised to prevent the spillage of fuel or overfilling either the vehicle fuel tanks or safety cans. Filler cap should be replaced and any spilled fuel disposed of by using a noncombustible adsorbent before the engine is restarted.

6. Smoking should be prohibited in the refueling area.

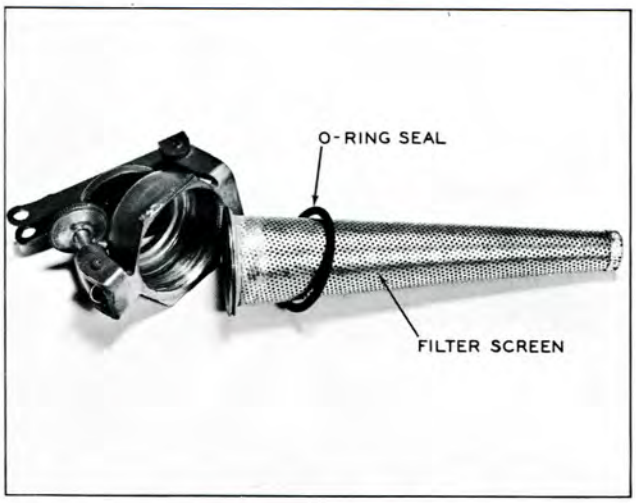


Plate 6627. Typical Gas Tank Filler Cap and Screen

HORN:

Check to be sure horn is working properly.

FUEL TANK:

Check fuel supply and fill if necessary. Use a good grade of diesel fuel: ASTM #1 or #2, 45 Centane minimum.

Before filling the tank, make certain the filler cap screen is in place and not damaged. (Machines so Equipped).

TIRE INFLATION (Pneumatic Tire Models):

See specifications.

ENGINE CRANKCASE CHECK:

Every 8 operating hours...check the engine crankcase...USE YOUR DIPSTICK. Fill if necessary with.....

SAE 10W----------0 deg to 32 deg F
SAE 20W----------33 deg to 75 deg F
SAE 30----------Above 75 deg F

See specs for crankcase capacity.

LOW TEMPERATURE OPERATION:

Multi-viscosity oil should be used only where cold starting conditions make it necessary. The oil supplier should assume full responsibility for satisfactory performance of the multi-viscosity oil at both low and normal engine operating temperatures.

SERVICE CONDITIONS:

Oil performance will reflect engine load, temperature, fuel quality, atmospheric dirt, moisture and maintenance. Where oil performance problems arise or are anticipated, the oil supplier should be consulted. When extended drain periods are contemplated, his analysis or that of a reputable laboratory should determine the suitability of oil for further service.

N O T E

Refer to diesel engine manual for machines so equipped.

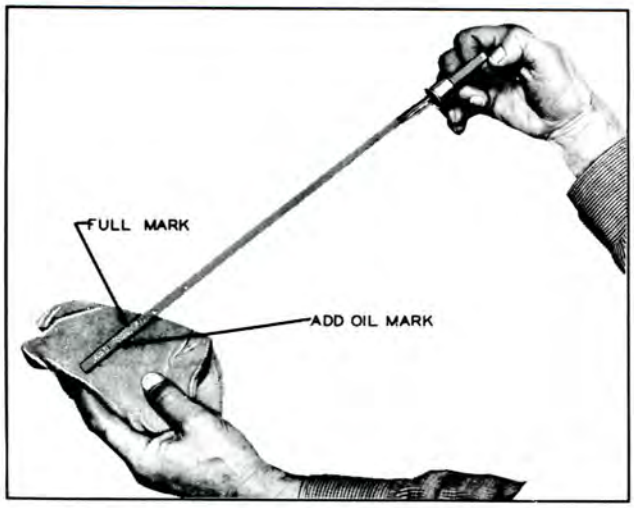


Plate 3145. Typical Crankcase Diptick

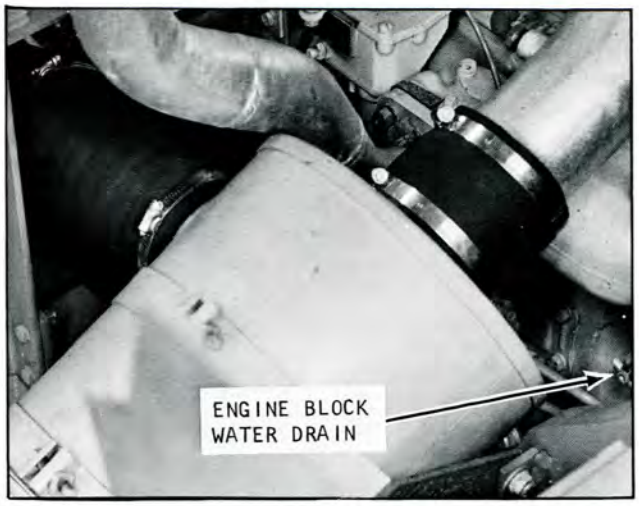


Plate 12085. Typical Engine Block Water Drain (GM DIESELS)

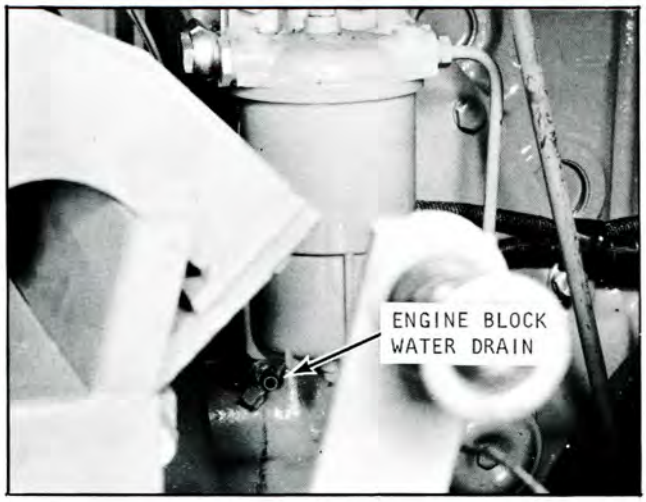


Plate 11025. Typical Engine Block Water Drain (PERKINS DIESEL)

ENGINE COOLING:

Make sure that the radiator drain cock and the water drain in the cylinder block are closed.

I M P O R T A N T

ALWAYS CHECK RADIATOR COOLANT LEVEL WITH THE ENGINE SHUT DOWN. BE SURE COOLANT LEVEL CAN BE SEEN IN THE FILLER NECK. FILL WITH CLEAN WATER UNLESS OPERATION IS IN COLD WEATHER, THEN USE A SUITABLE ANTI-FREEZE SOLUTION. IT IS RECOMMENDED THAT A SOLUBLE OIL IN THE PROPORTION OF 1 OUNCE PER GALLON OF WATER BE ADDED TO THE COOLING SYSTEM FOR LUBRICATION OF THE WATER PUMP.

C A U T I O N

NEVER POUR COLD WATER OR COLD ANTI-FREEZE INTO THE RADIATOR OF AN OVERHEATED ENGINE. ALLOW THE ENGINE TO COOL AND AVOID THE DANGER OF CRACKING THE CYLINDER HEAD OR BLOCK. KEEP ENGINE RUNNING WHILE ADDING WATER OR ANTI-FREEZE. WHEN PERMANENT ANTI-FREEZE OF THE ETHYLENE GLYCOL TYPE IS USED, THE COOLANT SOLUTION MUST CONTAIN AT LEAST 40% WATER.

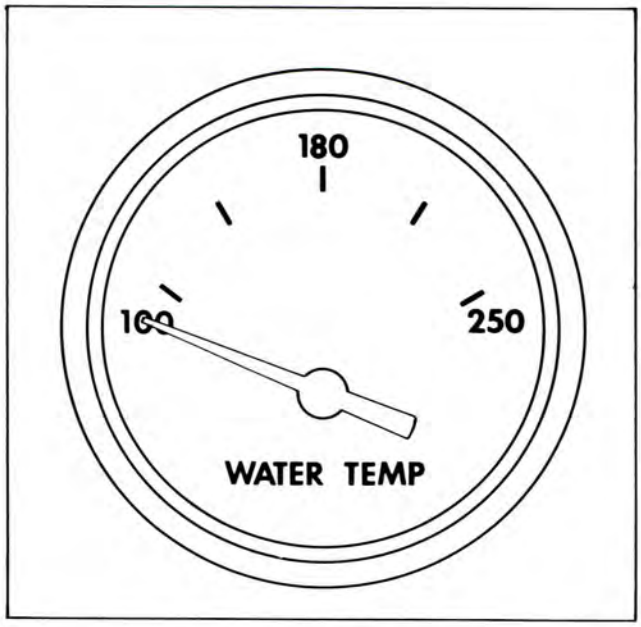


Plate 12082. Typical Engine Coolant Temperature Indicator

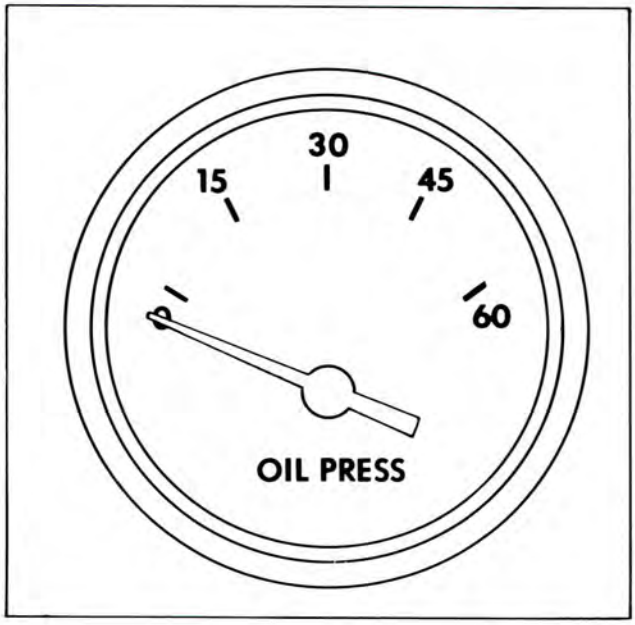


Plate 12083. Typical Oil Pressure Indicator

COOLANT TEMPERATURE:

The engine coolant should be the right temperature after the first ten to fifteen minutes of operation. See the diesel engine manual for right operating temperature.

OIL PRESSURE:

As soon as the engine has started, the oil pressure gauge should register the right oil pressure (see your diesel engine manual). If not, shut down the engine immediately and report to the designated authority.

Before placing machine in operation, run engine a few minutes to warm oil, especially in cold operating temperatures.

C A U T I O N

ON NEW MACHINES, AFTER FIRST STARTING THE ENGINE, RUN IT AT IDLE FOR 5 MINUTES, THEN STOP THE ENGINE AND RECHECK THE ENGINE OIL LEVEL. IF DOWN, BRING THE OIL LEVEL TO REQUIRED CAPACITY.

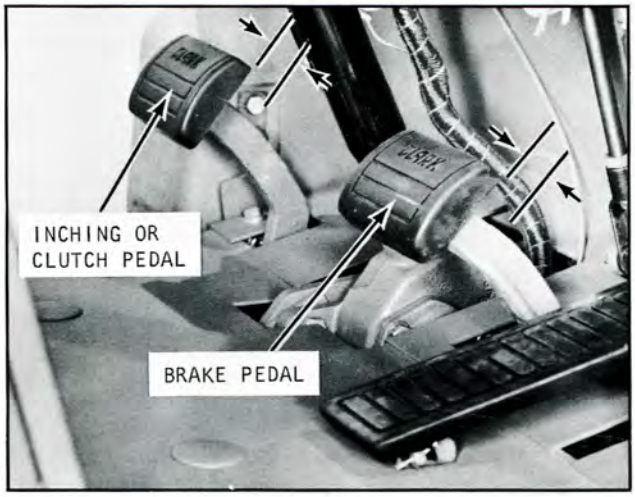


Plate 10987. Typical Free Travel Check

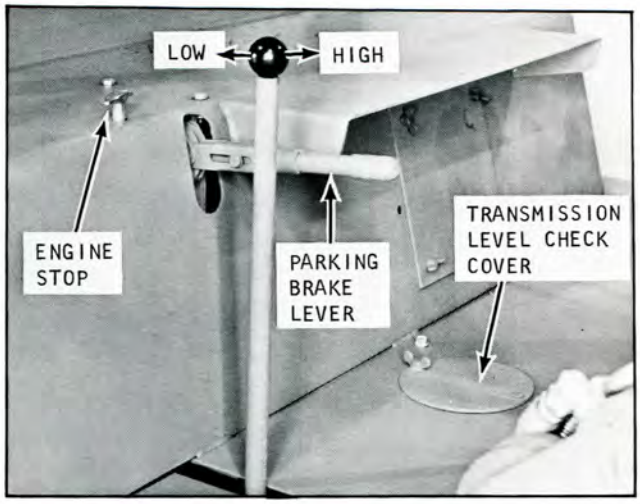


Plate 12086. Typical Parking Brake Lever

BRAKE PEDAL FREE TRAVEL CHECK:

N O T E

Brake Pedal free travel check should be made with the engine shut down.

1. Depress pedal and hold foot pressure for at least ten seconds. Pedal must be solid, must not be spongy or drift under foot pressure.

2. Now...depress pedal by hand. When pedal meets resistance from the master cylinder, the distance traveled should be 3/16 - 1/2 of an inch.

PARKING BRAKE:

Make certain that the parking brake is working properly. Fully apply hand brake, moving brake lever from full forward to full rear position... cable tension should be strong enough so that the lever hesitates or remains in a vertical position before continuing on as the lever passes through center position to full rear position.

N O T E

The parking brake must be capable of holding truck with full rated capacity load, on a 15% grade.

If the brake operation is not satisfactory, report to designated person in authority.

Refer to the Index for Linkage Adjustments and Brake Bleeding Procedures.

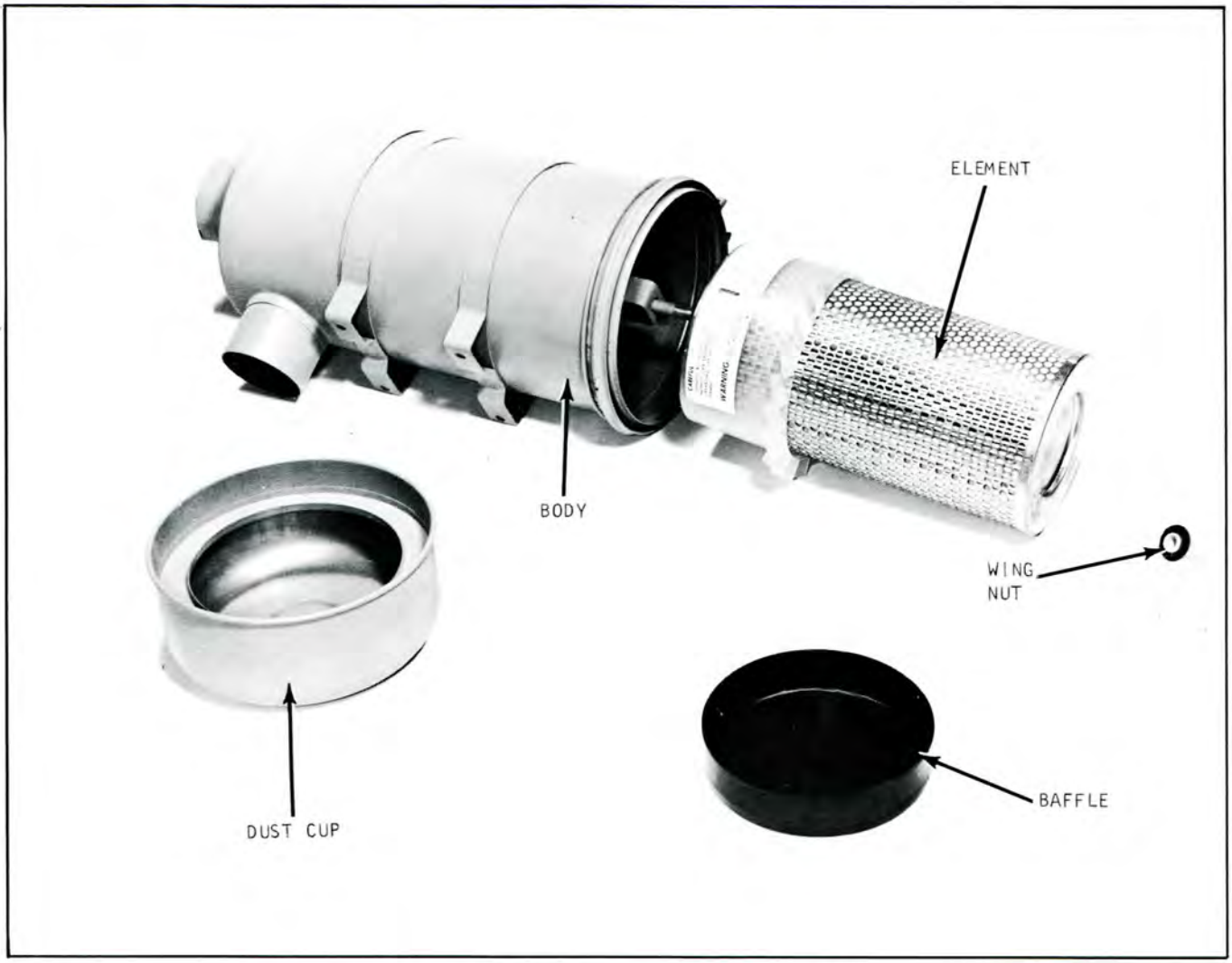


Plate 9154. Typical Air Filter Assembly

ENGINE AIR CLEANER (DRY TYPE):

Operating conditions determine the air cleaner service periods. The air cleaner should be checked every 8 operating hours and cleaned. This may be necessary more often under dusty operating conditions.

1. Remove air cleaner element and tap on a hard flat surface until all loose dirt is removed.

N O T E

If filter cartridge cannot be properly cleaned, replacement is necessary.

2. Check hose connections to be sure they are tight thus preventing any air and dirt from entering at these points. Periodically remove air cleaner and check interior for any signs of dirt or dust. If found, this indicates that more frequent cleaning intervals are necessary as the interior should be free of all dirt and dust.

3. Check gasket for damages, replace if necessary.

N O T E

Depending on the type of operation the machine is subjected to, will determine the frequency of air cleaner maintenance. Close observance and common sense can best determine the frequency of air cleaner maintenance.

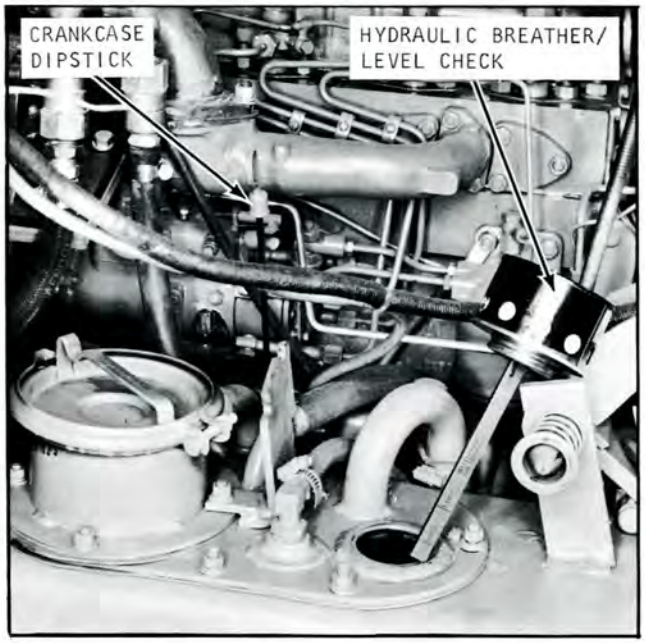


Plate 11012. Typical Hydraulic Breather/Dipstick

HYDRAULIC SUMP TANK:

Check hydraulic sump tank fluid level in the following manner:

1. Lower upright.

2. Turn switch key to off position.

3. Remove sump breather. Fluid level should be no more than eight inches from the top with the upright lowered. If necessary, fill the sump tank using MS 68 hydraulic fluid. Add fluid as necessary to bring oil level to the proper level. Move valve control levers with hydraulic pump operating to allow any air in the lines to escape. Then recheck sump tank fluid level and fill as required before putting the machine in operation.

HYDRAULIC CONTROL LEVERS:

I M P O R T A N T

EVERY 8 OPERATING HOURS (OR EVERY SHIFT)

ELEVATE UPRIGHT TO THE UPPER LIMIT. THIS WILL PROVIDE LUBRICATION TO THE TOP PORTION OF THE LIFT CYLINDER.

Check lift and tilt operations. The lift and tilt cylinders should actuate when lift or tilt levers are moved either way from neutral position.

When load is elevated and control lever returned to neutral position, load should remain in elevated position with no noticeable downward drift. If load drifts downward excessively, this may indicate lift cylinder U-cup or seal damage. Report to designated authority.

With tilt lever in neutral position, upright should remain steady with no noticeable backward or forward drift. If upright drifts excessively either way, this may indicate tilt cylinder seal or U-cup damage. Report to designated authority.

C A U T I O N

NEVER ALLOW LOADED OR UNLOADED LIFT CARRIAGE TO REMAIN IN AN ELAVATED POSITION FOR ANY PROLONGED PERIODS. LIFT CARRIAGE SHOULD BE LOWERED WHEN NOT IN USE. DO NOT HOLD CONTROL LEVERS IN EXTREME POSITIONS AFTER A LOAD HAS REACHED ITS LIMITS. TO DO SO WILL RESULT IN HIGH OIL PRESSURE THAT MAY RESULT IN HEATING OF THE HYDRAULIC OIL.

RIM AND WHEEL MAINTENANCE:

N O T E

"In order to maintain and insure maximum service, a continuous maintenance program is advisable... maintenance procedures should be carried out both during tire inspections and during tire changes."

x x x x x x x x x x x x x x x x x x x x x x x x x x
x x
x W A R N I N G x
x x
x PULL DAMAGED RIMS OR WHEELS. DEFLATE x
x x
x TIRES PRIOR TO THE REMOVAL OF RIMS OR x
x x
x WHEELS FROM THE VEHICLE. x
x x
x x x x x x x x x x x x x x x x x x x x x x x x x x

Check all metal surfaces thoroughly while making tire inspections...watch for...

1. Fatigue cracks in metal.
2. Bent flanges, resulting from road obstructions.
3. Deep rim tool marks.
4. Loose, missing or damaged nuts.
5. Bent or stripped studs.
6. Excessive rust or corrosion.

Mark damaged or hazardous areas with chalk so that part will be removed from service...replace damaged parts.

Insure that replacements are made with the proper sizes and types...refer to your machine serial number when ordering replacement parts. Care should be taken to assure that all replacement parts are interchangeable with the original parts and of a quality equal to that provided in the original equipment.

Check all metal surfaces, as listed above, and check for cracks. These are caused by deep rim tool marks, overloading and overinflating tires and using larger than recommended tire sizes.

Cracks in wheel between stud holes are caused by loose wheel nuts...improper installation procedures and use of incorrect sizes or types of attaching parts. Insufficient mounting torque can cause wheel shimmy, resulting in damage to parts and extreme tire tread wear. Excessive mounting torque can cause studs to break and disc to crack in the stud hole area.

Thoroughly clean wheels...remove rust, dirt and other foreign materials from all surfaces. Hand or electric wire brushes, and blasting or chemical baths may be used.

Bead seat areas of the rim should be free of rust and rubber deposits. This is especially important for drop-center tubless rims...because of the air-sealing element.

Paint rim by brush or spray with a fast-drying metal primer. Surfaces should be clean and dry prior to painting. Insure that bare metal areas on outside or tire side of rim are covered. This is especially important on drop-center tubless rims, because warm and somethimes moist air is in constant contact with the metal surface on the tire side of the rim.

Lubricate tire side of rim base just prior to mounting tire...avoid the use of any lubricant which contains water or solvent that is injurious to rubber...a combination lubricant and rust-preventive compound is preferable. This protective measure is of particular importance with drop-center tubless rims as the air in the tire is contained by the tire-side rim surface.

N O T E

Rim Distributors can supply the proper compound that serves as a lubricant and rust preventive.

TIRE MAINTENANCE:

Inspect for proper inflation. Refer to Specifications for correct tire pressure.

Inspect tires and wheels regularly for cuts, breaks, alignment, security of wheel clamp bolts (on machine using split rims), and lug nuts or bolts.

Even with the best of maintenance practices, cuts will still be a source of tire trouble. The correct procedure for handling and repairing tires should be given careful attention. Close inspection of all tires should be made at the time of inflation check, and all tires having cuts that penetrate into the cord body should be taken off for proper repair.

Failure to make regular inspections and repairs, when needed, will result in further deterioration of the cord body and eventually a blowout. Small rocks and dirt will get into shallow cuts in the tread and if neglected will gradually be pounded through the cord body.

One simple method to forestall this action is to clean out the cut with an awl or similar tool to remove any stones or other matter which may be lodged in the cut. Use a sharp, narrow-bladed knife and cut away the rubber around the cut to form a cone-shaped cavity extending to the bottom of the injury. The sides of the cavity should be slanted enough to prevent stones from

TIRE MAINTENANCE (CONTINUED):

wedging into it. Tires with cuts treated in this manner may be continued in service without danger of further growth of these injuries. If a tire has at least one deep cut that requires a repair, then all smaller cuts may be quickly and economically repaired and vulcanized by the steam kettle method.

WARNING

IT IS NOT RECOMMENDED THAT TIRES WITH BREAKS BE USED AGAIN.

If uneven tire wear is evident, wheel alignment should be checked.

TIRE INFLATION:

Before inflating tires, make certain all wheel nuts are tightened to proper torque (see Specifications).

WARNING

IN ALL CASES, WHEN REMOVING TIRES WITH SPLIT RIMS FROM THE MACHINE FOR REPAIR OR PERIODIC ROTATION, COMPLETELY DEFLATE TIRES. THIS IS ACCOMPLISHED BY REMOVING THE VALVE CORE.

WARNING

IN ALL CASES, WHEN REMOVING TIRES EQUIPPED WITH THE LOCK RING TYPE RIM FROM THE MACHINE FOR REPAIR OR PERIODIC ROTATION, COMPLETELY DEFLATE TIRES. THIS IS ACCOMPLISHED BY REMOVING THE VALVE CORE.

WARNING

WHEN REPAIRING TIRES USED ON MACHINES THAT EMPLOY THE LOCK RING TYPE RIM, USE CAUTION WHEN INFLATING TIRE, PROCEED AS FOLLOWS:

1. After positioning lock ring on rim, turn wheel and rim assembly over so that lock ring is on side toward ground.

2. Inflate tire to 5 to 10 pounds.

3. Turn rim over and tap lock ring carefully with a mallet to be sure it is properly seated.

4. If you have access to a steel cage...use it, (see next page)...otherwise turn rim and wheel over once again so that lock ring is on the bottom and inflate tire to proper pressure.

WARNING

IF LOCK RING IS NOT LOCATED PROPERLY, IT IS POSSIBLE FOR IT TO POP OFF RIM WITH GREAT FORCE WHEN TIRE IS INFLATED AND COULD RESULT IN SERIOUS INJURY TO ANYONE STRUCK BY IT.

On machines using split rims, make periodic checks for noises in the wheel, as it is possible for damage to occur to the wheel bolts if they are not securely tightened when tires are changed. If the wheel bolts are loose or have been sheared off as a result of being loose, a grinding or scraping noise will be present when wheels are turned. Should this condition exist, it will be necessary to immediately remove the rim and tire from the machine and determine the cause of noise and repair or replace defective parts.

NOTE

Refer to WARNING on deflation of tires before removing wheels from machine.

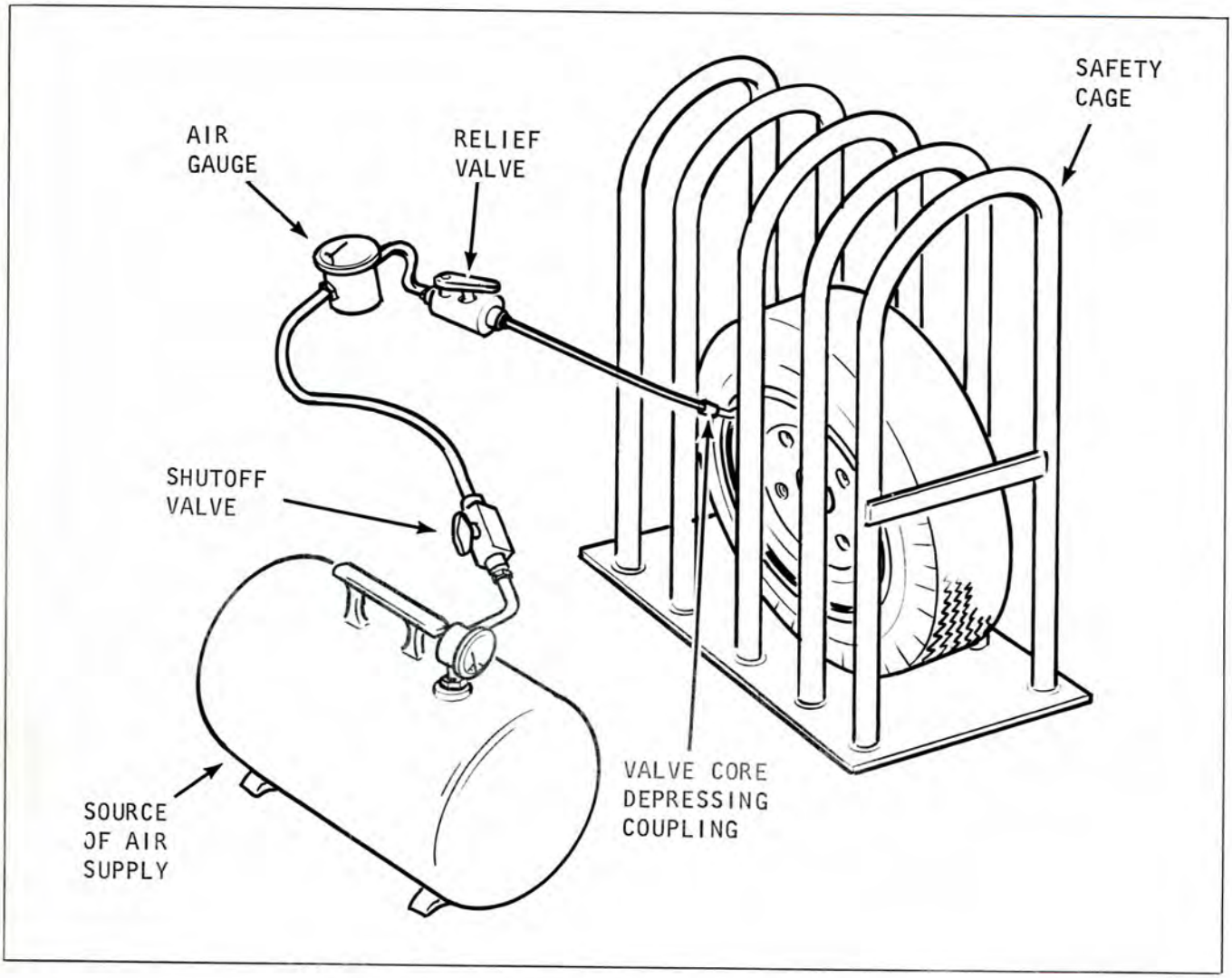


Plate 9702. Typical Tire Inflation Procedure

Torque wheel stud nuts or wheel bolts to the values listed in specifications. Excessive torque of wheel nuts can cause stud and rim damage.

Any replacement parts used should be of a quality equal to that provided in the original manufacture.

Inflation

```
x x x x x x x x x x x x x x x x x x x x x x x x x
x                                               x
x                    C A U T I O N              x
x                                               x
x  ALL FASTENERS SHOULD BE PROPERLY INSTALLED   x
x                                               x
x  BEFORE INFLATING WHEEL/TIRE ASSEMBLY.        x
x                                               x
x x x x x x x x x x x x x x x x x x x x x x x x x
```

Tires with split wheels should be inflated in a safety cage or when properly installed on the vehicle. In either case, make sure all nuts and bolts are properly installed and torqued according to specifications.

```
x x x x x x x x x x x x x x x x x x x x x x x x x
x                                               x
x                    C A U T I O N              x
x                                               x
x  USE ONLY AN APPROVED SAFETY CAGE DESIGNED    x
x                                               x
x  FOR THIS PURPOSE.                            x
x                                               x
x x x x x x x x x x x x x x x x x x x x x x x x x
```

Tires used on lock-ring type wheels should be inflated in a safety cage (see previous caution) or use a clip-on type air chuck and stand aside (in-line with the tire tread) during inflation. Insure that rings are properly

Plate 7613. Typical Split Wheel

seated prior to inflation. An inflated tire contains potentially explosive energy that can blow rings loose.

All wheel/tire assemblies should be inflated in a safety cage. The air hose should have a special set-up as shown in Plate 9702. The hose should have an adapter so that it can be securely fastened to the valve stem. Using this set-up you would:

1. Attach air hose to valve stem.

2. Open shut-off valve allowing compressed air to enter tube.

3. Shut off air supply occasionally to check pressure in tube at air gauge.

4. Inflate to proper capacity. If pressure exceeds proper inflation capacity, depress the relief valve to release excess air pressure.

5. This alternating procedure is followed until proper inflation is reached. See specifications.

I M P O R T A N T

MAINTAIN UNIFORM INFLATION IN BOTH TIRES OF A DUAL ASSEMBLY SO THAT WEIGHT IS EQUALLY SUSTAINED.

NEVER RE-INFLATE A TIRE THAT HAS GONE FLAT WITHOUT FIRST INSPECTING IT AND THE WHEEL ASSEMBLY.

The tire inflation arrangement as shown in Plate 9702 can be made up from local suppliers.

Parts can be ordered from the following suppliers:

Relief Valve - Model 250V-1/4"

Humphrey Products
P.O. Box 2008
Kilgore at Sprinkle Rd.
Kalamazoo, Mich.

Shut-Off Valve - Imperial #77E(1/4 to 1/4 1 PT)

Kendall Industrial Supplies, Inc.
702 N. 20th St.
Battle Creek, Mich. 49016

Air Gauge - Marshaltown #23 (160 lb, 1/4 1 PT, 2 1/2" diameter gauge)

Kendall Industrial Supplies, Inc.
702 N. 20th St.
Battle Creek, Mich. 49016

Safety Cage

Meyers Tire Supplies
6400 Epworth Blvd.
Detroit, Mich.

DIRECTIONAL TREAD TIRES

All directional tread tires are to be mounted in the correct position with respect to the arrow cast on the side of the tire as explained and illustrated below.

Directional Tread Dual Tires:

1. Inside dual tire arrow to point in the direction of foward rotation, see Plate 6422.

   (Rotate wheel to bring arrow on tire above the wheel. Arrow must point toward front of truck.)

2. Outside dual tire arrow to point in the direction of rearward rotation, see Plate 6423.

   (Rotate wheel to bring arrow on tire above the wheel. Arrow must point toward rear of truck.)

Directional Tread Single Drive Tires:

1. Tire arrow to point in the direction of forward rotation, see Plate 6422.

   (Rotate wheel to bring arrow on tire above the wheel. Arrow must point toward front of truck, see Plate 6422.

Plate 6422. Inside Dual Tire
(or Single Drive Tire)
(Arrow to point toward front of truck)

Plate 6423. Outside Dual Tire
(Arrow to point toward
rear of truck)

SOLID OR CUSHION TIRE AND RIM MAINTENANCE

1. Inspect tires regularly - remove all sharp objects picked up by treads before they have a chance to cut further into the rubber and cause chipping or possible separation of the rubber from the base metal.

2. Avoid overloading and do not allow vehicle to stand under heavy loads for prolonged periods as this will cause a "flat" spot on the tires.

3. Check steering axle alignment regularly to protect against fast, irregular tread wear and separation.

4. If rubber tires come in contact with oils, grease, and gasoline they should be wiped off without delay.

5. Regular lubrication of all wheel bearings will assure free-rolling and elimination of tire drag when stopping or starting.

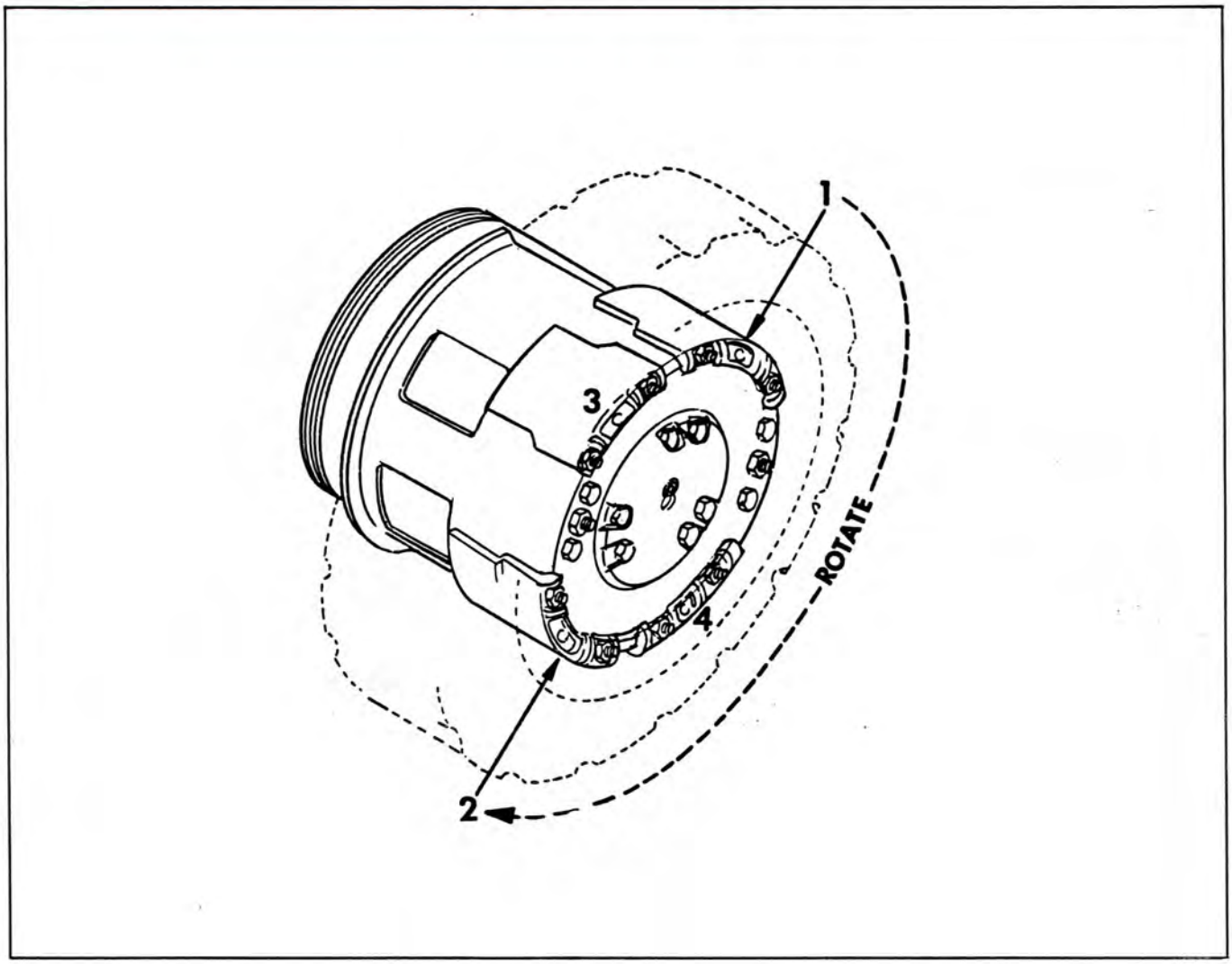


Fig. 15727

DRIVE WHEEL CLAMP NUTS:

Torque 105 to 120 lb. ft.

These clamp nuts must be torqued:

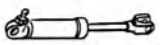
1. At installation.
2. After the first two hours of operation.
3. After eight operating hours.
4. Then every 200 operating hours, thereafter.

I M P O R T A N T

The following sequence must be adhered to:

1. Place clamp #1 on TOP.
2. Tighten nuts (#1) until SNUG.
3. Rotate wheel 180 degrees ... tighten nuts #2.
4. Rotate wheel for clamp nuts #3 & #4.
5. Then TORQUE nuts ... following the same sequence.

100 HOUR INDEX



TILT CYLINDERS:
CHECK CONDITION...
PAGE 100H 403.

HYDRAULIC VALVE/LINES:
CHECK CONDITION...
PAGE 100H 403.

LIFT CYLINDER:
CHECK CONDITION...
PAGE 100H 403.

LIFT CHAINS:
CHECK ADJUSTMENT...
1000H 403/703.

FUEL TANK/LINES:
CHECK CONDITION...
PAGE 100H 001.

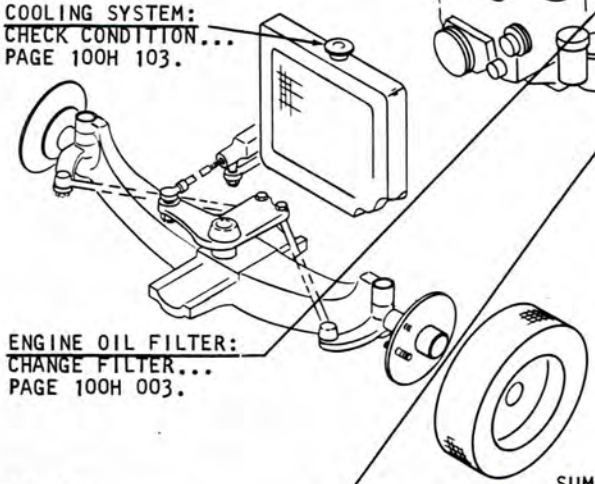
BRAKE SYSTEM:
CHECK CONDITION...
PAGE 100H 303.

CRANKCASE BREATHER:
CHECK CONDITION...
PAGE 100H 003.

ENGINE CRANKCASE:
DRAIN AND REFILL...
PAGE 100H 003.

DRIVE BELTS:
CHECK ADJUSTMENT...
PAGE 100H 203.

COOLING SYSTEM:
CHECK CONDITION...
PAGE 100H 103.



LIFT CARRIAGE:
INSPECT CONDITION...
PAGE 100H 403.

PEDAL FREE TRAVEL:
CHECK ADJUSTMENT...
PAGE 100H 302.

TRANSMISSION:
CHECK FLUID LEVEL...
PAGE 100H 001.

ENGINE OIL FILTER:
CHANGE FILTER...
PAGE 100H 003.

SUMP TANK BREATHER:
CHECK CONDITION...
PAGE 100H 503.

BATTERY:
CHECK CONDITION...
PAGE 1000H 603.

NOTE

IN ADDITION TO THE ABOVE, PERFORM THE 8 HOUR PREVENTIVE MAINTENANCE SERVICES.

LUBRICATION AND PREVENTIVE MAINTENANCE PICTORIAL INDEX. 100 HOUR.

HYDRATORK TRANSMISSION LEVEL CHECK:

Verify fluid level with engine operating and transmission in neutral. The combination dipstick and filler pipe is located on the right side of the transmission and may be reached through the floorboard opening.

Fill if necessary with the lubricant as outlined in the lubrication section.

Fill through the combination filler and dipstick opening. Fill to Full mark on dipstick if transmission fluid is at normal operating temperatures.

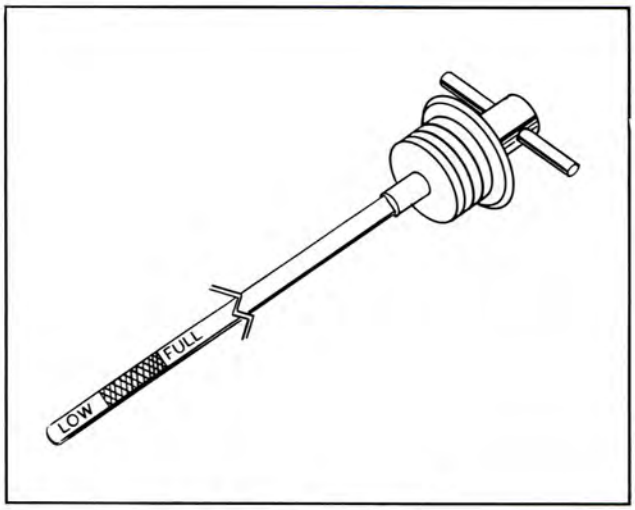


Plate 9739. Typical
Transmission Dipstick

DIFFERENTIAL BREATHER:

Check breather to be sure it is free of obstruction....remove and clean in a Stoddard type cleaning solvent if necessary. Dry breather with compressed air before replacing it on differential.

DIFFERENTIAL:

Remove fill/level plug and verify differential lubricant level. Level should be maintained to the height of the plug opening. See Plate 7336. If lubricant level is not as specified, fill with the lubricant as outlined in the lubrication section. Do not fill above the level of the filler plug opening.

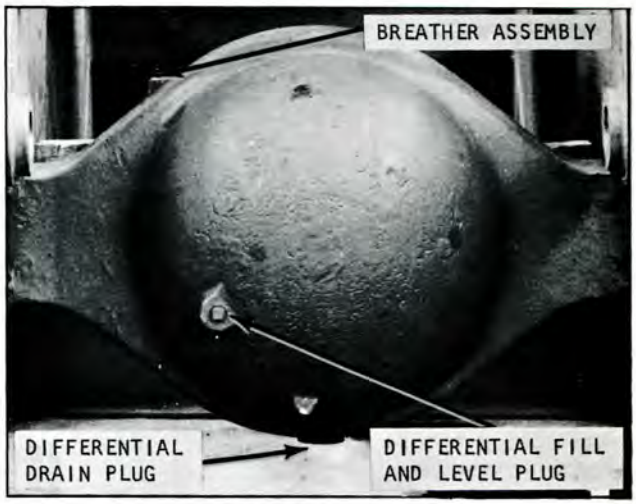


Plate 7336. Typical Differential
Drain and Fill Plugs

```
x x x x x x x x x x x x x x x x x x x x x x x x x x x
x                                                     x
x                     W A R N I N G                   x
x                                                     x
x  THE FUEL TANK IS AN INTEGRAL PART OF THE           x
x                                                     x
x  MACHINE FRAME AND ANY WELDING IN THIS AREA         x
x                                                     x
x  SHALL NOT BE ATTEMPTED BEFORE FIRST TAKING         x
x                                                     x
x  ADEQUATE SAFETY PRECAUTIONS.  REPORT TO            x
x                                                     x
x  DESIGNATED PERSON IN AUTHORITY.                    x
x                                                     x
x x x x x x x x x x x x x x x x x x x x x x x x x x x
```

FUEL LINES:

Make certain that fuel line connections are secure. Check fuel lines for obstructions and leaks. Check screen in fuel filler cap to make certain that it is properly installed and not damaged.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

CLARK EQUIPMENT

CAUTION

USE OF
INCORRECT FILTER
MAY DAMAGE
YOUR ENGINE

1147-Z FEB 72

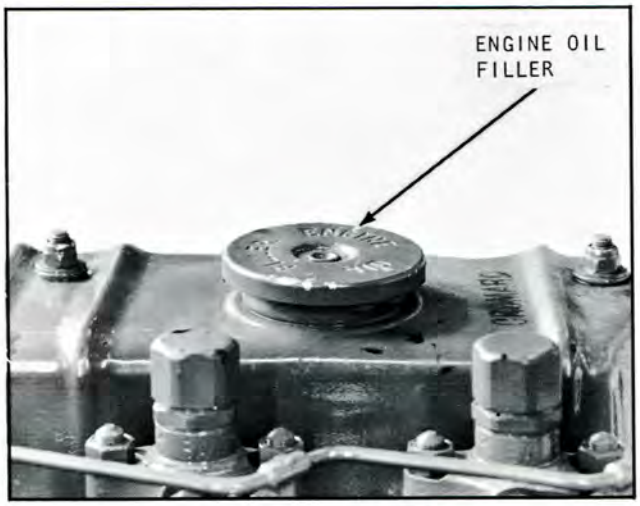


Plate 11047. Typical Crankcase Fill

ENGINE CRANKCASE:

1. Every 100 operating hours; drain the engine crankcase at operating temperature and clean the magnetic drain plug.

2. Change the engine oil filter element.

3. Refill crankcase using recommended oil listed below. (USE YOUR DIPSTICK --- for capacity see specifications.
   SAE 10W---0 deg to 32 deg F
   SAE 20W---33 deg to 75 deg F
   SAE 30---Above 75 deg F

4. Start engine and check oil filter for leaks at cover. Run engine at idle a few minutes, then shut down engine. Allow time for engine oil to return to crankcase (approx. 5 min.) and then check oil level with the dipstick. Add oil as necessary to bring oil level to full mark on the dipstick.

SERVICE CONDITIONS:

Oil performance will reflect engine load, temperature, fuel quality, atmospheric dirt, moisture and maintenance. Where oil performance problems arise or are anticipated, the oil supplier should be consulted. When extended drain periods are contemplated, his analysis or that of a reputable laboratory should determine the suitability of oil for further service.

Plate 6458. Radiator Pressure Cap

W A R N I N G

USE EXTREME CARE IN REMOVING THE RADIATOR PRESSURE CAP. IN PRESSURE SYSTEMS, THE SUDDEN RELEASE OF PRESSURE CAN CAUSE A STEAM FLASH AND THE FLASH, OR THE LOOSENED CAP CAN CAUSE SERIOUS PERSONAL INJURY. LOOSEN CAP SLOWLY AND ALLOW STEAM TO ESCAPE.

I M P O R T A N T

ALWAYS CHECK THE COOLANT LEVEL WITH THE ENGINE SHUT DOWN.

<u>COOLING SYSTEM</u>:

Check radiator, hoses and water pump for leaks.

Add proper amount of water or anti-freeze solution to cooling system. If anti-freeze is not available and machine is to be at rest for an appreciable length of time, drain system when temperature is likely to be 32 deg F., or lower. If water is added to radiator containing anti-freeze solution, always test solution in radiator with a hydrometer to determine the degree of protection. For proper amount of anti-freeze solution required to protect the cooling system, refer to instructions on anti-freeze container.

N O T E

Cooling system capacity - refer to specifications.

Accumulated foreign material should be blown from radiator fins with compressed air. Direct air stream through radiator fins towards engine to make this process effective.

