

Lull[®]

Illustrated Parts Manual

Model
400

10709905
March 1998

ANSI

JLG[®]

MASTER 400 HIGH -LIFT LOADER

<u>INDEX NO.</u>	<u>PAGE</u>	<u>SERIAL NO.</u>	<u>DESCRIPTION</u>	<u>AXLE/ENGINE</u>
1156	-	100-	Lubrication Chart	A11
1157	-	100-	Cap & Tower Lub Chart	A11
1158	-	100-	Wiring Diagram - Gas	A11
1268	-	100-	Wiring Diagram - Diesel	A11
1160	-	100-	Wiring - Electrical System	A11
1163	25	100-329	Loader Assembly	RS/225/Int.
1238	25	330-599	Loader Assembly	RS/225/Int.
1413	25	600-	Loader Assembly	N/225
1419	25	600-798	Loader Assembly	N/Int.
1497	25	799-	Loader Assembly	N/Wauk
1600	25	956-	Loader Assembly	N/225/TF
1608	25	1058-1333	Loader Assembly	N/Wauk/TF
1702	25	1334-	Loader Assembly	N/Wauk/TF
1164	27	100-538	Drive Train Assembly	RS/225
1165	29	100-538	Drive Train Assembly	RS/225
1166	31	100-538	Drive Train Assembly	RS/225
1362	27	101-	Drive Train Assembly	RS/N/Int.
1363	29	101-	Drive Train Assembly	RS/N/Int.
1364	31	101-	Drive Train Assembly	RS/N/ Int.
1372	27	418-	Drive Train Assembly	N/225
1373	28	418-	Drive Train Assembly	N/225
1374	31	418-	Drive Train Assembly	N/225
1684	27	1183-	Drive Train Assembly (Young Radiator)	N/Wauk
1685	29	1183-	Drive Train Assembly (Young Radiator)	N/Wauk
1682	31	1182-	Drive Train Assembly (Young Radiator)	N/Wauk
1618	27	1108-	Drive Train Assembly (Cr. Flow)	N/Wauk
1619	29	1108-	Drive Train Assembly (Cr. Flow)	N/Wauk
1681	31	1108-	Drive Train Assembly (Cr. Flow)	N/Wauk
1167	33	100-538	Drive Shaft Assembly	RS/N/A11
1168	35	100-538	Drive Shaft Assembly	RS/225/ Int.
1169	37	100-	Drive Shaft Assembly (Eng. Drop Box)	RS/N/A11
1593	39	954-1499	Tilt Cylinder Assembly	N/A11
1690	39	1500	Tilt Cylinder Assembly	N/A11
1598	41	959-	Side Tilt Control Assembly	N/225/TF
1673	41	1108-	Side Tilt Control Assembly	N/Wauk/TF
1170	39	100-	Front Axle	RS/225/Int.
1171	41	100-	Front Axle, Outer End	RS/225/Int.
1172	43	100-	Front Axle	RS/225/Int.
1173	45	100-	Front Axle, Differential	RS/225/Int.
1213	46A	100-	Front Axle, Brake Assembly	RS/225/Int.
1174	47	100-	Rear Axle	RS/225/ Int.
1175	49	100-	Rear Axle Brake Assembly	RS/225/Int.
1177	54	100-	Rear Axle, Differential	RS/225/Int.
1178	56	100-	Rear Axle, Outer End	RS/225/Int.
902	50	100-	Brake & Hydrovac Assembly	N/RS/225/Int
1502	50	799-	Brake & Hydrovac Assembly	N/Wauk
1176	52	100-	Brake Line Assembly	A11
1180	60	100-	Operators Platform Assembly	RS/225
1367	60	100-	Operators Platform Assembly	RS/Int.
1422	60	600-798	Operators Platform Assembly	N/Int.