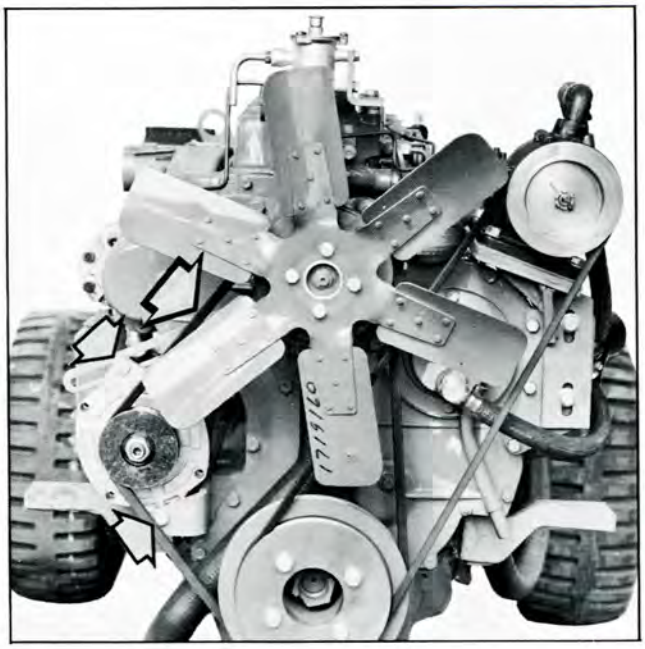


Plate 11013. Typical
Drive Belt Adjustment

FAN AND DRIVE BELT ADJUSTMENT:

The drive belt should have a specific finger pressure deflection midway on the long span. (See specifications.)

x x x x x x x x x x x x x x x x x x x x x x x x x
x x
x WARNING x
x x
x CHECK FAN BELT DEFLECTION WITH ENGINE OFF. x
x x
x x x x x x x x x x x x x x x x x x x x x x x x x

C A U T I O N

IF THE FAN CAN BE ROTATED EASILY WITH A FINGER PULLING ON THE FAN BLADES, THE BELT IS TOO LOOSE AND MUST BE ADJUSTED.

If the belt requires adjustment, use the following procedure:

1. Loosen the alternator brace adjusting bolt and the two lower mounting bolts.

2. Move alternator toward cylinder block to loosen drive belt and away from cylinder block to tighten belt. Tighten bolts when correct finger deflection is obtained.

C A U T I O N

WHEN TIGHTENING BELT TENSION, APPLY PRESSURE AGAINST THE STATOR LAMINATIONS BETWEEN THE END FRAMES AND NOT AGAINST EITHER END FRAME. WHEN ADJUSTING FOR DEFLECTION, PULL ALTERNATOR BY HAND. DO NOT USE A PRY BAR. EXERCISE CAUTION WHEN ADJUSTING BELTS. BELTS ADJUSTED TOO TIGHT WILL VERY LIKELY CAUSE BEARING DAMAGE. CONVERSELY, BELTS ADJUSTED TOO LOOSE WILL RESULT IN BELT WEAR AND HIGH ENGINE TEMPERATURE DUE TO BELT SLIPPAGE.

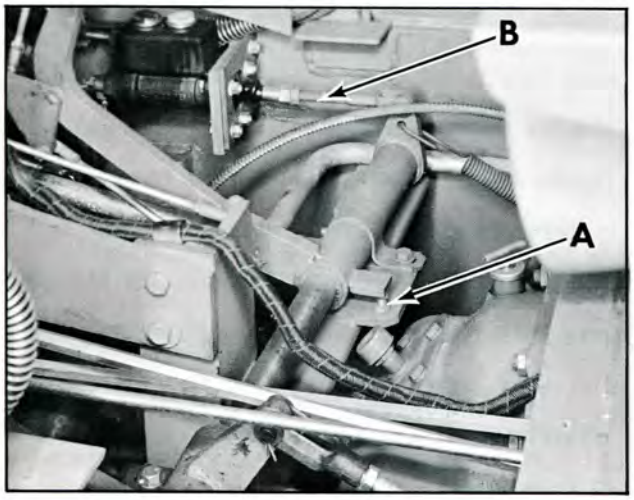


Plate 11519. Typical Brake Pedal Adjustment

BRAKE PEDAL ADJUSTMENT:

Upheight Adjustment:

Always adjust pedal travel before adjusting free travel. Adjust pedal travel (at stop bolt A) so that you get maximium pedal travel just short of pedal arm hitting floor plate.

Free Travel Adjustment:

Now adjust free travel (at point B) 3/16 to 1/2 inches. Check free travel by placing a ruler beside pedal (letting it rest on the floor plate) and push pedal down by hand until resistance is felt from the master cylinder.

Actuation Stroke:

If brake pedal travels beyond low limit, this could indicate; lack of fluid, air in the system, or brakes needing adjustment.

```
x x x x x x x x x x x x x x x x x x x x x x x x x
x                                               x
x                  W A R N I N G                x
x                                               x
x  CORRECT BRAKE ADJUSTMENT IS IMPORTANT FOR    x
x                                               x
x  SAFE OPERATING BRAKES.                       x
x                                               x
x x x x x x x x x x x x x x x x x x x x x x x x x
```

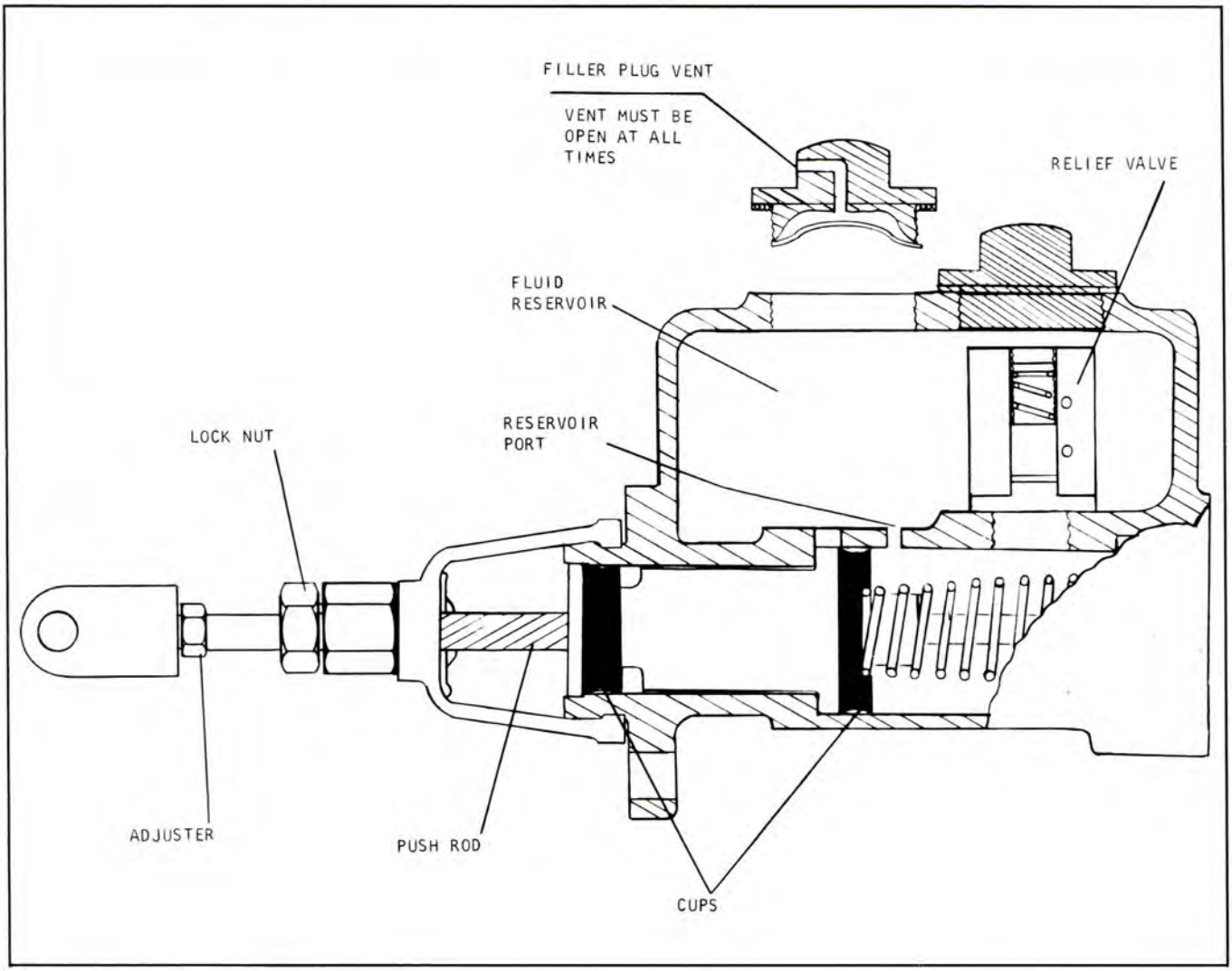


Plate 7339. Typical Brake Pedal Adjustment

BRAKE SYSTEM:

Check brake fluid level in the master cylinder. Brake fluid should be within 1/4 inch of the top. Fill with the fluid stated in the lubrication section.

Master Cylinder Filler Cap Vent Hole:

Check cap vent hole for obstruction. Vent hole must be open at all times. Clean if necessary. See Plate 7339.

```
x x x x x x x x x x x x x x x x x x x x x x x x x x x
x                                                     x
x                       W A R N I N G                 x
x                                                     x
x  CORRECT BRAKE PEDAL FREE TRAVEL IS IMPOR-          x
x                                                     x
x  TANT FOR SAFE OPERATING BRAKES.                    x
x                                                     x
x x x x x x x x x x x x x x x x x x x x x x x x x x x
```

LIFT AND TILT CYLINDERS

Check for drift, leakage at packings, damage and security of mountings. (Anchor pivot pins, flanges and mounting rings.)

LIFT CHAINS

The lift chains are mounted to the chain anchors on the lift carriage and at the chain anchor rods near the lift cylinder piston head.

If it becomes necessary to adjust the lift chains, proceed as follows:

X X X X X X X X X X X X X X X X X X X X X X X X

WARNING

KEEP CLEAR OF LOAD AND CARRIAGE WHEN MAKING ADJUSTMENTS TO AVOID INJURY IF ANY MALFUNCTION SHOULD OCCUR AND CAUSE LOAD OR CARRIAGE TO FALL.

X X X X X X X X X X X X X X X X X X X X X X X X

1. Elevate carriage to about 4 feet.

2. Smear grease on the innerslide channel as shown in Plate 8622.

3. Pick up a capacity load.

NOTE

It is important that the chain adjustment be made with a capacity load. In this manner you will allow for chain stretch.

4. Making sure upright is either vertical or aft of vertical, lower load to the bottom.

5. Remove capacity load.

6. Raise carriage and measure the distance from where the center of the <u>bottom carriage roller</u> stopped, to the bottom edge of the inner slide. Distance must not be less than 1/2".

LUBRICATE MACHINE

Lubricate all miscellaneous linkage with SAE 20 oil and all grease fittings with chassis grease. (Refer to Lubrication Chart.)

CAUTION

WHEN LUBRICATING MACHINE INSPECT FOR LEAKING HYDRAULIC LINES, FITTINGS, AND ELECTRICAL WIRING.

HYDRAULIC CONTROL VALVE AND LINES

Inspect for damage, leakage and security of mounting.

LIFT BRACKET

Inspect for damage, bent forks, etc.

Plate 6634. Lift Chain Adjustment (Chain Anchor Rods)

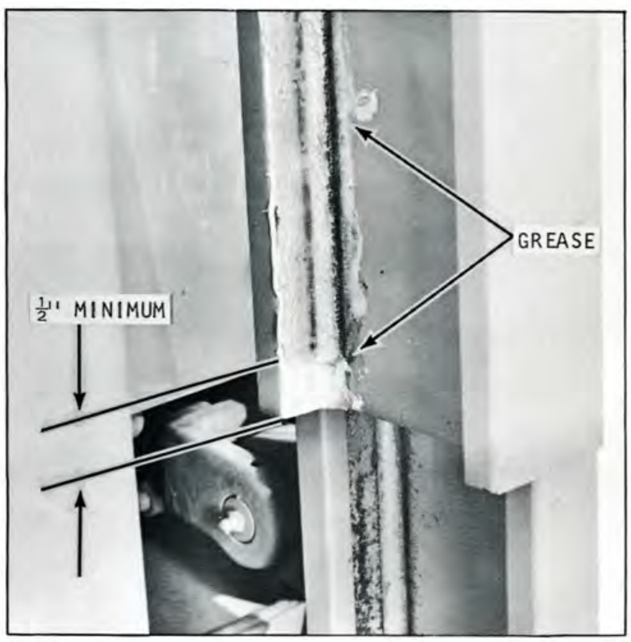


Plate 8622. Lift Chain Adjustment

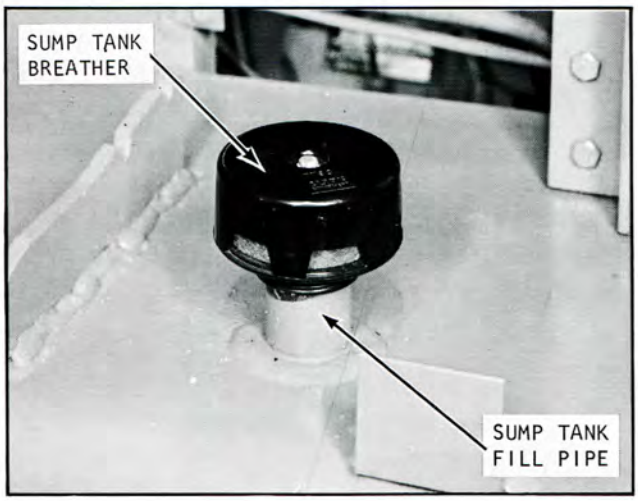


Plate 11518. Typical Hydraulic
Sump Tank Breather

HYDRAULIC SUMP TANK BREATHER:

Check breather to be sure it not dirty or clogged with foreign matter. Replace breather if dirty.

BATTERY INSPECTION

Remove all caps and check fluid level. Keep the fluid in each battery cell above the plates or up to the level ring in the bottom of the filler well. Use only pure distilled water. If the machine is exposed to freezing temperatures, operate the engine for a period of time to make sure the added water mixes thoroughly with the battery electrolyte solution. Otherwise, the water may freeze and damage the battery.

X X X X X X X X X X X X X X X X X X X X X X X X
X X
X W A R N I N G X
X X
X NEVER ALLOW FLAME OR SPARKS NEAR THE X
X X
X BATTERY FILLER HOLES BECAUSE EXPLOSIVE X
X X
X HYDROGEN GAS MAY BE PRESENT. X
X X
X X X X X X X X X X X X X X X X X X X X X X X X

Take hydrometer reading of electrolyte to determine state of charge. Charge battery if reading is below 1.225 at 24 deg. C (75 deg. F), or below 1.265, if machine is exposed to freezing temperatures. If machine is operating in tropical areas in which freezing weather is not encountered, the full charge specific gravity reading may be lowered from 1.375 to 1.225 by diluting the electrolyte with distilled water.

N O T E

Add distilled water before charging. Do not add distilled water immediately after a charge.

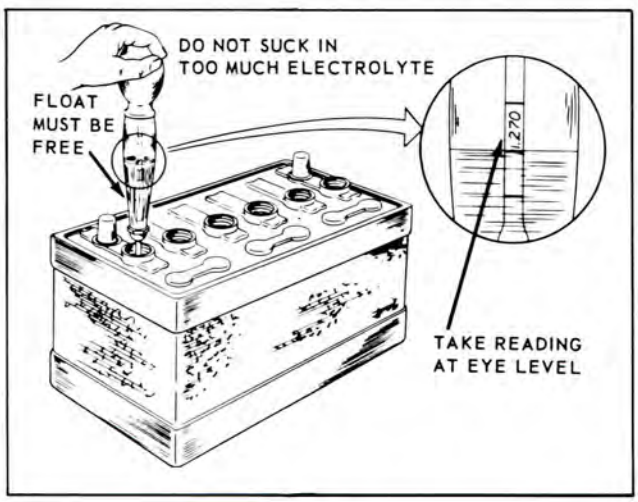


Plate 6271. Checking
Specific Gravity of Battery

Make sure that all connections are tight at battery, starter, generator voltage regulator, distributor and spark plugs. Corrosion can be removed from the battery cables and terminals with a solution of baking soda or ammonia and water. After cleaning, flush the top of the battery with clean water, and coat the parts with grease to retard further corrosion.

BATTERY TEST PROCEDURE

A defective battery or a discharged battery may be found by performing the following "Light Load Test".

1. Place an electrical load on the battery by cranking the engine for three seconds. If it starts, turn the ignition off immediately.
2. Place a 10 ampere load across the battery terminals for one minute. This will condition the battery so an accurate voltage comparison test can be made between cells. (Turning two headlights on low beam will equal the 10 ampere load - this method may be used in place of the load placed across the terminals)

3. After one minute, and with the 10 ampere load still on the battery, check the individual cells with an expanded scale voltmeter.

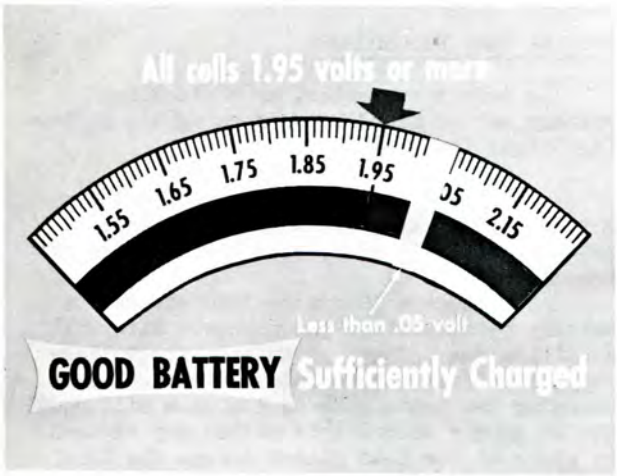


Plate 8306.

4. Place the positive voltmeter prod on the positive side of the cell and the other prod on the negative side. A good battery, sufficiently charged will read 1.95 volts or more on each cell with a difference of less than .05 volt between highest and lowest cell.

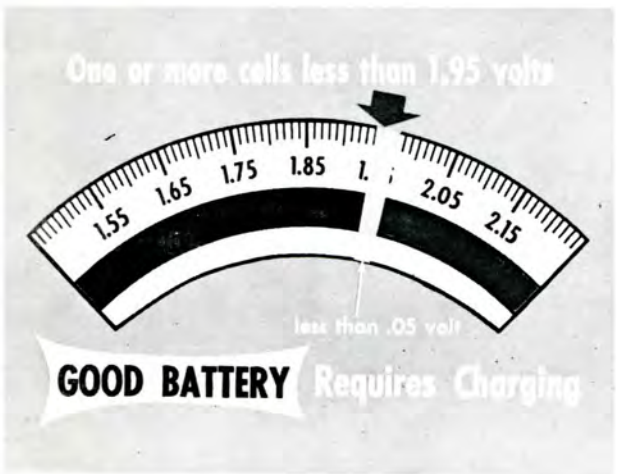


Plate 8307.

5. If cells read both above and below 1.95 volts and the difference between highest and lowest cell is less than .05 volt, battery is good but requires charging.

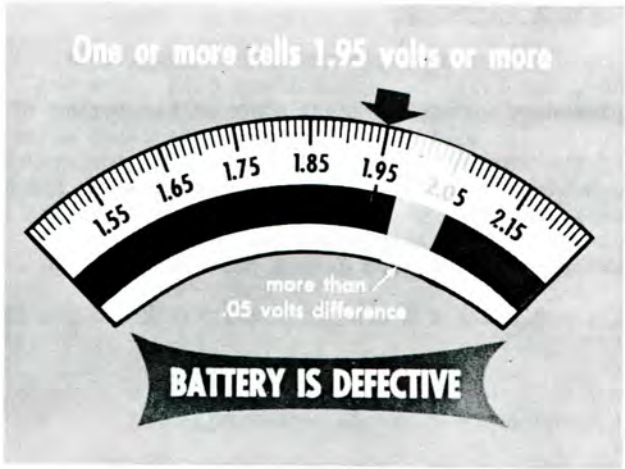


Plate 8308.

6. If any cell reads 1.95 volts or more and there is a difference of .05 volt or more between the highest and lowest cell, the battery is defective.

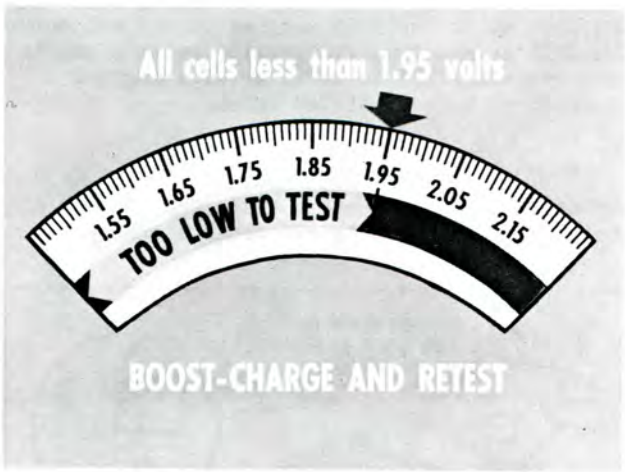
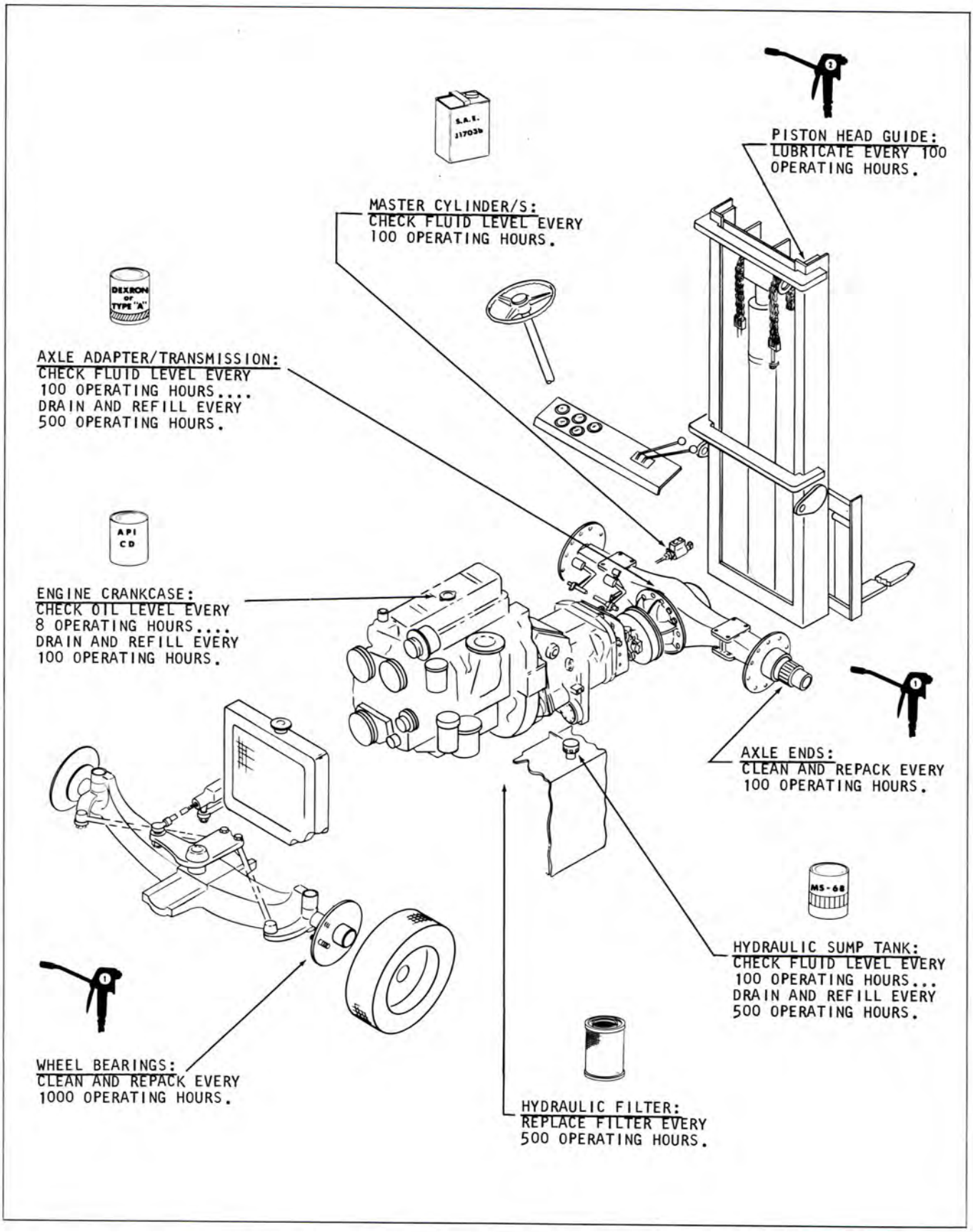


Plate 8309.

7. If all cells read less than 1.95 volts, battery is too low to test accurately. Boost-charge and repeat light load test.


S.A.E. J1703b
PISTON HEAD GUIDE:
LUBRICATE EVERY 100
OPERATING HOURS.
MASTER CYLINDER/S:
CHECK FLUID LEVEL EVERY
100 OPERATING HOURS.
DEXRON or TYPE "A"
AXLE ADAPTER/TRANSMISSION:
CHECK FLUID LEVEL EVERY
100 OPERATING HOURS....
DRAIN AND REFILL EVERY
500 OPERATING HOURS.
API CD
ENGINE CRANKCASE:
CHECK OIL LEVEL EVERY
8 OPERATING HOURS....
DRAIN AND REFILL EVERY
100 OPERATING HOURS.
AXLE ENDS:
CLEAN AND REPACK EVERY
100 OPERATING HOURS.
MS-68
HYDRAULIC SUMP TANK:
CHECK FLUID LEVEL EVERY
100 OPERATING HOURS...
DRAIN AND REFILL EVERY
500 OPERATING HOURS.
WHEEL BEARINGS:
CLEAN AND REPACK EVERY
1000 OPERATING HOURS.
HYDRAULIC FILTER:
REPLACE FILTER EVERY
500 OPERATING HOURS.

GENERAL:

Proper lubrication techniques, combined with a waterproof type grease, prevents corrosion of the sleeve and housing on steering boosters.

The proper lubrication techniques are explained in the following paragraphs.

LUBRICATION TECHNIQUES:

Recommended lubrication (greasing) techniques is to apply grease with ball stud in a vertical position.

This will place the grease nipple exactly 180 deg. opposite the ball stud. The lubrication access hole at the bottom of the sleeve will also be lined up with the grease nipple.

This will allow the grease to penetrate into the ball stud and ball seat area (primary lubrication area).

Grease should then be applied while moving the ball stud from side to side to lubricate between the sleeve and the housing (secondary lubrication area).

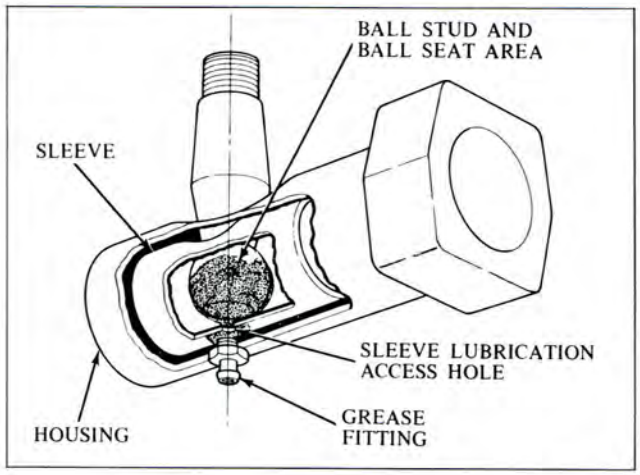
The following series of illustrations show how the grease should be properly dispersed in the ball joint area.

1. #11477 shows the ball stud in a vertical position which aligns the sleeve lubrication access hole directly opposite the grease nipple. This allows the grease to be adequately dispersed into the ball seat area (primary lubrication area) of the sleeve. Note that very little grease is dispersed between the sleeve and housing.

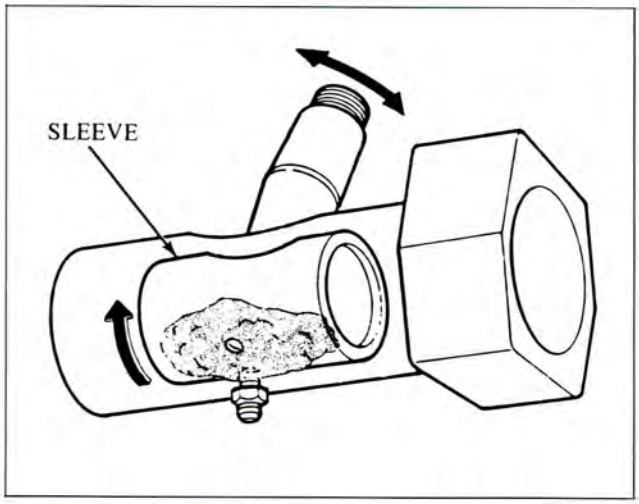
2. #11478 shows the grease properly dispersed around the O.D. of the sleeve. Apply grease when the sleeve is rotated and the grease fitting is not in line with the hole in the sleeve.

N O T E

Grease the control ball stud housing sparingly under low pressure through the grease fitting. Use a hand grease gun rather than a high pressure gun to avoid packing of grease which would hamper control valve movement. Housing must be at least 50% filled and all internal parts thoroughly coated.



#11477



#11478

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(A) ENGINE CRANKCASE OIL

FOR ... GASOLINE, L.P. GAS ENGINES AND NATURALLY ASPIRATED DIESEL ENGINES.

SPECIFICATION TO MEET API Service Classification "CC" and "SC" per SAE Report J183 and/or MIL-L-2104B* Sulfated ash content 1.00% weight maximum. Zinc content 0.06 to 0.10% weight maximum.

This specification includes oils meeting Specification MIL-L-46152 when applicable. Also, API Service "SC"/"SD" (Formerly "MS") oils may be preferred under stop-and-go or light service conditions.

*Although Specification MIL-L-2104B has recently been superceded, oils of this quality will continue to be available.

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

Chevron RPM DELO Multi-Service Oil
Shell X-100 or Rotella, Rotella T
Sunfleet H.P. Motor Oil
ARCO Fleet X.H.D. Motor Oil
or ARCO Fleet H.D.
Gulflube Motor Oil X.H.D.
Citgo C300 Motor Oil
AMOCO 200 Motor Oil
Texaco Havoline
or URSA Extra Duty Motor Oil
Mobil Delvac 1100B
or 1200 Series Motor Oil
...or the equivalent to the above.

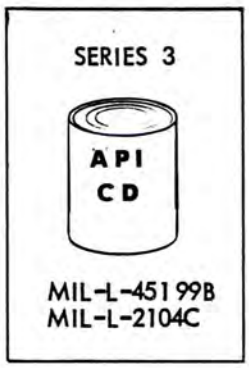
OILS FORMULATED FOR L.P.G. ENGINES

Cito L.P. Gas Engine Oil
Chevron Gas Engine Oil HDAX

(B) ENGINE CRANKCASE OIL (cont.)

FOR ... TURBOCHARGED DIESEL ENGINES or DIESEL ENGINES USING HIGH SULFUR CONTENT FUEL (OVER 0.5% SULFUR).

SPECIFICATION TO MEET API Service Classification "CD" per SAE Report J183 and equivalent Series 3 and/or MIL-L-45199B specifications. Also MIL-L-2104C when applicable. Sulfated ash content 1.65% maximum.



Chevron DELO Super 3 Oil
Shell Rimula Motor Oil
Sunfleet S-3 Motor Oil
ARCO Fleet MS-3 Motor Oil
Gulf Super Duty Motor Oil
AMOCO 300 Motor Oil
Citgo C-500 Motor Oil
Texaco URSA LA-3 Motor Oil
Mobil Delvac 1300 Series Motor Oil
...or the equivalent to the above.

FOR ALL OPERATIONS WITHIN NOMINAL TEMPERATURE RANGES, THE USE OF SINGLE-GRADED OILS IS RECOMMENDED...AS LISTED BELOW.

SAE 10W	...	0 deg -to- 32 deg F.
SAE 20/20W	...	33 deg -to- 75 deg F.
SAE 30	...	above 75 deg F.

SAE #30 OIL OF MIL-L-2104B PERFORMANCE LEVEL IS RECOMMENDED FOR YEAR AROUND USE IN DETROIT DIESEL ENGINES...(Limitations - Zinc . 0.10% maximum, sulfated ash 1.0% maximum.). The use of Multi-grade oils in Detroit Diesel engines is not recommended.

Oil Change Intervals ... a helpful guide in determing the intervals is an engine oil analysis made several different times. Local oil distributors offer this service. And by using it you can set P.M. intervals with greater certainty.

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(A/B) ENGINE CRANKCASE OIL

FOR ... MISCELLANEOUS LINKAGE

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

(C) TRANSMISSION LUBRICANT

FOR ... STANDARD MANUAL SHIFT (SYNCHROMESH) TRANSMISSIONS AND GEAR BOXES.

SPECIFICATION Regular type gear lubricant of straight mineral gear oil for API GL-1 Service per SAE Report J308a. ("EP" lubricants are not approved.)

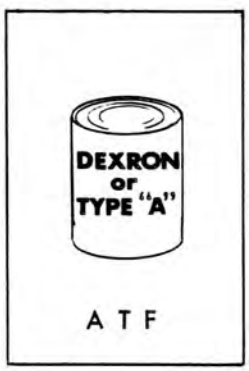
ABOVE 0 deg F. - SAE #90
BELOW 0 deg F. - SAE #80

Chevron RPM Gear Oil
Shell Dentax 90 Gear Oil
Sunoco Gear Oil
ARCO Mineral Gear Oil
Gulf Transmission Oil
AMOCO Gear Lubricant
Citgo Regular Gear Oil
Texaco Thuban 90
Mobilube C Gear Oil
Molub-Alloy Trans., Gear Lube
...or the equivalent to the above.

(D) TRANSMISSION FLUID

FOR ...
...POWRSHIFT FORWARD & REVERSE UNIT
...POWRWORKER HYDRAULIC SYSTEMS
...POWER STEERING RESERVOIRS
...POWRSHIFT TRANSMISSIONS
...HYDRACOOL (WET) CLUTCH TRANS.
...HYDRATORK TRANSMISSION
...AUTOMATIC TRANSMISSION
...FLUID COUPLING DRIVES
...TORQUE CONVERTERS
...ELECTRIC TRUCK DRIVE UNITS*
...(WHEN SPECIFIED ON LUBE CHARTS*)
...NARROW AISLE TRUCK HYDRAULIC SYS.

SPECIFICATION USE DEXRON AUTOMATIC TRANSMISSION FLUID or Type "A", Suffix "A" ATF (AQA-Armour Qualified) as available.



Shell Auto. Trans. Fluid Donax T-6, Dexron.
Sunoco Auto. Trans. Fluid, Dexron.
ARCO Auto. Trans. Fluid, Dexron.
Gulf Auto. Trans. Fluid, Dexron.
Mobil Auto. Trans. Fluid 220 Dexron.
Texaco 1859 Texamatic Fluid, Dexron.
Citgo Auto. Trans. Fluid, Dexron.
AMOCO Auto. Trans. Fluid, Dexron.
...or the equivalent to the above.

- continued -

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

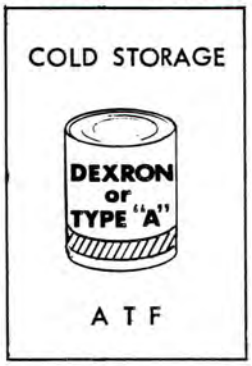
LUBRICATION CHART KEY

(D) TRANS. FLUID - continued - DRIVE UNIT FLUID

FOR ... -COLD STORAGE OPERATION-

FOR ... DRIVE UNIT(S)
NARROW AISLE TRUCKS
POWRWORKERS
ELECTRIC RIDER TRUCKS

SPECIFICATIONS Refer to Specifications listed under Item "D" on the previous page.



TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

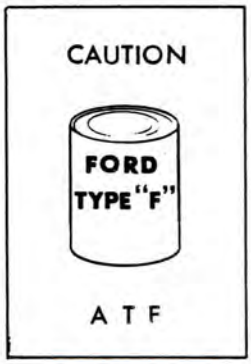
Refer to the previous page under Item "D".

(E) TRANSMISSION FLUID - FORD

FOR ... ALL FORD AUTOMATIC TRANSMISSIONS AND CONVERTERS.

SPECIFICATIONS Automatic Trans., Fluid, Type "F", which meets FORD MOTOR COMPANY Specification:

M2C33E (UNDYED) -or-
M2C33F (RED DYED)



Shell Auto. Trans. Fluid Donax T-7, Type "F".
Sunoco Auto. Trans. Fluid, Type "F".
ARCO Auto. Trans. Fluid, Type "F".
Gulf Auto. Trans. Fluid, Type "F".
Citgo Auto. Trans. Fluid, Type "F".
Texaco 1876 Texamatic Fluid, Type "F".
Mobil Auto. Trans. Fluid 210, Type "F".
...or the equivalent to the above.

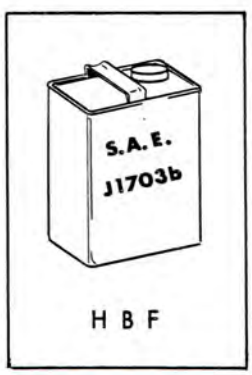
C A U T I O N

DEXRON AND TYPE "A" FLUIDS ARE NOT COMPATIBLE WITH TYPE "F" FLUIDS AND SHOULD NOT BE MIXED. DEXRON FLUID OR TYPE "A" FLUID SHOULD NOT BE USED IN THESE TRANSMISSIONS AND CONVERTERS ... (CTA "E" MODELS) ... TO DO SO WILL RUIN CLUTCH DISC FACINGS.

(F) HYDRAULIC BRAKE FLUID

FOR ... HYDRAULIC BRAKE SYSTEMS EXCEPT WHEN SPECIFIED DIFFERENTLY ON THE LUBRICATION CHART(S) AND NOT USED FOR COLD STORAGE.

SPECIFICATION Use only heavy-duty Hydraulic Brake Fluid which meets the requirements of SAE J1703b.



Shell Super Safety or Donax "B" Brake Fluid.
Gulf Super Heavy Duty Hydraulic Brake Fluid.
Atlas Heavy Duty Hydraulic Brake Fluid.
Texaco Super Heavy Duty Hydraulic Brake Fluid.
Mobil Hydraulic Brake Fluid.
ARCO Heavy Duty Brake Fluid.
Wagner 21B Hydraulic Brake Fluid.
Hollingshead 2665 Heavy Duty Brake Fluid.
...or the equivalent to the above.

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(F) HYDRAULIC BRAKE FLUID

FOR ... -COLD STORAGE OPERATION-

FOR ... ALL HYDRAULIC BRAKE SYSTEMS EXCEPT WHEN SPECIFIED DIFFERENTLY ON LUBRICATION CHART(S).

SPECIFICATION Use Fluid per CLARK Specification MS-92:

Recommended fluid: 85% by volume,
Isopropyl Alcohol: 15% by volume.

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

Extreme Low Temperature Hydraulic Brake Fluid:

Dow Chemical Company
(Pre-Blended
Clark Fluid Number 300)

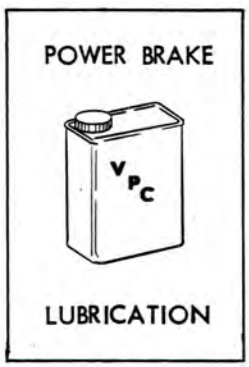
... Dow Chemical Fluid HD35-4
... Hollingshead Formula 2665

(G) POWER BRAKE VACUUM CYLINDER LUBRICANT

FOR ... BENDIX HYDROVAC UNIT

SPECIFICATION Bendix Vacuum Power Cylinder Oil or approved equivalent.

Apply after installation and periodic maintenance per instruction.



Bendix Vacuum Power Cyl Lubricant
Part No 377299(2 oz Tube)
Part No 377300(Quart Can)
Texaco Rabtex
AeroShell Fluid 4
...or the equivalent to the above.

(H) HYDRAULIC FLUID

FOR ... MAIN HYDRAULIC SYSTEMS EXCEPT WHEN SPECIFIED DIFFERENTLY ON THE LUBRICATION CHART(S).

SPECIFICATIONS Use only high quality hydraulic fluid with Zinc Anti-Wear Additive which meets Clark Specification MS-68.

Shell LO Hydrax 127
Sunvis Industrial Oil #816 WRP
Gulf Harmony 43 AW
AMOCO Industrial Oil RL #14A
Citgo Pacemaker XD-15 MS-68
Hydraulic Fluid.
Texaco 729 Rando Oil HD-A
ARCO Duro AW-16 or Duro AWS-150
Chevron EP Hydraulic Oil 9
Molub-Alloy Industrial Hydraulic
Oil #601.
...or the equivalent to the above.

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(H) -continued-

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

HYDRAULIC FLUID

FOR ... -COLD STORAGE OPERATION-

FOR ... MAIN HYDRAULIC SYSTEMS EXCEPT WHEN SPECIFIED DIFFERENTLY ON THE LUBRICATION CHART(S).

SPECIFICATIONS Use Hydraulic Fluid which meets MIL-H-5606A per CLARK Specification MS-226.

A petroleum base hydraulic fluid with additives to improve viscosity index, oxidation resistance, and anti-wear characteristics blended to form a stable product under storage and operational conditions between -65 and +160 deg. F. meeting MIL-H-5606A* per CLARK Specifications MS-226.

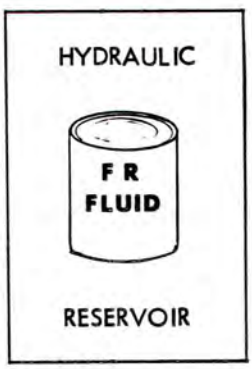
*The restrictive cleanliness specifications of later revisions is not required.

Shell Product #60421
AeroShell Hydraulic Fluid 4
...or the equivalent to the above.

HYDRAULIC FIRE RESISTANT FLUID

FOR ... SPECIAL APPLICATIONS

FOR ... MAIN HYDRAULIC SYSTEMS EXCEPT WHEN SPECIFIED DIFFERENTLY ON THE LUBRICATION CHART(S).



SPECIFICATIONS High quality Water-Glycol Fire Resistant Hydraulic Fluid composed of approximately 42% water and 58% glycol with a nominal viscosity of 200 SUS at 100F. Pour point -60 deg. F min. To contain proper additive balance to impart optimum stability, lubricity, wear and corrosion protection. Approved by Factory Mutual Insurance Underwriters.

Citgo Pacemaker Glycol - FR Fluid, Grade 20.
Houghto-Safe 620
Texaco Hydraulic Safety Fluid 200
...or the equivalent to the above.

NOTE

For data pertaining to the "testing" of Water-Glycol ... refer to the last page of this KEY.

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(J) DRIVE AXLE GEAR LUBRICANT:

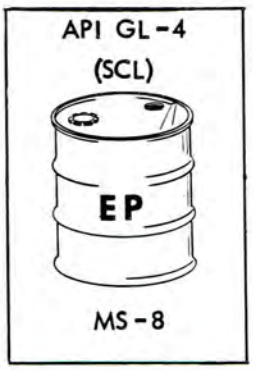
FOR: ... DRIVE AXLES,
HEAVY DUTY DIFFERENTIALS,
PLANETARY WHEEL ENDS.

SPECIFICATIONS: Extreme pressure type gear lubricant with sulfur-chlorine-lead (SCL) 'EP' additive for API GL-4 Service per SAE Report J308a. To meet CLARK Specification MS-8.

Below 0 to -10 de F -- SAE 80
Normal Temperature -- SAE 90
100 deg F and above -- SAE 140

NOTE

SAE 80 and SAE 140 viscosities, when used, should contain like additives as specified by MS-8 (SAE 90). DO NOT ADD (MIX) DIFFERENT TYPES OF LUBRICANT.



TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

Shell HDR Gear Oil 90 EP
Shell HDR Gear Oil 140 EP
Chevron RPM Special Gear Lube SCL
Sunoco XD Gear Lubricant
Gulf Hypoid Gear Lubricant A.P.T.
AMOCO Superla Gear Lubricant
Citgo Gear Oil Lead Base
Texaco Gear Lube HD 90
Molub-Alloy Drive Axle Lube #518
Mobilube 46
ELCO Gear Safety 28
...or the equivalent to the above.

(K) GENERAL PURPOSE GREASE:

FOR: ... CLARK AXLE ENDS
WHEEL BEARINGS
STEERING GEARS
JOINTS, LEVERS & BUSHINGS
POWRWORKER and NARROW AISLE TRUCKS - ALL POINTS

SPECIFICATIONS: NLGI #1 per MS-107B

GENERAL PURPOSE GREASE:

FOR: ... STEER AXLE TRUNNION BRGS.
UPRIGHT MAST ROLLERS & SLIDES.
UNIVERSAL JOINTS.
WATER PUMP BEARINGS.
GENERAL CHASSIS LUBRICATION.

SPECIFICATIONS: NLGI #2 per MS-107C

A multi-purpose grease of refined mineral oil blended with a lithium soap thickener or equal containing anti-wear, anti-rust and anti-oxidants with EP additives.

Clark Specification:
MS-107B - Grade No. 1
MS-107C - Grade No. 2

Shell Alvania EP Grease #1 or #2
Sun Prestige 741 EP #1 or #2
Gulfcrown Grease EP #1 or #2
AMOLITH GREASE EP #1 or #2
Citgo HEP Grease #1 or #2 or Citgo AP Grease.
Texaco Multifak EP #1 or Marfak ALL Purpose #2.
Molub-Alloy General Purpose Grease #1 or #2.
ARCO Litholine Ind. Grease #2 EP or Litholine EP #2 Grease.
Mobilgrease 76 or 77
...or the equivalent to the above.

REFER TO THE ABOVE FOR RECOMMENDED SUPPLIERS.

ADDITIONAL RECOMMENDATIONS

*Chevron BRB-2
*Shell AeroShell Grease 5

*Recommended for Water Pumps and Universal Joints.

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

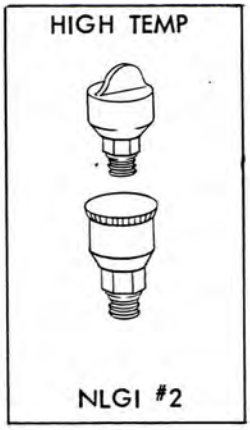
LUBRICATION CHART KEY

(L) HIGH TEMPERATURE GREASE

FOR ... CLUTCH THROWOUT BEARINGS
CLUTCH PILOT BEARINGS
DYNATORK PILOT BEARINGS

SPECIFICATIONS A high temperature grease of refined mineral oil base with a lithium soap thickener or equal compounded with additives to give high load-carrying ability and resistance to water and high temperature. To withstand temperatures of -20 deg F (to) +300 deg F. NLGI Grade No. 2.

Reference Specification:
(For typical product.)
MIL-G-3545C



TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

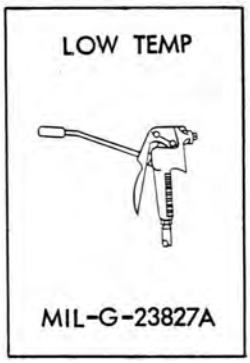
Shell AeroShell Grease #5
Gulfcrown Grease EP #2
AMOLITH Grease EP #2
Citgo HEP Grease #2 or
Citgo AP Grease.
Texaco High Temperature Grease
1999 #2.
Mobilgrease 28
...or the equivalent to the above.

(M) LOW TEMPERATURE GREASE

FOR ... -COLD STORAGE OPERATION-

FOR ... GENERAL CHASSIS GREASE
UPRIGHT MOUNTING
UPRIGHT LIFT CHAINS
ALL MOVABLE PARTS EQUIPPED WITH GREASE FITTINGS.
BRAKE (AND CLUTCH) PEDAL LINKAGE.
(Narrow Aisle Trucks and Powrworkers)
DRIVE UNIT FITTINGS
PANTOGRAPH
CASTER WHEELS
STEER CHAIN
LOAD WHEELS WITH FITTINGS

SPECIFICATION An extreme low temperature aircraft quality grease meeting Specification MIL-G-23827A, or equivalent product. Temperature range -100 to +250 deg F.



Texaco #2346 Low Temperature
Grease "EP".
American Oil SUPERMIL
Grease A-72832.
...or the equivalent to the above.

(N) SPECIAL GREASE

FOR ... STRADDLE CARRIERS
EQUALIZING LINKAGE
HOOK & HANGER BUSHINGS
HOIST MECHANISM

SPECIFICATIONS A smooth high quality grease of refined mineral oil base with a lithium soap thickener or equal compounded with corrosion and oxidation inhibitors and containing 1 to 3% moly (molybdenum disulfide).
NLGI #2

American Molylith Grease #92006
Molub-Alloy General Purpose
Grease #2.
Molytex #2
...or the equivalent to the above.

- continued -

NOTES

LUBRICATION CHART KEY

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

(N) SPECIAL GREASE - continued -

FOR: ... DISTRIBUTOR CAMS

SPECIFICATION: Refer to previous page.

MOLY GREASE

Clark Part Number: 1800636

SPECIAL GREASE - continued -

FOR: ... DELCO STARTER BEARINGS

SPECIFICATION: Refer to previous page.

MOLY GREASE

Clark Part Number: 1800574

(P) SPECIAL GREASE:

FOR: ... GENERATOR PUMP DRIVE TANG
PUMP & MOTOR SHAFT SPLINES

SPECIFICATIONS: A lithium base or equal multi-purpose grease blended with selected additives to provide high load-carrying capacity with superior protection against corrosion and high-temperature oxidation and containing 3 (to) 5% moly (molybdenum disulfide).

NLGI #2

N O T E

Grease products under this specification are suitable for use on ball and roller bearings operating under extreme loads or in severe environments, and for extended lubrication intervals including chassis, sleeve bearings, cams and sliding mechanisms, etc., under heavy loads, shock and vibration.

MOLY GREASE

Clark Part Number: 1800531

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(R) SPECIAL LUBRICANT

FOR ... CLUTCH THROWOUT BEARING-CARRIER RAILS

SPECIFICATION Use an approved Dry Film Type Lubricant or the equivalent.

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

Graph-O-Kote #220 (Aerosol-can)
(Joseph Dixon, Crucible Company, Jersey City, N.J.)

Molub-Alloy #369 Dry Lube.

Dow Corning Molykote 321 Bonded Lubricant

...or the equivalent to the above.

(S) COLD STORAGE OPERATION

FOR ... ELECTRICAL SWITCHES AND TERMINALS.
- ELECTRIC RIDER TRUCKS -

FOR ... SOLID STATE CONTROL EQUIPPED TRUCKS.

SPECIFICATION Spray Coating

Krylon, Inc.,
Norristown, Pa. -6412-

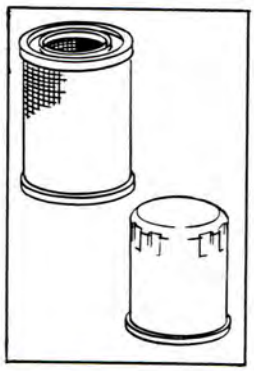
Sprayon 707 PDRP
26300 Fargo Avenue
Bedford, Ohio -44146-

...or the equivalent to the above.