MASTER 400 HIGH-LIFT LOADER

<u>INDEX NO.</u>	<u>PAGE</u>	<u>SERIAL NO</u>	<u>DESCRIPTION</u>	<u>AXLE/ENGINE</u>
1601	60	600-	Operators Platform Assembly	N/225
1667	60	799-	Operators Platform Assembly	N/Wauk
1181	62	100-1055	Torq. Converter Control,W/Out Cab	A11
1498	62	100-	Torq. Conv. Control, W/Cab	A11
1182	64	100-1119	Shifting Assembly	A11
1615	64	1120-	Shifting Assembly	A11
1183	66	100-599	Rear Steering Control	A11
1208	67A	100-599	Rear Steering Valve	A11
1184	68	100-	Front Steering Assembly	A11
1185	70	100-1074	Throttle Assembly	RS/N/225
1254	70	100-	Throttle Assembly	RS/N/Int.
1613	70	1075-	Throttle Assembly	N/225
1507	70	799-	Throttle Assembly	N/Wauk
1562	70	959-1074	Throttle Assembly	N/225/TF
1612	70	1075-	Throttle Assembly	N/225/TF
1610	70	799-	Throttle Assembly	N/Wauk/TF
1186	72	100-1085	Brake & Disconnect Assembly	N/RS/A11
1614	72	1086-	Brake & Disconnect Assembly	N/A11
1187	74	100-	Battery Support Assembly	N/RS/GAS
1244	74	100-	Battery Support Assembly	N/RS/Diesel
1188	76	100-	Valve Control Assembly	RS/N/225/Int.
1500	76	799-1107	Valve Control Assembly	N/Wauk
1661	76	1108-	Valve Control Assembly	N/Wauk
1189	78	100-446,539-599	Hydraulic Pump Assembly	A11
1378	78	447-538	Hydraulic Pump Assembly	A11
1411	78	600-1681	Hydraulic Pump Assembly	A11
1597	78	959-	Hydraulic Pump Assembly	A11
1679	78	1108-	Hydraulic Pump Assembly	N/Wauk/TF
1190	82	100-	Fuel Tank Assembly	A11
1191	84	100-	Valve Assembly	A11
1192	86	100-886	Hyd. Pump Drive Assembly	RS/N/225
1379	86	100-798	Hyd. Pump Drive Assembly	RS/N/Int.
1569	86	850,887-1613	Hyd. Pump Drive Assembly	N/225
1712	86	1614-	Hyd. Pump Drive Assembly	N/225
1501	86	799-1613	Hyd. Pump Drive Assembly	N/Wauk
1711	86	1614-	Hyd. Pump Drive Assembly	N/Wauk
1193	88	100-599	Hyd. Piping Assembly	A11
1423	88	600-798	Hyd. System (Pump to Valve)	A11
1424	89A	600-798	Hyd. System-Continued	A11
1306	88	799-	Hyd. System (Pump to Valve)	N/Wauk
1595	89A	799-	Hyd. System-Continued	N/Wauk
1662	88	1108-	Hyd. System (Pump to Valve)	N/Wauk/TF
1663	89A	1108-	Hyd. System-Continued	N/Wauk/TF
1596	89C	959-1333	Hyd. System Assembly	N/225/TF
1692	89D	1334-	Hyd. System Assembly	N/225/TF
1693	89E	1334-	Hyd. System Assembly	N/225/TF
1694	89F	1334-	Hyd. System Assembly	N/225/TF
1611	89C	1058-1333	Hyd. System Assembly	N/Wauk/TF
1677	89D	1108-	Hyd. System Assembly	N/Wauk/TF
1674	89E	1108-	Hyd. System Assembly	N/Wauk/TF
1680	89F	1334-	Hyd. System Assembly	N/Wauk/TF

MASTER 400 HIGH-LIFT LOADER

<u>INDEX NO.</u>	<u>PAGE</u>	<u>SERIAL NO.</u>	<u>DESCRIPTION</u>	<u>AXLE/ENGINE</u>
1194	90	100-	Hyd. System Assembly (Lift Arm)	A11
1195	92	100-599	Front Orbitrol Steer Assembly	RS/A11
1368	92	100-599	Front Orbitrol Steer Assembly	N/A11
1577	92	600-	Front Orbitrol Steer Assembly	A11
1196	94	100-	Front Steer Cylinder Assembly	RS/A11
1197	96	100-	Rear Steer Cylinder Assembly	RS/A11
1198	98	100-599	Rear Orbitrol Steer Assembly	RS/A11
1369	98	100-599	Rear Orbitrol Steer Assembly	N/A11
1578	98	600-	Rear Orbitrol Steer Assembly	A11
1199	100	100-599	Hoist Cylinder Assembly	A11
1416	100	600-1333	Hoist Cylinder Assembly	A11
1689	100	1334-	Hoist Cylinder Assembly	A11
1417	102	100-1333	Tilt Cylinder Assembly	A11
1687	102	1334-	Tilt Cylinder Assembly	A11
1201	104	100-	Transverse Cylinder Assembly	A11
912	106	100-	Drop Box Transmission Assembly	A11
913	108	100-	Drop Box Transmission Assembly	A11
914	110	100-	Drop Box Transmission Assembly	A11
1202	112	100-599	Steering Cylinder Assembly	A11
1421	114	100-1429	Tower Assembly	A11
1697	113	1430-	Tower Assembly	A11
1698	113	1430-	Carriage & Fork Assembly	A11
1236	115	100-	Tower Cylinder Assembly	A11
1204	116	100-	Overhead Guard Assembly	A11
1205	118	100-	Side Tilt Carriage Assembly	A11
1206	120	100-	Torque Converter Assembly	A11
1273	122	100-798	Vacuum pump Assembly	RS/N/Int.
1503	122	799-	Vacuum Pump Assembly	N/Wauk
1274	124	100-798	Fuel Line Pump & Tank Assembly	RS/N/Int.
1506	124	799-1108	Fuel Line Pump & Tank Assembly	N/Wauk
1678	124	1109-	Fuel Line & Tank Assembly	N/Wauk
1302	130	959-	Valve Assembly (Tilt Frame Models ONLY)	A11
1790	51	418-	NAPCO PLANETARY AXLE ASSEMBLY	N/A11
1791	53	418-	Axle Assembly - Continued	N/A11
1792	55	418-	Axle Assembly - Continued	N/A11
1793	57	418-	Axle Assembly - Continued	N/A11
1794	59	418-	Axle Assembly - Continued	N/A11
1783	38	418-	Brake Assembly	N/A11
1784	39	418-	Brake Assembly - Continued	N/A11
1787	45	418-	Steer Cylinder Assembly	N/A11
1620 THRU 1642		100-	FUNK REVERSER	A11