(‡) OIL & FLUID FILTERS

FOR ... TRUCK SYSTEM(S)

SPECIFICATIONS Replacement parts to be of a quality equal to that provided in the original equipment. ‡Consult CLARK Service Parts Publication(s) for recommended replacement parts.



Oil Filter Cartridge Kit(s)
(Reference: Appropriate Parts Manual)

- continued -

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

(T) ENGINE FUEL - GASOLINE

FOR ... INDUSTRIAL GASOLINE ENGINES

SPECIFICATIONS Fuel to be Automotive Quality Regular Grade Gasoline containing a corrosion inhibitor.

Minimum Motor Octane Number - 85

TYPICAL PRODUCT RECOMMENDED BY MAJOR BRAND OIL SUPPLIERS

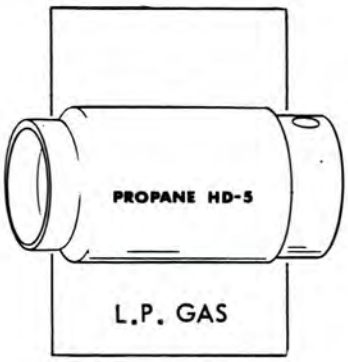
Shell Regular Gasoline
Sunoco 200 Gasoline
Good Gulf Gasoline
American Regular Gasoline
Citgo Regular Gasoline
Texaco Firechief Gasoline
ARCO Gasoline Regular
Mobil Gasoline Regular
...or the equivalent to the above.

(U) ENGINE FUEL - L.P.GAS

FOR ... INDUSTRIAL L.P.GAS POWERED ENGINES

SPECIFICATIONS Use LPG meeting PROPANE HD-5 (NGPA Specification 2140-62) or ASTM D2154 (Special Duty Propane) requirements.

Minimum Motor Octane Number - 95



Citgo L.P. Gas (HD-5)
Texaco 436 Propane
...or the equivalent to the above.

(V) ENGINE FUEL - DIESEL

FOR ... INDUSTRIAL DIESEL POWERED ENGINES

SPECIFICATIONS Fuel to be Automotive Quality Diesel Fuel Oil as defined by ASTM D975, Grades No. 1-D and 2-D, and having a Sulfur Content of less than 0.5% weight.

Recommended Cetane Number - 45 Minimum

NOTE

AN ASTM NO. 1-D FUEL IS PREFERRED WHERE MINIMUM SMOKE AND ODOR IS REQUIRED OR WHERE LIGHT LOAD AND SPEED WITH CONSIDERABLE IDLING IS ENCOUNTERED AND FOR COLD-WEATHER USE GENERALLY.

Shell Preminum Dieseline OR45
Sun Diesel Fuel 245-T
ARCO Preminum Diesel
ARCO Diesel #1 and #2
Gulf Diesel Fuel #1 or #2
AMOCO Diesel Fuel #1D and American Premier Diesel Fuel #2D
Citgo Diesel Fuel #1 or #2
Texaco Diesel Chief #1
Mobil Fuel Diesel & Mobil Diesel Fuel Special
...or the equivalent to the above.

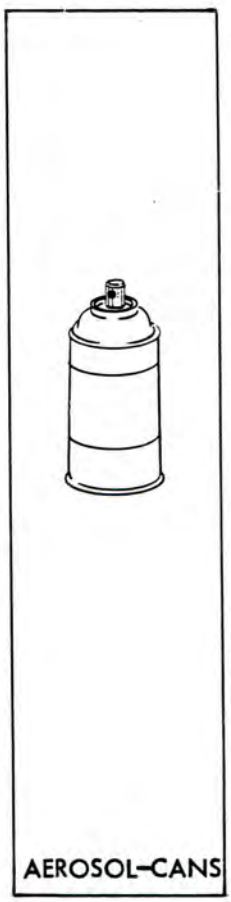
NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

LUBRICANTS ETC., BY CLARK PART NUMBER

	PART NUMBER		DESCRIPTION
HYDRAULIC BRAKE FLUID	884677 1800200 850487		1 - quart can 1 - case of 16-ounce cans 1 - case of 6 one-gallon cans
HYDRAULIC SYSTEM FLUID	885385 885382		1 - case of 24 one-quart cans 1 - case of 6 one-gallon cans
AUTOMATIC TRANSMISSION FLUID	879803 879804 941615		1 - quart can 1 - case of 24 one-quart cans 1 - case of 6 one-gallon cans
BATTERY CLEANER	886398		1 - case of 12 one-pint cans
LUBRICANT	886396		1 - case of 12 one-pint cans
PENETRATING OIL	886397		1 - case of 12 one-pint cans
BELT DRESSING	1800078		1 - case of 12 one-pint cans
CHAIN LUBE	886399		1 - case of 12 one-pint cans (Roller & Leaf Chain Lube)
SPRAY KOTE	886784		1 - case of 12 16-ounce cans (Transparent Protective Insulating Sealer with Clear Lube.)
SPRAY LUBE	886785		1 - case of 12 16-ounce cans (Black Heavy-Duty "EP" Lubricant.)
DEGREASER	1800330		1 - case of 12 one-pint cans
CONQUER SPRAY	1801145		1 - case of 12 16-ounce cans
DEGREASER	1801146		1 - case of 12 16-ounce cans

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

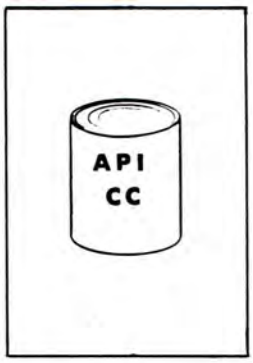
LUBRICATION CHART KEY

LUBRIPLATE

FOR ... SLIP TUBES, SLEEVES,
SPRING APPLIED SLEEVES,
LINKAGE BALL JOINTS, ETC.

SPECIFICATION Lubriplate 630-AA
or equivalent.

Fiske Brothers Refining Company
...or the equivalent to the above.



CRANKCASE MOTOR OIL

S.A.E. 10W	1800946	1 - case of 24 one-quart cans
S.A.E. 20W	1800990	1 - case of 24 one-quart cans
S.A.E. 30	1800947	1 - case of 24 one-quart cans
S.A.E. 10W - 30	1800948	1 - case of 24 one-quart cans

TECHNICAL SOCIETIES IN REFERENCE (PREVIOUS PAGES)

AGMA	---------	American Gear Manufacturers Association
API	---------	American Petroleum Institute
ASTM	---------	American Society for Testing and Materials
EMA	---------	Engine Manufacturers Association
MIL	---------	Military Specification
NGPA	---------	Natural Gas Processors Association
NLGI	---------	National Lubricating Grease Institute
SAE	---------	Society of Automotive Engineers

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

PRODUCTS IN REFERENCE

AMERICAN OIL COMPANY
STANDARD OIL DIVISION

AMOCO
Amolith
Molylith

ATLANTIC RICHFIELD COMPANY

ARCO

CHEVRON OIL COMPANY

Chevron Products

CITIES SERVICE OIL COMPANY

Citgo Products

GULF OIL CORPORATION

Gulf Products
Gulfcrown

IMPERIAL OIL & GREASE COMPANY., INC

Molub-Alloy

MOBIL OIL CORPORATION

Mobilube
Mobilgrease

SHELL OIL COMPANY

Rotella, Rotella T Motor Oil
Rimula Motor Oil
Dentax Gear Oil
Spirax Gear Lubricant
Alvania Grease
AeroShell

SUN OIL COMPANY

Sunfleet Motor Oil
Sunoco Products
Sun Prestige
Sunvis Oil

THE ELECO CORPORATION

ELCO

TEXACO, INC

Texaco Havoline or URSA
Thuban
Texamatic
Molytex

LOW TEMPERATURE OPERATION (MULTI-VISCOSITY OILS)

MULTI-VISCOSITY OIL SHOULD BE USED ONLY WHERE COLD STARTING CONDITIONS MAKE IT NECESSARY. THE OIL SUPPLIER SHOULD ASSUME FULL RESPONSIBILITY FOR SATISFACTORY PERFORMANCE OF THE MULTI-VISCOSITY OIL AT BOTH LOW AND NORMAL ENGINE OPERATING TEMPERATURES.

SERVICE CONDITIONS

OIL PERFORMANCE WILL REFLECT ENGINE LOAD, TEMPERATURE, FUEL QUALITY, ATMOSPHERIC DIRT, MOISTURE AND MAINTENANCE. WHERE OIL PERFORMANCE PROBLEMS ARISE OR ARE ANTICIPATED, THE OIL SUPPLIER SHOULD BE CONSULTED. WHEN EXTENDED DRAIN PERIODS ARE CONTEMPLATED, HIS ANALYSIS OR THAT OF A REPUTABLE LABORATORY SHOULD DETERMINE THE SUITABILITY OF OIL FOR FURTHER SERVICE.

NOTES

INDUSTRIAL TRUCK DIVISION

LUBRICATION SPECIFICATIONS

LUBRICATION CHART KEY

Reference: HYDRAULIC FIRE RESISTANT FLUID (SPECIAL APPLICATIONS)
Ref. Specification(s): 871-L-224-1971 Water-Glycol

THE FOLLOWING "TEST PROCEDURE" WAS DEVELOPED BY CITGO ... BE SURE TO REQUEST "TEST PROCEDURE(S)" FROM THE SUPPLIER OF THE PRODUCT USED IN YOUR EQUIPMENT.

The Cities Service Research and Development Department has developed a simple and rapid method for determining the alkalinity level of CITGO Pacemaker Glycol-FR Fluid. This procedure is based on the use of Quantab B001, an indicating device calibrated to permit the direct determination of free alkalinity present in the fluid. Quantabs are available from Ames Company, Inc, Elkhart, Indiana.

CITIES SERVICE TEST PROCEDURE --
CONTROL OF FREE ALKALINITY

1. Measure 90 ml. of distilled water into a 100 ml. graduate.
2. Add 10 ml. of the CITGO Pacemaker Glycol-FR Fluid from the system to be tested. This measurement should be accurate in order to assure proper alkalinity readings.
3. Stopper the graduate and shake well for approximately 30 seconds.
4. Place approximately 10 ml. of the diluted fluid into a small (150 ml.) beaker or other suitable receptacle.
5. Remove the end tab from a Quantab B001 indicator and place the Quantab into the beaker with the 10 ml. sample of diluted fluid.
6. After the fluid has wetted the entire column (about 15 to 20 minutes) read the height of the color alternation on the Quantab as shown by a change from blue to green opposite the Quantab scale.
7. If the Quantab scale reading is 3.2 or above, no alkalinity adjustment is required; if the scale reading is below 3.2, add 1 quart of morpholine for each 50 gallons of fluid in the system.

An alkalinity check should be made twenty-four hours after the water content or alkalinity of the fluid is adjusted. Alkalinity levels should be checked frequently during the first month after a system has been converted to CITGO Pacemaker Glycol-FR Fluid. Thereafter, a regular schedule for checking alkalinity should be set up depending on experience and the needs of the system.

Control of alkalinity by direct measurement of the pH of the system fluid is not recommended. Where laboratory facilities are available the free alkalinity of CITGO Pacemaker Glycol-FR Fluid may be measurd by electrometric titration. A sample of fluid from the system is diluted with distilled water and tirated to a pH of 6.3 with standardized 0.1N HCL. If the milliequivalents per liter of HCL is below 60, one quart of morpholine should be added for each 50 gallons of fluid in the system. The control valve of "60" in this procedure corresponds to the 3.2 scale reading of the Quantab B001 indicator in the Cities Service Test Procedure.

NOTES

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

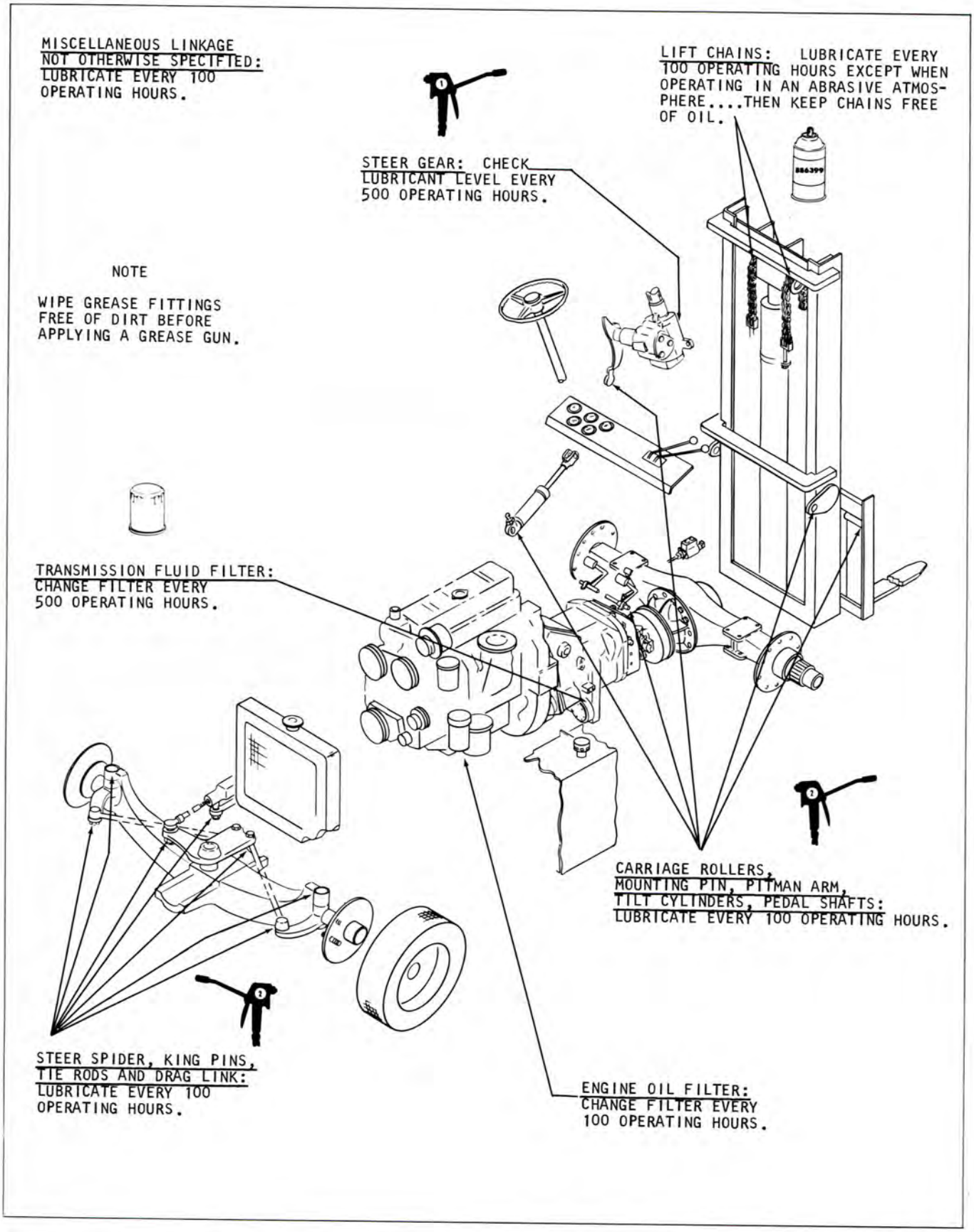
BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z


MISCELLANEOUS LINKAGE NOT OTHERWISE SPECIFIED: LUBRICATE EVERY 100 OPERATING HOURS.
LIFT CHAINS: LUBRICATE EVERY 100 OPERATING HOURS EXCEPT WHEN OPERATING IN AN ABRASIVE ATMOSPHERE....THEN KEEP CHAINS FREE OF OIL.
STEER GEAR: CHECK LUBRICANT LEVEL EVERY 500 OPERATING HOURS.
886399
NOTE
WIPE GREASE FITTINGS FREE OF DIRT BEFORE APPLYING A GREASE GUN.
TRANSMISSION FLUID FILTER: CHANGE FILTER EVERY 500 OPERATING HOURS.
CARRIAGE ROLLERS, MOUNTING PIN, PITMAN ARM, TILT CYLINDERS, PEDAL SHAFTS: LUBRICATE EVERY 100 OPERATING HOURS.
STEER SPIDER, KING PINS, TIE RODS AND DRAG LINK: LUBRICATE EVERY 100 OPERATING HOURS.
ENGINE OIL FILTER: CHANGE FILTER EVERY 100 OPERATING HOURS.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

500H HOUR INDEX

LUBRICATION AND PREVENTIVE MAINTENANCE PICTORIAL INDEX. 500 HOUR

MACHINE NUTS, BOLTS, CAPSCREWS: CHECK SECURITY OF MOUNTING... PAGE 500H 403.

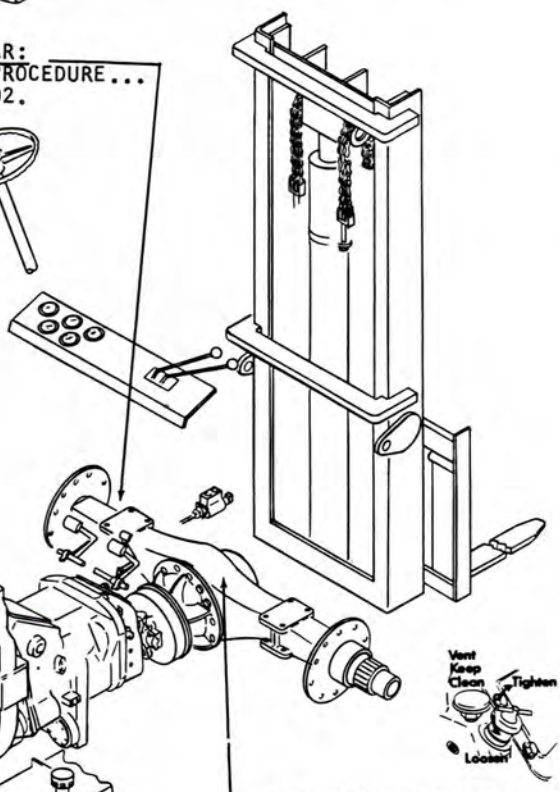
NOTE

STEAM CLEAN MACHINE EVERY 500 HOURS.

STEERING GEAR: ADJUSTMENT PROCEDURE... PAGE 500H 202.

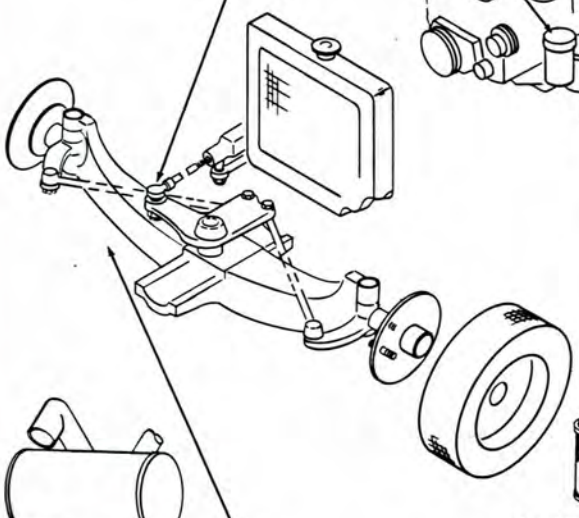
FUEL FILTER/SEPARATOR: REPLACE ELEMENTS AND BLEED..... PAGE 500H 001.

TRANSMISSION FILTER: CHANGE FILTER.... PAGE 500H 003.

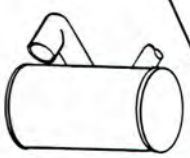


STEER LINKAGE: CHECK ADJUSTMENT... PAGE 500H 302.

TRANSMISSION/AXLE ADAPTER: DRAIN AND REFILL... PAGE 500H 003.



HYDRAULIC TANK: DRAIN AND REFILL... PAGE 500H 103.



HYDRAULIC FILTER: CHANGE ELEMENT... PAGE 500H 103.

EXHAUST SYSTEM: CHECK CONDITION... PAGE 500H 403.

NOTE

IN ADDITION TO THE ABOVE, PERFORM THE 8 HOUR AND 100 HOUR PREVENTIVE MAINTENANCE SERVICES.

FUEL SYSTEM SERVICING (PERKINS ENGINE):

Every 500 hours it is necessary to service the fuel system. This entails the draining and cleaning of the water separator and fuel filter/s and bleeding the fuel system.

Cleaning:

Remove the sediment bowl on the water separator, drain, and clean in a Stoddard type cleaning solvent (Plate 12087).

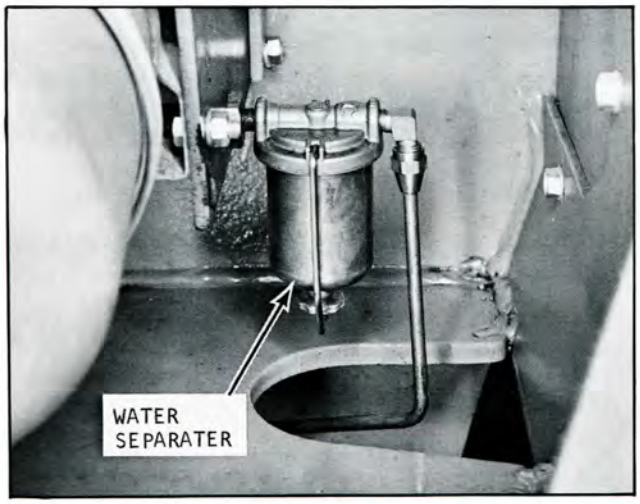


Plate 12087. Typical Water Separator

WARNING

BE SURE AREA (WHERE FUEL SYSTEM SERVICING IS BEING PERFORMED) IS WELL VENTILATED AND HAS NO OPEN FLAMES OR SPARK PRODUCING EQUIPMENT. CONTAINERS (SUCH AS FLAT DRIP PANS) SHOULD BE USED TO CATCH ALL FUEL BEING BLED FROM THE MACHINE. THE ENGINE SHOULD ALSO BE COLD.

Remove the filter bowls on the primary and final filters. Clean in a Stoddard type cleaning solvent and install a new filter element (Plates 11020 and 11021).

Once these procedures are completed, it is necessary to bleed the system before the engine will run.

Fuel System Priming (Bleeding):

The air must be vented from the fuel system whenever any part of the system between the fuel tank and injection pump has been disconnected for any reason or when the system has been emptied of fuel.

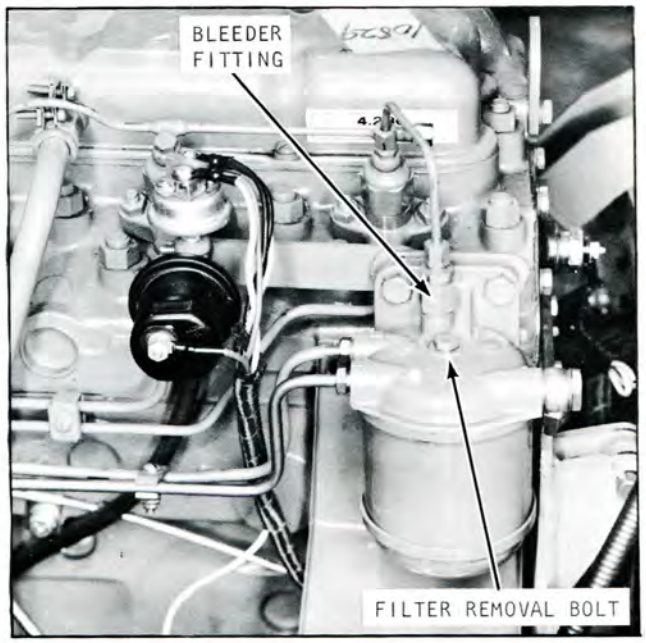


Plate 11020. Typical Fuel Filter

Plate 11021. Typical Fuel Filter

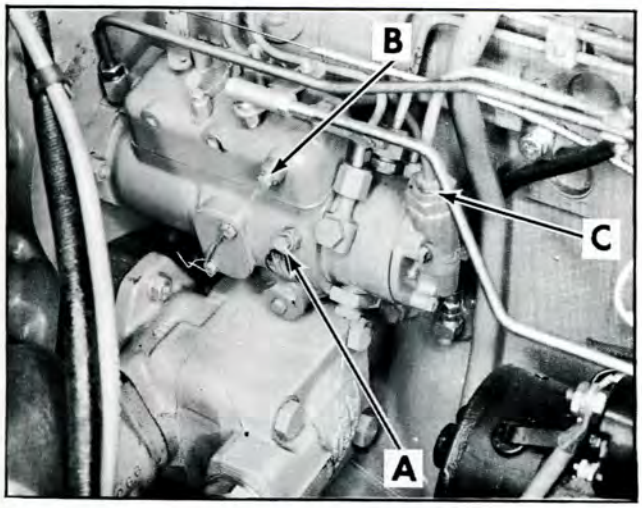


Plate 11022. Typical Fuel Injection Pump

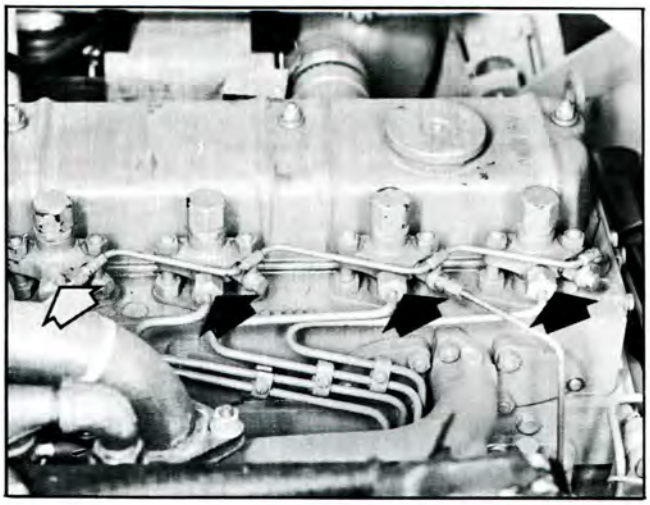


Plate 11023. Typical Atomiser Ends

No attempt must be made to start the engine until the injection pump has been filled and primed as serious damage can be caused to the pump due to lack of lubrication.

Bleed the fuel system in the following manner:

1. Open the bleeder screw on the primary fuel filter, machines so equipped (Plate 11021). Operate the hand prime lever until fluid runs clear of air bubbles. Close the bleeder screw.

N O T E

If the cam on the engine camshaft operating the fuel lift is on maximum lift, it will not be possible to operate the hand primer. If such a condition arises, then the engine should be turned one complete revolution.

2. Open the bleeder fitting on the final filter and proceed as before (Plate 11020).

3. Bleed the fuel injection pump at points A, B, C (in alphabetical order) closing each bleed fitting before going on to the next one (Plate 11022).

4. Loosen the fittings at the atomiser ends of all the high pressure pipes (Plate 11023).

5. Set the accelerator at the fully open position and ensure that the stop control is in the run position.

6. Crank the engine until fuel oil, free from air bubbles, issues from all fuel pipes.

7. Tighten the fittings on all fuel pipes, and the engine is ready for starting.

TRANSMISSION FLUID FILTER:

The fluid filter is a throw-away type. The filter should be changed whenever the fluid is drained. To change filter;

1. Unscrew filter and throw-away.

2. Put engine oil on filter gasket...

3. Screw on new filter till gasket contacts base, then turn 1/2 turn more.

N O T E

Filter element should be replaced each time fluid is drained or at any time when a repair to the transmission or axle adaptor is made.

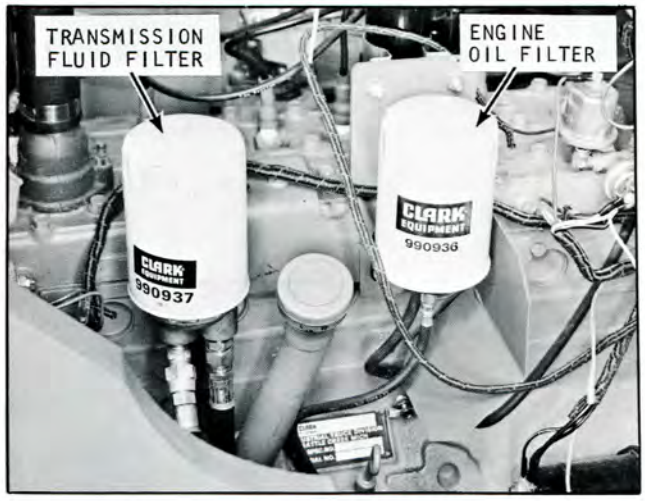


Plate 11535. Typical Transmission and Engine Oil Filters

TRANSMISSION SUMP SCREENS:

1. The transmission should be drained at operating temperature. Remove both drain plugs to facilitate complete draining (Plates 9861 and 9772...next page).

2. Clean plug of all foreign material. See Plate 9861.

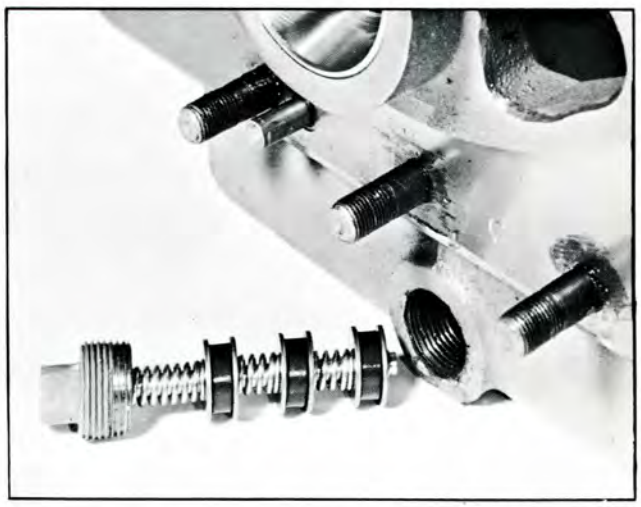


Plate 9861. Transmission Drain Plug

3. Remove and clean transmission sump screens. Check O-rings for damage, nicks, scratches... replace O-rings if found in this condition. Use a Stoddard type cleaning solvent to clean the screens. Blow dry with compressed air...directing air stream from inside...outward thru screen.

4. Install screens and sump drain plug to bottom of transmission and axle adaptor.

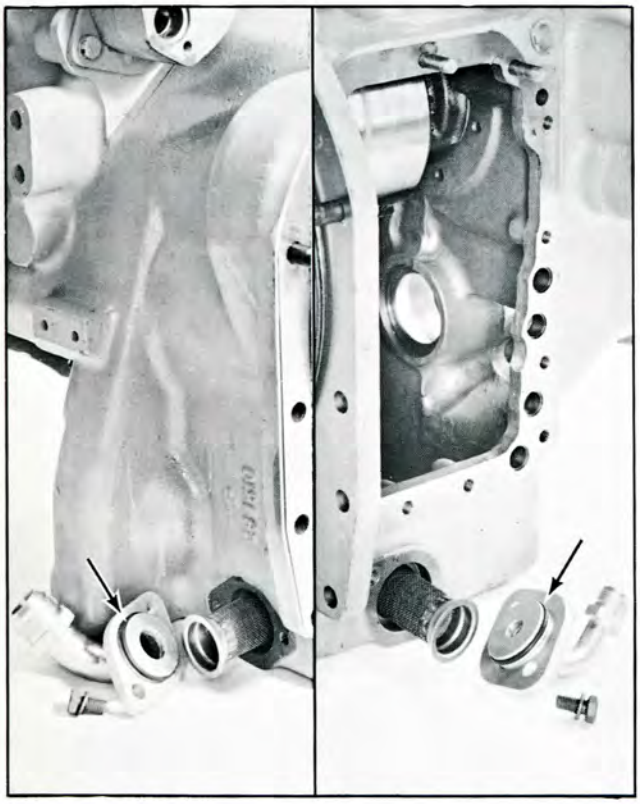


Plate 9860. Transmission Sump Screens

5. Replace drain plugs and refill transmission with the lubricant as outlined in the lubrication section.

6. Operate engine at fast idle for approximately 4 minutes to distribute lubricant throughout the system.

7. Shut down engine and check fluid level with dipstick. Add fluid as required to bring the level to the full mark on the dipstick.

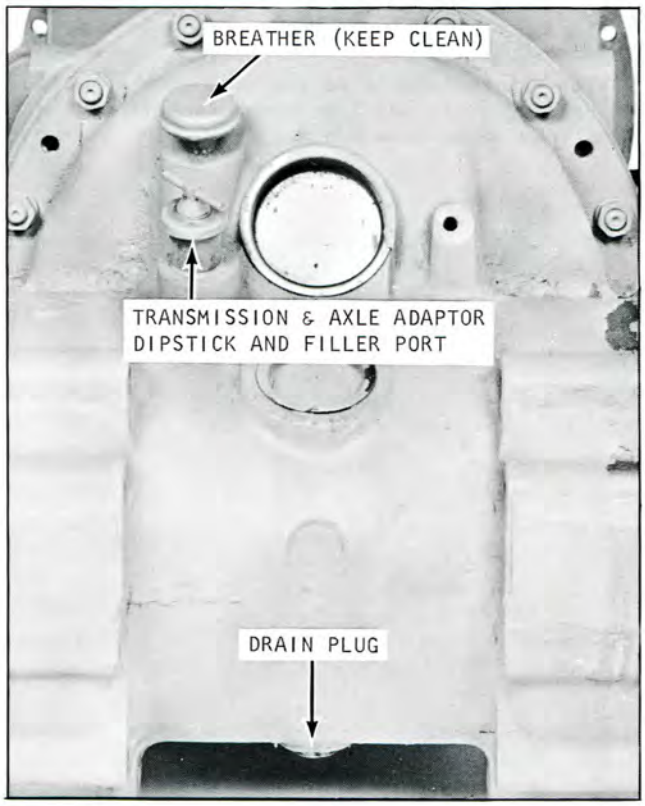


Plate 9772. Axle Adaptor/Transmission Dipstick, Breather and Adaptor Drain Plug

Plate 11527. Typical Sump Tank Drain

HYDRAULIC SUMP TANK DRAIN AND FILTER CHANGE:

Frequency of element change depends on individual applications. Replacement of original element after first 50 hours of operation is recommended. Generally, each 500 thereafter will insure maximum filtration.

1. With engine shut down, lower upright to the floor.

2. Place a flat pan (of adequate size) under the sump tank.

3. Loosen the breather and remove the drain plug (Plate 11527) and allow the tank to drain.

4. Unscrew the filter retainer bolt allowing the case and filter element to be removed from the filter base (Plate 11528).

5. Remove the sealing ring, filter element, spring, retainer bolt and gasket from the case.

6. Discard the element, sealing ring and retainer bolt gasket.

7. Thoroughly clean the filter case in a Stoddard type cleaning solvent and allow to dry.

8. Flush tank with 2 quarts of clean hydraulic fluid.

9. Replace drain plug and refill. Use the hydraulic fluid recommended in the lubrication section. See the specification for capacity.

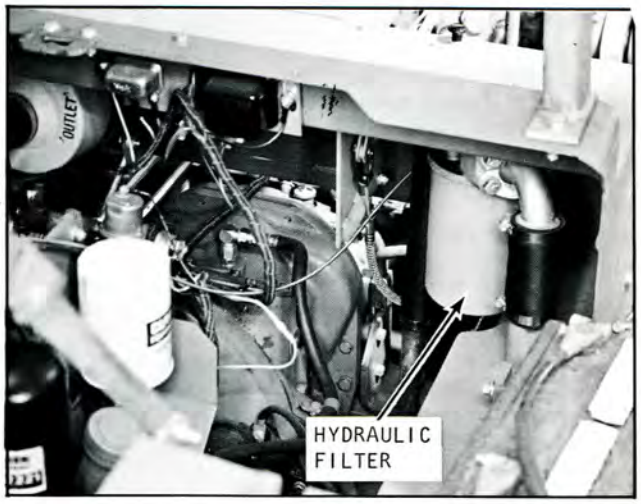


Plate 11528. Typical Hydraulic Filter

CAUTION

START ENGINE AND OPERATE HYDRAULIC CONTROL LEVERS SEVERAL TIMES. CHECK FOR LEAKS. RECHECK OIL LEVEL AND ADD FLUID IF NECESSARY.

REASSEMBLY:

1. Place a new gasket on the retainer bolt and insert bolt in filter case. Slide the spring over the retainer bolt and place a new element in the case so that it rests upon the spring.

2. Using a new sealing ring install the case sub-assembly to its base and securely tighten the retainer bolt. Install the drain plug and its gasket in the case and tighten.

CAUTION

START ENGINE AND OPERATE HYDRAULIC CONTROLS SEVERAL TIMES, CHECK OIL FILTER FOR LEAKS. IF ANY LEAKS ARE EVIDENT, CORRECT AS REQUIRED.

STEERING GEAR

Steering gear adjustments must be made in the following manner (see Plates 6636 and 6637).

Always check worm bearing thrust adjustment, and adjust if necessary, before making sector gear lash adjustment.

Before making above adjustments, the following preliminary operations are necessary.

1. Disconnect steering drag link from pitman arm. Note relative position of drag link parts when disconnecting link so the parts may be re-assembled correctly.

2. Check lubricant level in steering gear housing. If low, add enough lubricant to bring level up to filler plug hole. (Use NLGI #1 Amolith grease EP #1 or its equivalent).

3. Tighten steering gear housing to frame side member bolts, see Plate 6636.

4. Determine straight-ahead position of steering mechanism by turning steering wheel to extreme right.

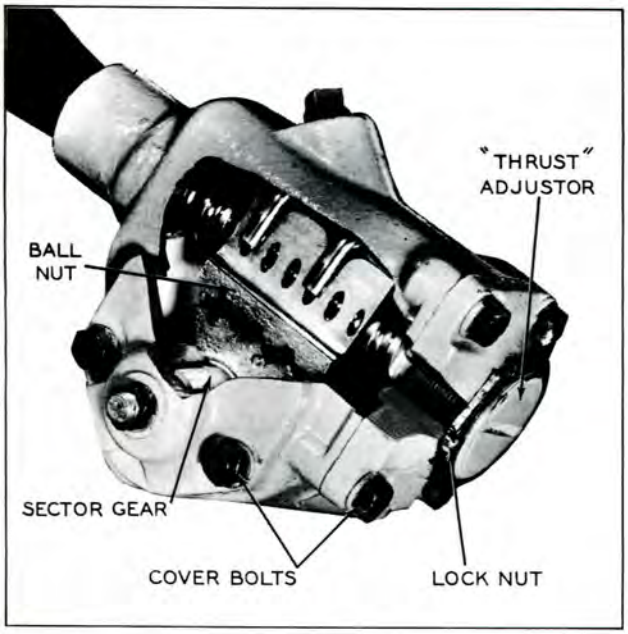


Plate 6636. Steering Gear Thrust Adjustment (Worm Bearings)

CAUTION

APPROACH EXTREME ENDS CAUTIOUSLY; WORM BALL NUT MUST NOT STRIKE ENDS WITH ANY DEGREE OF FORCE.

Then turn to extreme left, counting the exact number of turns from right to left end. Turn wheel back one-half number of wheel turns. Mark wheel with respect to steering column so center position may readily be found during adjustment procedures.

Worm Bearing THRUST Adjustment: Refer to Plate 6636 and proceed as follows:

1. Check tightness of cover bolts, see Plate 6636. Loosen lock nut and turn lash adjuster screw (Plate 6637) counterclockwise a few turns to provide clearance between sector gear and worm ball nut.

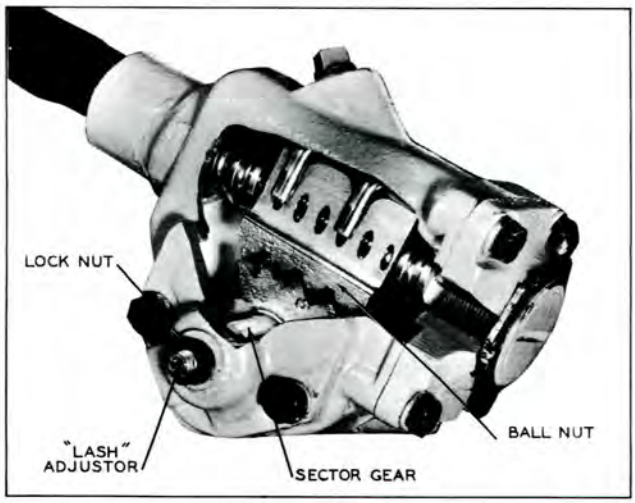


Plate 6637. Steering Gear Lash Adjustment (Sector Gear)

2. Turn steering wheel GENTLY to one extreme end. Turn wheel back one full turn. With spring scale on spoke of wheel, measure pull required to KEEP WHEEL MOVING. Pull on scale should be made at right angles to wheel spoke. If pull is within 1 1/2 to 2 pounds, proceed to lash adjustment in the following paragraphs. If pull is not within 1 1/2 to 2 pounds, adjust worm bearings. The pitman shaft adjustment must be made if worm bearing check is accomplished, or if the worm bearings are adjusted.

3. If it is necessary to adjust the worm bearings, loosen lock nut and then turn worm bearing adjuster nut clockwise until all end play is removed, see Plate 6636. Using

spring scale, as directed in Step 2, check pull and readjust as necessary; then tighten lock nut securely.

Sector Gear Lash Adjustment: Refer to Plate 6637 and proceed as follows:

1. Steering Gear Mechanism must be in straight ahead position as previously explained.

2. Turn lash adjuster screw clockwise to remove all lash between gear teeth. Tighten adjuster screw lock nut. Position spring scale on steering wheel so pull may be made at right angles to wheel spoke.

3. Measure pull while wheel is TURNED THROUGH CENTER POSITION. Readjust if reading is not within 2 1/2 to 3 pounds.

4. Tighten adjuster screw lock nut, check pull again.

5. After adjustments are made, install drag link on pitman arm.

N O T E

If steering linkage adjustment is necessary do not install drag link to pitman arm.

STEERING SYSTEM ADJUSTMENT AND ADJUSTMENT CHECKS:

N O T E

In making power steering adjustments, we are out to accomplish these basic things:

(a) To torque all items which have a bearing on steering.

(b) To eliminate end play and free play of the hand wheel.

(c) To center the hand wheel and the Pitman arm with the steer wheels straight.

(d) To eliminate any steering linkage looseness caused by wear or misadjustment.

(e) To set the Pitman arm stops so that the power steering pump will operate at its minimum pressure when steer wheels are turned full right and full left...with steer wheels off the ground.

Plate 10978. Typical Frame -to- Axle Adapter Bolts (Cushion Machines)

The following procedures will achieve these objectives. They are laid out to enable you to do a thorough job, and, at the same time, do it efficently and fast...without jumping around or backtracking. Thus, it will pay you to follow the steps in the order given. It is also important to remember that incorrect power steering adjustments can shorten the life of various steering system components.

Before starting any adjustment, strip the truck down to a point where you can get at the components. This includes: Removing the side hoods; removing the floor board; removing the entire seat assembly.

With these operations out of the way, we can now continue with the step-by-step procedures.

STEP 1: Check, and, if necessary, adjust the tilt cylinder rods to eliminate upright racking.

STEP 2: Torque the frame-to-axle adapter bolts to 450 -to- 550 pound feet. It is not necessary to remove the wheels to do this (cushion machines only).

N O T E

Torque the center capscrew first; then, torque the top capscrew...then, torque the bottom capscrew. Recheck torque, again starting with the center capscrew.

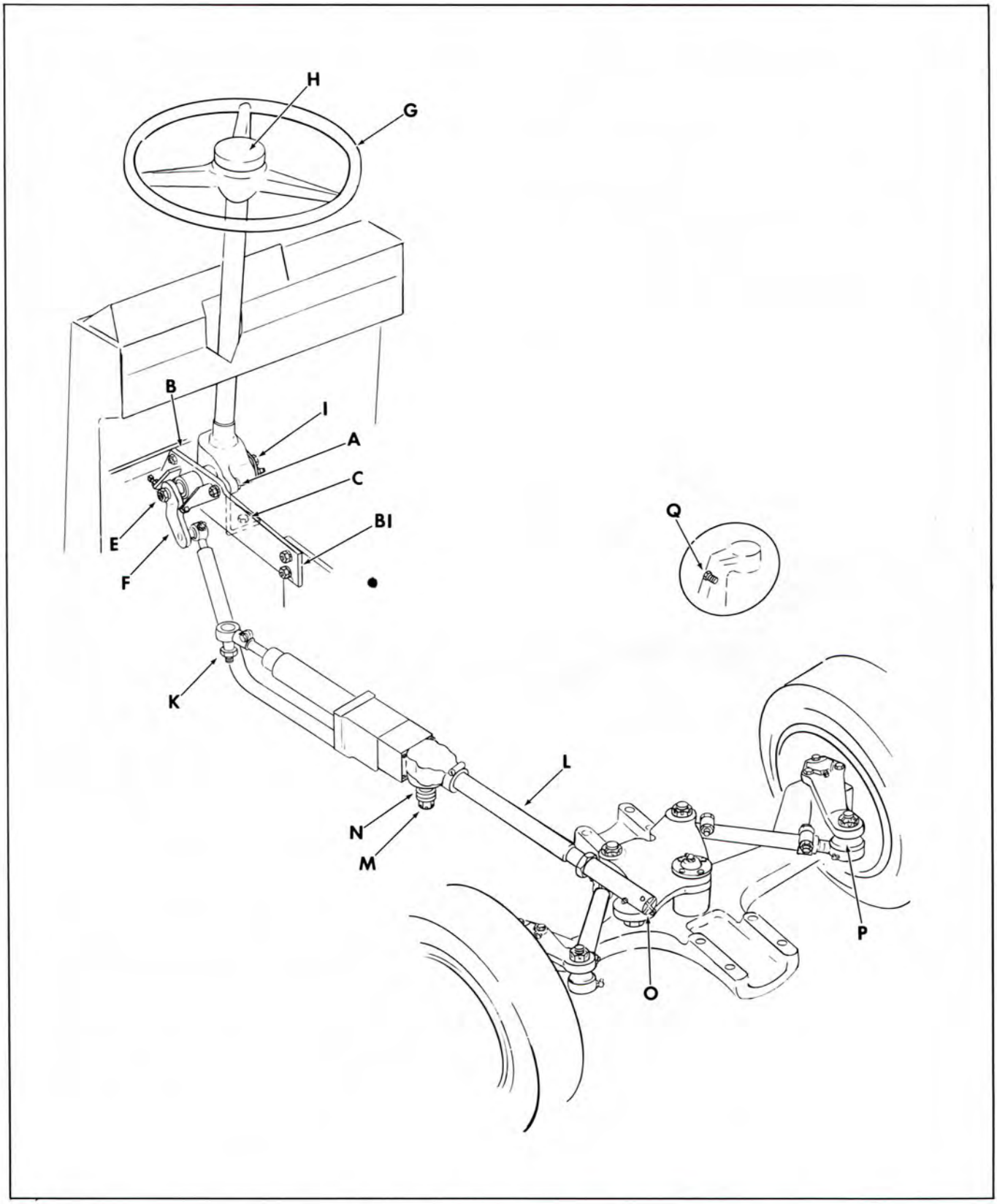


Plate 11532. Typical Steering Axle and Linkage Adjustments

STEP 3: Now...check the torque of the steering gear mounting bolts (refer to Plate 11532):

Steer gear-to-bracket bolt (A); 75-90 lbs/ft.

Bracket-to-frame bolts (B): 70-80 lbs/ft. (Cushion)
60-75 lbs/ft. (Yardlift)

Bracket-to-frame bolts (B1): 70-85 lbs/ft. (Yardlift)

Bracket-to-frame bolts (C): 60-75 lbs/ft. (Cushion)

All the above torqueing steps must be carried out each time you perform power steering adjustments....because each of the items torqued has a definite bearing on the steering characteristics of the truck. With these torqueing steps out of the way...we can now get to work on checking out the steering system....starting by determining whether there is hand wheel end play.

Plate 9843. Typical Hand Wheel End Play Check

STEP 4: To check for hand wheel end play.... first place the steer wheels in a straight position. Then....place your left hand on the steering column with your thumb just touching the hand wheel mounting base, as shown. Now... turn the hand wheel, with the right hand, back and forth. Any up and down movement indicates:

(a) That the steering shaft thrust adjustment screw at the base of the steering shaft must be drawn up.

STEP 5: If the capscrews that secure both caps are loose, tighten them securely (Plate 9844).

STEP 6: If there is still end play in the steering shaft, loosen the steering shaft thrust adjusting screw locknut....and turn the adjusting screw in until end play is eliminated. Then... tighten the adjusting screw locknut (Plate 9845).

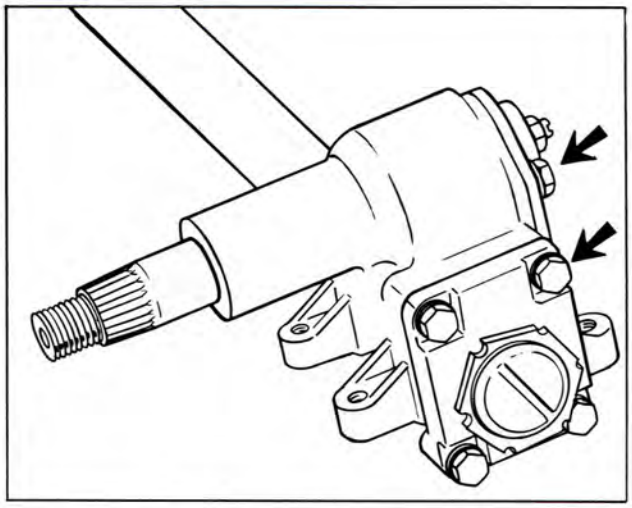


Plate 9844. Typical Side & End Caps Security Check

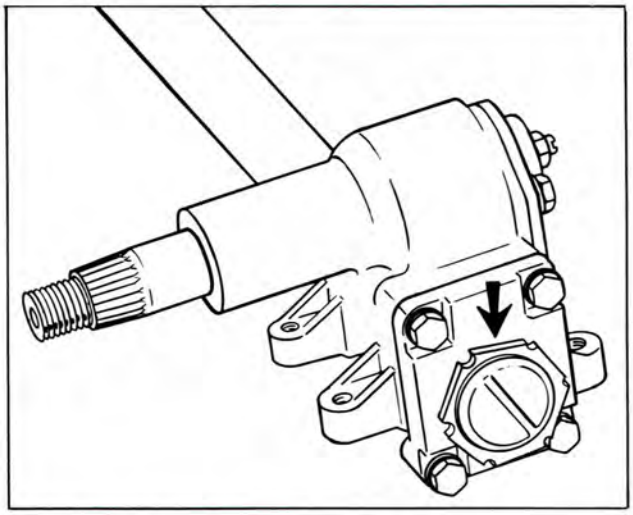


Plate 9845. Typical Thrust Adjustor Check

STEP 7: With end play eliminated, now check to make sure the hand wheel and pitman are are centered in relationship to the steering gear. To do this....remove the pitman arm stop Jam nuts (D) and completely back off the pitman arm in both directions.

STEP 8: Now....turn the hand wheel as far as possible in both directions. The pitman arm should not contact either stop. If the pitman arm does hit a stop, then....reposition it on the shaft one spline to the right or the left... to center it between the stops.

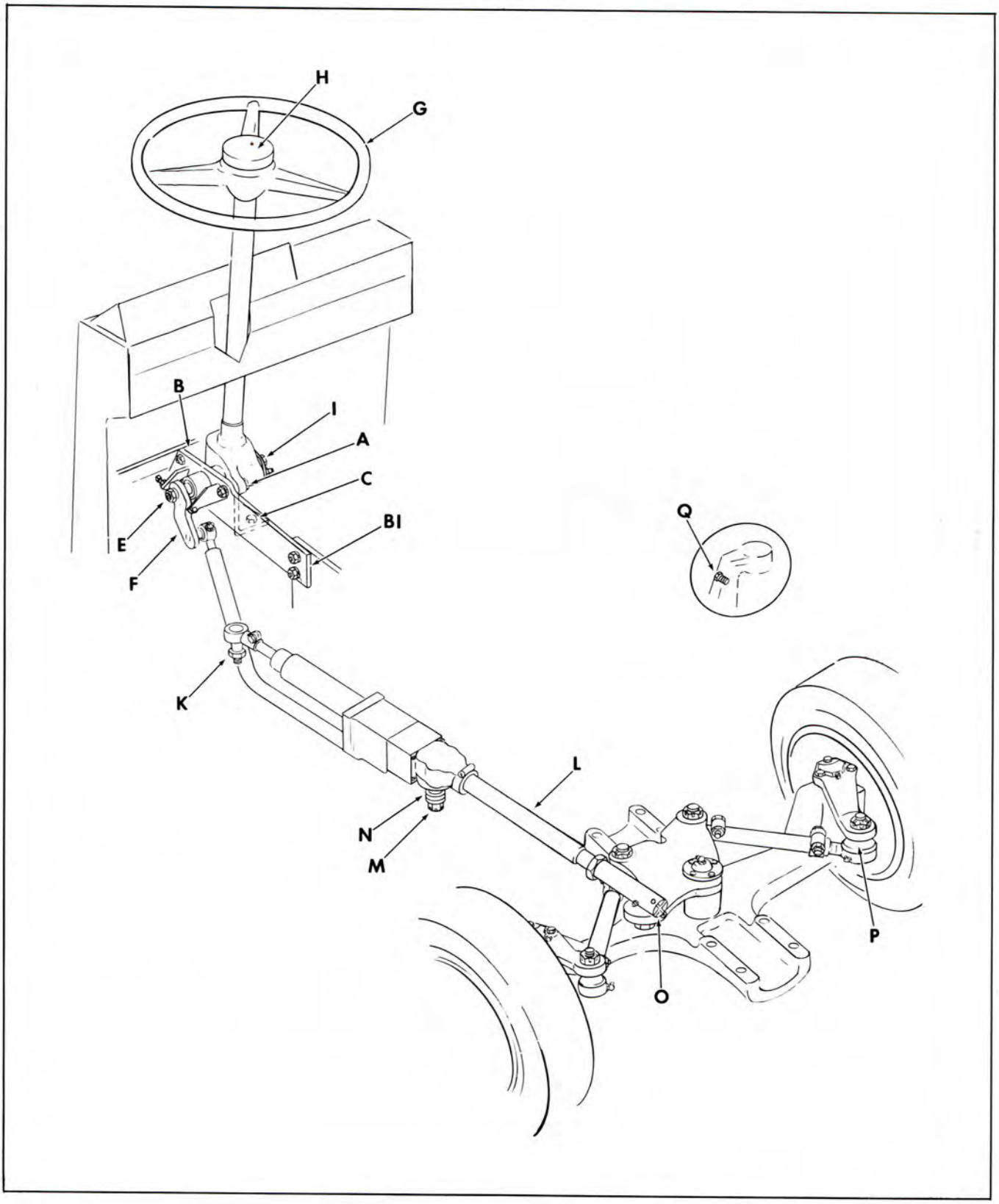


Plate 11532. Typical Steering Axle and Linkage Adjustments

N O T E

In some cases the pitman arm may barely contact the stops when the hand wheel is fully turned right or left. In such cases it is not necessary to reposition the pitman arm on the shaft, since final adjustment of the pitman arm stops will correct this condition.

Plate 9848. Typical Pitman Arm Shaft Locknut Torque

STEP 9: Always torque the pitman arm shaft locknut (item E) to 120 to 130 pound feet.... even when you haven't had to reposition the pitman arm.

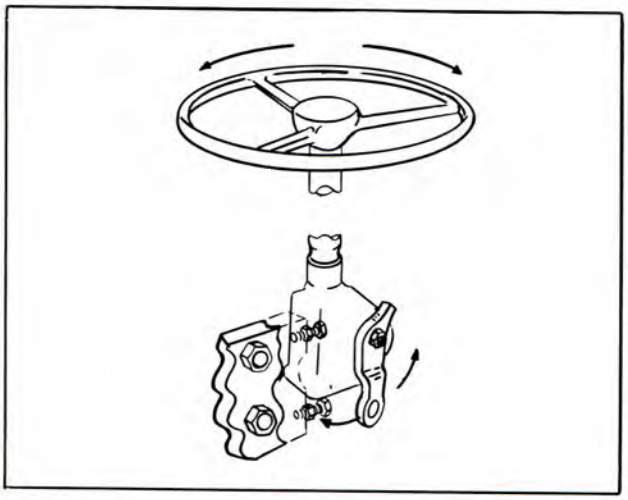


Plate 9847. Typical Hand Wheel & Pitman Arm Free Play Check

STEP 10: With the pitman arm (F) and steering gear centered....next check for free play between the hand wheel and pitman arm....by turning the hand wheel. The pitman arm should move the instant the hand wheel moves.

STEP 11: Then....center the steering gear by turning the hand wheel (G) full right to full left....counting turns from right to left and bringing the hand wheel back to its halfway position. When installing the hand wheel.... torque the hand wheel nut (H) to 35 to 40 pound feet....and, using a prick punch, stake the nut to the shaft....in two places 180 degrees apart. If the hand wheel has three evenly spaced spokes ....then spoke position can be disregarded.

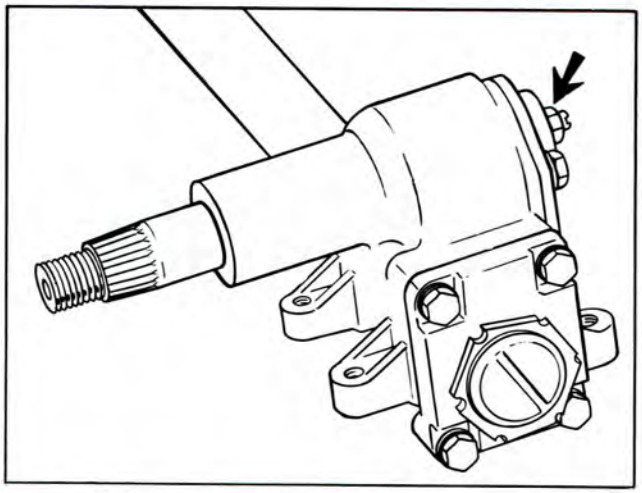


Plate 9846. Typical Sector Lash Adjustment Screw

STEP 12: If the pitman does not move instantly ....loosen the jam nut on the sector lash adjustment screw (I) and turn the adjustment screw in until all free play between the hand wheel and pitman arm is eliminated. Then....tighten the jam nut.

STEP 13: Then...reconnect the front drag link (J) to the pitman arm (F). Always be sure to torque the front drag link ball stud adjusting screw to 20 pound feet, and back if off to the nearest hole, install cotter pin.

STEP 14: Torque anchor nut (K) 110 to 125 lbs/ft and then tighten to next cotter pin slot.

STEP 15: Be sure cylinder piston rod stroke is centered so that piston does not bottom out in either direction.

STEP 16: With the cylinder and steering gear centered, the steer wheels should be straight. If they are not...it will be necessary to adjust the rear drag link (L) as we check out the linkage.

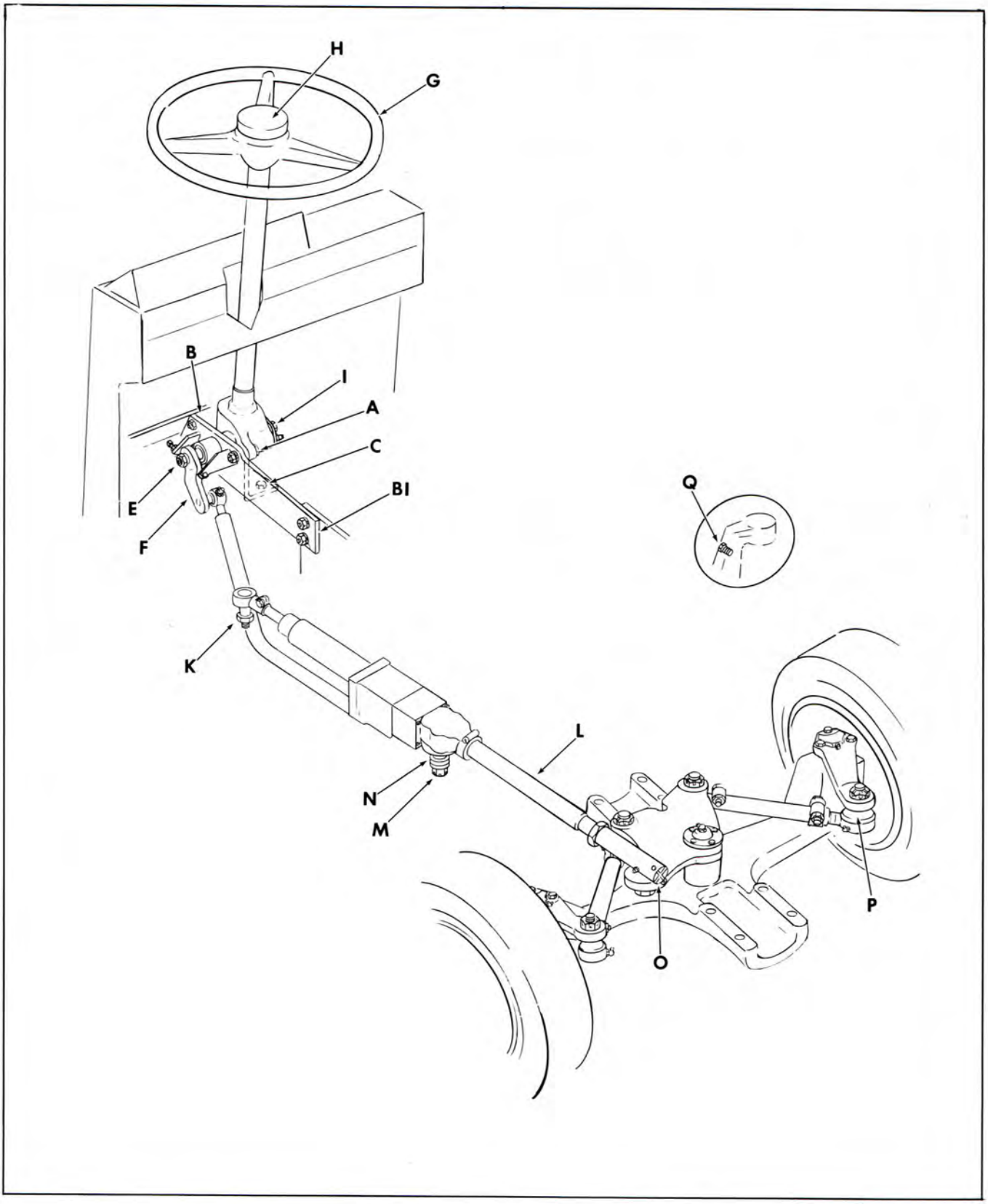


Plate 11532. Typical Steering Axle and Linkage Adjustments

STEP 17: Now check for free play caused by loose or misadjusted linkage. To do this...first, torque the cylinder valve control ball stud nut (M) 90-110 (cushion) and 110-125 (yardlifts) pounds feet. Then...check the cylinder valve control stud (N) for movement before the steer wheels move. Its normal allowable total valve travel is about 1/4". If ball stud travel exceeds this....cylinder removal and adjustment will be required.

STEP 18: Then...inspect the rear drag link (L). If necessary, adjust it to assure that the steer wheels are straight with cylinder and steering gear centered, making certain to tighten the locknut shown after the adjustment is made. Tighten the rear drag link ball socket screw (O) to 20 pound feet and back if off to nearest hole.

STEP 19: Now...inspect the tie rod ends (P). If they are loose, replace them. If the tie rod stud is loose, tighten the stud nut. The tie rod stud nut should be torqued to 70 lbs/ft, then increase to next cotter hole.

STEP 20: Now...inspect the steer axle stop locknuts (Q) for tighteness. If an axle stop is missing...install a stop...making certain to maintain a 78 degree steer wheel angularity for solid tired trucks. For pneumatic tired trucks, the steer wheel angularity is 75 degrees.

STEP 21: Then...place masking tape on right and left spindle arm. Place tape on the spindle stop bolt head, on some models. Now...connect a tachometer and start the engine with the transmission in neutral. With the engine running at 500 RPM, turn the hand wheel full right and full left so that each steer wheel contacts its axle stop (stop contacts tape) or until engine speed decreases.

STEP 22: Then...shut off the engine and check the masking tape for an imprint. Both tapes should have an imprint. If one of the tapes has no imprint...then the rear drag link (L) is out of adjustment and must be adjusted so that the tape will be imprinted when the wheel is fully turned.

STEP 23: When both tapes are imprinted, we are ready for final adjustment....which is the setting of the pitman arm stops (D). There are two ways of doing this....with a pressure gauge or with a tachometer. The use of a pressure gauge is preferred, however, because it provides more accurate readings.

STEP 24: When using a pressure gauge, hook up the gauge in the pressure line going to the power steering cylinder.

Now...with the parking brake set, the truck blocked up, the transmission in neutral and the engine idling, turn the hand wheel to the extreme right....until the axle stop makes contact and you get a sharp rise in pressure. Then back off hand wheel until pressure drops to a minimum.

STEP 25: When minimum pressure is reached, hold the hand wheel at this position and screw in the pitman arm adjusting screw until it touches the pitman arm. Then back off the hand wheel and turn the pitman arm adjusting screw one full additional turn toward the pitman arm.

STEP 26: Now...tighten the stop screw jam nut (D)...which must always be installed as shown. Then, turn the hand wheel to contact the adjusting screw with considerable force. The pressure should not rise above the minimum pressure specified.

Repeat the same procedures for the left turn adjustment.

When the tachometer only is being used, the same routine is followed except that instead of reading pressures, you will read RPMs. With the engine running at 500 RPM, turn the hand wheel to the extreme right until the RPM drops. Then ....slowly back off the hand wheel until engine speed comes back to 500 RPM.

When 500 RPM is reached, hold the hand wheel at this position and screw in the pitman arm adjusting screw one full additional turn toward the pitman arm...and install and tighten the adjusting screw jam nut. Now...turn the hand wheel to contact the adjusting screw with considerable force. The engine speed should not decrease. Repeat these same procedures for the left turn adjustment.

When the above adjustments have been made, disconnect any gauges used and lubricate all axle and linkage points. Then lower the truck to the floor and install the seat assembly, floor board, and side hoods.

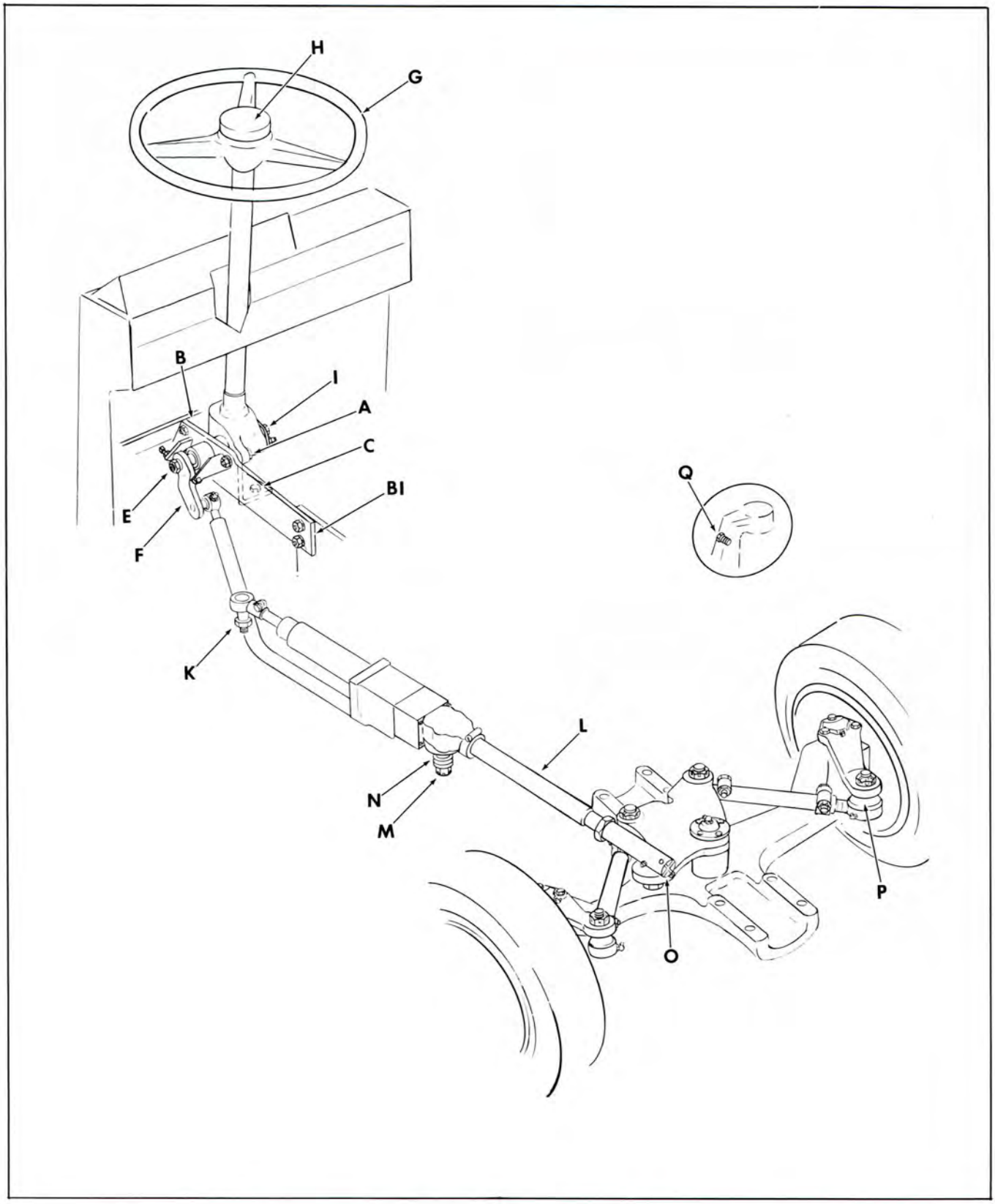


Plate 11532. Typical Steering Axle and Linkage Adjustments

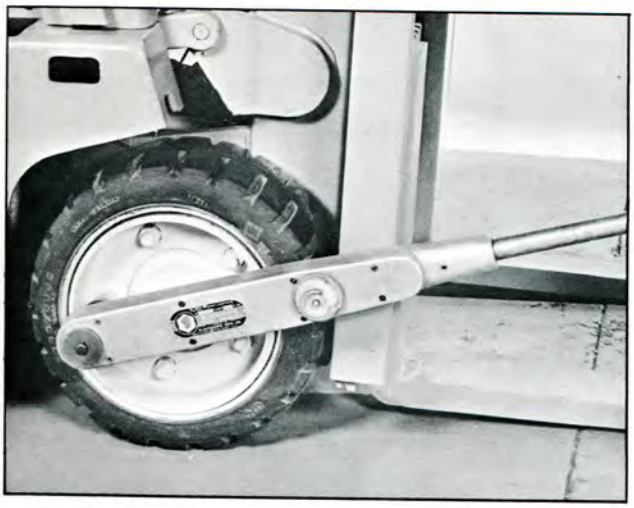


Plate 9852. Typical Drive Wheel Lug Nuts Torque

STEP 27: Now...torque all drive wheel lug nuts to the correct torque: 450 to 500 lbs/ft. (cushion) and 105-120 lbs/ft. (yardlifts).

The above specifications cover both cushion and pneumatic tire model machines.

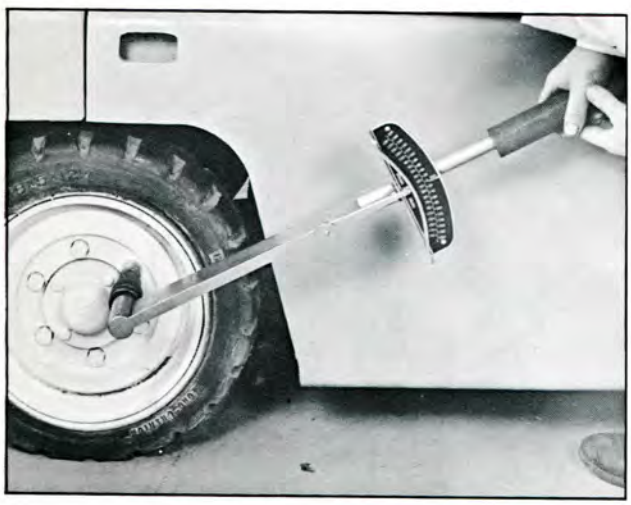


Plate 9853. Typical Steer Wheel Lug Nuts Torque

STEP 28: Then...torque all steer wheel lug nuts 290 to 350 pounds feet (cushion) and 450 to 500 (yardlifts).

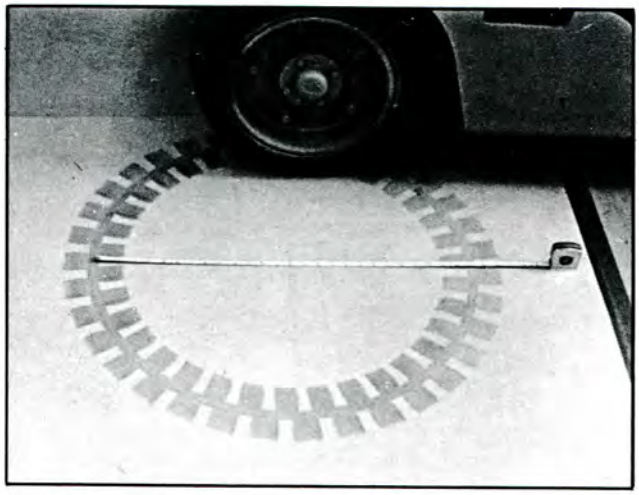


Plate 9854. Typical Adjustments Check

STEP 29: To check the correctness of your adjustments, drive the truck in full left and right turns and measure the inside turning diameter of each drive tire. The two diameters should be nearly equal.

STEP 30: The basically simple routine we have covered must be followed in every power steering adjustment. There is no short cut to doing the job right. And every step shown should be carried out in the order given. By so doing, you will insure that the job will be done right and efficiently.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

1000H HOUR INDEX

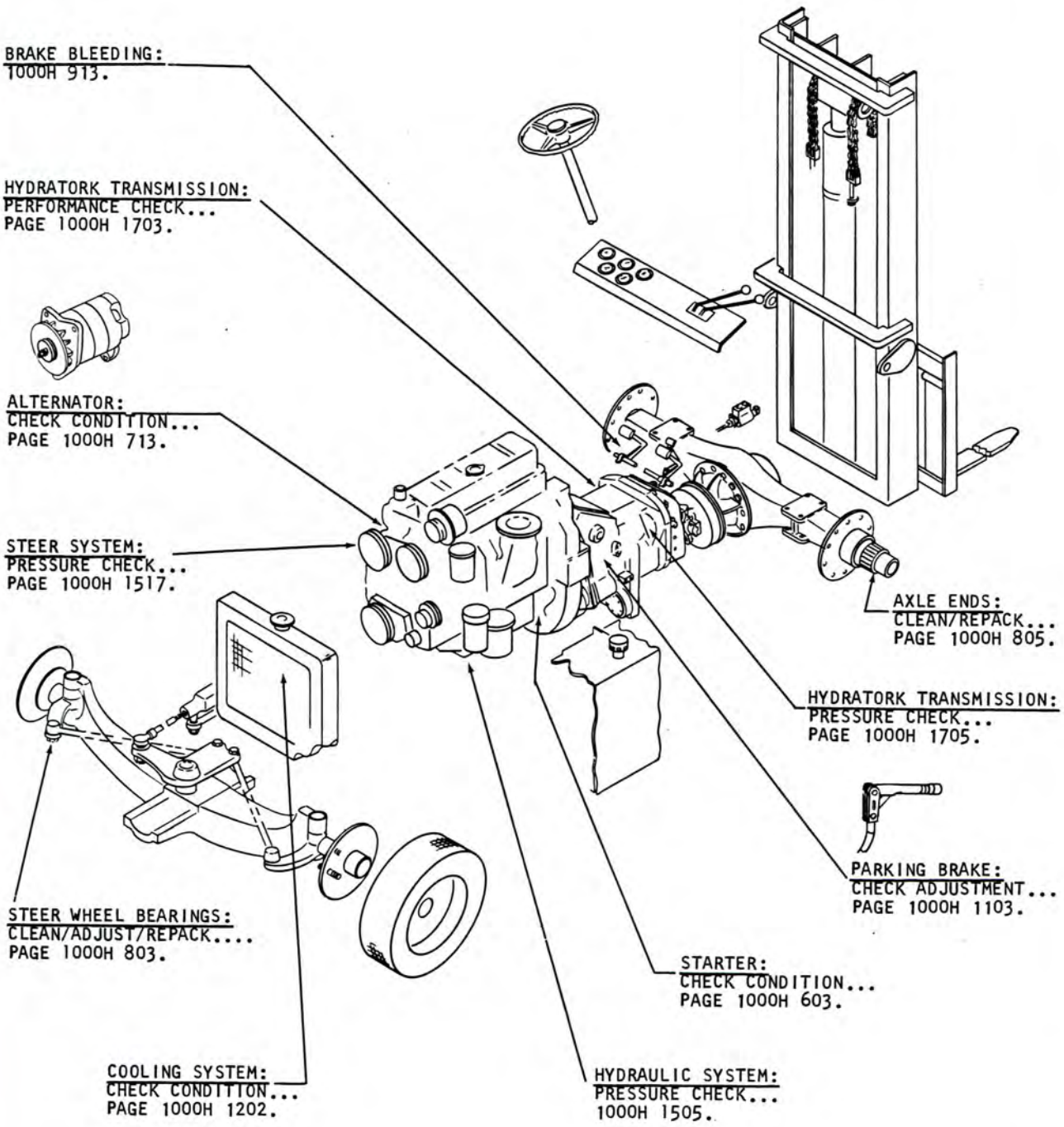


Plate 9768. Steer Wheel Bearings

CLEAN, REPACK AND ADJUST STEERING WHEEL BEARINGS

Every 1000 operating hours or every six months of operation, whichever occurs first, clean, repack and adjust wheel bearings using a smooth stringy multi-purpose grease or refined mineral oil blended with a lithium soap thickner containing anti-wear, anti-rust and anti-oxidants with EP additives. To meet or exceed Clark Specifications MS-107 and Timken Test 40# minimum [NLGI #1 or NGI #2].

Shell Aluania EP Grease #1 or #2.
Sun Prestige 741 EP #1 or 742 EP #2;
Gulfcrown Grease EP #2;
AMOLITH Grease EP #1 or #2;
Citgo HEP #1 or #2;
Texaco Multifak EP #1 or Marfak All Purpose #2;
Poco HT Grease EP #1 or #2;
Molub-Alloy General Purpose Grease #1 or #2;

or the equivalent of the above listed lubricants.

1. Raise the rear of the machine far enough to clear the floor and place heavy blocking under the machine frame....not under the counterweight....so it cannot accidentally become lowered. Deflate the tires....machines so equipped.... and remove the wheels from the hub assembly.

X X X X X X X X X X X X X X X X X X X X X X X X X

X W A R N I N G X

X AFTER RAISING MACHINE AND BEFORE X

X MAKING ANY ADJUSTMENTS OR ADJUST- X

X MENT CHECKS, PLACE ADEQUATE (HEAVY) X

X BLOCKING (SUFFICIENT TO SUPPORT THE X

X WEIGHT OF THE MACHINE) UNDER THE X

X FRAME....NOT UNDER THE COUNTERWEIGHT X

X ....TO PREVENT ACCIDENTAL LOWERING X

X OR FALLING OF THE VEHICLE, THUS X

X PREVENTING PERSONAL INJURY TO MECH- X

X ANIC OR BYSTANDERS. X

X X X X X X X X X X X X X X X X X X X X X X X X X

2. Clean the bearings in a Stoddard type cleaning solvent. After all solidified particles of lubricant are removed from the bearings blow dry with compressed air. Direct air stream across bearings to prevent spinning. Slowly rotate bearings by hand to facilitate drying. Inspect bearings and races carefully to determine if they are in good condition and suitable for further service. Dry the hub with compressed air.

3. Repack with a smooth stringy multi-purpose grease of refined mineral oil blended with a lithium soap thickner containing anti-wear, anti-rust and anti-oxidants with EP additives. To meet or exceed Clark Specifications MS-107 and Timken Test 40# minimum [NLGI #1 or NLGI #2].

ADJUSTMENT CHECK

1. Inspect adjustment of bearings by gripping top and bottom of tire, chuck tire in and out to determine looseness or wobble. Now grip front and rear side of tire, chuck tire in and out to determine looseness or wobble.

N O T E

Before making wheel bearing adjustment, be sure play [looseness or wobble] is in the wheel bearings and not in the king pins. [If wheel bearings need adjustment clean and repack bearings before making adjustments. Refer to lubrication paragraph/s in preceding write-up].

ADJUSTMENT

2. If looseness or wobble is in the wheel bearings, remove hub cap and spindle cotter pin. Tighten nut with a 12" wrench and at the same time rotate the wheel in one direction and then in the other until there is a slight bind to be sure all bearing surfaces are in contact. Then back off the nut 1/6 to 1/4 turn allowing the wheel to rotate freely. Secure nut at this position with a new cotter pin and replace hub cap.

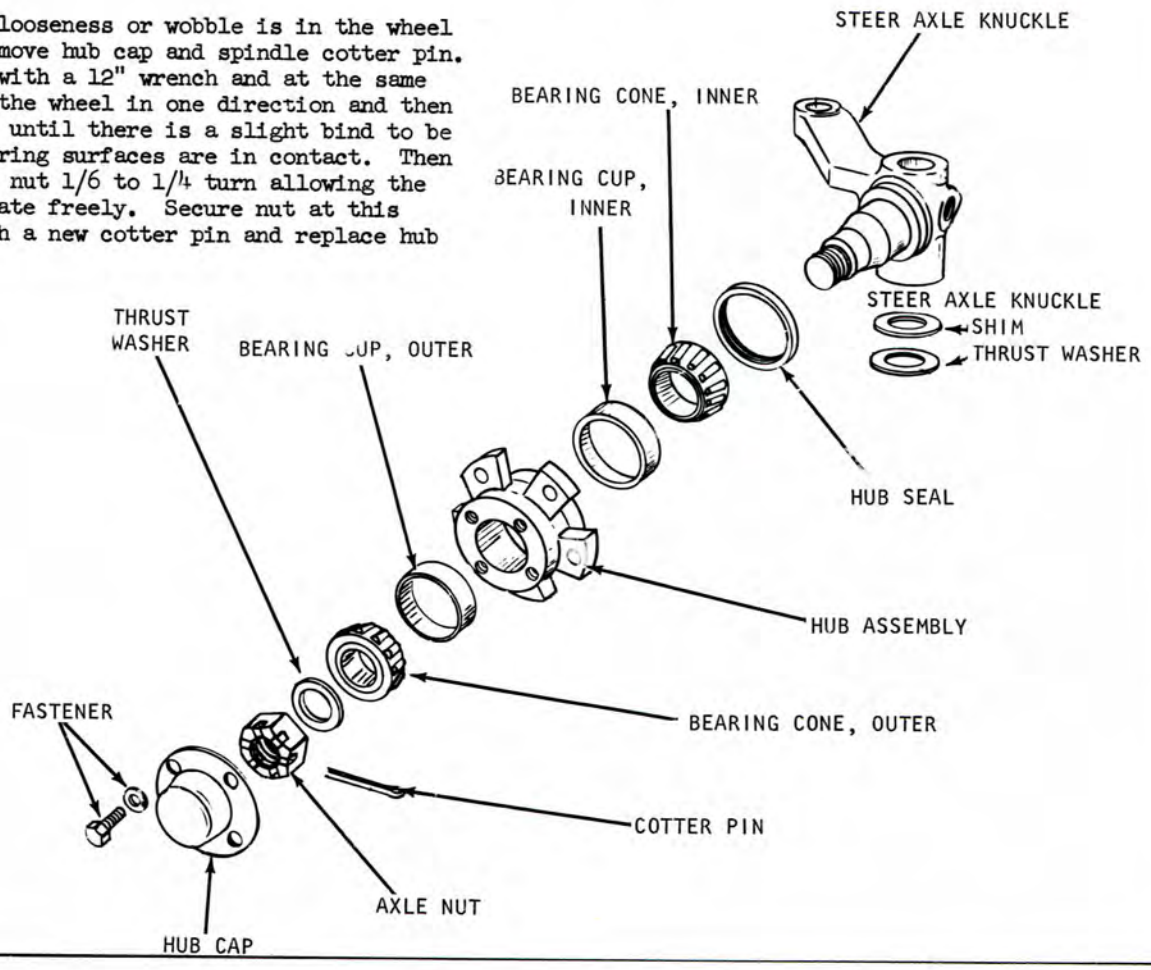


Plate 9857. Steer Wheel Bearings

CLEAN AND REPACK AXLE ENDS (CUSHION MACHINES):

Every 1000 operating hours or every six months of operation, whichever occurs first, clean and repack the axle ends using a smooth stringy multi-purpose grease or refined mineral oil blended with a lithium soap thickner containing anti-wear, anti-rust and anti-oxidants with EP additives. To meet or exceed Clark Specifications MS-107 additives.

Test 40# minimum (NLGI #1 or NGI #2).
Shell Aluania EP Grease #1 or #2;
Sun Prestige 741 EP #1 or 742 EP #2;
Gulfcrown Grease EP #2;
Amolith Grease EP #2;
Citgo HEP #1 or #2;
Texaco Multifak EP #1 or Marfak All Purpose #2;
Poco HT Grease EP #1 or #2;
Molub-Alloy General Purpose Grease #1 or #2; or the equivalent of the above listed lubricants.

Plate 9799. Raise Tires Clear of Floor

1. Tilt upright back. Place solid heavy blocks under each upright rail. Tilt upright forward until vertical to the floor. This should allow the drive wheels to clear the floor. Deflate the tires....machines so equipped.... and remove the wheels from the hub assembly.

2. Remove the hub cap, cotter pin, washer, spindle nut and pull hub assembly from spindle.

3. Remove bearings and clean in a Stoddard type cleaning solvent. Slosh bearings up and down in solvent. Remove and tap large side of bearing against a block of wood to dislodge solidified particles of lubricant. Repeat operation until bearings are thoroughly clean. Blow bearings dry with compressed air. Direct air stream across bearing to avoid spinning. Slowly rotate bearing by hand to facilitate drying. Dip bearings in gear oil and wrap them in clean paper until they are to be reinstalled.

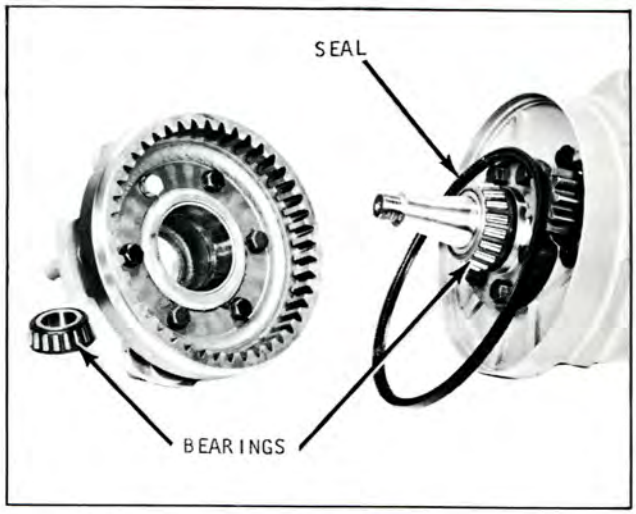


Plate 6892. Typical Axle End Assembly

4. Clean ring gear, pinion drive shaft, hub assembly, spindle and spindle support in a Stoddard cleaning solvent.

5. Inspect seal for cuts, scratches and nicks. It is necessary to replace seal if such a condition is found.

Plate 9775. Repack Axle End

6. Repack each axle end with specified lubricant. Each axle end holds approximately 1 pound of grease. Check axle end vent for obstruction, vent must be open.

7. Install bearings, seal, hub, washer, spindle nut, cotter pin and hub cap. Tilt upright back and remove blocking.

AXLE ENDS:

Drain and refill with the lubricant as outlined in the lubrication section as follows:

1. Rotate wheel until FILL/DRAIN PLUG is down. Remove drain plug and allow oil to drain.

N O T E

A clean method to drain these axle ends is to screw a 12" curved pipe into the FILL/DRAIN opening. This pipe could then be used to help when you refill.

2. Now rotate wheel till arrow beneath level plug points down. Remove level plug and fill the axle ends till the fluid pours out of the level hole.

3. Replace both plugs.

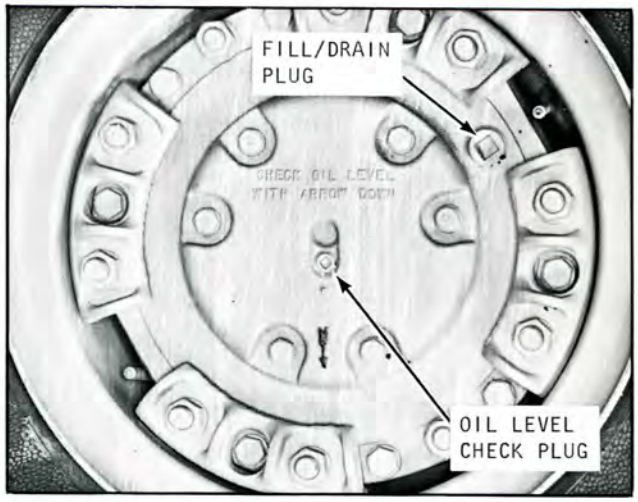


Plate 11534. Typical Axle Ends

POWER ASSIST BRAKE TEST:

A simple operation test to determine whether the power unit is operating, can be made as follows:

Start the engine and allow vacuum to build up in the system and then shut off the engine. Depress the brake pedal to a given point several times noting any increase in pedal pressure required to depress the pedal. If there is a noticeable increase in the amount of pedal pressure required to depress the pedal the last time, compared with the first time, the power brake unit is operating. If, however, there is no change in the amount of pedal pressure required between the first and the last test, then the power system is not functioning, necessitating corrective service.

Before replacing the power unit, a systematic check of the complete power brake system should be made to make sure the trouble is in the power brake unit. A check on the vacuum supply should be made to insure that an adequate supply of vacuum is available at the power unit for good operation. A malfunctioning vacuum pump, kinks in the vacuum lines, soft spots in the hose (resulting in collapse) could cut off or restrict the vacuum supply to the point where the power brake does not operate properly.

At this point, use a standard vacuum gauge to determine that the vacuum pump is operating properly. Before making any operational tests, check level of brake fluid in the master cylinder or hydraulic cylinder fluid reservoir. The fluid level should be approximately 1/4" from the top of the reservoir. Excessive loss of brake fluid from the complete brake system may be due to leakage in the power unit or leakage at some point in the basic brake system. External leakage can usually be located by visual inspection. The presence of brake fluid in the vacuum hose indicates internal hydraulic leakage in the power brake unit.

With the engine shut off, depress brake pedal and hold pedal depressed. If pedal gradually moves down under steady pressure on the pedal, leakage is indicated which may be past the primary piston cup of the master cylinder or hydraulic cylinder, at the wheel cylinder cups, or from external leakage in the lines, fittings or seals. Check out the basic system for leakage. If no leakage occurs in the basic brake system, the trouble is in the power unit hydraulic section. Should power brakes fail to fully release, check brake pedal for free play, adjust if necessary, also check pedal linkage for bind, wear or misalignment. Free up linkage and lubricate if necessary.

Use Brake Lubricant on plastic bushings and bearings. If pedal adjustment or freeing up linkage does not correct the malfunction, the trouble is in the master cylinder, hydraulic cylinder, in the power unit or the vacuum pump. To check master cylinder compensating port action or hydraulic cylinder compensating valve action of integral type units, depress the brake pedal slowly with the fluid reservoir cover removed and watch for a spurt of fluid as the compensating port closes. Failure to obtain a spurt of fluid as the brake pedal is slightly depressed, indicates that the lip of the primary cup does not clear the compensating port or failure of the compensating valve to open when the brake pedal is in the released position. This condition may be due to a swollen cup, incorrect internal pushrod adjustment or a bent compensating valve stem.

To make vacuum tests on power units, start the engine and allow vacuum to build up in the system. Stop engine and wait one minute (five minutes if vacuum reservoir is used) - then apply the brakes. Vacuum should still be in the system. A rapid loss of vacuum may be due to a faulty check valve, leakage in the vacuum section of the power unit. To isolate the power unit from the vacuum system (except where the vacuum check valve is attached directly to the power unit) disconnect vacuum line at the power unit from the vacuum system (except where the vacuum check valve is attached directly to the power unit) disconnect vacuum line at the power unit and plug end of hose. Again start engine and after a few revolutions, stop engine. Vacuum in the lines should hold for one minute (five minutes with reservoir) in system without any noticeable loss. If vacuum drops rapidly, replace check valve and any defective hose or tubing and repeat test. When vacuum holds, repeat test with power unit in the system. If vacuum fails to hold with power unit in the system, leakage is indicated, necessitating replacement of the power unit.

Hydraulic leakage in the brake master cylinder can be corrected by servicing the master cylinder. Hydraulic leakage in the power brake units where the hydraulic section is a part of the unit necessitates replacement of the complete power brake unit.

See 1000H 902 for Trouble Shooting.

TROUBLE SHOOTING:

TROUBLE	POSSIBLE CAUSES	POSSIBLE REMEDIES
Low vacuum.	Excessive vacuum leaks in vacuum lines and fittings.	Check for loose vacuum fittings throughout system and tighten if necessary.
	Inadequate lubrication in vacuum pump.	Check for restrictions in oil lines or low oil supply in separator tank.
	Low pump speed due to belt slippage.	Correct belt tension.
	Excessive clearance in vacuum pump.	Pump must be removed from the installation, disassembled and clearances corrected.
No vacuum output from pump.	Belt broken or off of pulley.	Replace belt. Check and adjust belt tension.
Oil leakage between end plates and housing.	Faulty rubber gaskets between end plates and housing.	Pump must be removed, disassembled and gaskets replaced.
Oil leakage around rotor shaft at front end plate.	Faulty oil seal in front end plate.	Pump must be removed and disassembled. Polish rotor shaft at oil seal locations and install new seal.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

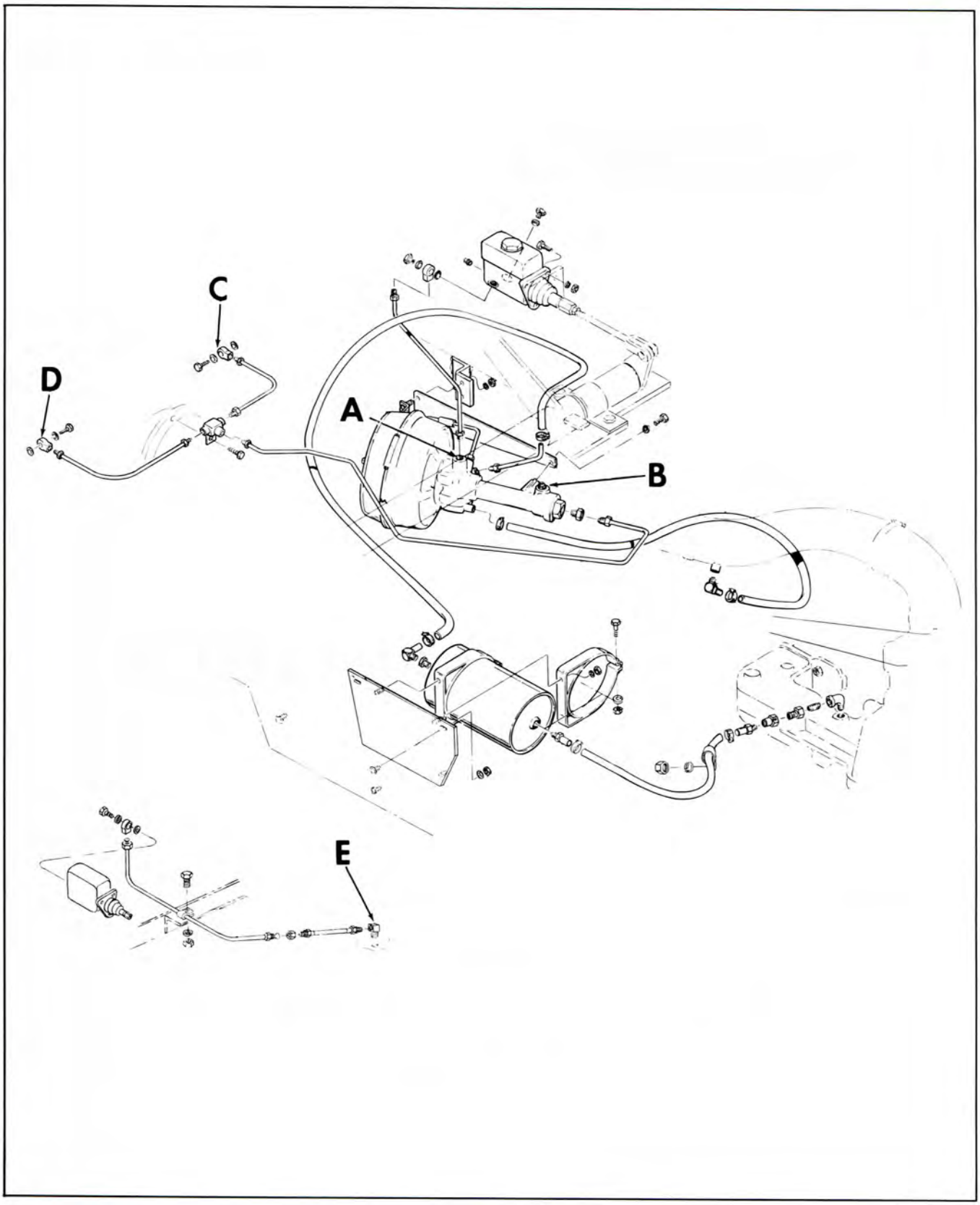


Plate 11537. Typical Bleeder Points

PRESSURE BLEEDING PROCEDURE

FOR PNEUMATIC MACHINES:

Make sure the bleeder tank contains enough of the right type of brake fluid to do the job. Do not intermix types of brake fluids. Never reuse brake fluid drained from any brake system.

N O T E

The following procedure is for machines with power assist brakes and inching. For machines without power assist brakes, skip bleeder points A and B. For machines without inching, skip bleeder point E.

x x x x x x x x x x x x x x x x x x x x x x x x x x x
x x
x W A R N I N G x
x x
x MAKE SURE PRESSURE BLEEDER TANK HAS BEEN x
x x
x TESTED TO WITHSTAND THE PRESSURE AS STATED x
x x
x BY THE MANUFACTURER. x
x x
x x x x x x x x x x x x x x x x x x x x x x x x x x x

1. Clean all dirt, grime, etc. from around the master cylinder reservoir cap and also from the inching master cylinder reservoir cap (Hydratork Models).

2. Remove the master cylinder reservoir cap and fill reservoir with fluid specified in the lubrication section to within 1/4" from top.

3. Put about 2 quarts of fluid in the bleeder tank, apply the right air pressure and attach hose to master cylinder.

4. Place a rubber hose on bleeder fitting (A). Submerge hose in a jar containing fluid, and bleed until no bubbles show in the fluid at this point. When air bubbles stop coming into the container, close the bleeder fitting and remove the tube.

5. Now place a rubber hose on points B, C, D and bleed in the same manner.

6. Disconnect bleeder tank line from master cylinder and connect it to the inching master cylinder (Hydratork Machines).

7. Following the same procedure as outlined above, bleed point E.

8. When bleeding operation is completed, fill both cylinders to within 1/4 inch from the top.

MANUAL BLEEDING PROCEDURE:

If a pressure bleeder is unavailable, the system may be bled manually. It must be remembered that the brake pedal should be depressed slowly and held until the line connections or bleeder screws are securely tightened. This prevents the possibility of air being drawn into the system during the bleeding operation. Check the master cylinder reservoir level often during manual bleeding and keep within 1/4 inch from the top.

With filler cap off the master cylinder, depress and release brake pedal. A small displacement of fluid should be noticed in the cylinder reservoir. If this happens, the brake pedal (upon being released) is returning the master cylinder piston to its normal position to open a master cylinder port. This port must be open.

If fluid is not displaced upon releasing the brake pedal, a pedal adjustment is required.

x x x x x x x x x x x x x x x x x x x x x x x x x x x
x x
x W A R N I N G x
x x
x RELEASE PRESSURE FROM BLEEDER TANK WHEN x
x x
x THRU. x
x x
x x x x x x x x x x x x x x x x x x x x x x x x x x x

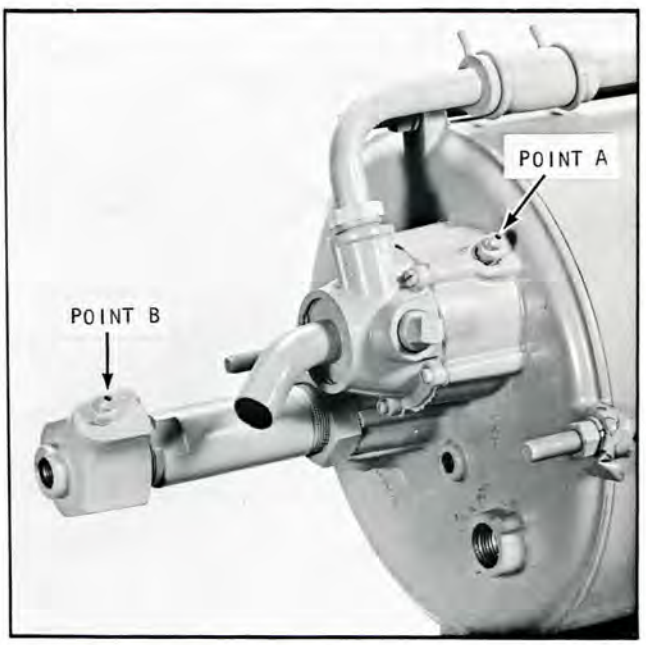


Plate 11536. Typical Bleeder Points

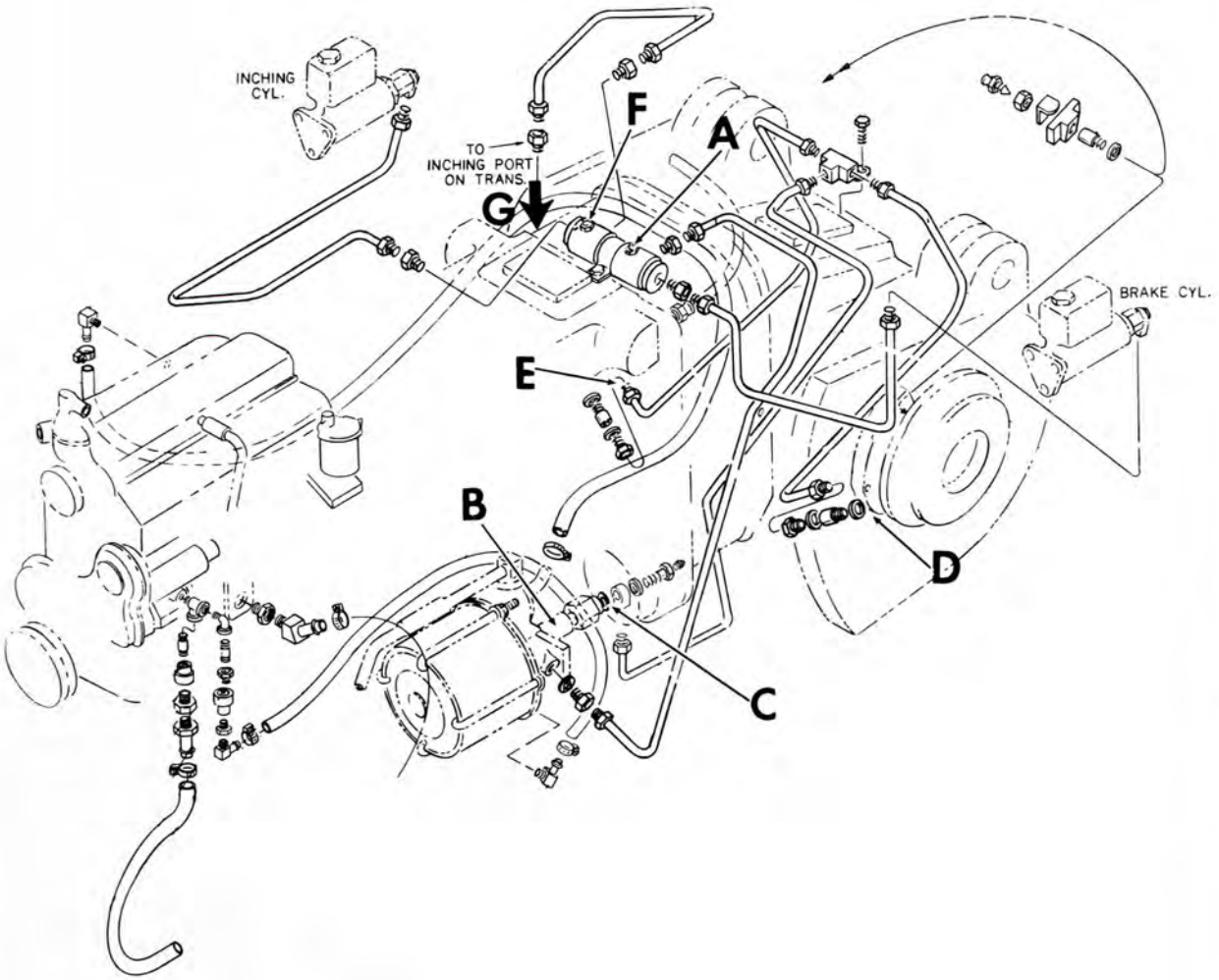


Plate 11538. Typical Bleeder Points

PRESSURE BLEEDING PROCEDURE

FOR CUSHION MACHINES:

Make sure the bleeder tank contains enough of the right type of brake fluid to do the job. Do not intermix types of brake fluids. Never reuse brake fluid drained from any brake system.

N O T E

The following procedure is for machines with power assist brakes and inching. For machines without power assist brakes and inching, bleed points D and E only.

W A R N I N G

MAKE SURE PRESSURE BLEEDER TANK HAS BEEN TESTED TO WITHSTAND THE PRESSURE AS STATED BY THE MANUFACTURER.

1. Clean all dirt, grime, etc. from around the master cylinder reservoir cap and also from the inching master cylinder reservoir cap (Hydratork Models).

2. Remove the master cylinder reservoir cap and fill reservoir with fluid specified in the lubrication section to within 1/4" from top.

3. Put about 2 quarts of fluid in the bleeder tank, apply the right air pressure and attach hose to master cylinder.

4. Place a rubber hose on bleeder fitting (A). Submerge hose in a jar containing fluid, and bleed until no bubbles show in the fluid. When air bubbles stop coming into the container, close the bleeder fitting and remove the tube.

5. Now place the rubber hose on bleeder points B, C, D, E and bleed in the same manner.

6. Disconnect bleeder tank line from master cylinder and connect it to the inching master cylinder (Hydratork Machines).

7. Following the same procedure as outlined above, bleed points F and G.

8. When bleeding operation is completed, fill both cylinders to within 1/4 inch from the top.

MANUAL BLEEDING PROCEDURE:

If a pressure bleeder is unavailable, the system may be bled manually. It must be remembered that the brake pedal should be depressed slowly and held until the line connections or bleeder screws are securely tightened. This prevents the possibility of air being drawn into the system during the bleeding operation. Check the master cylinder reservoir level often during manual bleeding and keep within 1/4 inch from the top.

With filler cap off the master cylinder, depress and release brake pedal. A small displacement of fluid should be noticed in the cylinder reservoir. If this happens, the brake pedal (upon being released) is returning the master cylinder piston to its normal position to open a master cylinder port. This port must be open.

If fluid is not displaced upon releasing the brake pedal, a pedal adjustment is required.

W A R N I N G

RELEASE PRESSURE FROM BLEEDER TANK WHEN THRU.

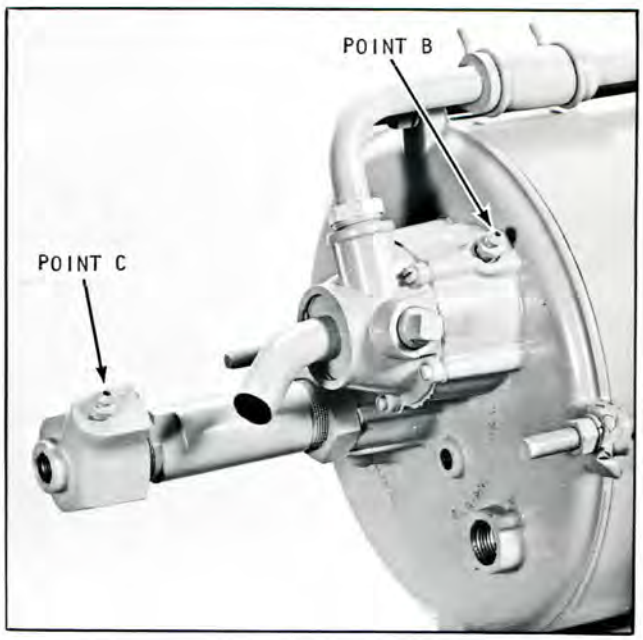


Plate 11539. Typical Bleeder Points

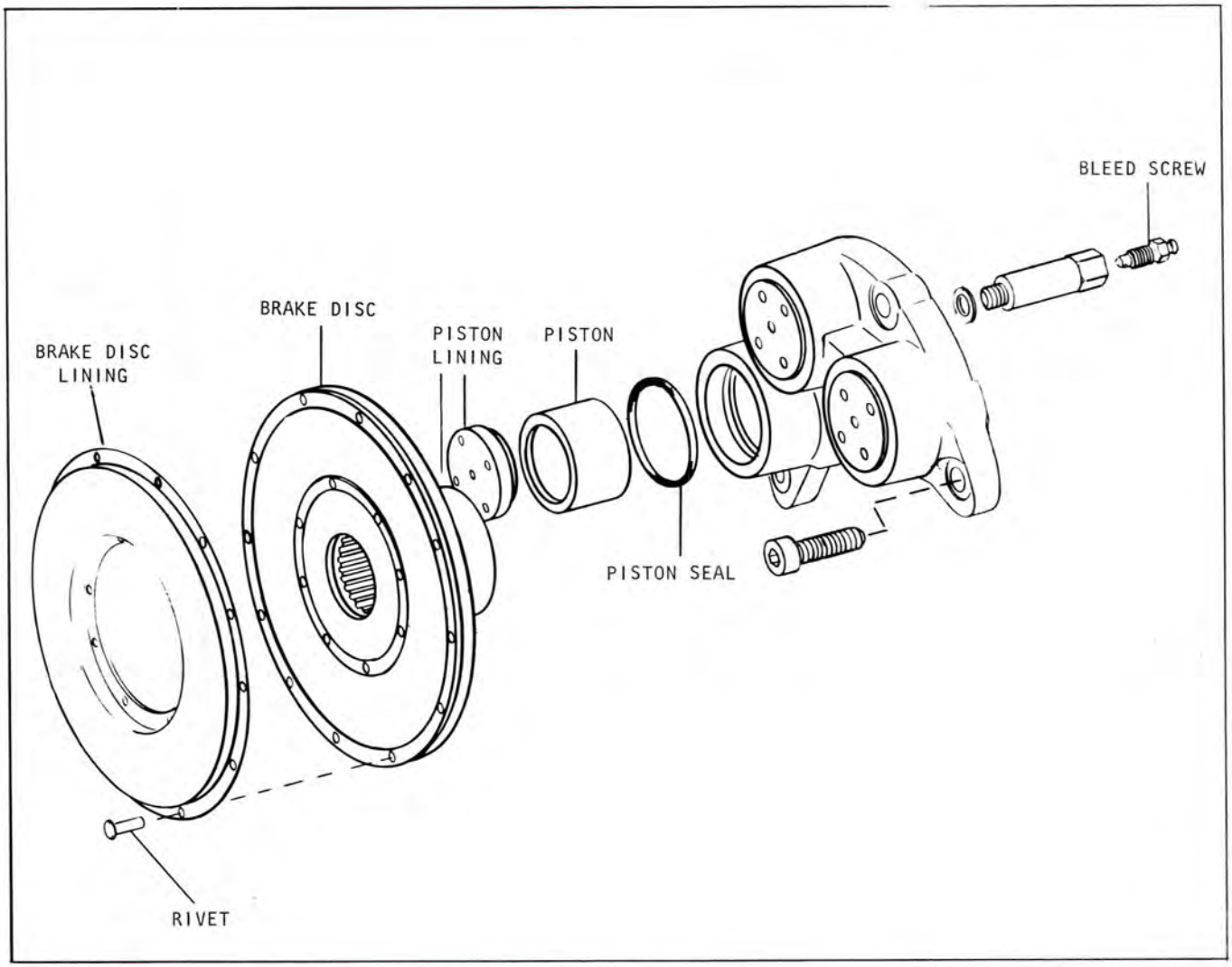


Plate 8261. Typical Wheel Brake Assembly

DESCRIPTION

When depressing the brake pedal, hydraulic pressure is applied to the brakes, the pistons move out and their linings force the brake disc and its lining against a member of the axle end producing braking action by friction.

INSPECTION

Operating conditions determine the inspection and service periods for the brake linings. If it is found that the brake effectiveness has dropped to a noticeable degree (and the system has been properly bled and pedal free travel is correctly adjusted) the axle ends should be removed so that linings may be inspected to determine their further serviceability.

The original thickness of the brake disc lining is 0.221 inch. The disc lining is effective until it is worn to 1/16 inch thickness. If after inspection it is found that the lining is worn to the extent that it will not be effective until the next inspection period, it should be replaced. The brake piston lining when new is 0.649 inch thick to the step on the lining. This lining should also be replaced if it is determined that it will be worn to within 1/16 inch of step before the next inspection period.

Before replacing axle ends, check the cylinders for leakage. The actual presence of fluid, other than mere dampness, indicates a fluid leak. Correct leaks as necessary by replacing the piston seals after cleaning the pistons and seal grooves thoroughly.

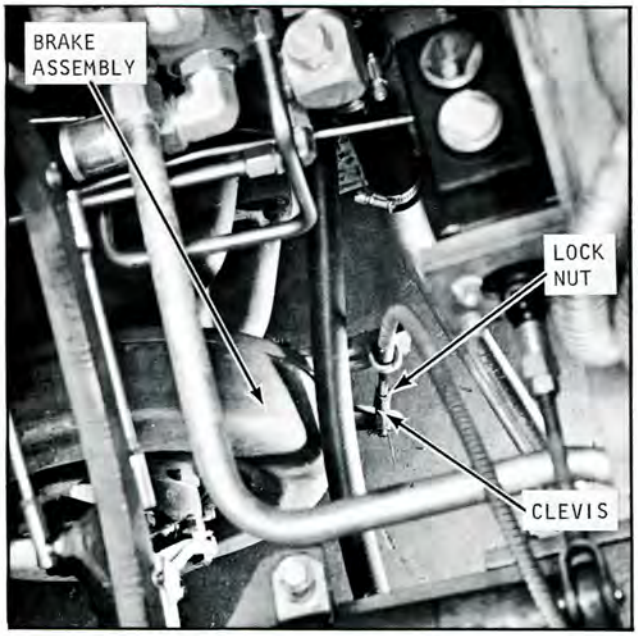


Plate 11523. Typical Transmission Parking Brake Assembly

PARKING BRAKE ADJUSTMENT CHECK AND ADJUSTMENT:

Adjustment Check:

Make certain that the parking brake is working properly. Fully apply hand brake, moving lever from full forward to full rear position...cable tension should be strong enough so that the lever hesitates or remains in a vertical position before continuing on as lever passes through center position to full rear position. If not, retate knurled knob on end of brake lever several turns clockwise.

Hydratork Models...now...again set hand brake lever, then...start engine (driver shall occupy driver's seat when making test) and place gear shift lever into low range. Depress accelerator pedal until engine runs up to full or maximum stall. Truck should not move or creep.

C A U T I O N

DO NOT RUN ENGINE AT STALL MORE THAN 5 SECONDS.

Hydracool Clutch Models...now...again set hand brake lever, then...start engine and place gear shift lever into low range. Depress accelerator pedal until engine runs up to full governed RPM ...slowly let out on the clutch pedal...truck should not move or creep...even at the point where the engine stalls.

N O T E

The parking brake must be capable of holding truck, with rated capacity load, on a 15% grade.

Parking Brake Adjustment:

1. Release hand brake lever...rotate knurled knob on end of lever counterclockwise to end of travel to release all cable tension.

2. Place brake lever in the applied position... full rear position.

3. Adjust clevis on end of cable at the transmission brake until lever on brake assembly just snugs up solid. This expands brake shoes into contact with brake drum.

4. Now...release brake lever and move it to the full forward position.

5. Rotate knurled knob on end of lever...clockwise several turns...enough to place a considerable amount of tension on the cable.

6. Now...apply hand brake and start engine.

7. Follow the Adjustment Check procedure in the opposite column.

8. If the vehicle moves or creeps, release accelerator pedal, place shift lever in neutral position, and...release hand brake lever. Now ....rotate knurled knob clockwise several more turns....enough to place approximately twice the tension on the cable as before. Check adjustment again. Readjust until brake meets specifications.

COOLING SYSTEM

Radiator Pressure Caps:

```
X X X X X X X X X X X X X X X X X X X X X X X X X X X
X                                                     X
X                    W A R N I N G                    X
X                                                     X
X USE EXTREME CARE IN REMOVING THE RADIATOR           X
X                                                     X
X PRESSURE CAP.  IN PRESSURE SYSTEMS, THE             X
X                                                     X
X SUDDEN RELEASE OF PRESSURE CAN CAUSE A              X
X                                                     X
X STEAM FLASH AND THE FLASH, OR THE LOOSENED          X
X                                                     X
X CAP CAN CAUSE SERIOUS PERSONAL INJURY.              X
X                                                     X
X LOOSEN CAP SLOWLY AND ALLOW STEAM TO ESCAPE.        X
X                                                     X
X X X X X X X X X X X X X X X X X X X X X X X X X X X
```

1. Inspect pressure cap gasket and radiator filler neck to be sure they are providing a proper seal. If the rubber face of the valve is defective, a new cap should be installed.

Plate 6458. Radiator Pressure Cap

2. Inspect pressure cap for freedom of operation. Pressure caps employ a spring loaded, rubber-faced valve which presses against a seat in the radiator top tank. Pressure caps employ either a vacuum valve held against its seat under spring pressure, or a weighted vacuum valve which hangs open until forced closed by a surge of vapor or coolant. Check to be sure components are free to operate.

N O T E

If a new cap is required, always install a cap of the same type and pressure rating.

3. Inspect for dented or clogged overflow pipe. To remove clogged material, run a flexible wire through pipe until obstruction is removed. When a pressure cap opens the sudden surge of vapor or liquid must pass thru the overflow pipe. If the pipe is dented or clogged, the pressure developed by the obstruction may cause damage to radiator or hoses.

Inspect and Clean Cooling System:

Check hose connections for coolant leaks as well as air leakage. Air leakage around hose connections allows oxygen into the system which is a major factor in corrosion.

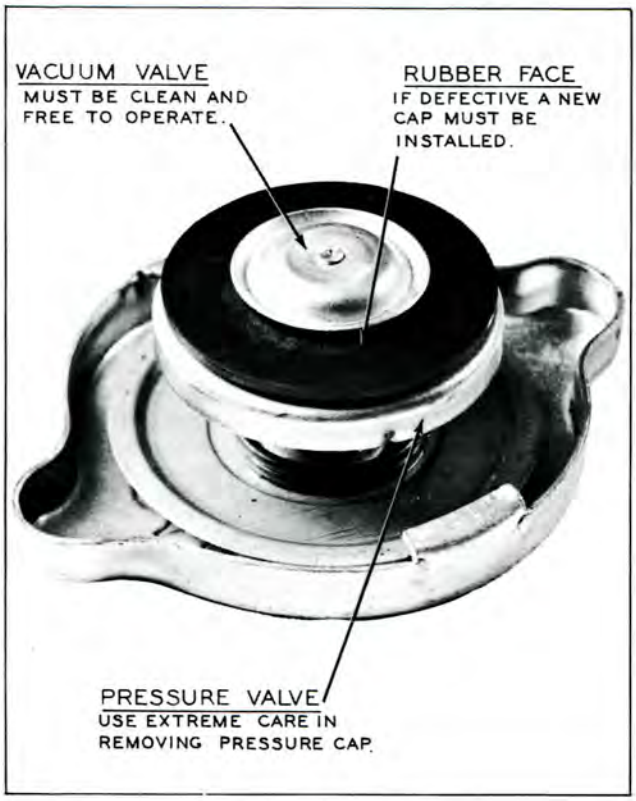


Plate 6459. Pressure Cap Gasket, Valve and Valve Gasket

N O T E

Exhaust gas leakage between cylinder head and gasket also results in corrosion. If exhaust gas discharges into coolant, the coolant and the gas combine to form a variety of acids. It is important that cylinder head stud nuts be drawn down to specs as shown in "Engine Tune-Up".

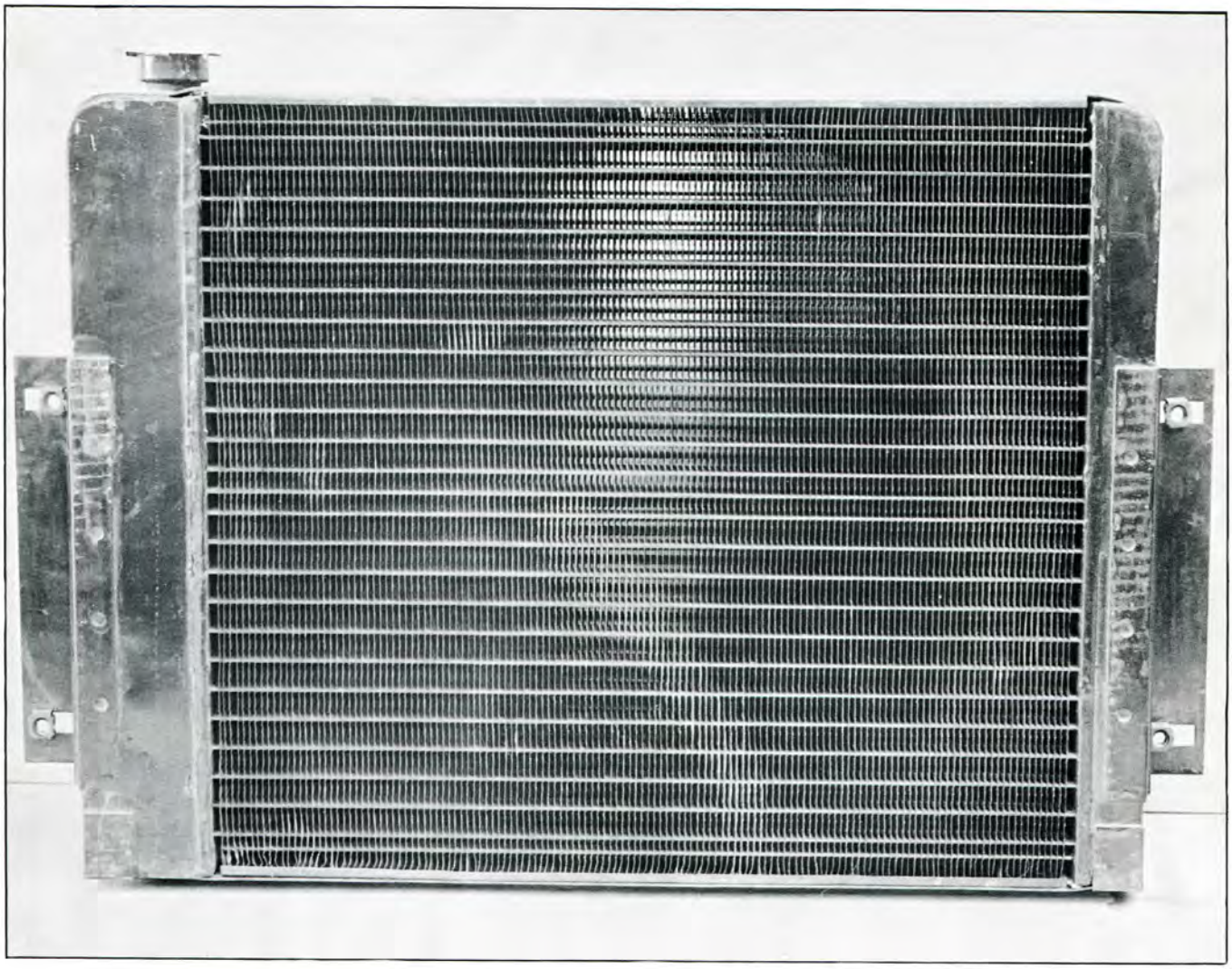


Plate 9740. Typical Cross-Flow Radiator

Using a washing soda solution, flush cooling system in the following manner:

1. Drain system.
2. Replace half of volume with fresh water. Refer to Specifications for capacity.
3. Boil other half of volume and add washing soda until no more will dissolve.
4. Add hot soda solution to cooling system (fill up).
5. Operate engine normally for 24 hours.
6. Drain, flush, refill with clean water to which a soluable oil has been added in a proportion of 1 ounce per gallon of water.

Maintaining the cooling system efficiency is important, as engine temperatures must be brought up to and maintained within satisfactory range for efficient operation; it however, must be kept from overheating, in order to prevent damage to valves, pistons and bearings. Continued overheating may cause internal damage, while continuously low operating temperature wastes fuel, increases engine wear and causes oil sludge and corrosion of engine parts. Overcooling may be caused by operating conditions such as excessive idling, low speed and light loads during cold weather. Overheating may be caused by faulty thermostat, clogged radiator or an improperly adjusted fan belt.

CAUTION

NEVER POUR COLD WATER OR COLD ANTI-FREEZE INTO THE RADIATOR OF AN OVERHEATED ENGINE. ALLOW THE ENGINE TO COOL AND AVOID THE DANGER OF CRACKING THE CYLINDER HEAD OR BLOCK. KEEP ENGINE RUNNING WHILE ADDING WATER.

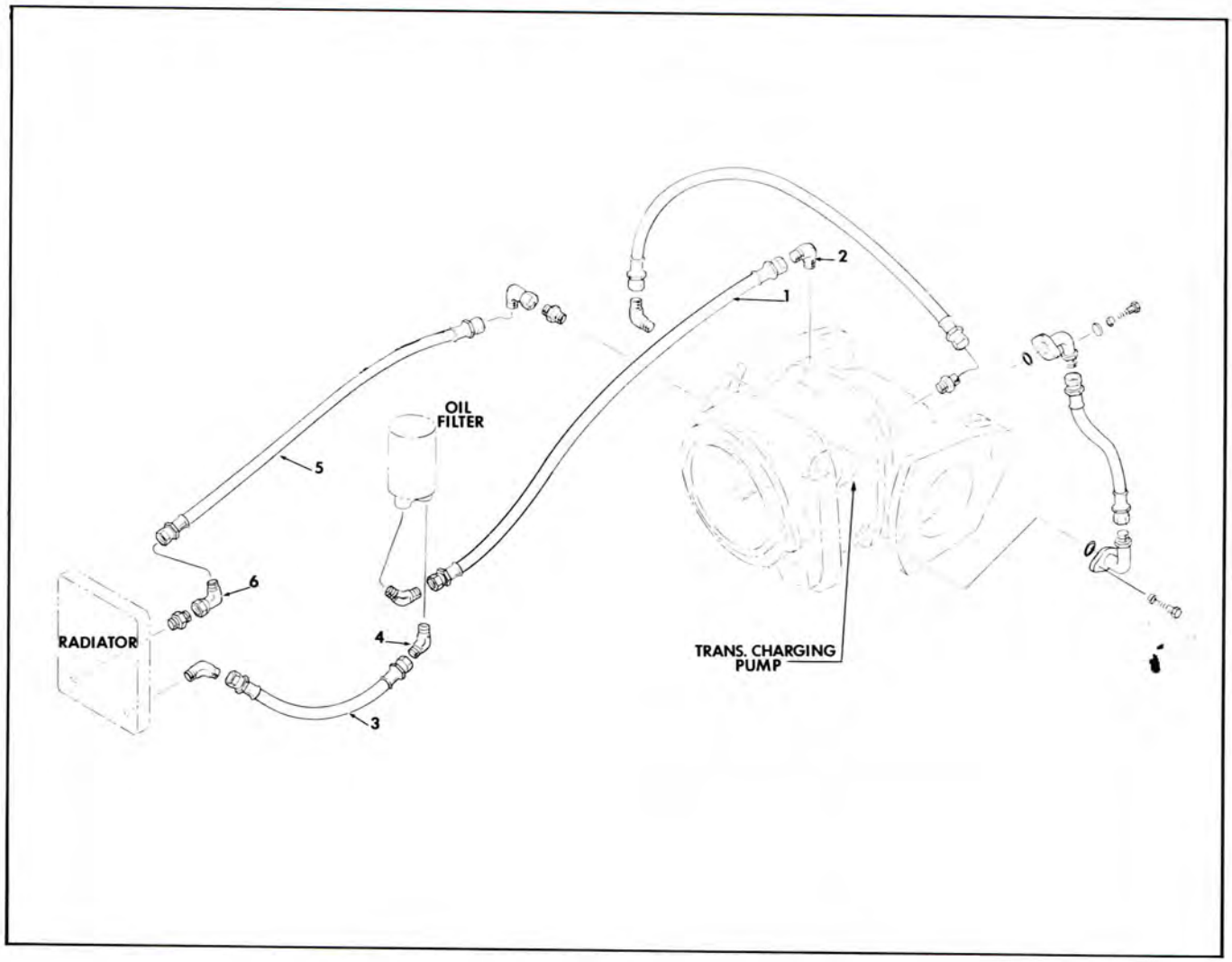


Plate 10988. Typical Transmission Cooling Lines

TRANSMISSION OIL COOLER CHECK:

The following procedure is a process of elimination to locate possible restrictions.

1. Check all lines for kinks and line pinching conditions.

2. Disconnect line 1 from fitting 2 and place line in a 3 gal. (or larger) container.

3. Start and accelerate engine to 1300 RPM, place line 1 in a 2 qt. container for 5 sec. and then remove. If the container fills in this time limit, at this RPM, then there are no restrictions in the oil cooling system.

4. If 2 qts. are not collected in 5 seconds at 1300 RPM at line 1, the same procedure is followed for line 3 at fitting 4 and line 5 at fitting 6.

If the flow is still below 2 qts. in 5 seconds at 1300 RPM, then the trouble will be found in the transmission.

THERMOSTAT REMOVAL:

1. Remove the bolts which retain the water outlet and the thermostat housing to the cylinder head.

N O T E

Be sure to mark the bolts in such a manner, so that upon reassembly, the same bolts are placed back in the same holes they came from.

2. Inspect and test thermostat.

THERMOSTAT TEST:

The thermostat operation can be checked by the following method;

1. Hang thermostat by its frame in a container of water so that it does not touch the bottom.

2. Check your engine manual to see at what temperature your thermostat is fully open. Heat the thermostat as shown to find out if it opens at the right temperature. If not, replace with a new thermostat.

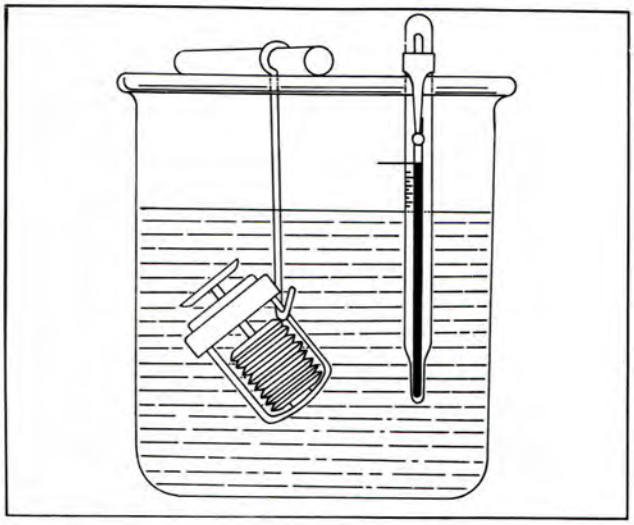


Plate 3553. Typical Thermostat Testing

THERMOSTAT REPLACEMENT:

1. Using gasket sealer on both sides, place thermostat on cylinder head.

2. Place water outlet on the cylinder head over the thermostat.

3. Install capscrews in their individual holes, finger tight.

4. Gradually and alternately tighten capscrews to normal torque.

HYDRAULIC SYSTEM PRESSURE CHECK:

The hydraulic relief valve setting may be checked with a Mico Quadrigage (Clark Part No. 1800106) or, by installing a conventional pressure gauge with a 0-4000 PSI scale at the hydraulic valve.

1. Connect the pressure line from the gauge to the test port of the valve by removing plug from test port.

2. Apply parking brake. Start engine and operate at governed rpm. Hold tilt lever back until the pressure builds up and moves the pressure relief valve off its seat. Avoid holding the tilt lever longer than is necessary to check pressure reading on gauge. Take reading, then release accelerator and tilt lever.

3. The pressure reading will indicate the setting of the relief valve. If reading taken is not reasonably close to those listed in specifications, appropriate repairs should be made. Report to designated person in authority.

Checking Main Hydraulic System Pressure With A Circuit Tester:

If a Schroeder Hydraulic Circuit Tester (Clark Part No. 1800060) is available, the hydraulic relief valve setting and the rate of flow being delivered by the hydraulic pump may be checked as follows:

1. Connect the pressure line from the tester to the test port of the hydraulic valve. Remove sump tank breather and insert the return line from the tester into the sump tank.

2. Apply parking brake. Start engine and operate at governed rpm. Hold tilt lever back while gradually closing the load valve until pressure reaches the relief valve setting in the main hydraulic valve (see Spec.). With the hydraulic fluid at the right temperature, make a note of the flow reading so it may be compared with the rate of flow found in the following step.

3. With engine operating at governed rpm, hold tilt lever in back position and continue to close the load valve until the pressure no longer increases on the gauge. (Close the load valve ONLY ENOUGH to reach the peak pressure reading and avoid holding the lever longer than necessary to check rate of flow and pressure.)

The pressure reading will indicate the setting of the relief valve. The flow reading should be compared with the flow register at the pressure relief valve setting (see Specs.). If the pump or valve is worn, flow will drop off appreciably as pressure is increased. This is due to internal oil slippage in the components.

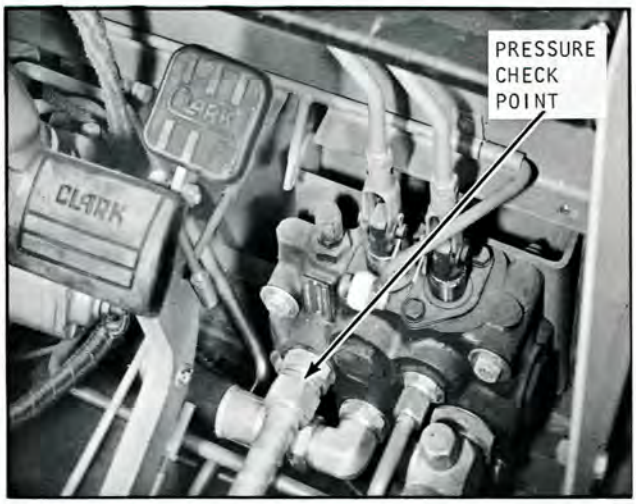


Plate 11524. Typical Hydraulic Point System Pressure Check

N O T E

Severly vibrating gauges are often an indication of entrapped air...check for suction line leaks.

If readings taken are not reasonably close to those listed in specifications, appropriate repairs should be made. Report to designated person in authority.

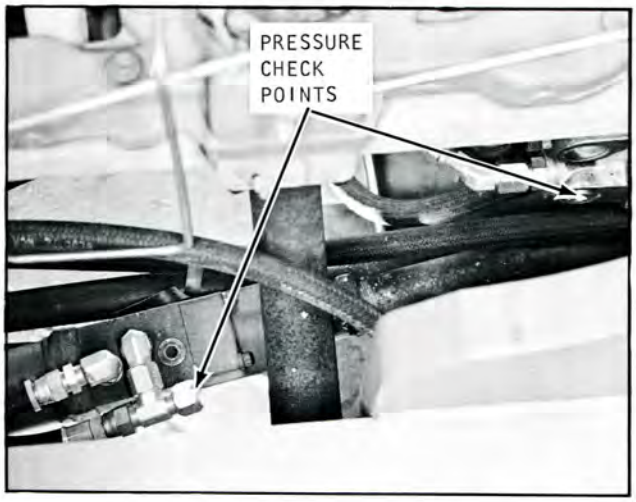


Plate 11513. Typical Power Steering Pressure Check.

POWER STEERING PRESSURE CHECK:

The power steering pressure may be checked with a Mico Quadrigage (Clark Part No. 1800106) or, by installing a conventional pressure gauge with a 0-3000 PSI scale...on the pressure side of the power steering pump as shown in the illustration.

1. Connect the gauge to the test port of the pump by removing the plug or cap from the test port.

2. Place blocking between axle and axle stop so that when the wheels are turned the pressure relief valve will move off its seat when pressure builds up.

3. Apply parking brake. Start engine and run at governed rpm. Rotate hand wheel all the way in one direction and hold...avoid holding the hand wheel (axle against stop) longer than is necessary to check pressure reading on gauge. Take the reading...release hand wheel and accelerator.

4. The pressure reading will indicate the setting of the relief valve. If reading taken is not reasonably close to those listed in specifications, appropriate repairs should be made. Report to designated person in authority.

CLARK EQUIPMENT

INDUSTRIAL TRUCK DIVISION

SERVICE ENGINEERING DEPARTMENT, BATTLE CREEK

CLARK EQUIPMENT

WORK SAFELY

DRIVE SAFELY

BE CAREFUL

ALWAYS

GIVE MACHINE SERIAL NUMBER

WHEN ORDERING PARTS

Rev OCT 73 1127-Z

TRANSMISSION FLUID AERATION CHECK

A FLUID LEVEL THAT IS TOO HIGH WILL CAUSE THE FLUID TO BECOME AERATED. AERATED FLUID WILL CAUSE LOW CONTROL PRESSURE AND THE AERATED FLUID MAY BE FORCED OUT THE VENT.

Check the transmission fluid level. Low fluid level can affect the operation of the transmission and may indicate fluid leaks that could cause transmission damage.

TRANSMISSION FLUID LEAKAGE CHECKS

LEAKAGE AT THE CONTROL COVER...INLET AND OUTLET PORTS OFTEN CAN BE STOPPED BY TIGHTENING THE ATTACHING BOLTS. IF NECESSARY, REPLACE THE GASKET.

Check the fluid lines and fittings between the transmission and the cooler in the radiator tank or on the transmission for looseness, wear, or damage. If leakage cannot be stopped by tightening a fitting ...replace the defective parts.

The cooler can be further checked for leaks by disconnecting the lines from the cooler fittings and applying 5 PSI air pressure to the fittings ...if the cooler is leaking and will not hold the pressure...the radiator must be replaced. The cooler cannot be replaced separately.

Inspect the pipe plug on the left side of the transmission case at the front. If the plug shows leakage...torque the plug to specifications. If tightening does not stop the leaks...replace the plug.

When converter drain plugs leak...remove drain plugs. COAT THE THREADS with a sealing compound and install the plugs. Torque the drain plugs to specifications.

I M P O R T A N T ‡ ‡

THIS TRANSMISSION USES ONLY TYPE "A", SUFFIX "A"

(OR) DEXRON AUTOMATIC TRANSMISSION FLUID.....

CLARK PART NUMBER 879803.

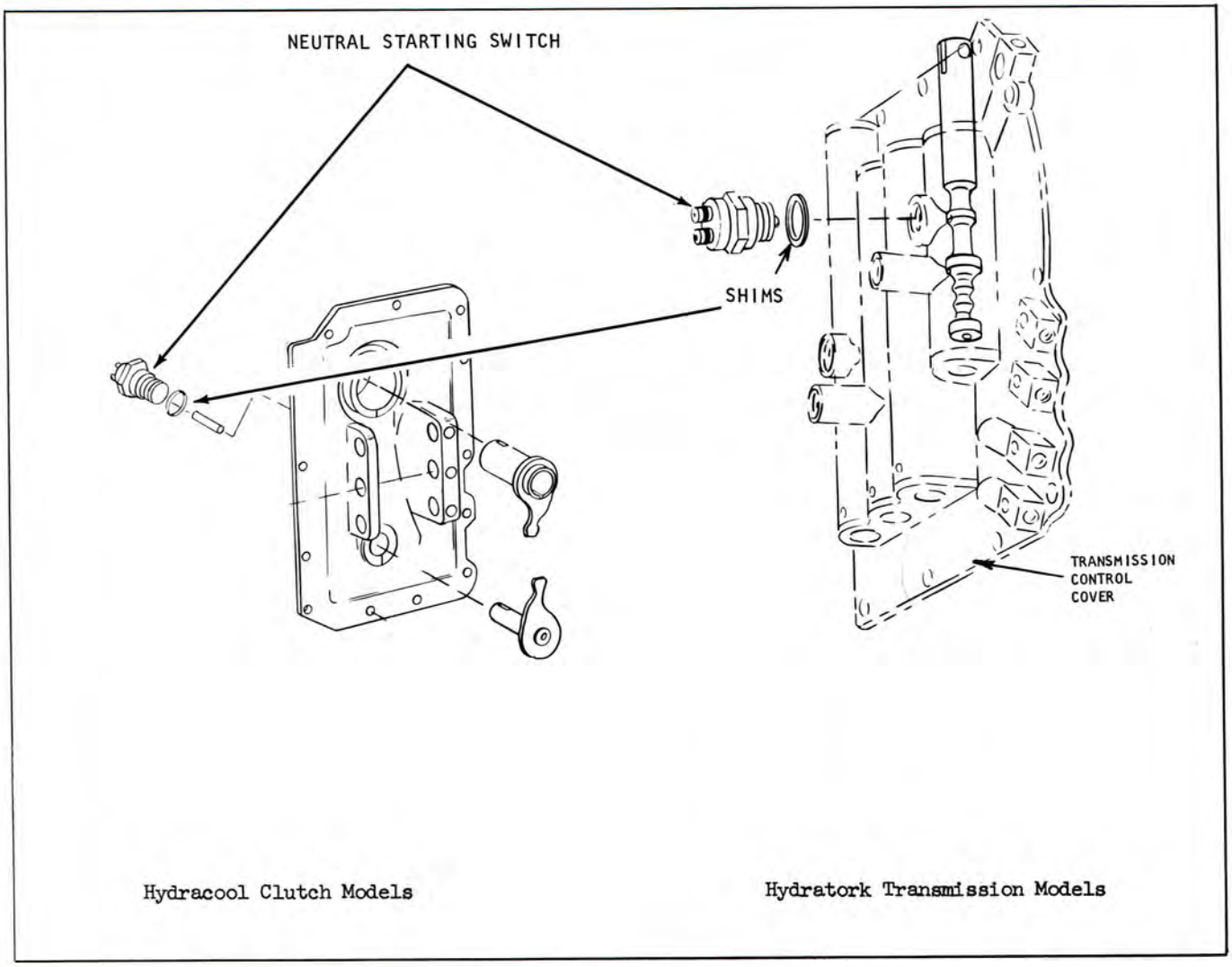


Plate 10648. Typical Neutral Starting Switches

NEUTRAL STARTING SWITCH:

The neutral starting switch should be adjusted so that machine will not start except when the transmission control is in the exact neutral position.

Adjustment Check:

1. With driver's seat occupied, parking brake applied, and transmission in gear (clutch pedal depressed on hydracool models),....turn and hold ignition switch in the start position. Then gently move shift lever towards neutral position from both directions.

2. If engine starts, coming from either direction (with the shift lever) prior to reaching neutral, switch should be adjusted by means of shims underneath the switch until engine will not start unless it is in the exact neutral position.

A. CARRIAGE REMOVAL

Before working on the upright, set parking brake and block drive wheels.

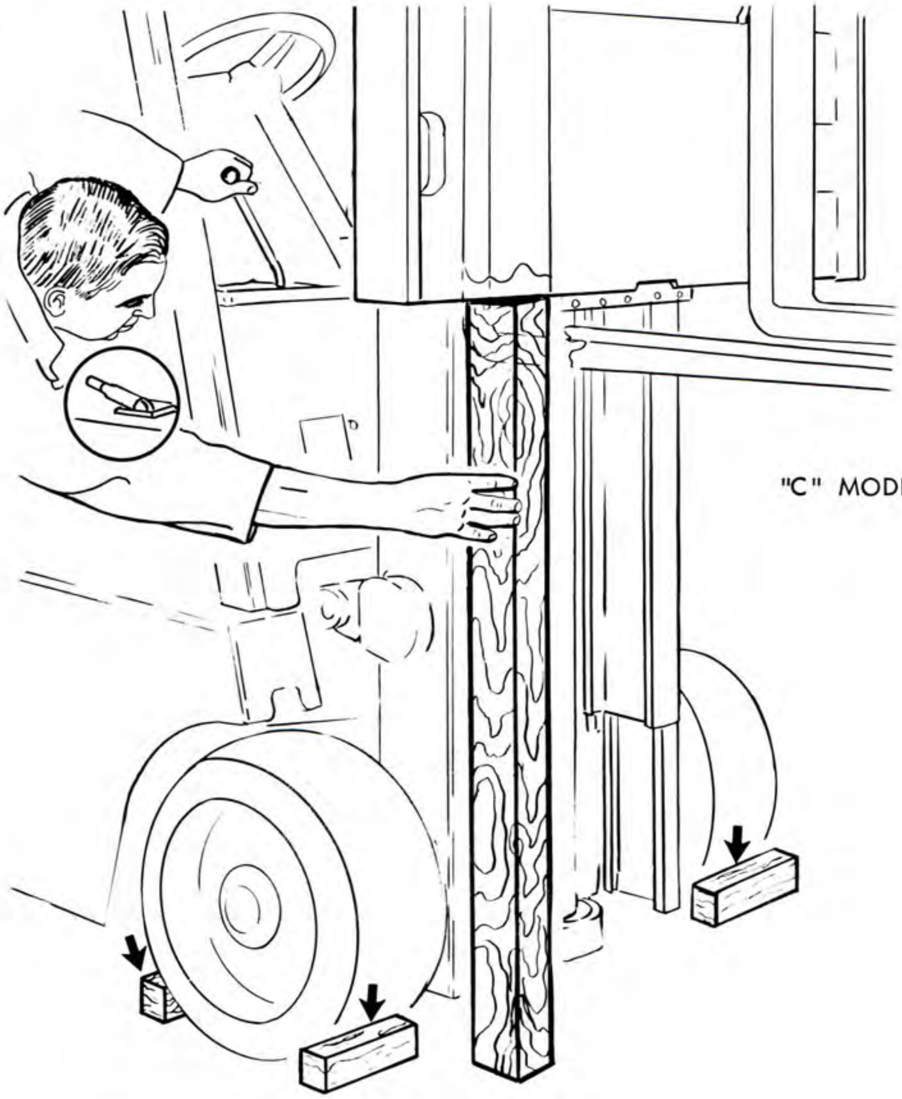


Plate 9559 Blocking Machine and Carriage

Step 1. Raise carriage about 4 feet. Place a 4" x 4" oak beam 3 to 4 feet in length between carriage and floor as shown. DO NOT STAND DIRECTLY UNDER FORKS. Standing to one side, lower carriage onto beam as shown.

X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X
X X
X W A R N I N G X
X X
X BEFORE WORKING ON UPRIGHT, SET PARKING BRAKE AND BLOCK DRIVE WHEELS AS SHOWN X
X X
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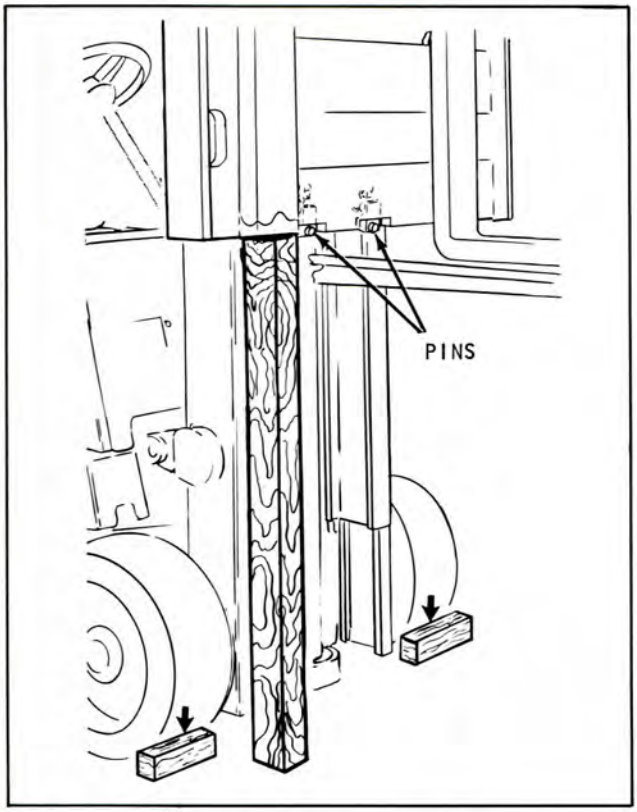


Plate 9593 Carriage Pin Replacement

Step 2. Remove anchor pins and replace with 3/8" x 2" bolts. FOR SAFETY REASONS, REMOVE ONLY ONE PIN AT A TIME. This will make pin removal easier when carriage is lowered.

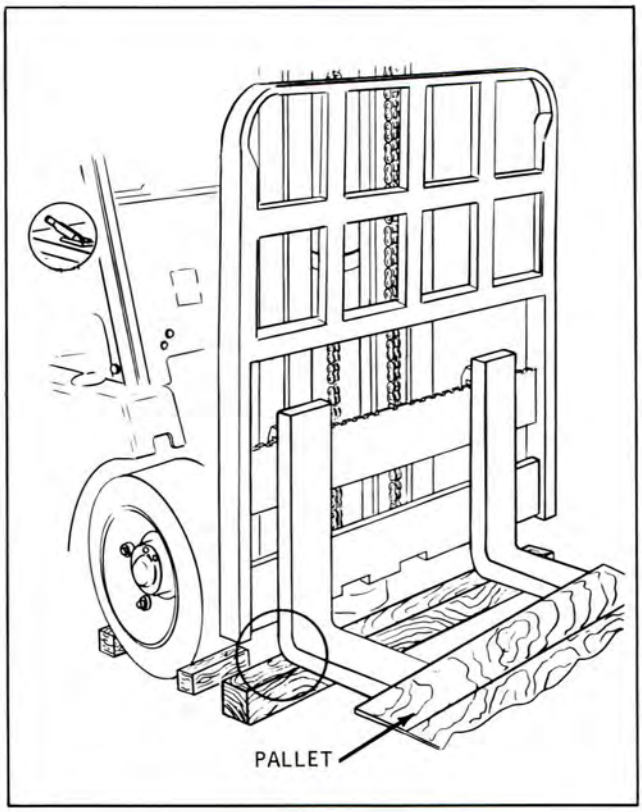


Plate 9560 Fork and Carriage Blocking

Step 3. Raise carriage off beam. Place beam on floor so, when lowered, the heal of the fork will rest on it as shown.

Step 4. Tilt upright full forward.

LIFT CARRIAGE AND UPRIGHT ROLLER ADJUSTMENT CHECK:

1. Extend the upright to the upper limit.

2. Check to be sure there is no bind.

a) Slowly...lower upright.

b) Rail assembly should be free to lower smoothly...without hesitation or hang-up.

If there is a bind...rail assembly hesitates or remains in one position and then breaks free as the lift cylinder retracts...this indicates improper roller adjustment and an adjustment should be made.

Refer to Lift Carriage and Roller Adjustment Procedure on the following pages.

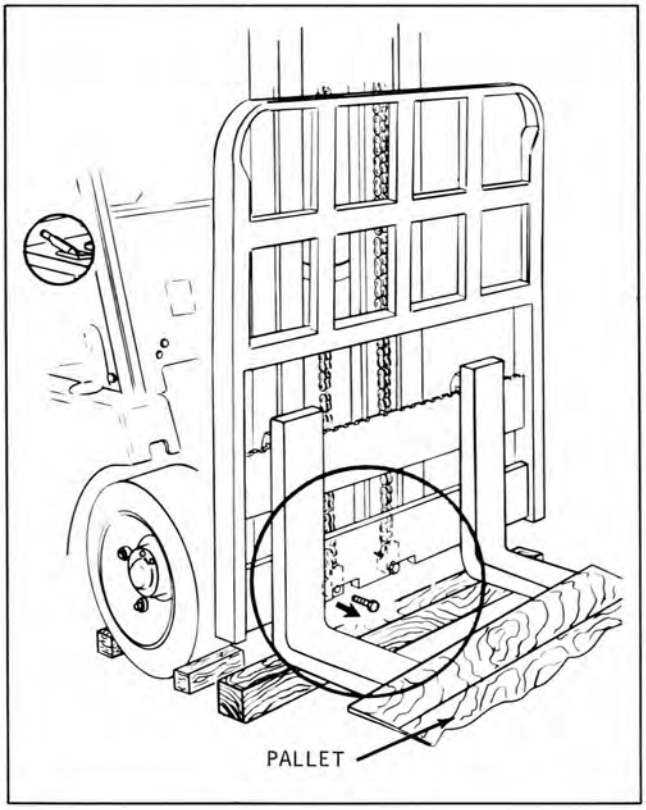


Plate 9561 Removing Bolts

Step 5. Remove 3/8" x 2" bolts. Place pallet on fork ends.

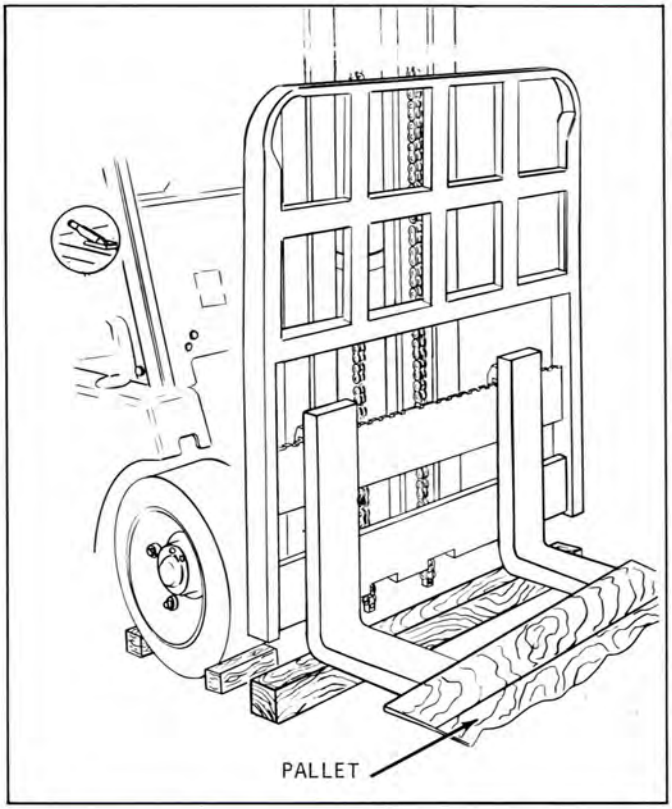


Plate 9562 Removing Chains From Anchors

Step 6. Pull chains out of carriage anchor brackets.

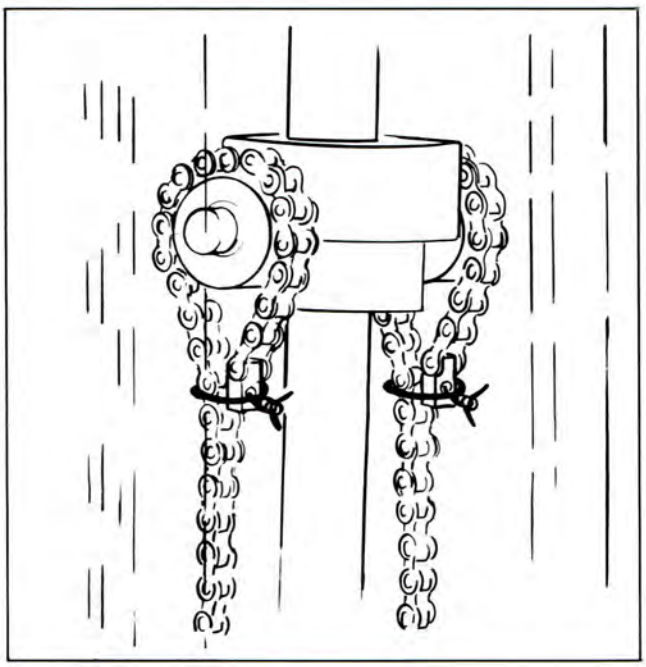


Plate 9563 Securing Chains (Typical)

Step 7. Wire chains around chain sheaves as shown

N O T E

Use the same method on all cylinders.

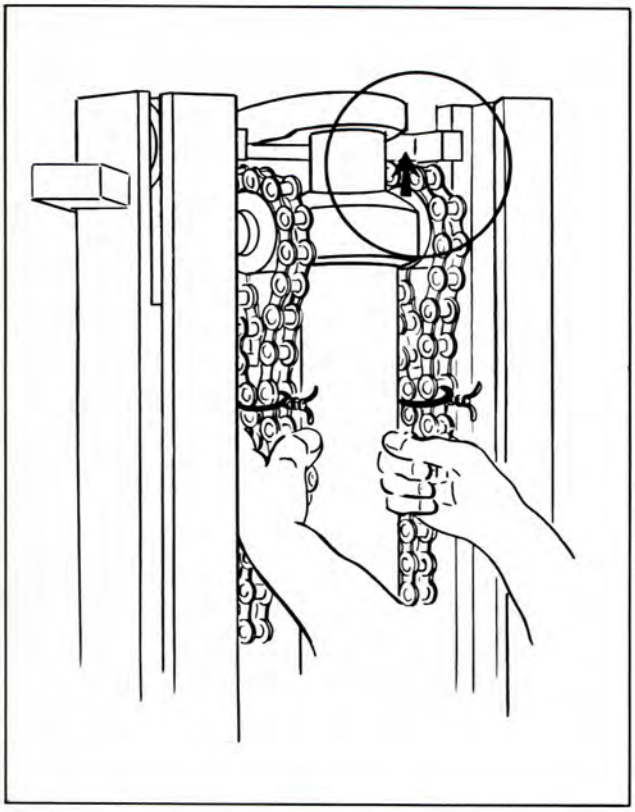


Plate 9564 Guiding Piston Head

Step 8. Guiding piston head with hands on chains raise piston to full up position.

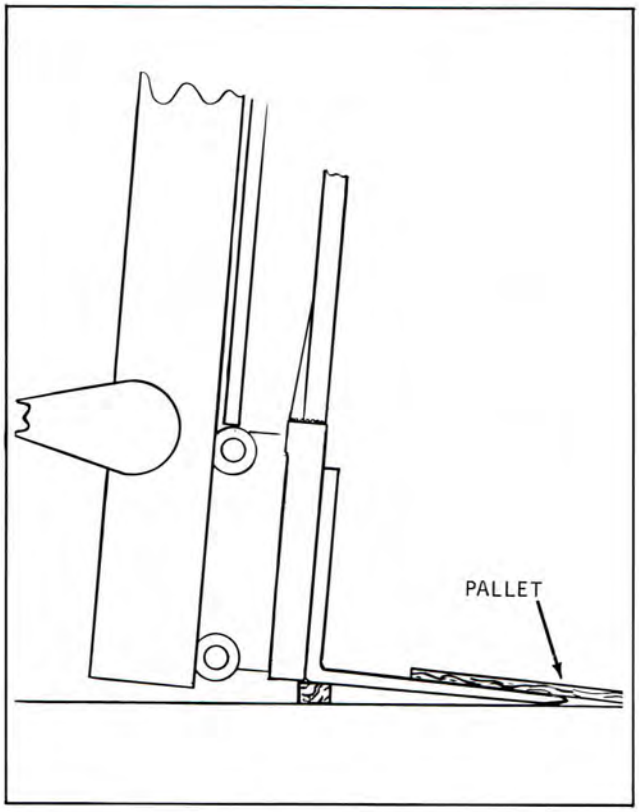


Plate 9565 Inner Rail Clearing Carriage Rollers

Step 9. Raise inner rail so it just clears upper carriage rollers. Leave upright at full forward tilt.

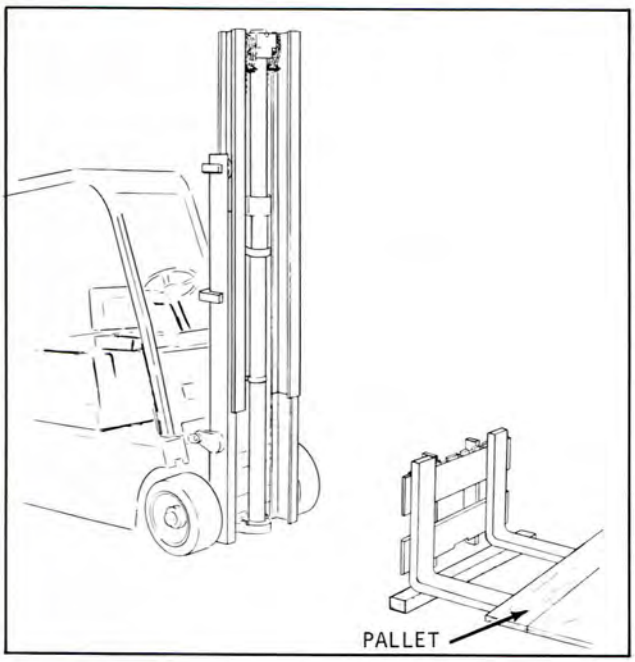


Plate 9566 Backing Machine Away From Carriage

Step 10. Remove blocks and release brake. Back machine away from carriage.

B. CARRIAGE ROLLER ADJUSTMENT

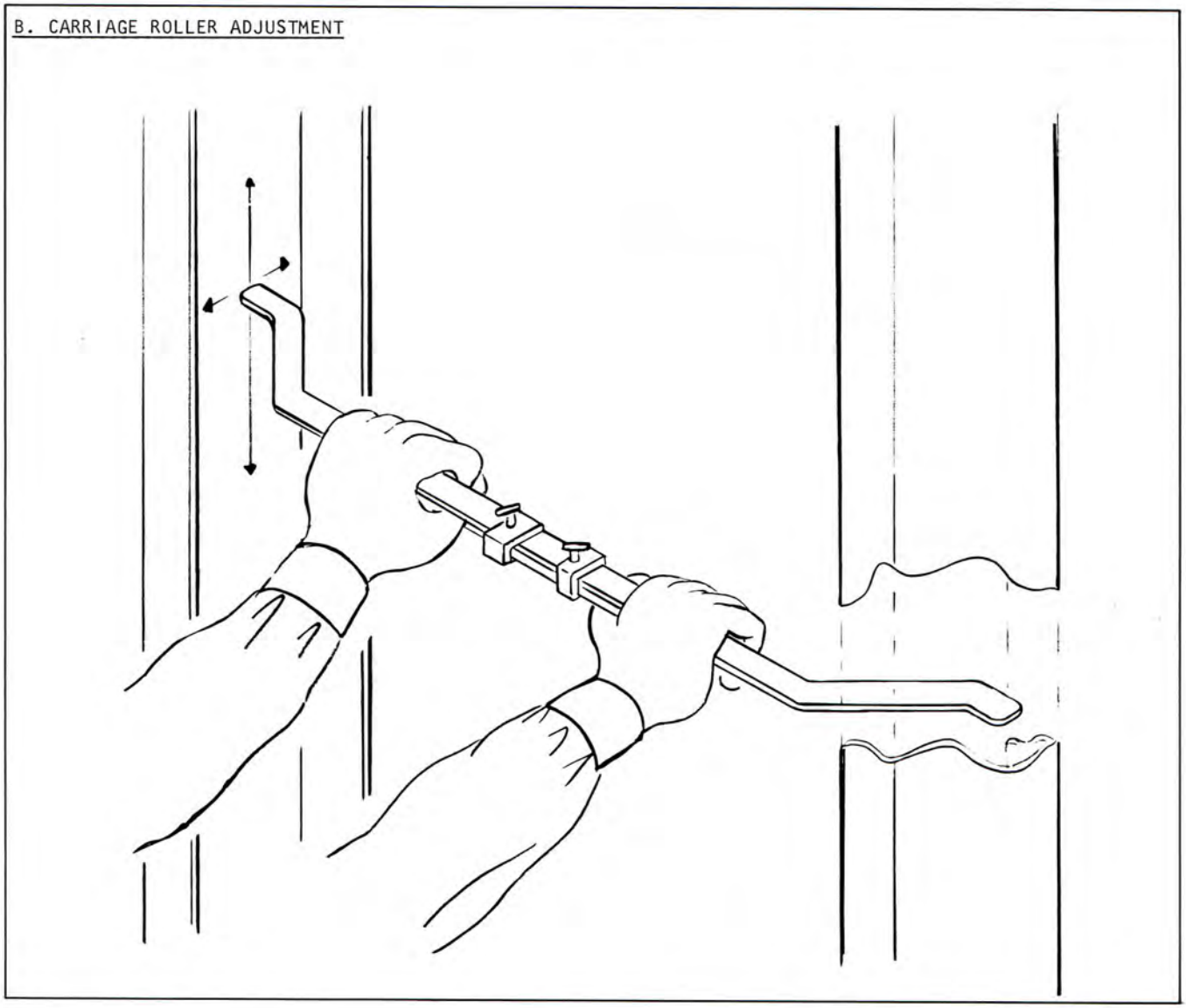


Plate 9567 Spanning Inner Rail

Step 1. Span inner rail with inside spanning tool to find the smallest distance between the rails. Lock tool in position.

N O T E

FOR SIX ROLLER CARRIAGE ONLY

After finding the smallest distance between rails, place a shim between the spanning tool and the inner rail, then lock spanning tool in position.

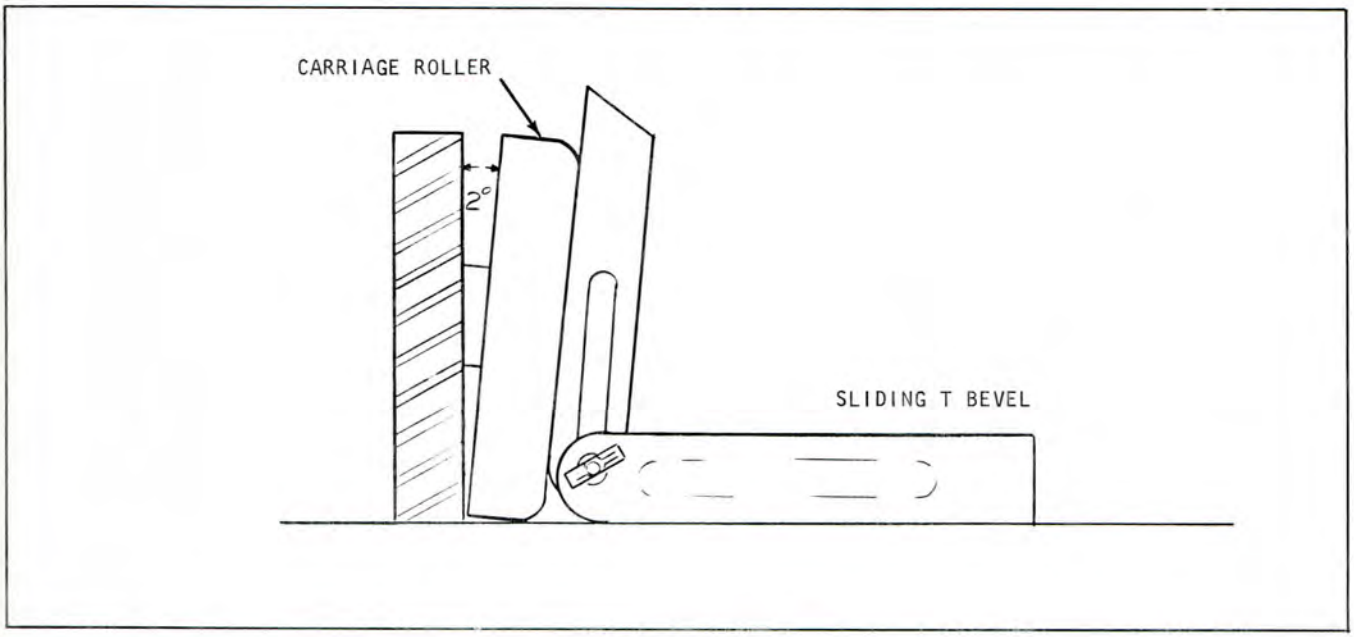


Plate 9589 Setting T Bevel

N O T E

Check angle of carriage rollers. Roller pin bosses are welded at 2° ± 1/2° and if damaged, replace carriage roller pin boss assembly. To obtain this, contact Central Parts.

To check roller angle use a Sliding T Bevel and Protractor. Lay one side against roller surface and lock in place.

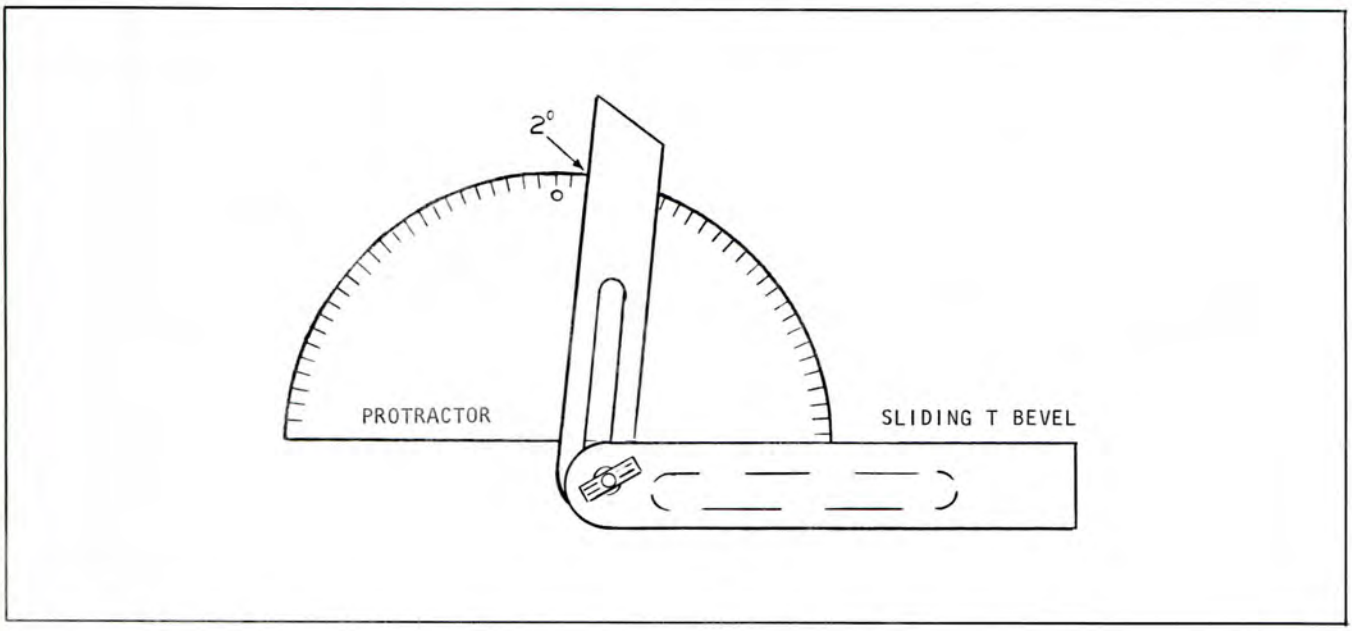


Plate 9590 Checking Roller Angle

Determine degree of angle by placing Protractor on Sliding T Bevel.

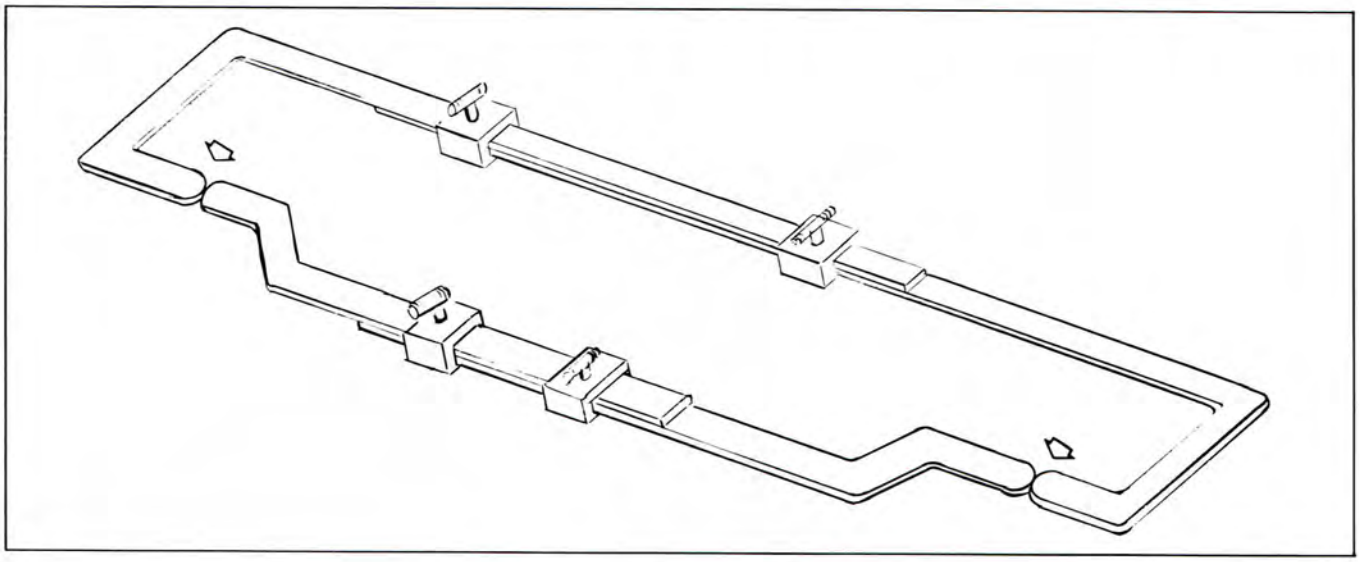


Plate 9568 Setting Outside Spanning Tool

Step 2. Set outside spanning tool to match inside spanning tool. Lock tool in position.

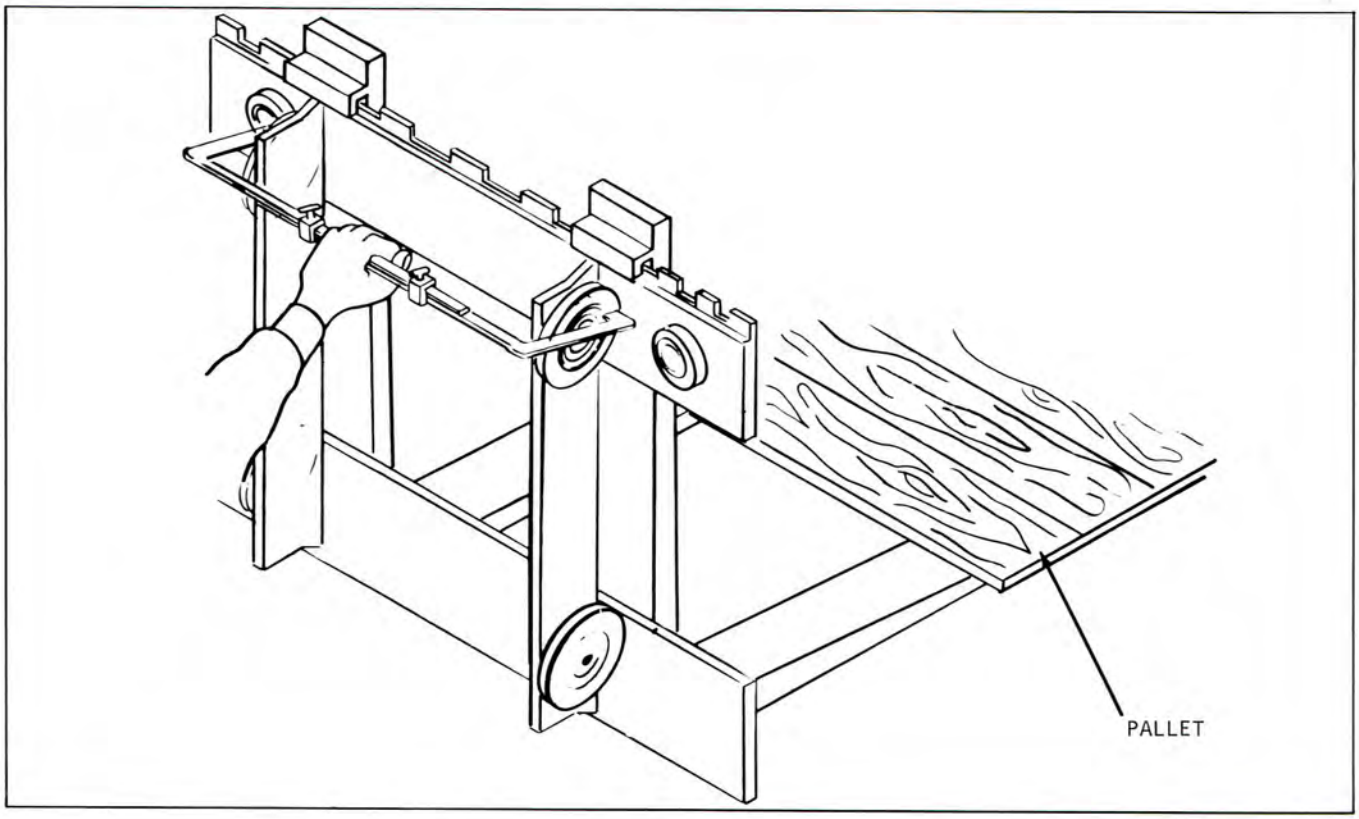


Plate 9569 Spanning Upper Rollers (Four Roller Carriage)

Step 3. Span upper carriage rollers at their outer most camber point. Add or subtract ...

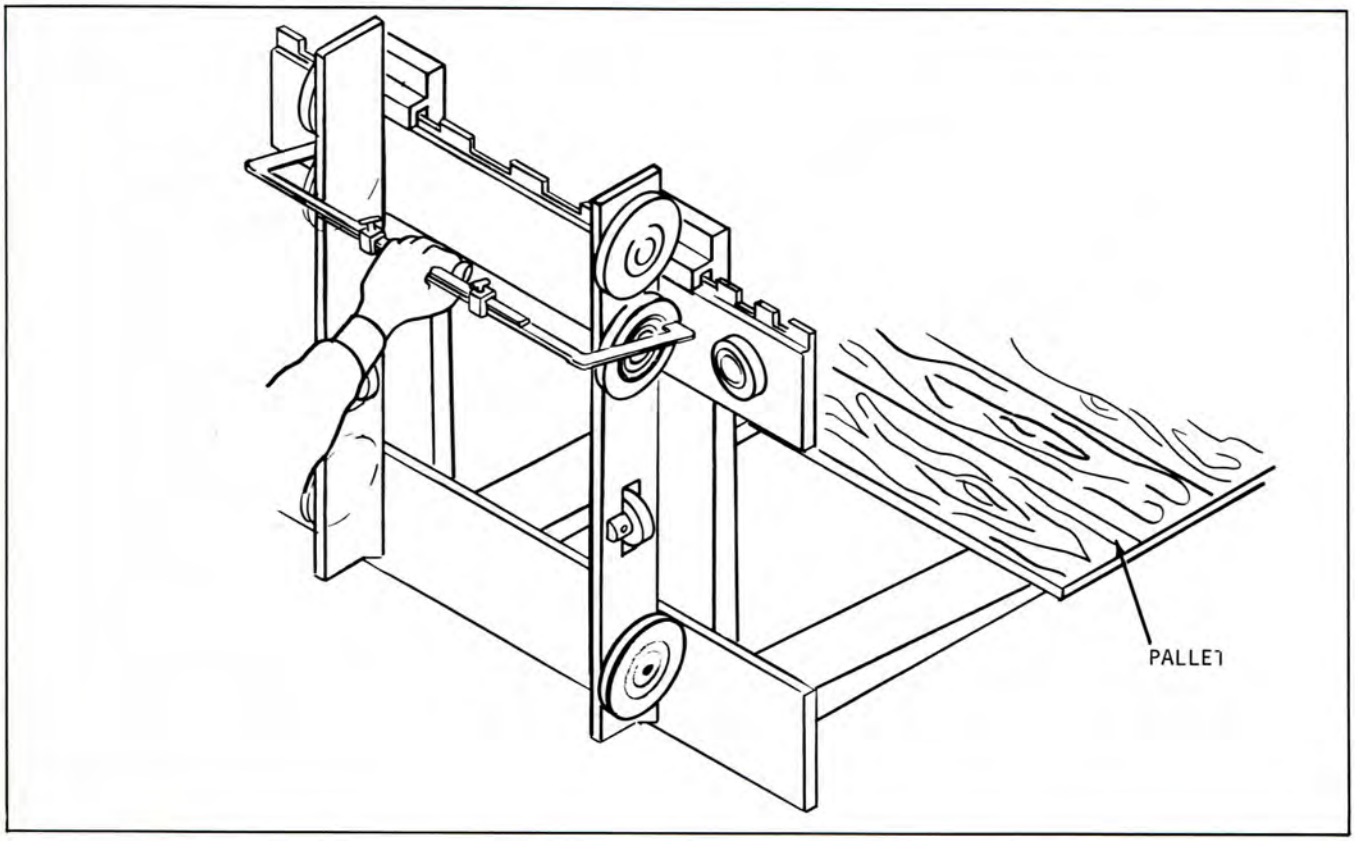


Plate 9570 Spanning Upper Rollers (Six Roller Carriage)

...shims at roller shaft to reach tool size.

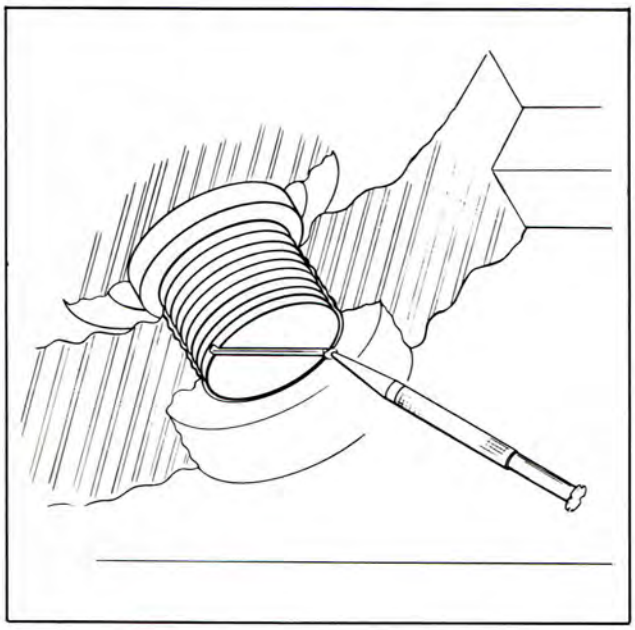


Plate 9571 Securing Outer Thrust Roller

N O T E

Before centering carriage rollers check outer thrust rollers for security and condition of bearings. If loose tighten and stake. If worn replace.

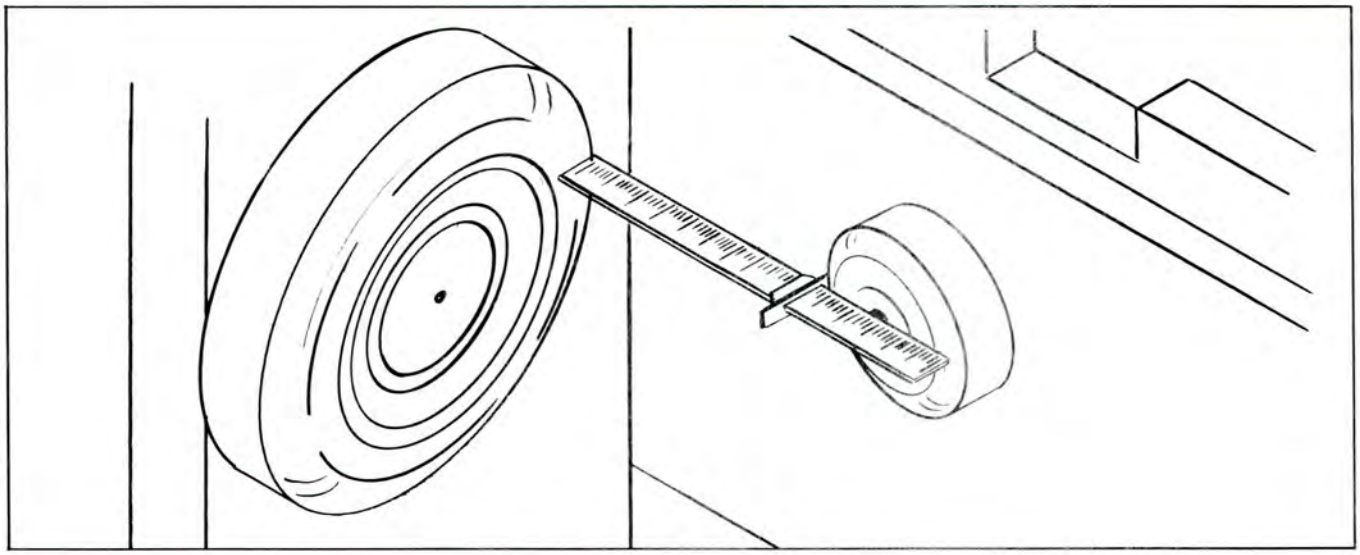


Plate 9572 Centering Carriage Rollers

Step 4. Center carriage rollers within outer thrust rollers by placing 6" scale on the carriage roller surface and measuring the distance to the outer thrust roller face. Add or subtract shims from one roller to the other to make measurement equal.

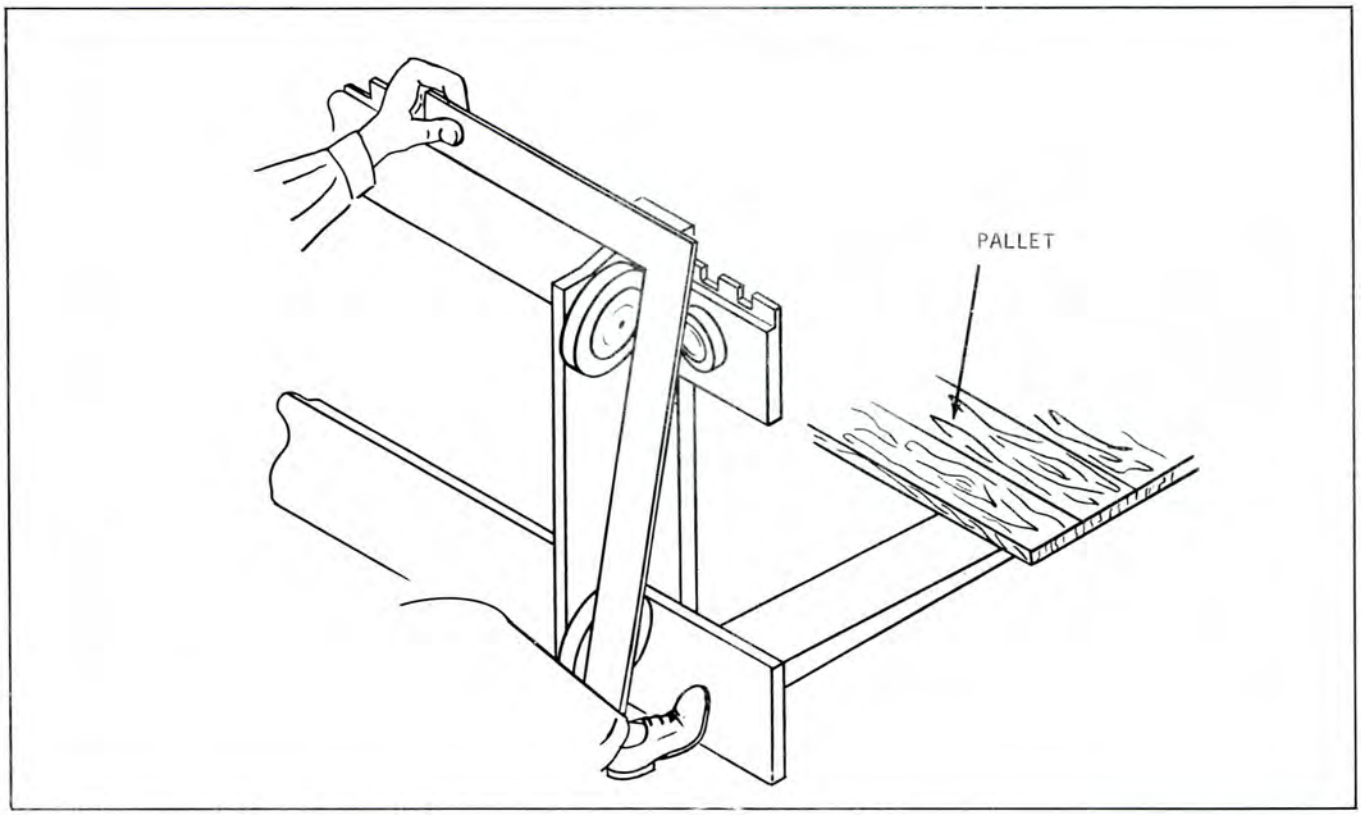


Plate 9573 Squaring Carriage Rollers (Four Roller Carriage)

Step 5. Square carriage rollers by placing carpenters square at the outer most camber of the ...

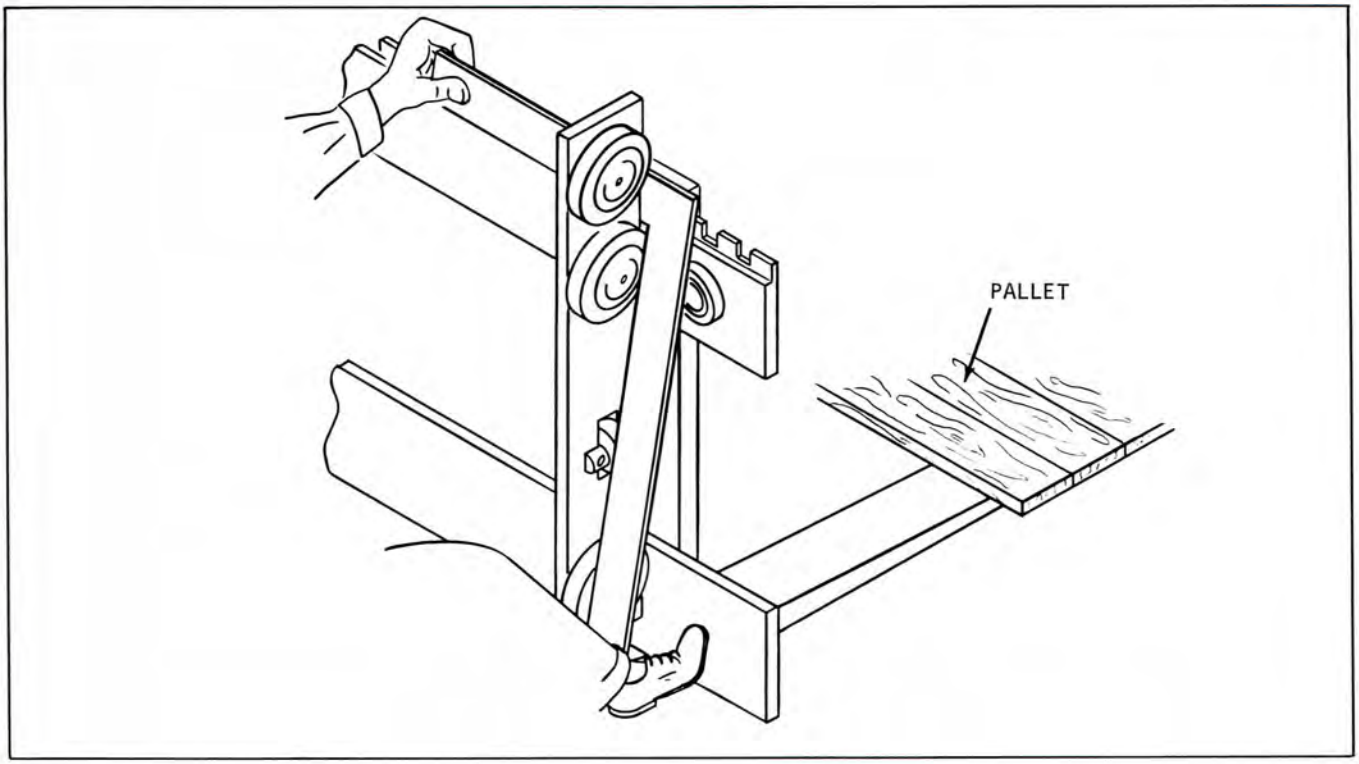


Plate 9574 Squaring Carriage Rollers (Six Roller Carriage)

... upper and lower rollers. Hold square in place with ankle and hand as shown.

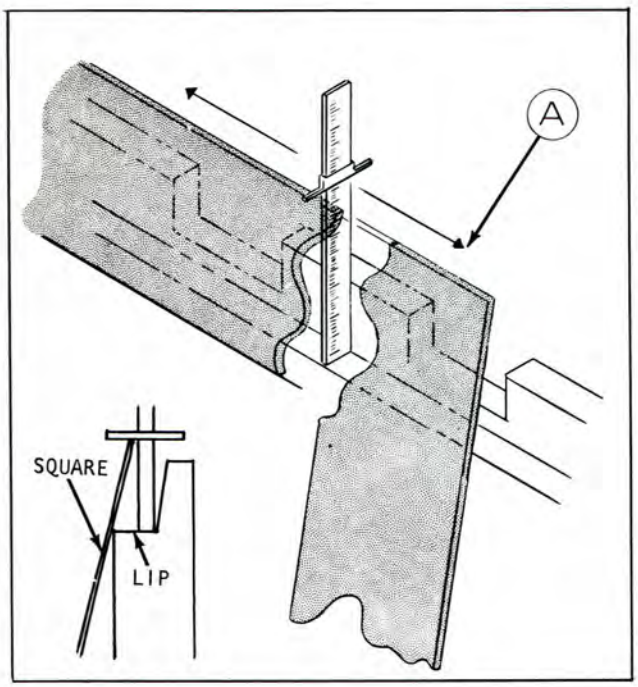


Plate 9575 Measuring For Squareness

Step 6. Hold square and measure the distance between the top face (or lip) of the upper fork bar to the edge of the square at Point A. Now take a measurement at opposite end of square .... these measurements should be the same. If they are not, add or remove shims on lower roller shaft until distance measured at each end is equal.

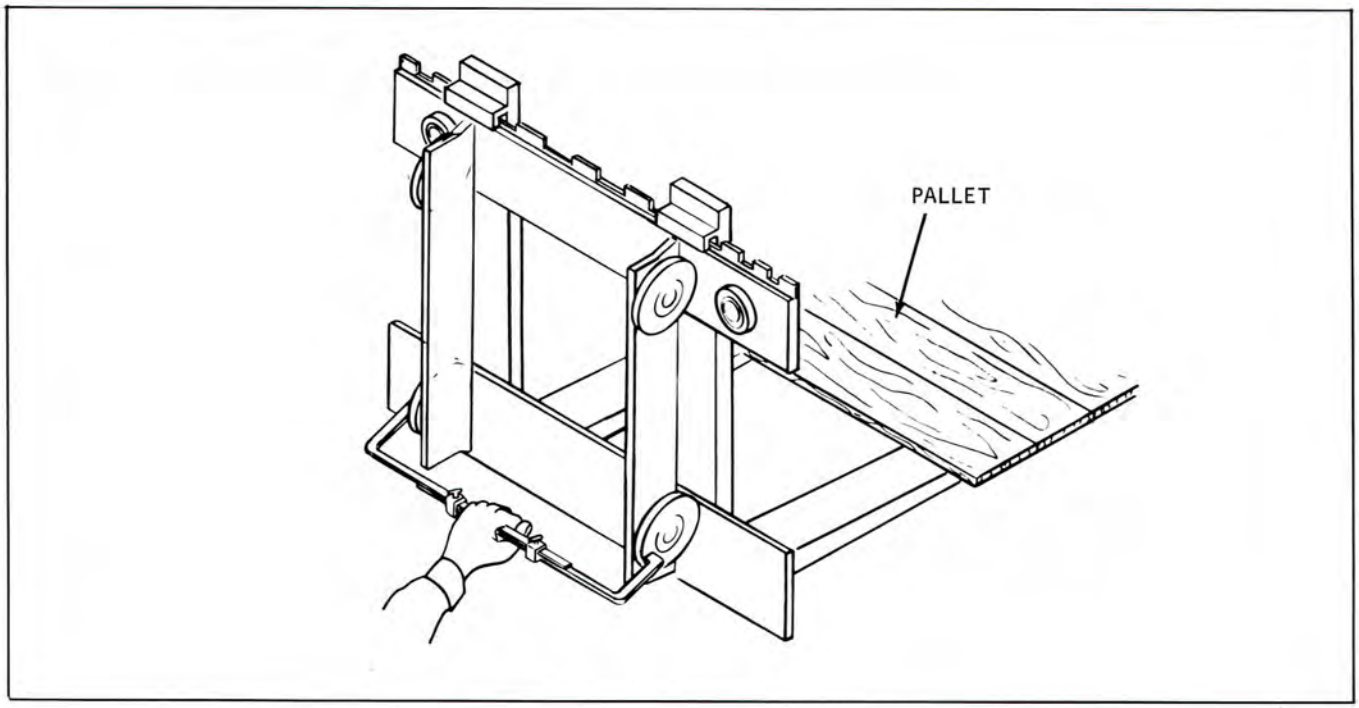


Plate 9576 Spanning Lower Rollers (Four Roller Carriage)

Step 7. Span lower rollers. Add or subtract shims to (the roller that has not been squared) ...

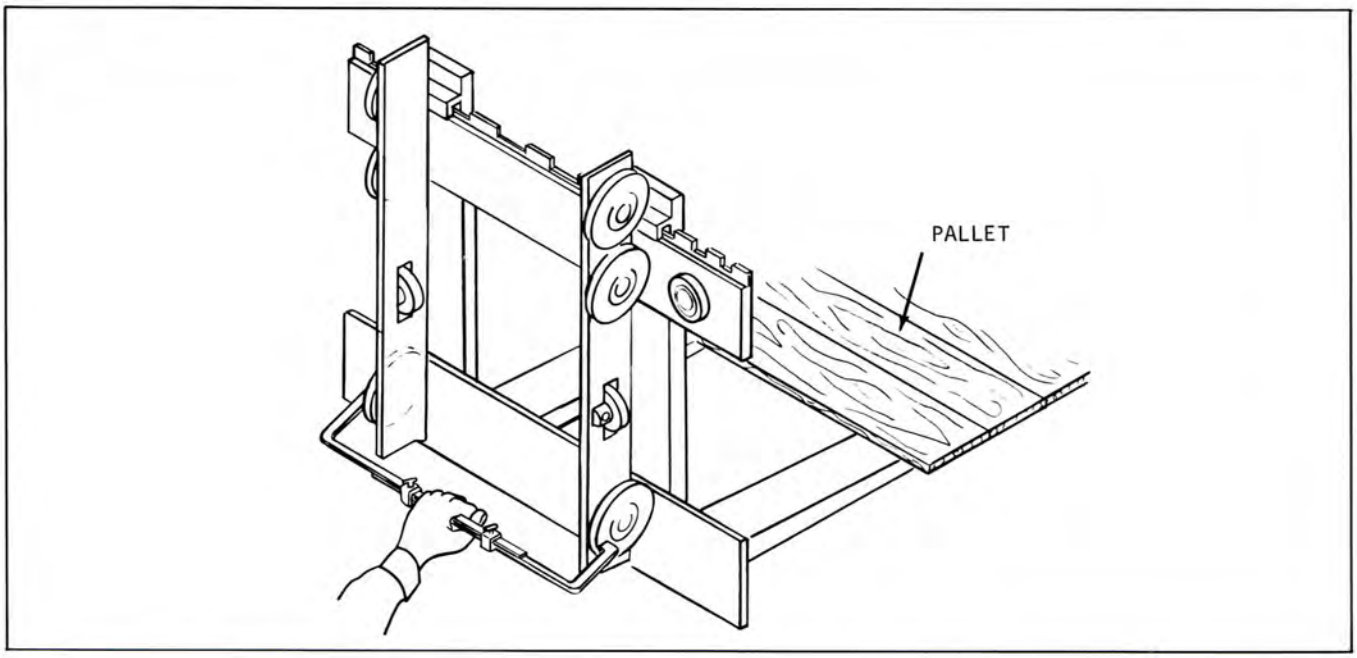


Plate 9577 Spanning Lower Rollers (Six Roller Carriage)

... reach the size of the outside spanning tool.

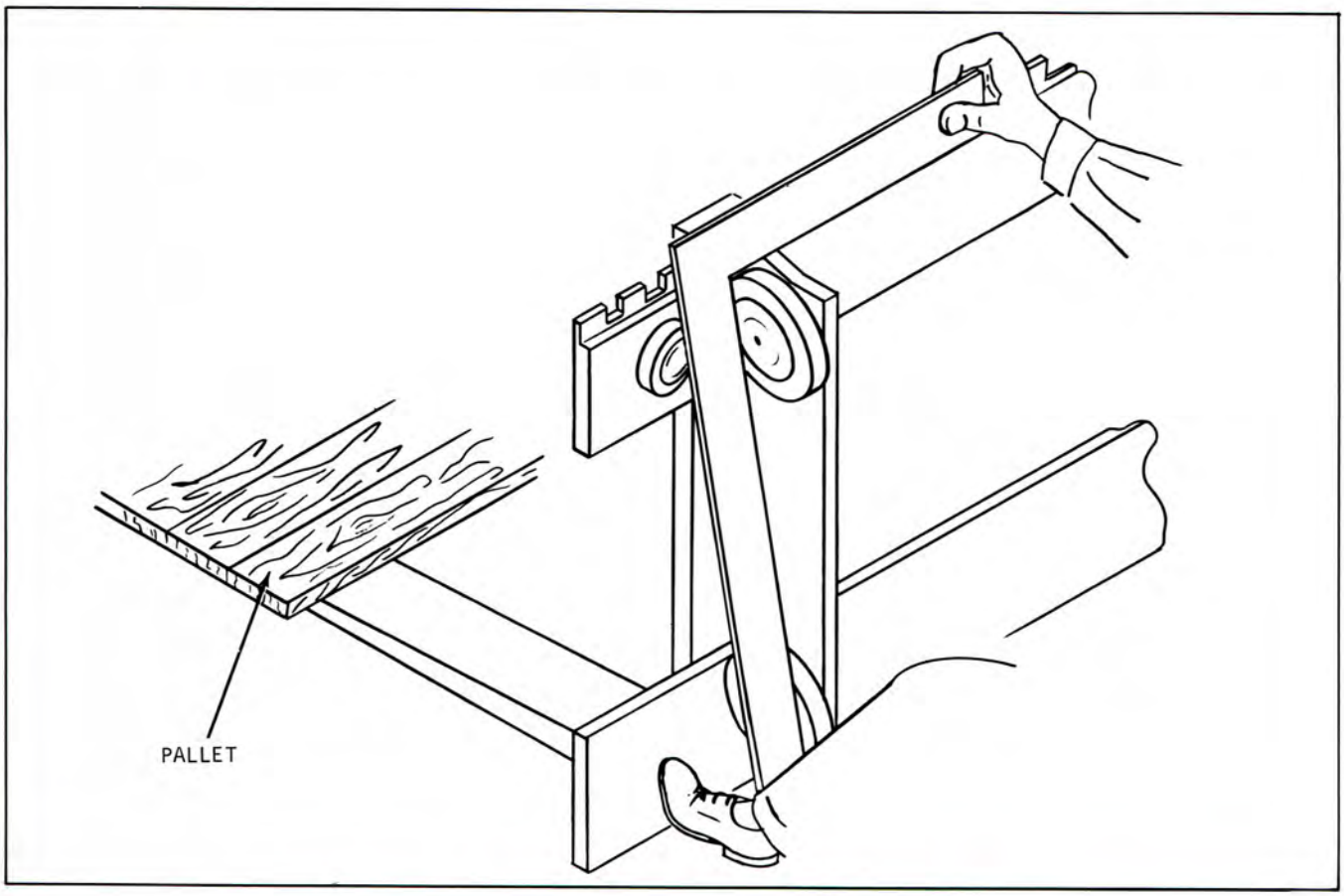


Plate 9578 Checking Squareness (Four Roller Carriage)

Step 8. Check opposite side for squareness (by holding square in the same manner as before and checking ...

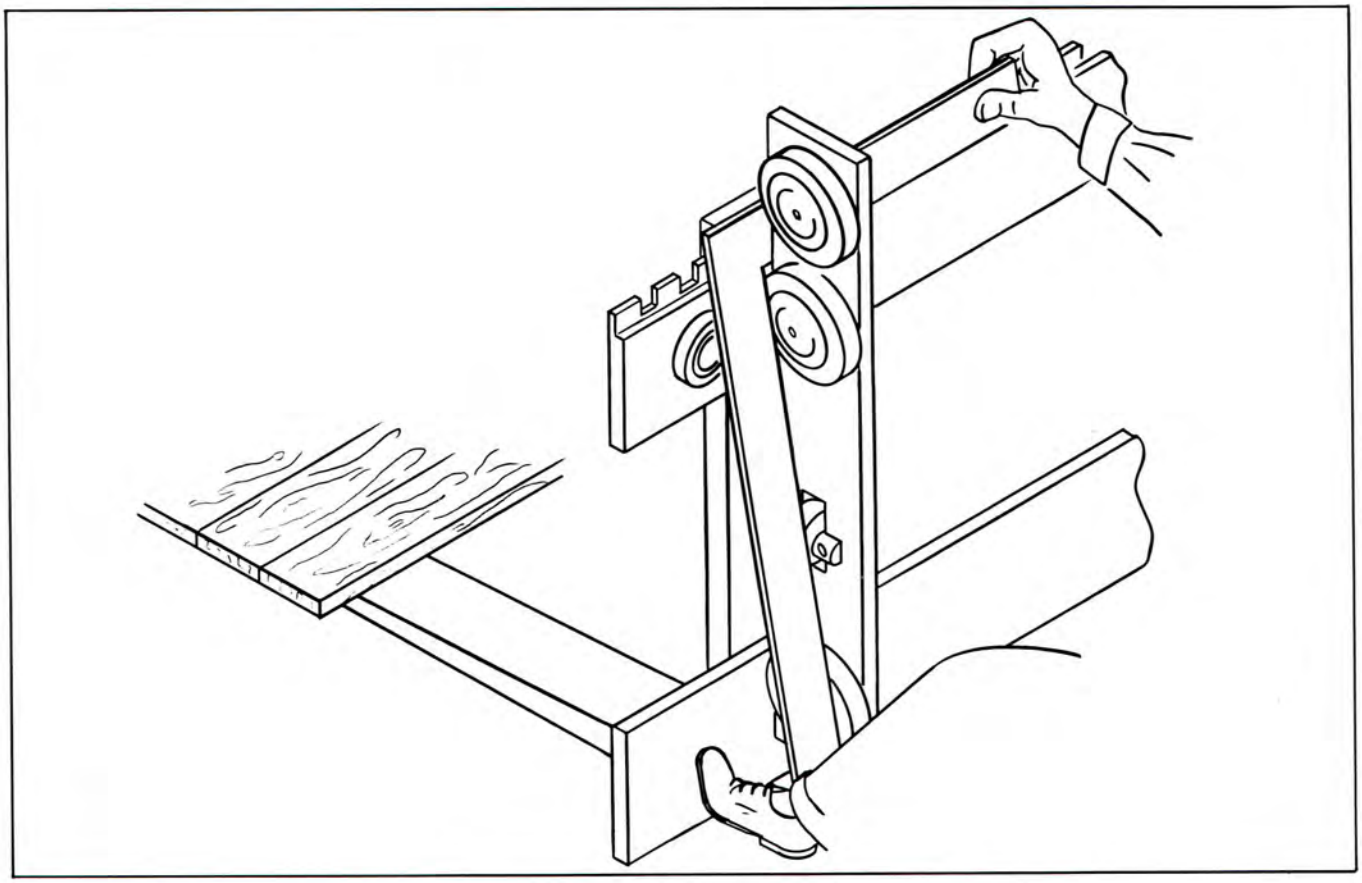


Plate 9579 Checking Squareness (Six Roller Carriage)

... measurement). This side will be square within 1/32"; if not, return to Step 5. and repeat procedure.

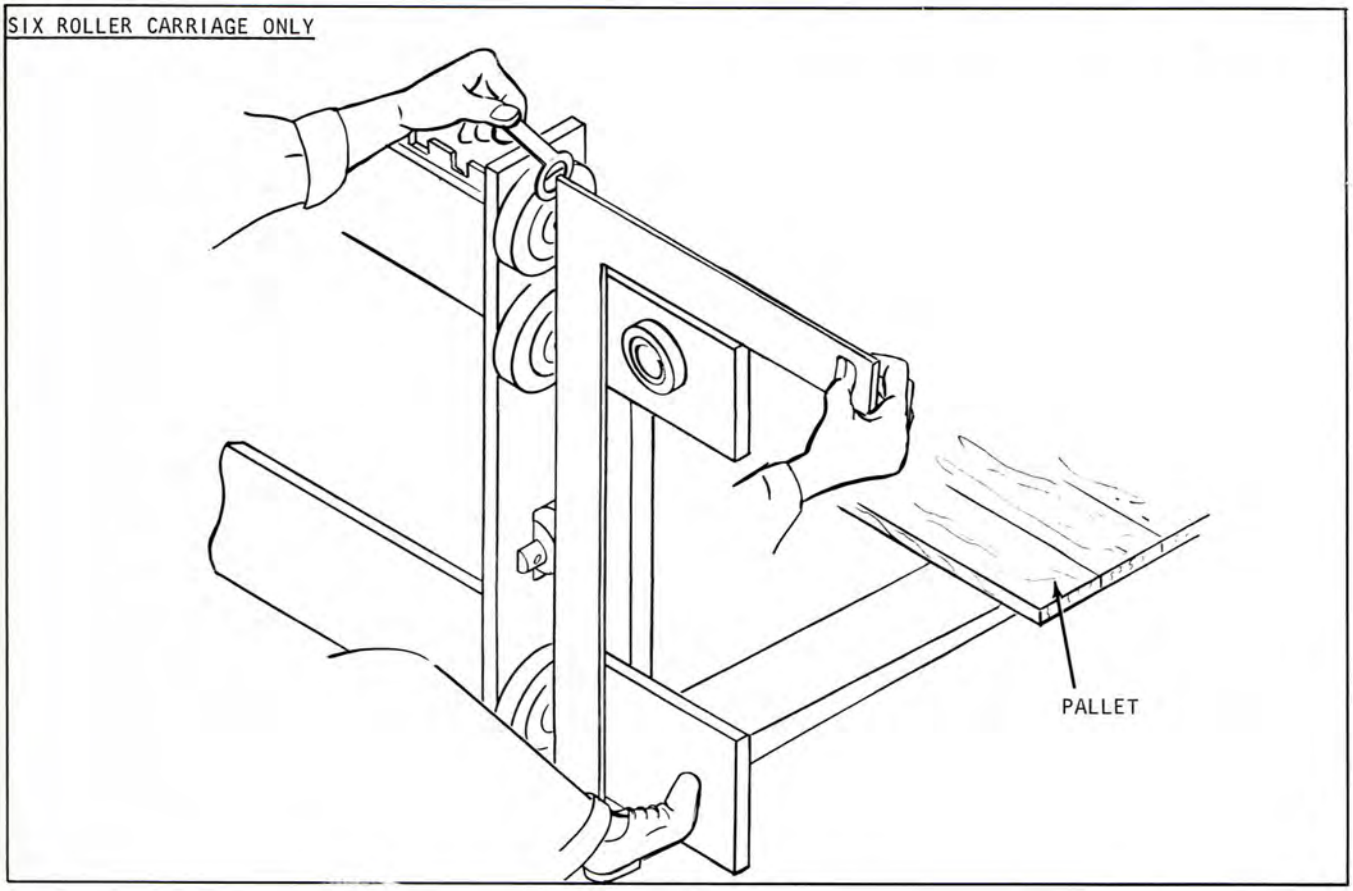


Plate 9580 Top Roller Clearance

Step 1. Place square on the vertical center line of the carriage rollers, as shown above. There must be some clearance between the square and the side surface of the top roller. This clearance should not exceed 1/32" or one shim

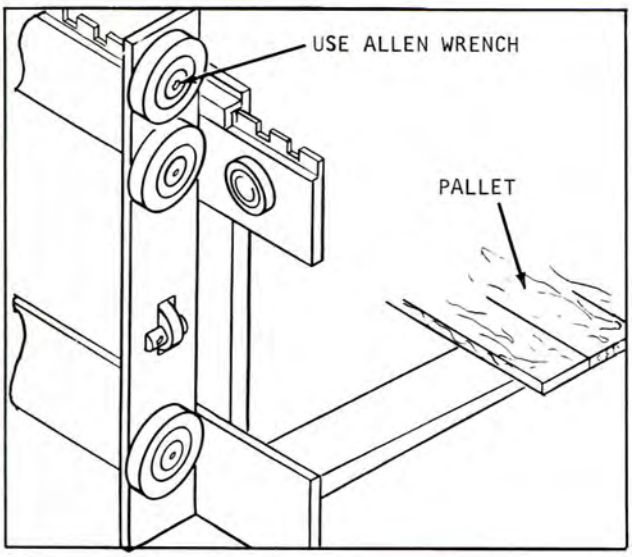


Plate 9581 Removing Top Roller

Step 2. If adjustment is necessary, remove allen screw, lock washer and flat washer to add or remove shims on shaft. Tighten screw securely after completing adjustment.

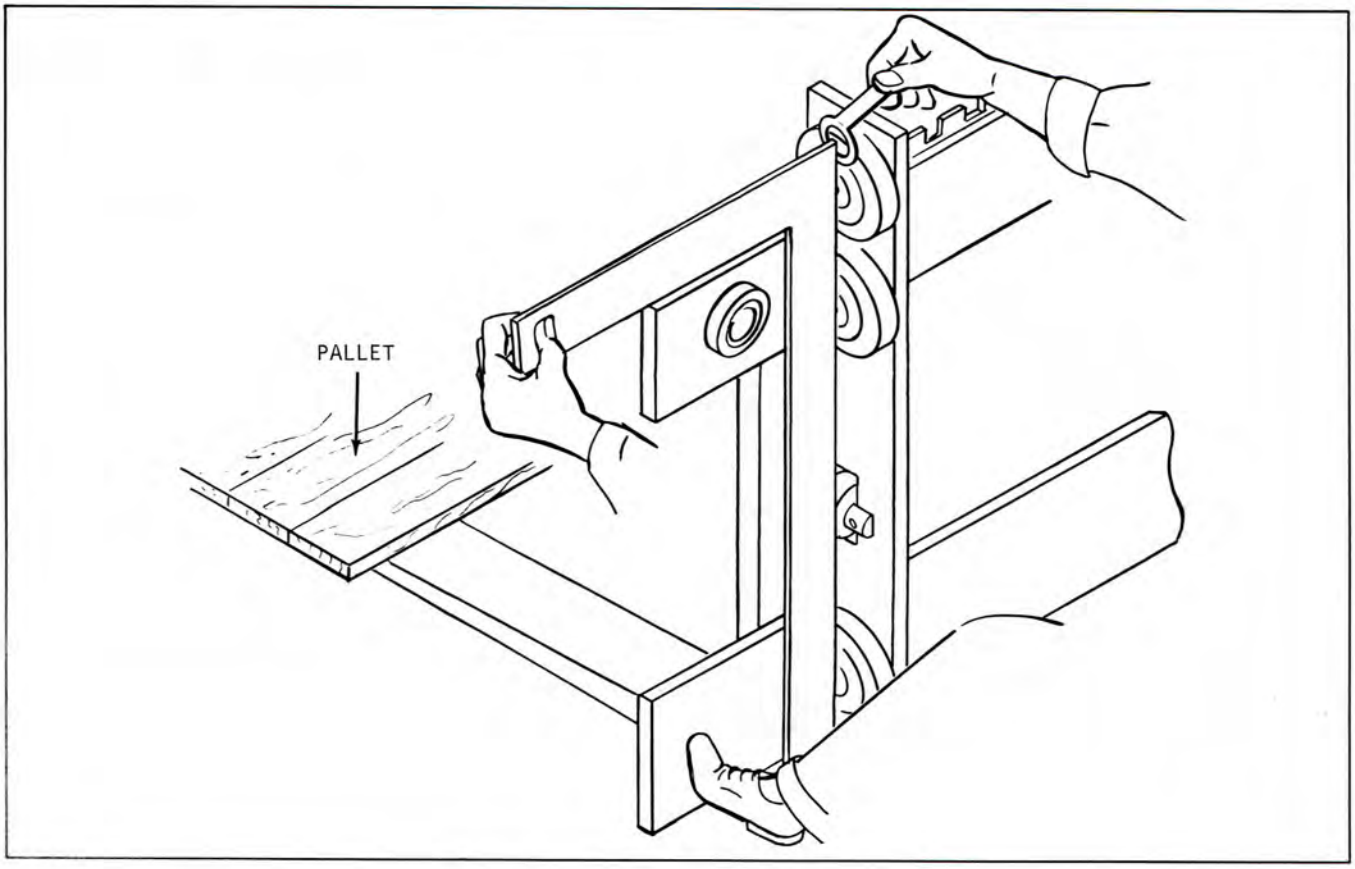


Plate 9582 Top Roller Clearance

Step 3. Check opposite upper roller in the same manner; adjust if necessary.

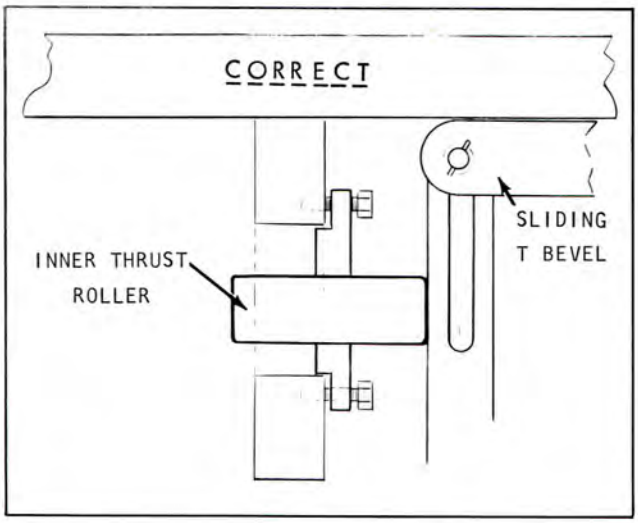


Plate 9583 Checking Squareness■CORRECT

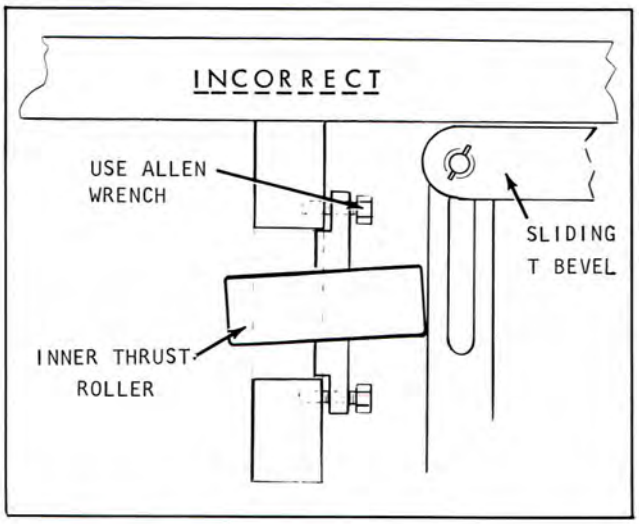


Plate 9584 Checking Squareness■INCORRECT

Step 4. Check squareness of inner thrust rollers with Sliding T Bevel. Set Sliding T Bevel to 90° using carpenters square.

Step 5. Add or subtract shims for adjustment (Use allen wrench see Plate 9584).

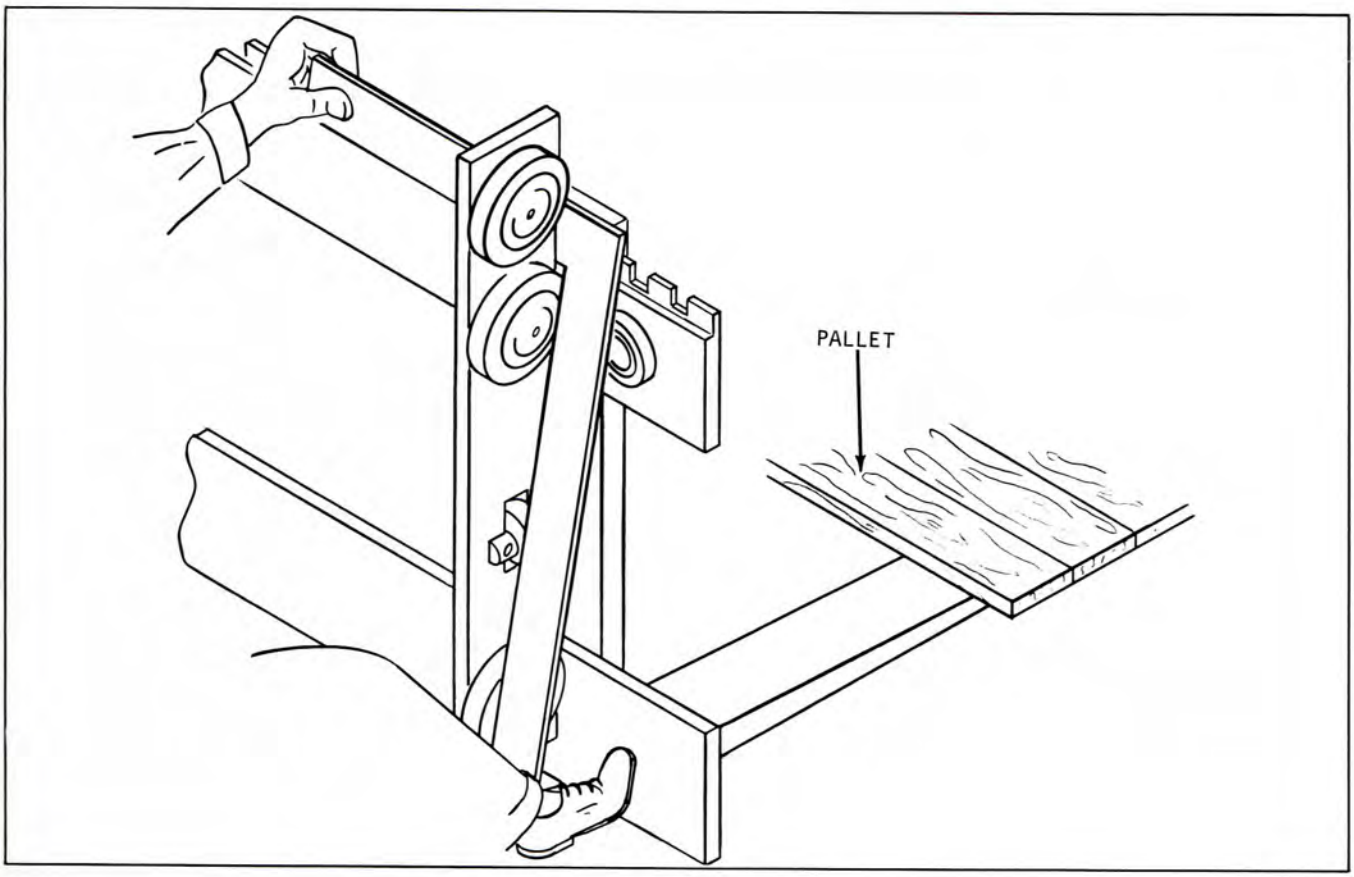


Plate 9574 Square And Side Thrust Roller

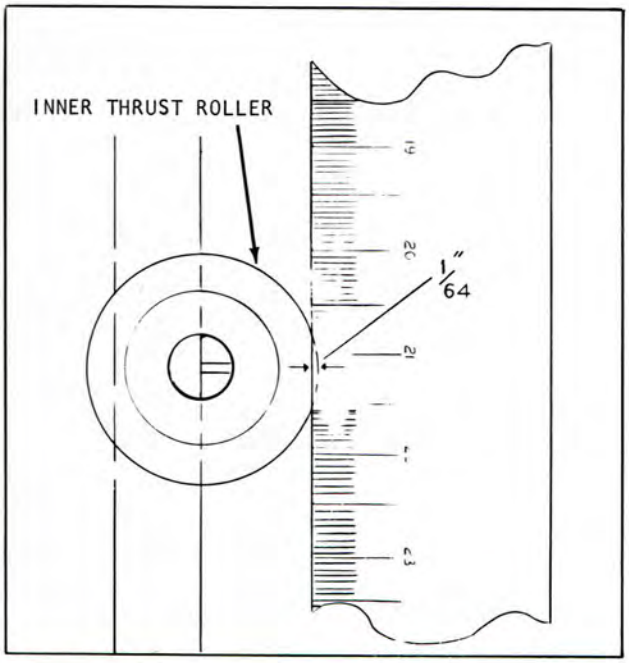


Plate 9585 Reading Roller Projection

Step 6. The inner thrust roller is to project 1/64" past line of square. Use one thrust roller shim and eyeball distance as shown (Plate 9573 and Plate 9585).

Step 7. Repeat Step 6. on opposite side.

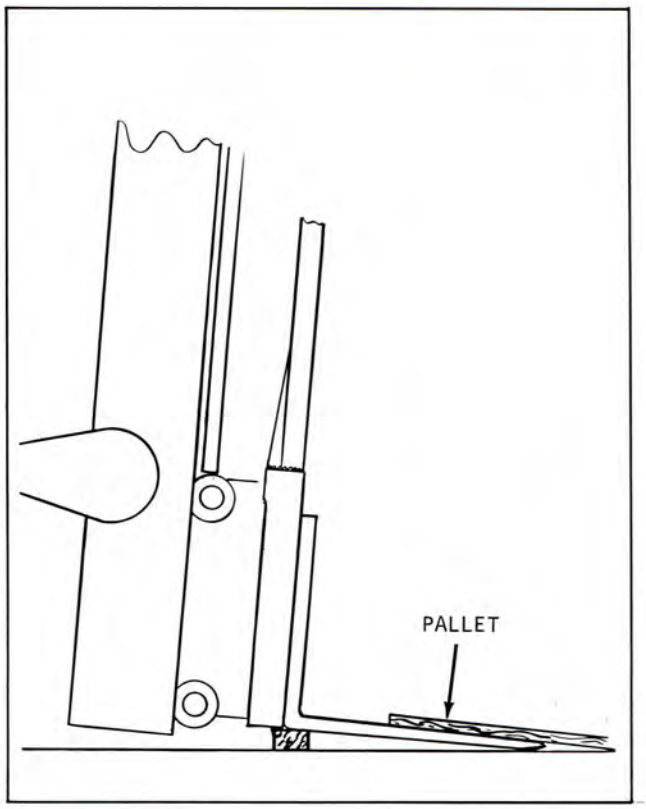


Plate 9565 Inner Rail Clearing Carriage Rollers

C. CARRIAGE INSTALLATION

N O T E

Before installing carriage, check upright for proper shimming adjustment.

Step 1. Drive machine up to carriage and position upright to match tilt of carriage.

Step 2. Raise inner rails to just clear upper carriage rollers.

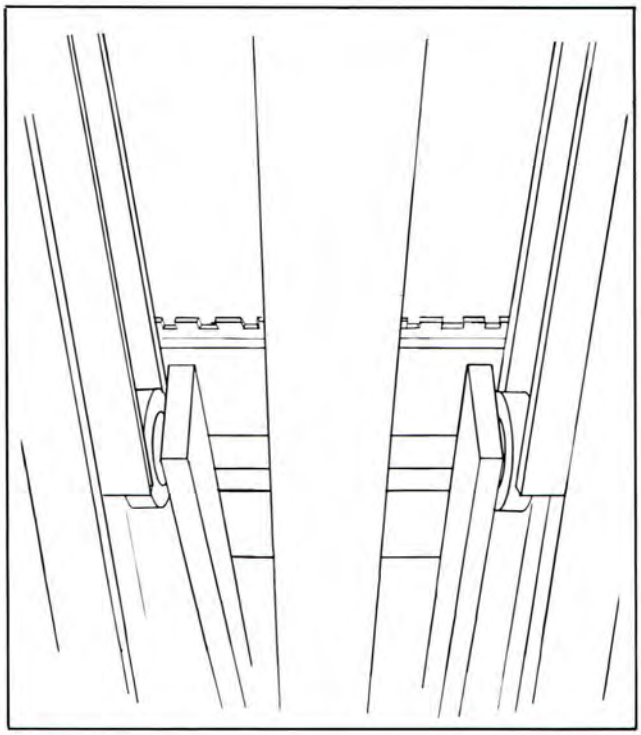


Plate 9591 Rollers Guiding Into Inner Rail

Step 3. Continue to drive machine forward until inner rails line up with upper carriage rollers, then.... slowly lower inner rails to full down position.

C A U T I O N

CHECK TO BE SURE THE TOP CARRIAGE ROLLERS ARE GUIDING INTO INNER RAIL.

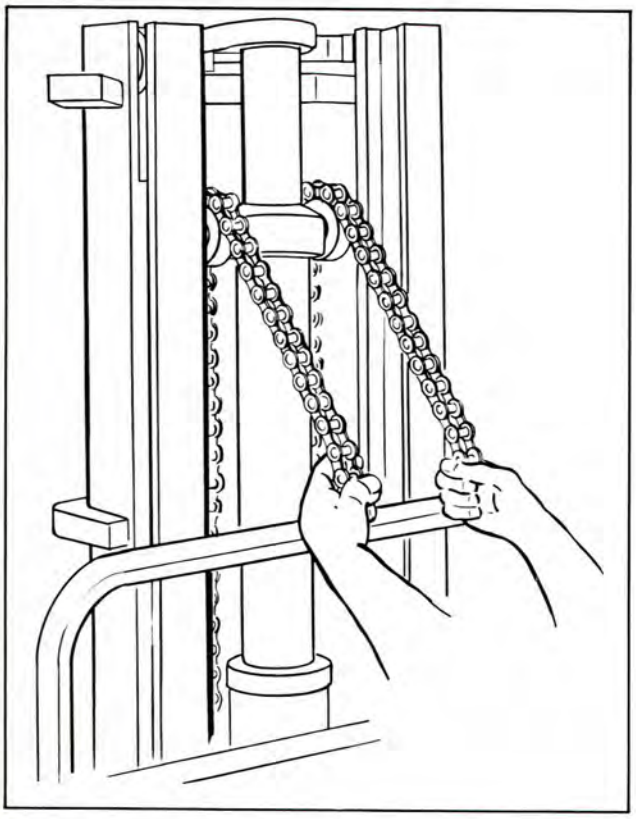


Plate 9586 Pulling Piston Head Down

Step 3(a). Remove wires holding lift chains.

(b). With a chain in each hand and someone holding the lift cylinder lever down, pull the piston to full down position. Place chains behind carriage.

Step 5. Raise carriage about 5' and place a 3' to 4' long 4"x4" wooden beam under it. DO NOT stand directly under forks. Lower carriage onto beam.

Step 6. Replace bolts with anchor pins.

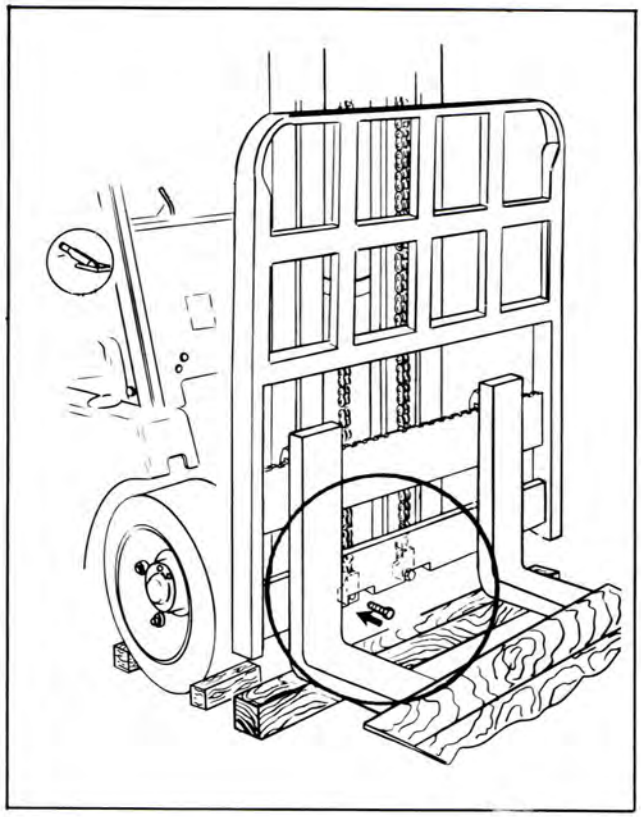


Plate 9587 Installing Bolts

Step 4. Put chain anchors in carriage anchor brackets and install 3/8" x 2" bolts in anchor pin holes.

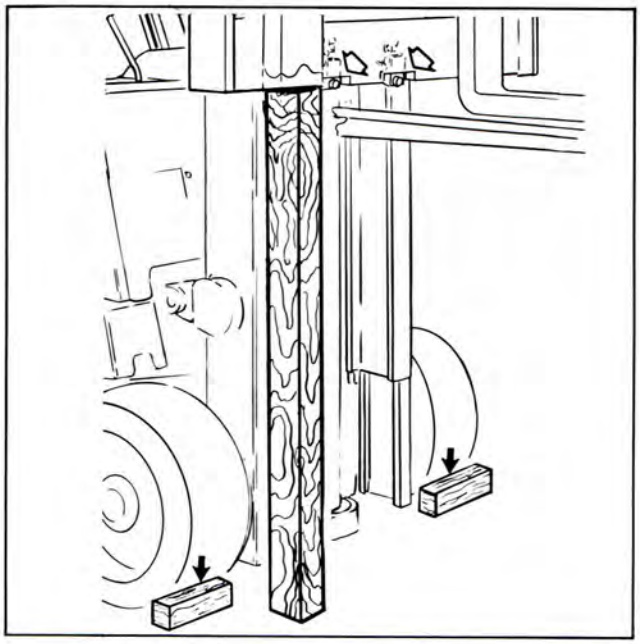


Plate 9593 Carriage Pin Replacement

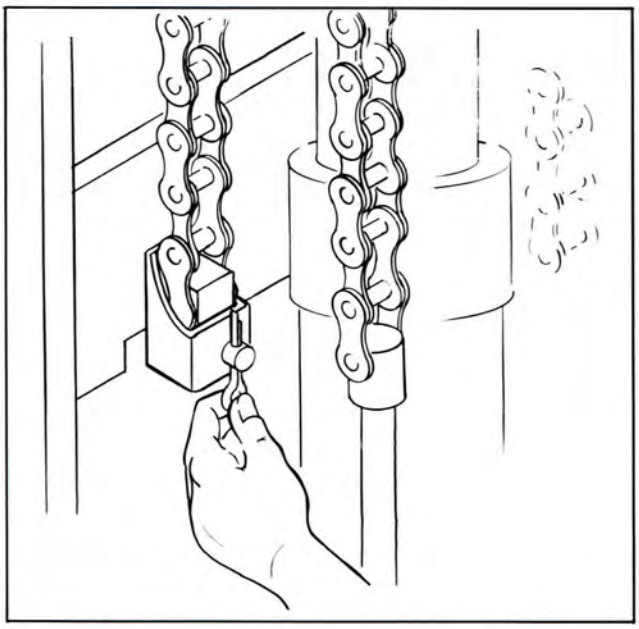
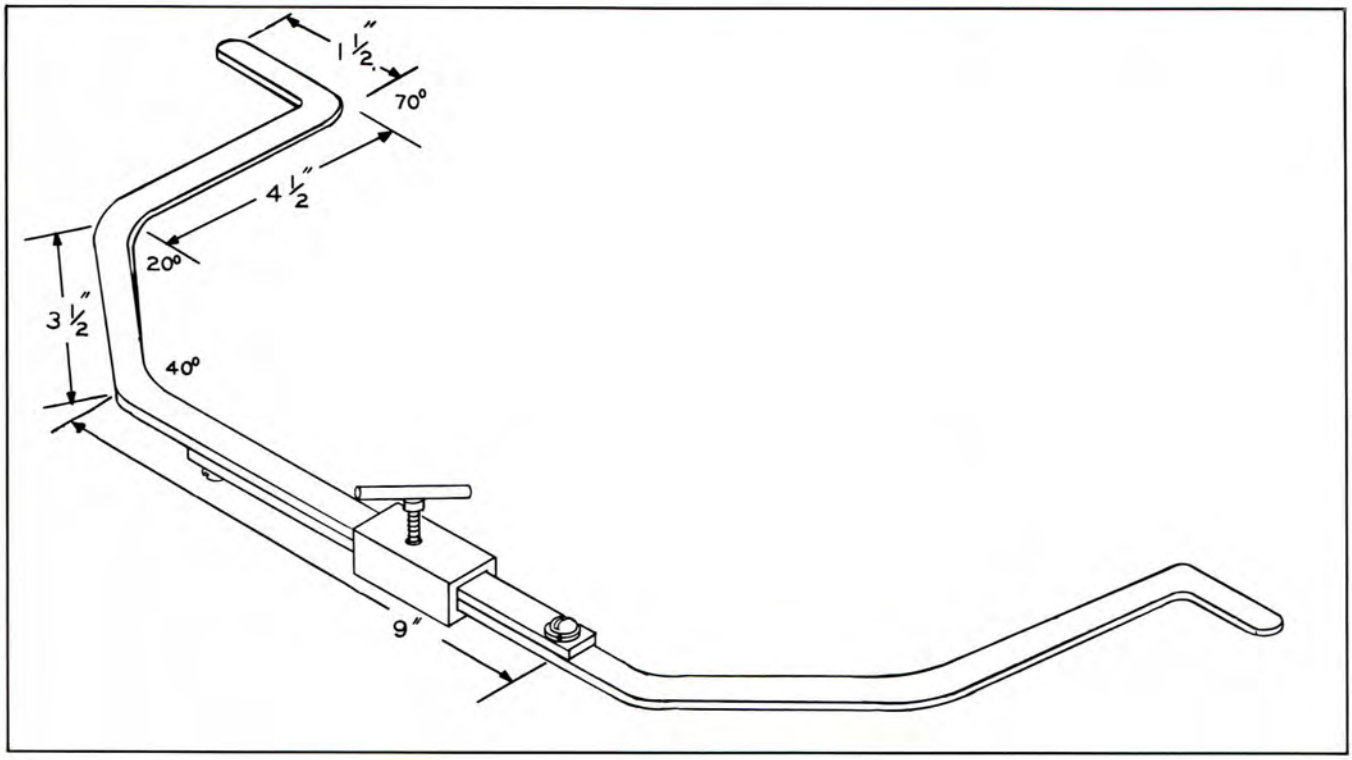


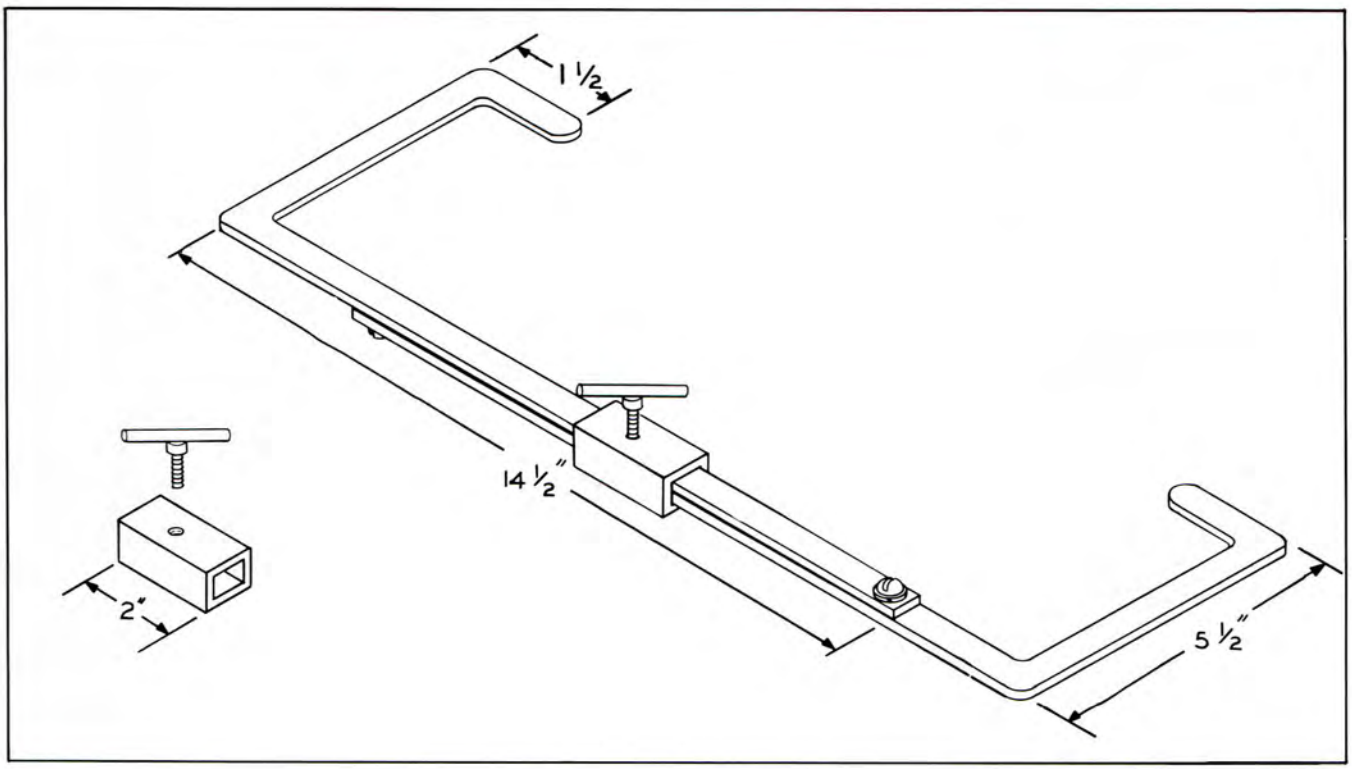
Plate 9588 Installing Cotter Pins

Step 7. Replace cotter pins in anchor pins.

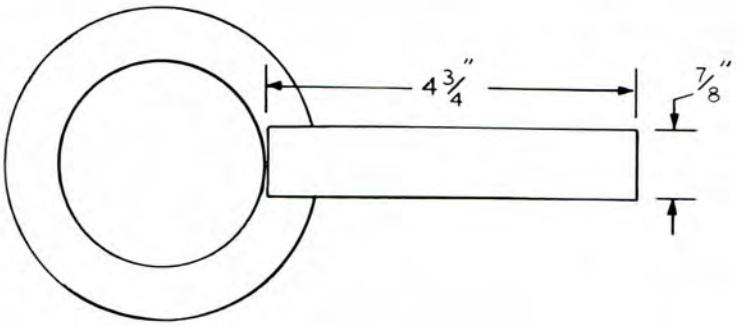
Step 8. Raise and lower carriage to full positions checking all phases of operation.

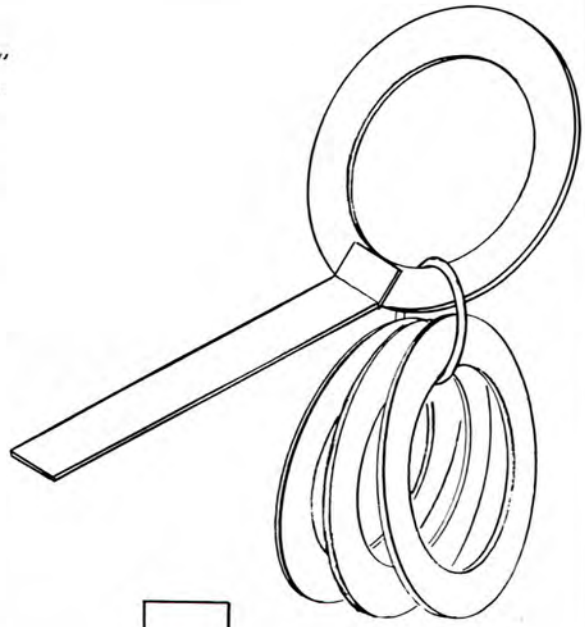


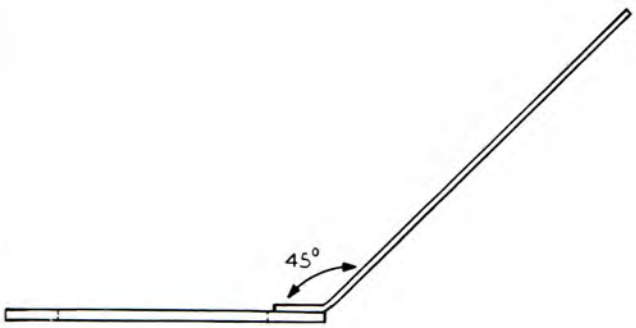
INSIDE SPANNING TOOL

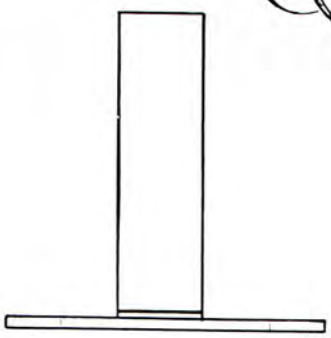


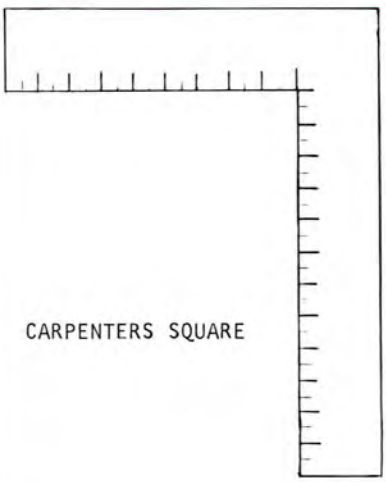
OUTSIDE SPANNING TOOL



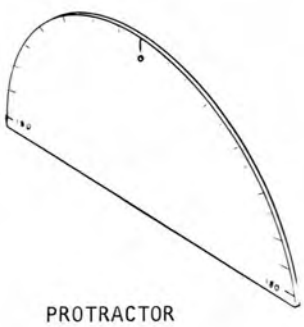




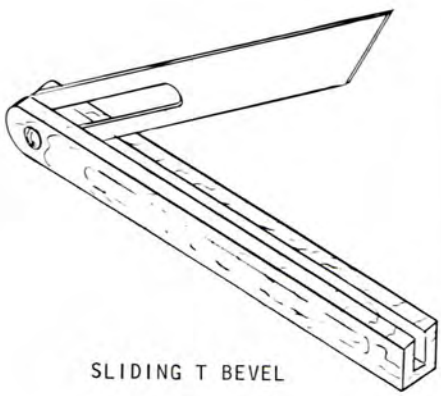




CARPENTERS SQUARE



PROTRACTOR



SLIDING T BEVEL

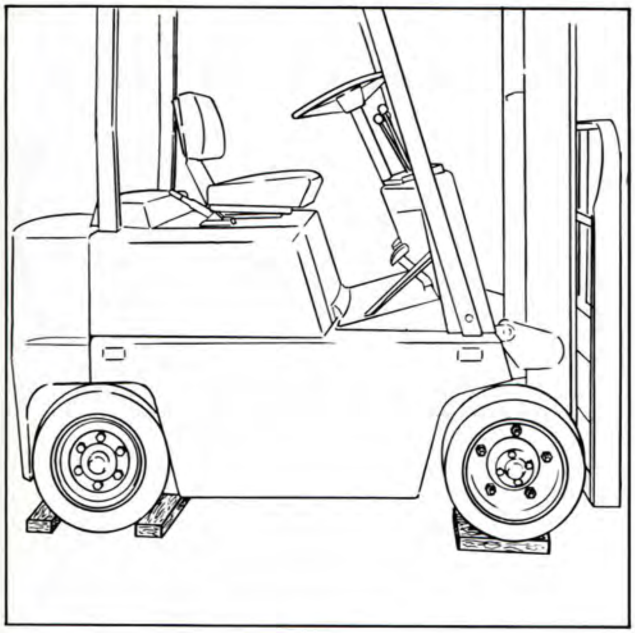


Plate 9811. Drive Wheels on Blocking, Block Steer Wheels

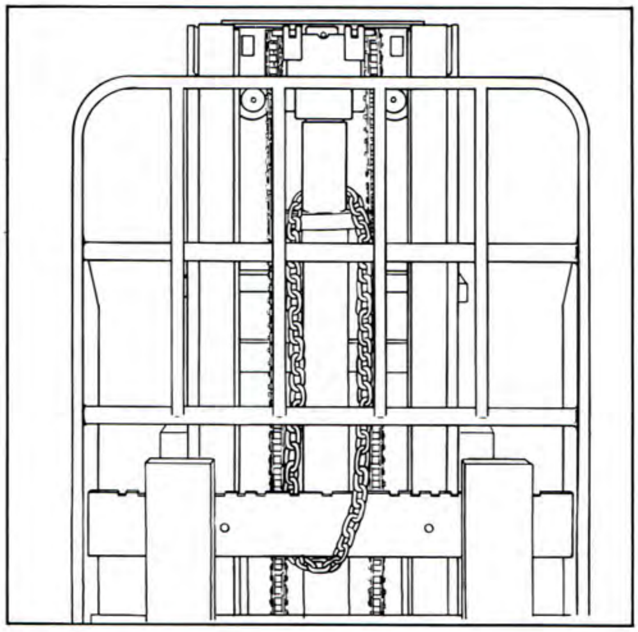


Plate 9807.. Support Carriage with Chain

```
X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X
X                                                           X
X                        W A R N I N G                      X
X                                                           X
X IF CARRIAGE IS TO BE LEFT ON MACHINE, SUPPORT CARRIAGE    X
X                                                           X
X BY PLACING CHAIN THROUGH LOWER CARRIAGE BAR AND WRAPPING  X
X                                                           X
X IT AROUND THE CYLINDER JUST ABOVE THE CYLINDER CHAIN      X
X                                                           X
X ANCHOR BRACKET.                                           X
X                                                           X
X BE SURE TO BLOCK STEER WHEELS BEFORE WORKING ON UPRIGHT.  X
X                                                           X
X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X X
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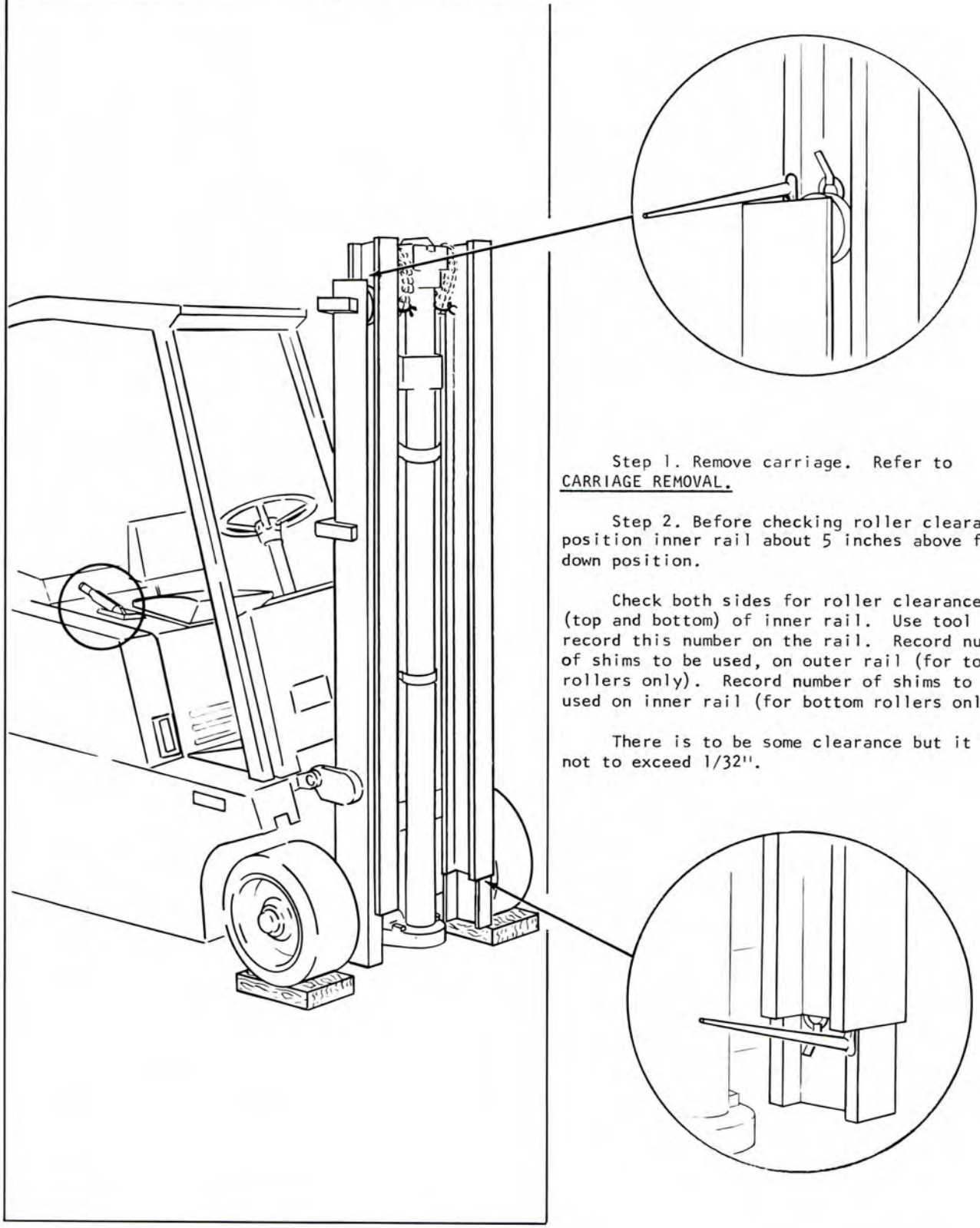
UPRIGHT ROLLER ADJUSTMENT -- STANDARD AND HILO SERIES 500



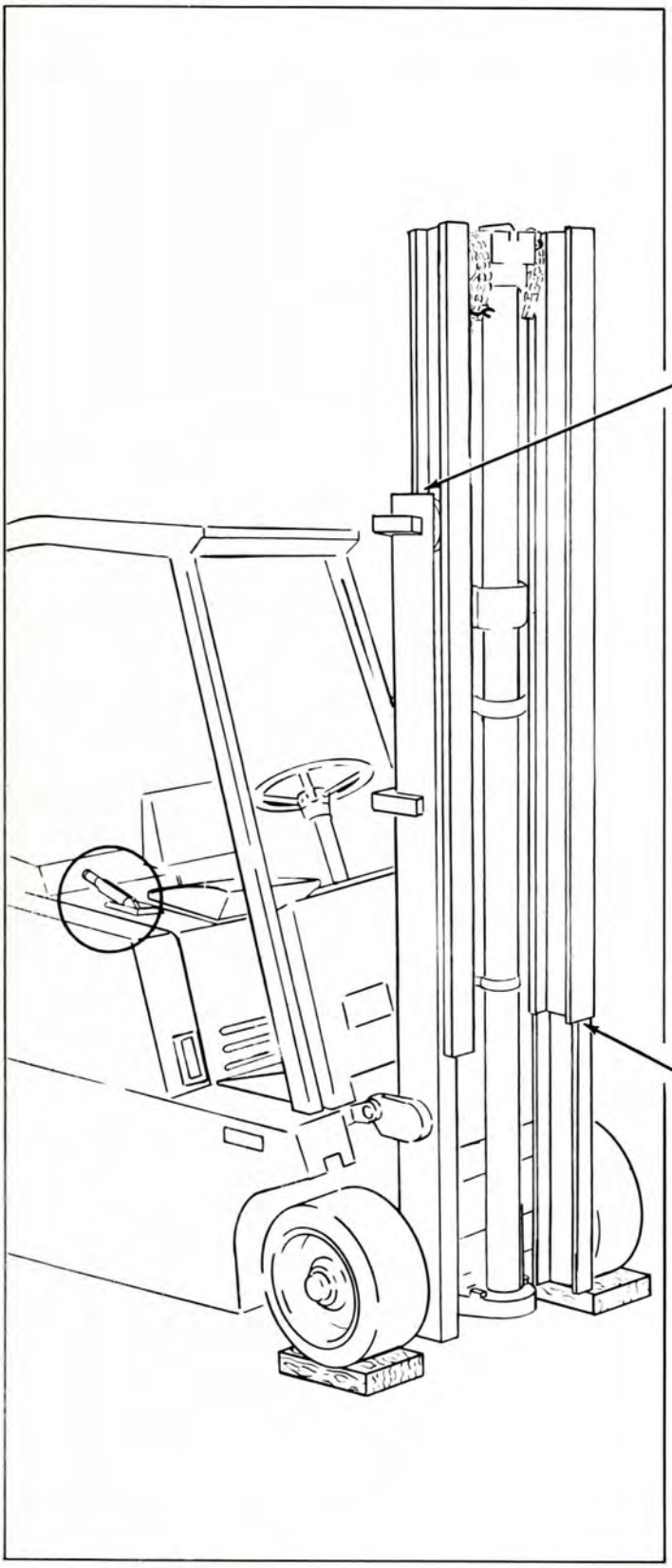
Step 1. Remove carriage. Refer to CARRIAGE REMOVAL.

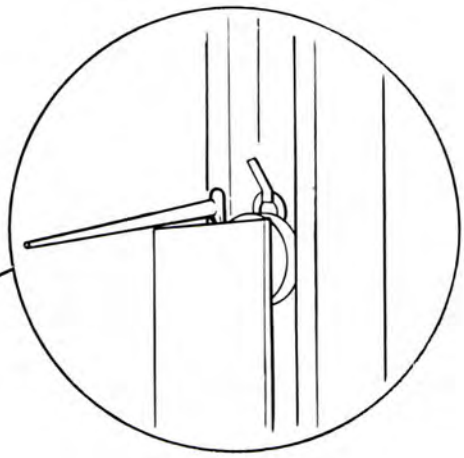
Step 2. Before checking roller clearance, position inner rail about 5 inches above full down position.

Check both sides for roller clearance at (top and bottom) of inner rail. Use tool to record this number on the rail. Record number of shims to be used, on outer rail (for top rollers only). Record number of shims to be used on inner rail (for bottom rollers only).

There is to be some clearance but it is not to exceed 1/32".

Plate 9804





Step 3. Raise inner rail to 1/2 of its full up position. With tool and bar, check the roller clearance in the same manner as before.

Record number of shims to be used, on outer rail (for top rollers only).

Record number of shims to be used, on inner rail (for bottom rollers only).

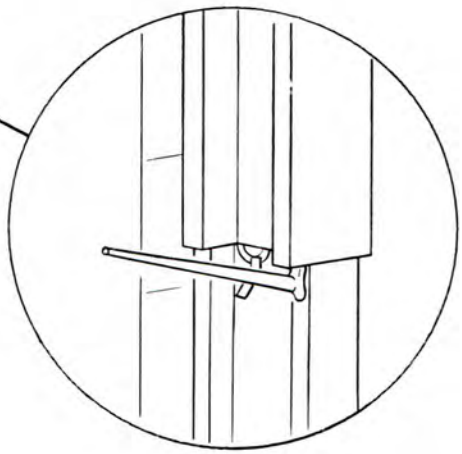
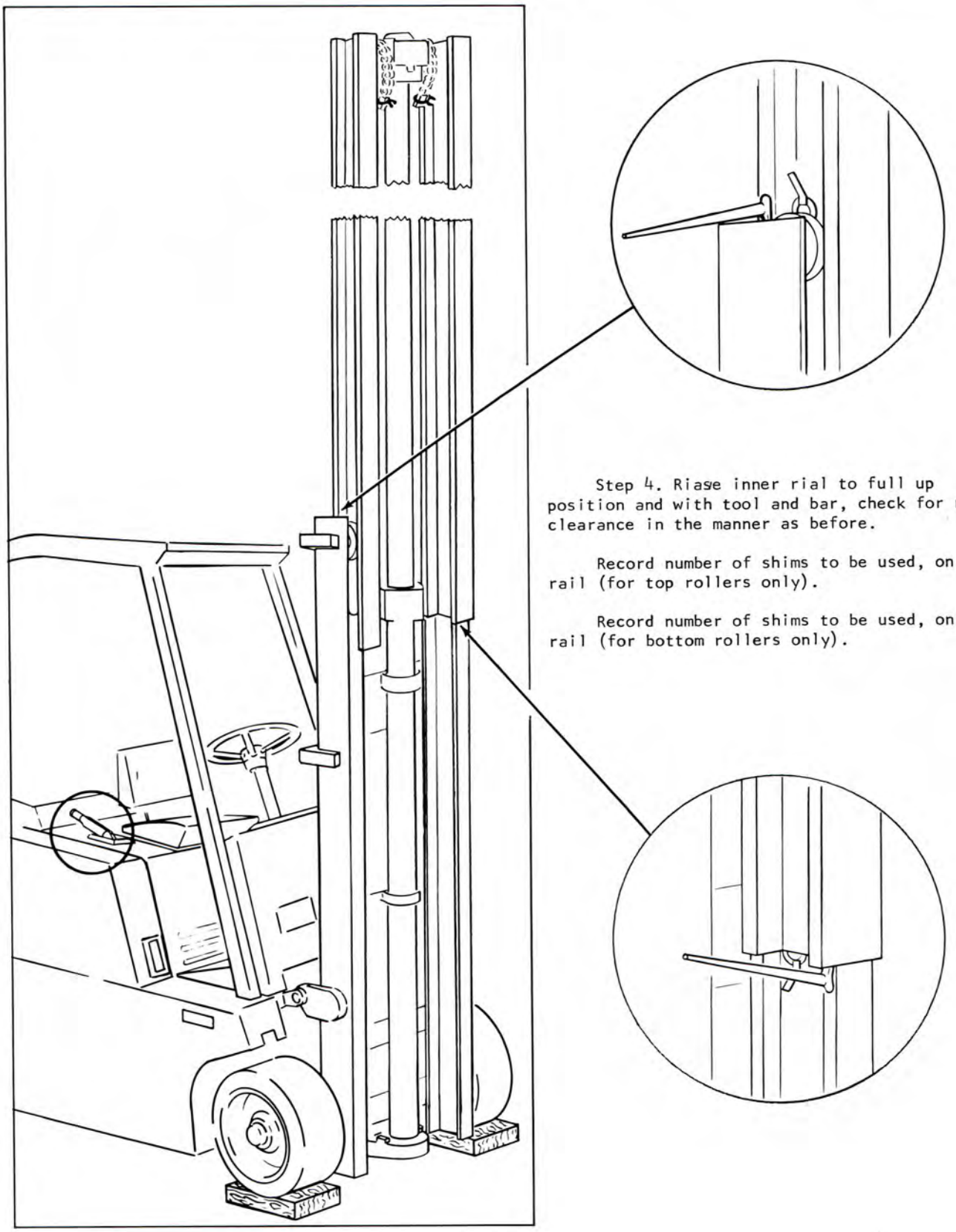


Plate 9805



Step 4. Riase inner rial to full up position and with tool and bar, check for roller clearance in the manner as before.

Record number of shims to be used, on outer rail (for top rollers only).

Record number of shims to be used, on inner rail (for bottom rollers only).

Plate 9806

Step 5. Raise inner rail about 5 inches and remove stop block.

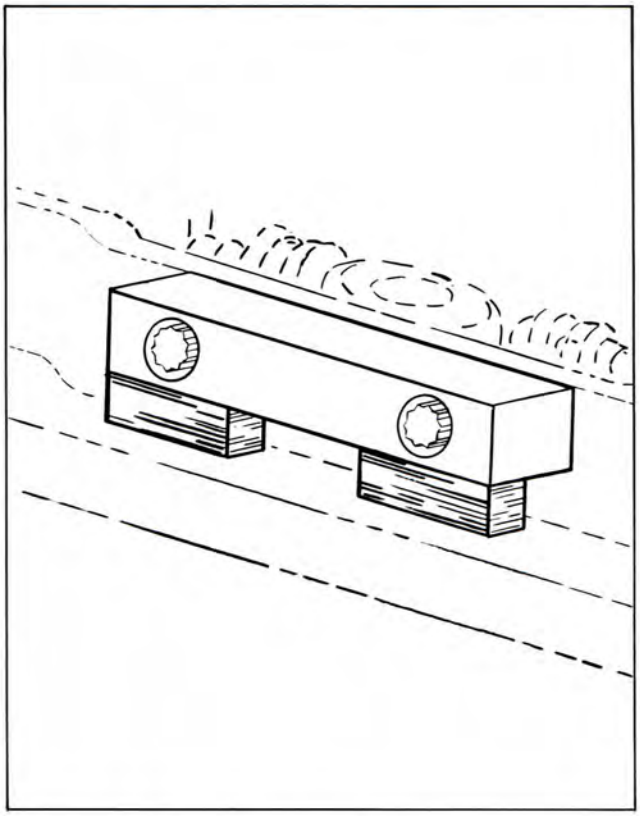
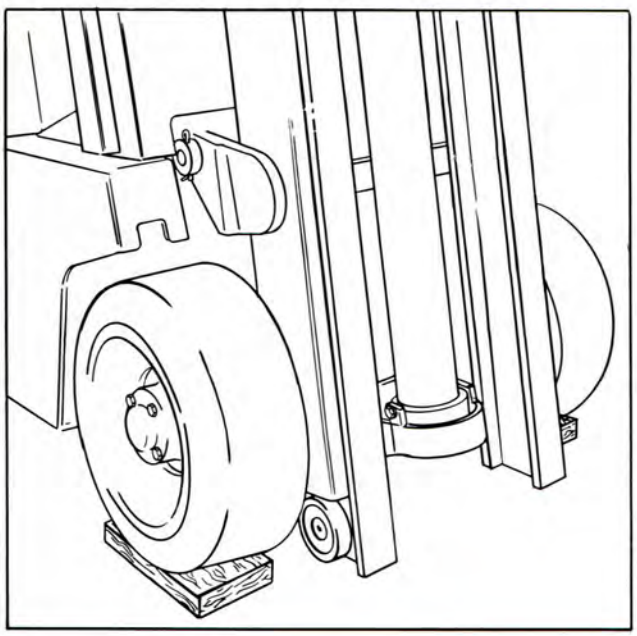


Plate 9808



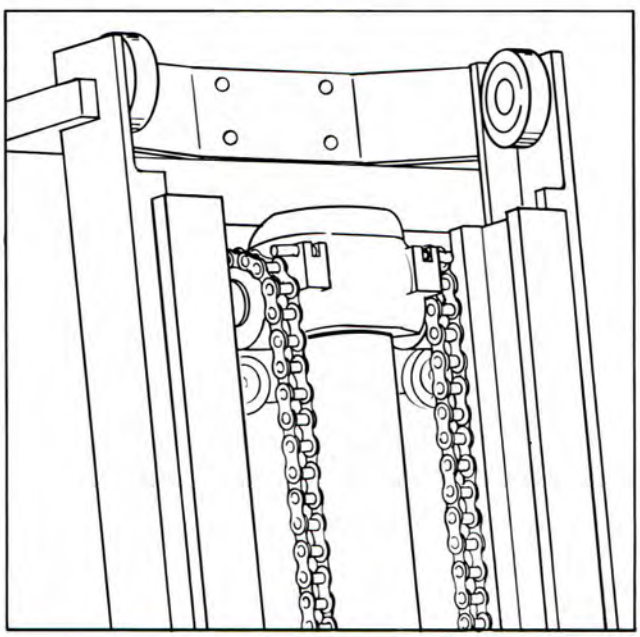


Plate 9809

Step 6. Lower inner rail until upper and lower rollers are clear for removal.

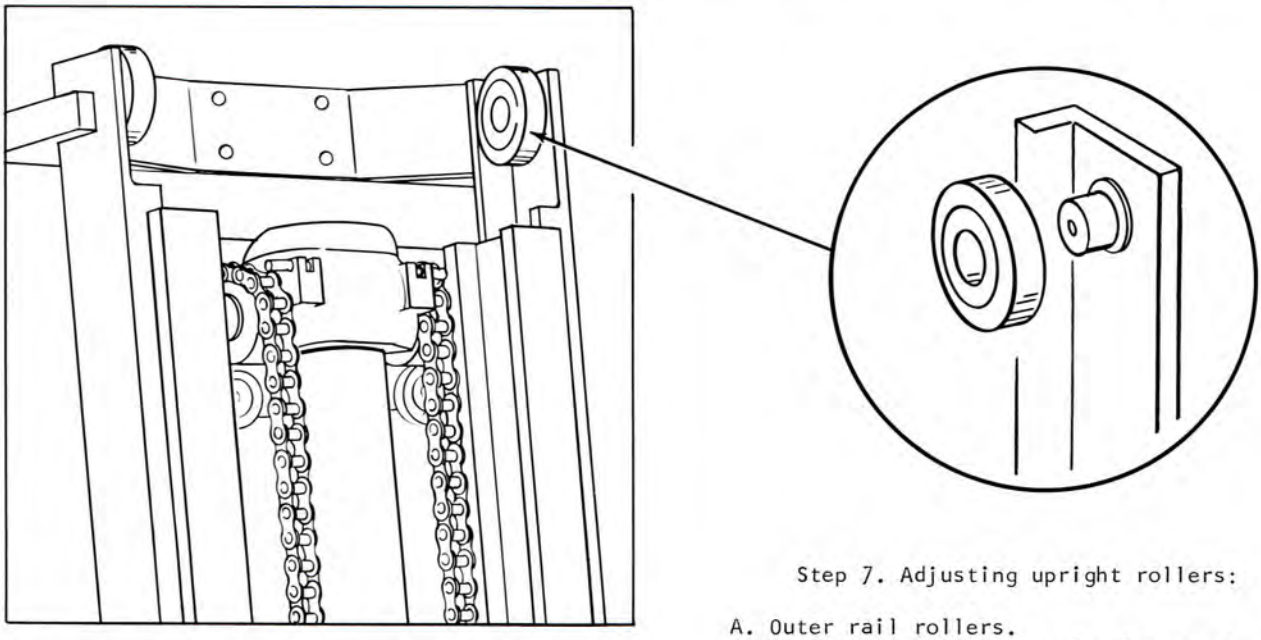


Plate 9810

Step 7. Adjusting upright rollers:

A. Outer rail rollers.

1. Count the number of shims at the right and left hand rollers.

2. Look at the three (3) numbers you recorded on the outer rail in Steps 2-3 & 4. The smallest of these numbers is the total number of shims to be added. A "0" means DO NOT add shims.

3. Your target for adjustment is to have the same number of shims at each upper roller. If you end up with an extra shim DO NOT remove it. Mark the side having an extra shim.

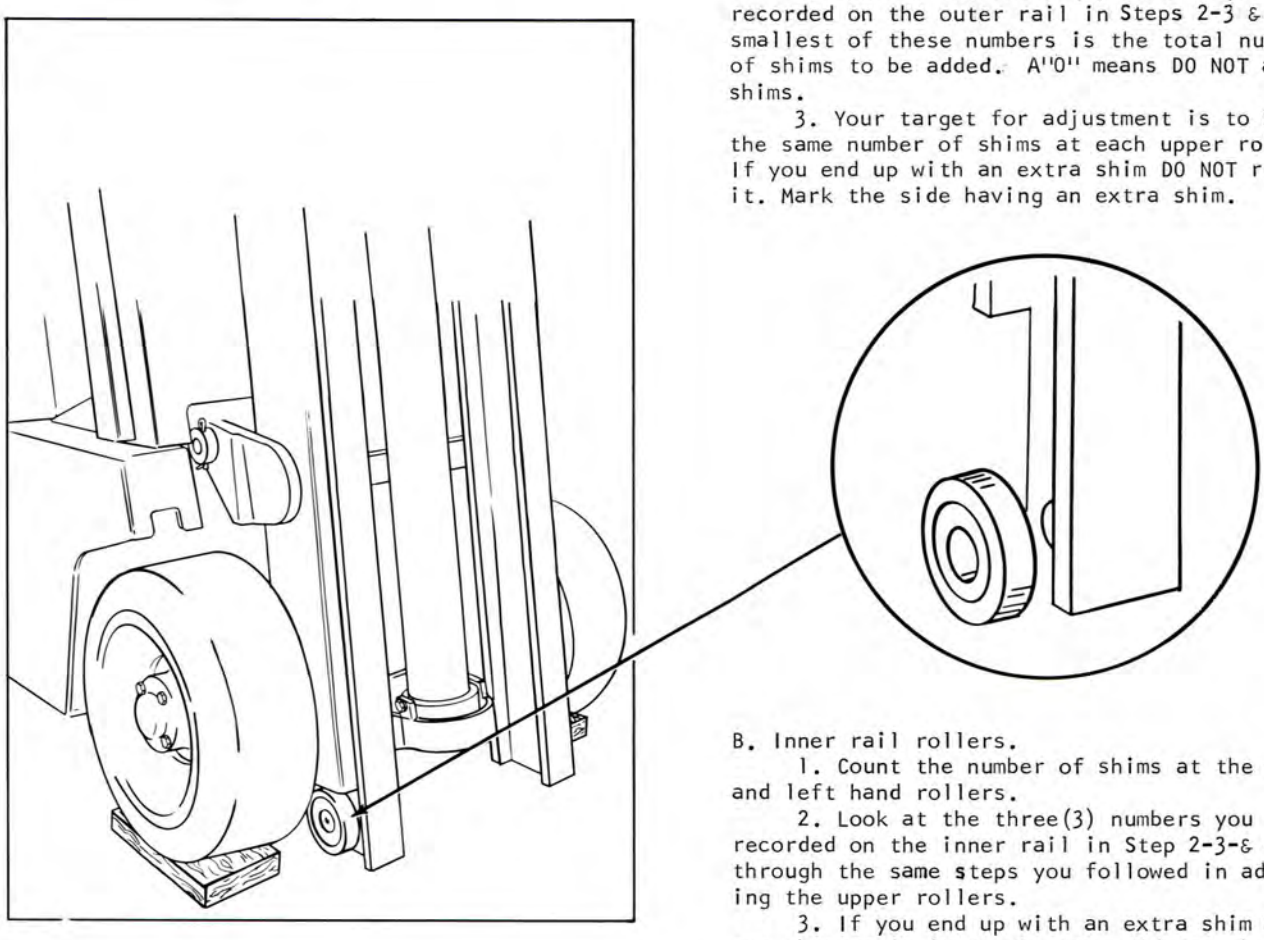


Plate 9812

B. Inner rail rollers.

1. Count the number of shims at the right and left hand rollers.

2. Look at the three(3) numbers you recorded on the inner rail in Step 2-3-& 4. Go through the same steps you followed in adjusting the upper rollers.

3. If you end up with an extra shim here too, besure it is on the same side as the extra upper shim.

Step 8. Raise inner rail about 5 inches above upper tie bar(of the outer rail) and install stop block and pad assembly.

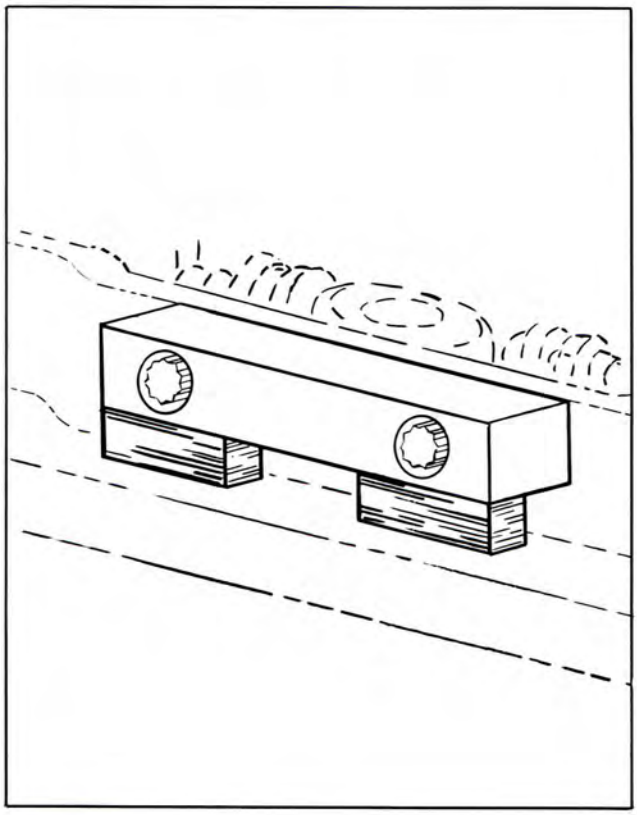


Plate 9808

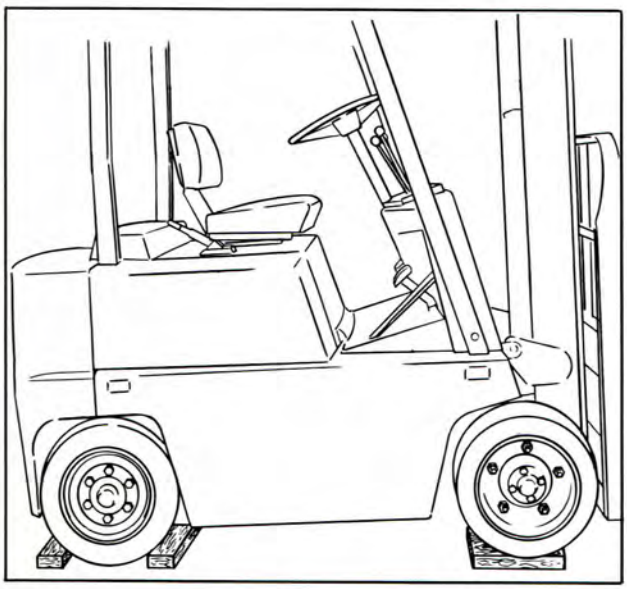


Plate 9811

Step 9. Remove carriage support chain and wheel blocks.

COOLING SYSTEM

TROUBLE	PROBABLE CAUSE	REMEDY
Overheating.	Unusual operating conditions of high temperature.	Inspect. (Refer to "Engine overheats".)
Loss of cooling solution.	Loose hose connections. Damaged or deteriorated hose. Leaking radiator.	Tighten hose connections. Replace hoses. Repair or replace radiator.
Engine operates too cool.	Thermostat sticking. Low air temperature.	Replace thermostat and gasket. Cover radiator.
Noises.	Frayed or loose fan belt. Water pump defective.	Replace or adjust belt. Replace pump.

STARTING MOTOR

TROUBLE	PROBABLE CAUSE	REMEDY
Starting motor cranks engine slowly.	Engine oil too heavy.	Change to proper grade oil.
	Battery charge low.	Recharge or replace battery.
	Battery cell shorted.	Replace battery.
	Battery connections corroded, broken, or loose.	Clean and tighten, or replace cables.
	Dirty commutator.	Clean commutator.
	Insufficient brush surface contact.	Free-up or replace brush.
	Defective starting motor.	Replace starting motor.
	Starting switch defective.	Replace switch.
Starting motor does not crank engine.	Engine oil too heavy.	Change to proper grade oil.
	Starting motor, Solenoid, or cables defective; loose connections.	Replace or tighten loose connections.
	Starting motor pinion gear jammed in flywheel drive gear.	Remove starting motor and reinstall. Replace defective driving gear.
	Dirty drive mechanism.	Clean and lubricate drive mechanism.
	Faulty Relay Switch.	Replace Relay Switch.
	Ignition Fuse Blown.	Replace Fuse.
	Faulty Ignition Switch.	Replace Switch.
	Faulty Neutral Starting Switch.	Replace Switch. NOTE: The INDEX of this manual will list an ADJUSTABLE Neutral Starting Switch if your machine is so equipped.

ALTERNATOR

TROUBLE	REMEDY
Damage to the alternator or other electrical components due to not taking precautions when performing service.	<u>Listed are some basics to be observed when alternator service is indicated</u>. 1. Before checking the alternator...the battery must be fully charged. If not...replace it with a fully charged battery. 2. Make sure of battery polarity...otherwise rectifiers in the alternator and the voltage regulator may be damaged due to reversed polarity. 3. Ignition switch should be in "OFF" position and...battery ground cable disconnected before any tests are made on the alternator. 4. Before checking the alternator or regulator...first, check the battery, wiring, connections and ground circuit. 5. If a booster battery is used for starting the engine...the booster cables must be connected correctly...negative to negative and positive to positive...otherwise rectifier and regulator damage can result. 6. Take special precautions to avoid grounding the alternator output terminal even if the system is not in operation. There is no circuit breaker in the system, and since the battery is connected directly to the alternator...grounding the alternator could result in damage to the unit. 7. When adjusting the voltage regulator...the tool used should be insulated with tape or a plastic sleeve...otherwise the tool could cause a short circuit through the regulator base. 8. Before starting the engine...check the alternator belt tension. It should be tight enough so it won't slip under load.

ALTERNATOR

I M P O R T A N T

SINCE THE ALTERNATOR AND REGULATOR ARE DESIGNED FOR USE ON ONLY ONE POLARITY SYSTEM, THE FOLLOWING PRECAUTIONS MUST BE OBSERVED WHEN WORKING ON THE CHARGING CIRCUIT. FAILURE TO OBSERVE THESE PRECAUTIONS WILL RESULT IN SERIOUS DAMAGE TO THE ELECTRICAL EQUIPMENT.

1. When installing a battery, always make absolutely sure the ground polarity of the battery and the ground polarity of the alternator are the same.

2. When connecting a booster battery, make certain to connect the negative battery terminals together and the positive battery terminals together.

3. When connecting a charger to the battery, connect the charger positive lead to the battery positive terminal and the charger negative lead to the battery negative terminal.

4. Never operate the alternator on open circuit. Make absolutely certain all connections in the circuit are secure.

5. Do not short across or ground any of the terminals on the alternator or regulator.

6. Do not attempt to polarize the alternator.

I N S P E C T I O N

1. The terminals should be inspected for corrosion and loose connections.

2. The wiring should be inspected for frayed insulation.

3. Check the mounting bolts for tightness.

4. Check the belt/s for correct alignment....proper tension and wear. Belt tension should be inspected and adjusted, if necessary, every 100 operating hours and adjusted per the procedures listed on page 100H 203.

5. After extended periods of operation, or at time of engine overhaul, the alternator may be removed from the vehicle for a thorough inspection and cleaning of all parts. The alternator requires no other service other than the previously mentioned inspection. When it becomes necessary to perform tests and internal inspection at the alternator, see your nearest authorized Clark Equipment Dealer.

BATTERY, LIGHTS AND HORN

TROUBLE	PROBABLE CAUSE	REMEDY
Battery discharged.	Battery solution level low.	Add distilled water to bring level above plates; inspect for cracked case.
	Short in battery cell.	Replace battery.
	Generator not charging.	Inspect generator, fan belt, and regulator.
	Loose or dirty connections; broken cables.	Clean and tighten connections; replace cables.
	Excessive use of starting motor.	Tune up engine; charge battery.
	Idle battery, or excessive use of lights with engine at idle.	Recharge or replace battery. Use lights sparingly.
	Short circuits.	Replace defective wiring.
Battery (other troubles)	Overheated battery.	Inspect for short circuit or excessive generator charge.
	Case bulged (or out of shape).	Inspect for overcharging and overtightening of hold-down screws.
Light switch.	Loose or dirty connections; broken wire.	Clean and tighten; replace broken wire.
	Defective switch.	Replace switch.
Wiring.	Loose or dirty connections; broken wire or terminal.	Clean, tighten, repair or replace. Wire or terminal.
Lights do not light.	Switch not fully "on".	Turn switch "on" fully.
	Loose or dirty connections; broken wire.	Clean and tighten; replace or repair wire or terminal.
	Wiring circuit short-circuited, or open.	Correct short circuit or replace defective parts.
	Light burned out.	Replace light.
Lights dim.	Loose or dirty connection.	Clean and tighten connections.
	Wiring short-circuited.	Correct short circuit or replace defective parts.
	Defective switch.	Replace switch.

BATTERY, LIGHTS AND HORN (Continued)

TROUBLE	PROBABLE CAUSE	REMEDY
Horn troubles.	Loose or dirty wiring connections.	Clean and tighten connections.
Horn sounds continuously.	Short-circuit in wiring between horn and horn button.	Replace wire.
Improper tone.	Loose or dirty wiring connections.	Clean and tighten connections.
	Cover or bracket screws loose.	Tighten.
	Points adjusted improperly.	Adjust points.
Horn will not operate.	Horn Fuse Blown.	Replace Fuse.
	Open Circuit.	Trace, repair or replace as required.
	Faulty Horn Relay.	Replace relay.

TRANSMISSION

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive noise.	Incorrect driving practice.	Correct practice.
	Insufficient lubricant.	Add lubricant.
	Gears or bearings broken or worn; shift fork bent, gears worn on splines.	Replace transmission.
	Overheated transmission.	Inspect lubricant grade and supply.
Hard shifting.	Clutch fails to release.	Adjust clutch pedal free travel.
	Clutch driven plate binds, or pressure plate is defective.	Report to designated individual in authority.
	Gearshift binding in housing.	Lubricate and free-up.
	Shift rods binding in case.	Report to designated individual in authority.
	Transmission loose on bell housing.	Tighten transmission mounting bolts.
	Clutch shaft pilot bearing binding, or shift housing damaged.	Report to designated individual in authority.
Slips out of gear.	Weak or broken rail spring.	Report to designated individual in authority.
	Transmission gears or bearing worn.	Replace transmission.
	Shifting fork bent, causing partial gear engagement.	Report to designated individual in authority.
	Transmission loose on bell housing.	Tighten transmission mounting bolts.
	Damaged bell housing.	Report to designated individual in authority.
	Damaged mainshaft pilot bearing.	Report to designated individual in authority.
Loss of lubricant.	Worn or damaged seals or gaskets.	Report to designated individual in authority.

DRIVE AXLE

TROUBLE	PROBABLE CAUSE	REMEDY
Continuous Axle Noise.	Badly worn parts.	Replace worn parts with new.
	Unevenly worn tires.	Replace tires.
	Improperly adjusted wheel bearing.	Adjust correctly.
	Lack of lubricant.	Add sufficient lubricant of correct grade.
Axle Noise on Drive or on Coast Only.	Differential pinion gear and ring gear out of adjustment or worn excessively.	Adjust, repair or replace entire unit if conditions warrants.
Excessive Backlash in Axle Driving.	Loose axle shaft drive flange cap screws.	Tighten cap screws.
	Flange loose on axle shaft.	Reweld flange to shaft.
	Worn splines on axle shaft at differential end.	Replace drive flange and shaft assembly.
	Differential drive pinion gear and ring gear out of adjustment or worn excessively.	Adjust or replace as condition warrants.
Complete Failure to Function.	Broken axle shaft.	Replace axle shaft.
	Broken teeth on ring gear or pinion gear.	Replace ring gear and pinion and other parts of differential necessary. Adjust ring gear and pinion gear correctly.

STEERING AXLE

TROUBLE	PROBABLE CAUSE	REMEDY
Trouble.	Damaged axle.	Replace axle.
	Lubrication leaks.	Replace oil seals. (Refer to Lubrication Section). Report to designated individual in authority.
	Incorrect caster or camber.	Report to designated individual in authority.
	Uneven tire wear.	Inflate tires properly. Check wheel alignment.

STEERING

TROUBLE	PROBABLE CAUSE	REMEDY
Steering difficult.	Lack of lubrication	Lubricate.
	Tight steering system connections.	Lubricate and adjust linkage.
	Tight steering gear; misaligned wheels.	Report to designated individual in authority.
	Bent steering connecting linkage or arm.	Straighten or replace linkage.
	Misaligned steering gear mounting.	Adjust mounting.
Wander or weaving.	Improper toe in camber or caster (axle twisted).	Report to designated individual in authority.
	Steering system connections or king pin bearings not properly lubricated.	Lubricate.
	Loose wheel bearings.	Adjust wheel bearings.
	Steering gear worn or maladjusted.	Report to designated individual in authority.
	Steering gear mountings loose.	Tighten mounting bolts.
Low speed shimmy or wobble.	Loose steering connections.	Adjust and tighten linkage.
	Steering gear worn, or adjustment too loose.	Report to designated individual in authority.
	Loose wheel bearings.	Adjust wheel bearings.
Vehicle pulls to one side.	Odd size, or new and old tires on opposite wheels.	Match tires.
	Tight wheel bearings.	Adjust. Lubricate wheel bearings.
	Bent steering arm or connection.	Straighten or replace bent linkage.

BRAKES

TROUBLE	PROBABLE CAUSE	REMEDY
Brakes drag.	Improper pedal adjustment.	Adjust brake pedal free travel.
	Brake pedal return spring broken or weak.	Replace spring.
	Brakes improperly adjusted.	Adjust brakes.
	Brake shoe anchor pin tight in shoe.	Free-up pin and lubricate lightly.
	Brake shoe return spring broken or weak.	Replace spring.
	Loose or damaged wheel bearings.	Adjust or replace wheel bearings.
	Insufficient brake shoe clearance, or improper brake anchor pin adjustment.	Adjust brakes.
	Brake backing plate loose.	Tighten plate.
	Grease on linings.	Correct grease leakage; clean or install new shoes and lining assemblies.
	Dirt imbedded in lining.	Clean lining with wire brush.
	Drums scored or rough.	Replace drum and brake shoe and lining assemblies.
Severe brake action on light pedal pressure.	Brake shoes improperly adjusted.	Adjust brakes.
	Grease on linings.	Correct grease leakage; clean or install new shoes and lining assemblies.
	Loose brake shoe anchor.	Adjust and tighten.
Brake locked.	Brake pedal lacks free travel.	Adjust pedal free travel.
	Brakes frozen to drums (cold weather).	Break loose by driving vehicle.
Brake noisy or chatters.	Brake lining worn.	Replace shoe and lining assemblies.
	Grease on linings.	Correct leakage; clean or replace shoe and lining assemblies.
	Dirt embedded in linings.	Clean lining with wire brush.
	Improper or loose linings.	Replace shoe and lining assemblies.
	Brake shoe or drum distorted.	Straighten or replace.

BRAKES (Continued)

TROUBLE	PROBABLE CAUSE	REMEDY
Excessive pedal travel.	Lining worn.	Adjust or replace shoe and lining assemblies.
	Brake improperly adjusted.	Adjust brake.
	Scored brake drums.	Repair or replace drums.
Excessive pedal pressure.	Grease on linings; worn or glazed lining.	Correct grease leakage; clean up and replace shoe and lining assemblies.
	Warped brake shoes, or defective brake linings.	Replace shoe and lining assemblies.
	Shoes improperly adjusted.	Adjust brakes.
	Brake drum scored or distorted.	Repair or replace drums.
	Shoes improperly adjusted.	Adjust brakes.
	Insufficient fluid in master cylinder.	Fill master cylinder to within 1/4 inch of the top.
Wheel troubles.	Wheel wobbles; bent.	Inspect mounting on hub, spindles, and drive axle; replace defective wheel or mounting.
	Wheel loose on hub.	Tighten.
	Wheel out of balance.	Balance wheel.
	Wheel bearings run hot.	Adjust, lubricate wheel bearings.

INDUSTRIAL TRUCK DIVISION

TROUBLE SHOOTING GUIDE

HYDRAULIC SYSTEM

TROUBLE	PROBABLE CAUSE	REMEDY
Pump not delivering oil.	Wrong direction of rotation.	Must be reversed immediately to prevent seizure and breakage of parts due to lack of oil.
	Tank oil level low.	Add recommended oil.
	Oil intake pipe or suction filter plugged.	Replace filter cartridge, clean strainer if so equipped.
	Air leak in suction line.	Will prevent priming, or cause noise and irregular action of control circuit.
	Oil viscosity too heavy to pick up prime.	Thinner oil should be used, per recommendations for given perature and service.
	Broken pump shaft or gear.	Report to designated individual in authority.
Pump not developing pressure.	Pump not delivering oil for any of the above reasons.	Check oil circulation by watching oil in tank.
	Relief valve setting not high enough.	Refer to relief valve instructions.
	Relief valve sticking open.	Dirt under pressure adjustment valve. Refer relief valve instructions.
	Leak in hydraulic control system (cylinders or valves).	Find leak and correct.
	Partially clogged intake line, intake filter or restricted intake pipe.	Pump must receive intake oil freely or cavitation will take place.
Pump making noise.	Small air leak at pump intake piping joints.	Test by pouring oil on joints while listening for change in operation. Tighten as required.
	Air leak at pump shaft packing.	Repair or replace.
	Tank air vent plugged.	Must be open thru breather opening or air filter.
	Too high oil viscosity.	Use recommended oils.
	Shaft packing worn.	Replace shaft packing per preceding instructions.
	Oil filter dirty.	Replace filter element.
Forks do not lift to maximum height.	Hydraulic Oil level low.	Fill sump tank.

HYDRAULIC SYSTEM CONTINUED

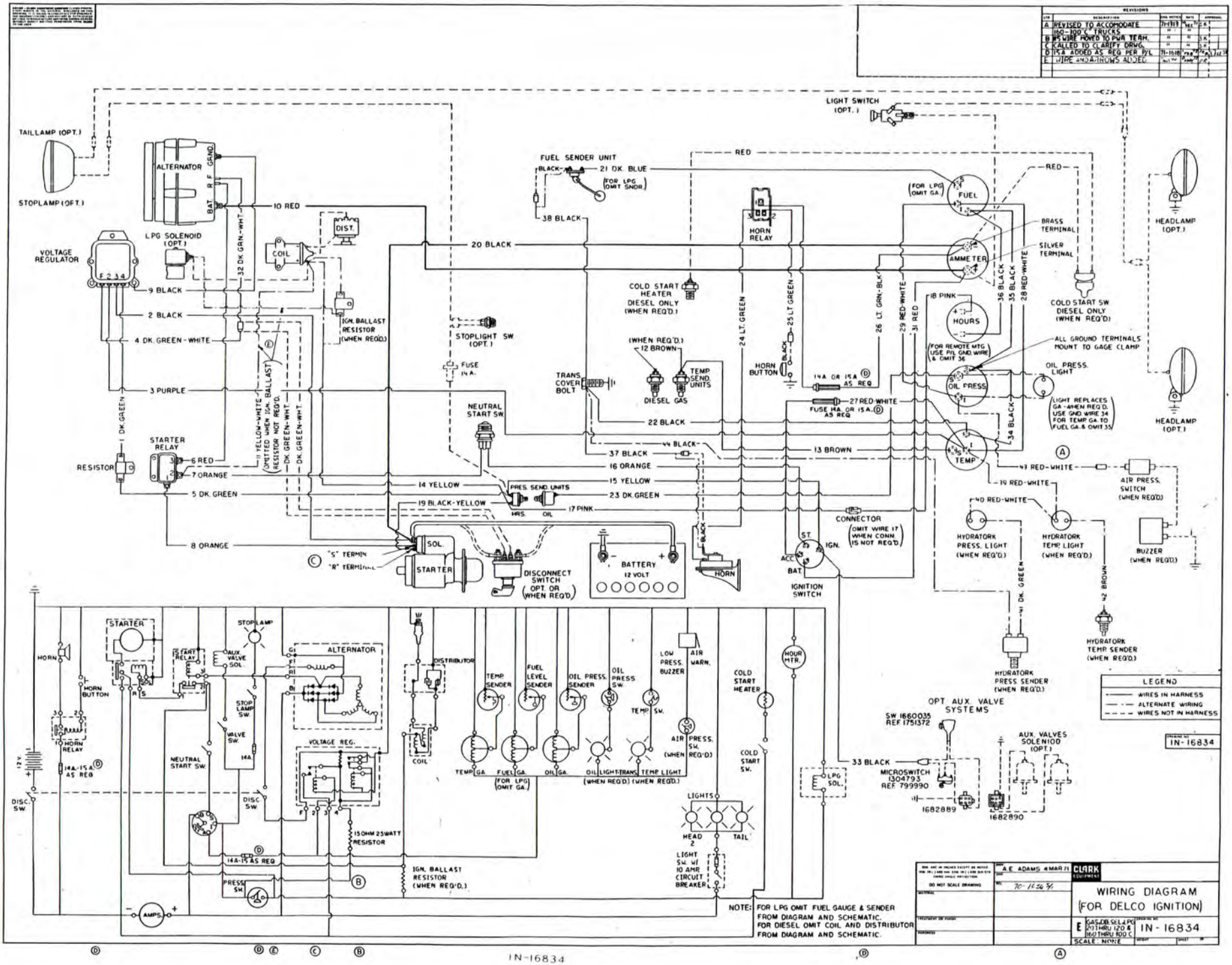
TROUBLE	PROBABLE CAUSE	REMEDY
Lift or tilt action fails.	Loss of oil pressure.	Report to designated individual in authority.
Oil leak at top of lift cylinder assembly.	Worn or damaged lift piston seal.	Replace seal.
	Scored cylinder wall.	Replace cylinder.
	Plugged vent line.	Clean out vent line. Replace if collapsed.
Oil leak around piston rod at tilt cylinder.	Worn seal.	Replace seal.
	Scored piston rod.	Replace rod and eliminate cause of scoring which may be caused by misalignment, worn bearing or foreign matter.
With load centered on lift forks load is lifted unevenly.	Lift chains out of adjustment.	Adjust chains.

INDUSTRIAL TRUCK DIVISION

N O T I C E

THE WIRING DIAGRAM IN THIS MANUAL IS FOR A STANDARD TRUCK, WITHOUT SPECIAL CUSTOM FEATURES.

THE PARTS BOOK FOR THIS SERIAL NUMBER INCLUDES WIRING DIAGRAM/S COVERING SPECIAL CUSTOM OPTIONS INCORPORATED AT TIME OF SHIPMENT.


REVISIONS
A REVISED TO ACCOMODATE 160-300 C TRUCKS
B WIRE MOVED TO PWR TERM.
C CALLED TO CLARIFY DRWG.
D 15A ADDED AS REQ PER P/L
E WIRE #40A-THRUWS ADDED.
TAILLAMP (OPT.)
STOPLAMP (OPT.)
ALTERNATOR
BAT R F GRND
LPG SOLENOID (OPT.)
VOLTAGE REGULATOR
F 2 3 4
DIST.
COIL
IGN. BALLAST RESISTOR (WHEN REQ'D.)
10 RED
32 DK GRN-WHT
9 BLACK
2 BLACK
4 DK. GREEN-WHITE
3 PURPLE
1 DK. GREEN
RESISTOR
STARTER RELAY
6 RED
7 ORANGE
5 DK. GREEN
8 ORANGE
11 YELLOW-WHITE (OMITTED WHEN 20A BALLAST RESISTOR NOT REQ'D.)
DK. GREEN-WHT.
DK. GREEN-WHT.
STARTER
SOL.
"S" TERMIN
"R" TERMINAL
DISCONNECT SWITCH (OPT. OR WHEN REQ'D)
BATTERY 12 VOLT
FUEL SENDER UNIT
BLACK
21 DK. BLUE
(FOR LPG OMIT SNDR.)
38 BLACK
STOPLIGHT SW. (OPT.)
FUSE 14 A.
TRANS. COVER BOLT
(WHEN REQ'D.) 12 BROWN
TEMP SEND. UNITS
DIESEL GAS
NEUTRAL START SW.
PRES. SEND. UNITS
HRS.
OIL
17 PINK
19 BLACK-YELLOW
14 YELLOW
15 YELLOW
23 DK. GREEN
16 ORANGE
37 BLACK
44 BLACK
22 BLACK
20 BLACK
HORN RELAY
HORN
HORN BUTTON
BLACK
14A OR 15A AS REQ
27 RED-WHITE
FUSE 14A. OR 15A. AS REQ
24 LT. GREEN
25 LT GREEN
26 LT. GRN-BLK
29 RED-WHITE
31 RED
13 BROWN
RED
(FOR LPG OMIT GA.)
FUEL
AMMETER
BRASS TERMINAL
SILVER TERMINAL
COLD START SW DIESEL ONLY (WHEN REQ'D)
18 PINK
HOURS
(FOR REMOTE MTG. USE P/L GND WIRE & OMIT 36)
ALL GROUND TERMINALS MOUNT TO GAGE CLAMP
OIL PRESS.
OIL PRESS. LIGHT
(LIGHT REPLACES GA - WHEN REQ'D. USE GND WIRE 34 FOR TEMP GA. TO FUEL GA. & OMIT 35)
TEMP
36 BLACK
35 BLACK
28 RED-WHITE
34 BLACK
HEADLAMP (OPT.)
HEADLAMP (OPT.)
43 RED-WHITE
AIR PRESS. SWITCH (WHEN REQ'D)
40 RED-WHITE
19 RED-WHITE
HYDRATORK PRESS. LIGHT (WHEN REQ'D.)
HYDRATORK TEMP LIGHT (WHEN REQ'D.)
BUZZER (WHEN REQ'D.)
CONNECTOR (OMIT WIRE 17 WHEN CONN. IS NOT REQ'D.)
ST.
IGN.
ACC
BAT.
IGNITION SWITCH
41 DK. GREEN
42 BROWN
HYDRATORK TEMP SENDER (WHEN REQ'D.)
HYDRATORK PRESS SENDER (WHEN REQ'D.)
LEGEND
WIRES IN HARNESS
ALTERNATE WIRING
WIRES NOT IN HARNESS
IN-16834
OPT AUX. VALVE SYSTEMS
SW. 1660035 REF. 1751372
MICROSWITCH 1304793 REF 799990
1682889
AUX. VALVES SOLENOID (OPT.)
1682890
33 BLACK
STARTER
HORN
HORN BUTTON
HORN RELAY
START RELAY
STOPLAMP
AUX VALVE SOL.
STOP LAMP SW.
VALVE SW.
NEUTRAL START SW.
14A
14A-15A AS REQ
DISC SW.
12V
ALTERNATOR
VOLTAGE REG.
150HM 25WATT RESISTOR
IGN. BALLAST RESISTOR (WHEN REQ'D.)
PRESS SW.
AMPS.
DISTRIBUTOR
COIL
TEMP SENDER
FUEL LEVEL SENDER
OIL PRESS. SENDER
OIL PRESS SW.
TEMP SW.
LOW PRESS. BUZZER
AIR WARN.
AIR PRESS. SW. (WHEN REQ'D)
TEMP GA.
FUEL GA. (FOR LPG OMIT GA.)
OIL GA.
OIL LIGHT (WHEN REQ'D.)
TRANS TEMP LIGHT (WHEN REQ'D.)
HOUR MTR.
COLD START HEATER
COLD START SW.
LPG SOL.
LIGHTS
HEAD 2
TAIL
LIGHT SW. W/ 10 AMP CIRCUIT BREAKER
NOTE: FOR LPG OMIT FUEL GAUGE & SENDER FROM DIAGRAM AND SCHEMATIC. FOR DIESEL OMIT COIL AND DISTRIBUTOR FROM DIAGRAM AND SCHEMATIC.
DO NOT SCALE DRAWING
A.E. ADAMS 4 MAR 71
70-1536-51
CLARK EQUIPMENT
WIRING DIAGRAM (FOR DELCO IGNITION)
E GAS, DIESEL & LPG 201 THRU 120 & 160 THRU 300 C
IN-16834
SCALE NONE