ALL = Applies to All Models Per S/N

225 = Chrysler - Gas

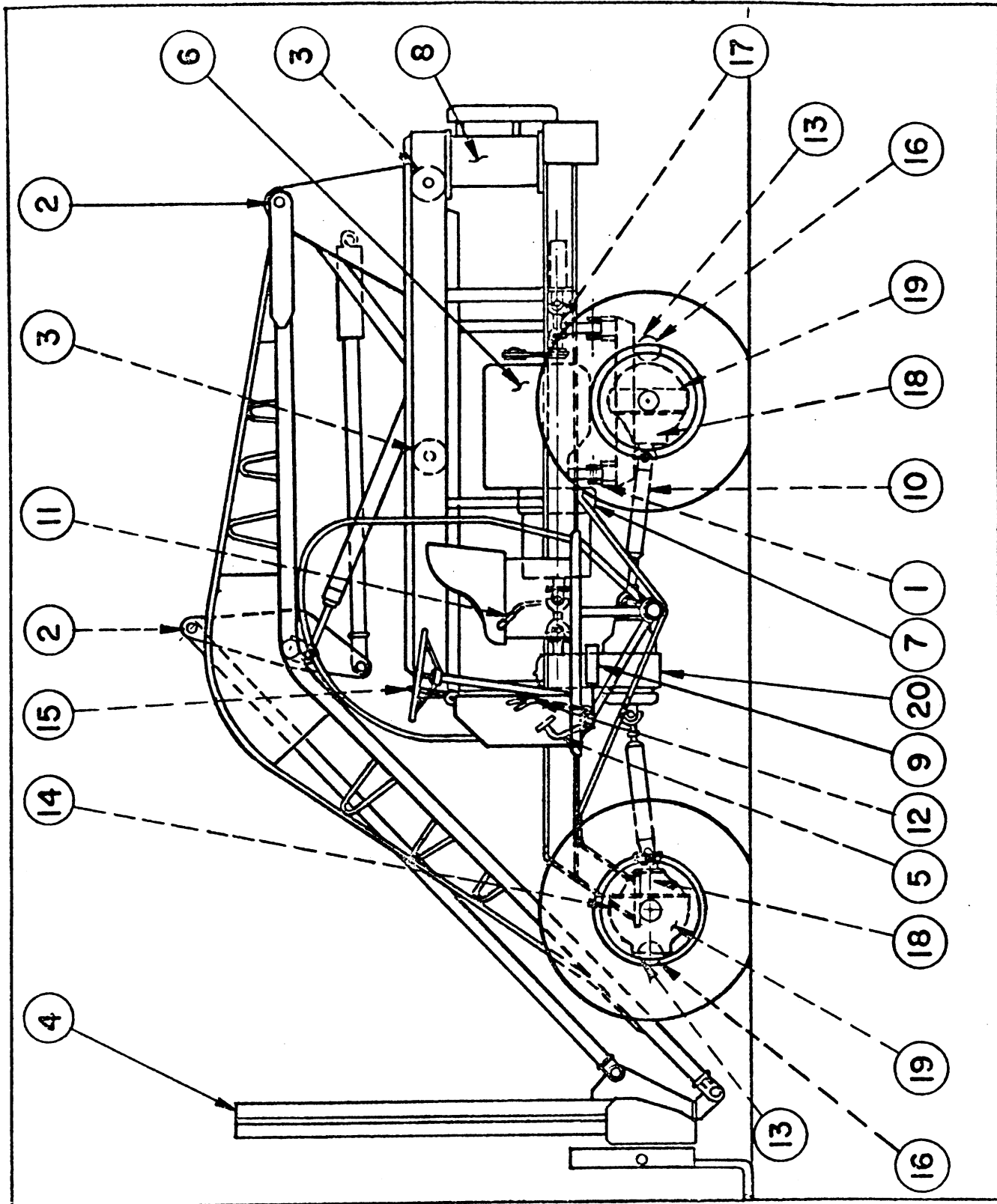
RS = Rockwell Axles

INT = International Diesel

N = Napco Axles

WAUK = Waukesha Diesel

TF = Tilt Frame



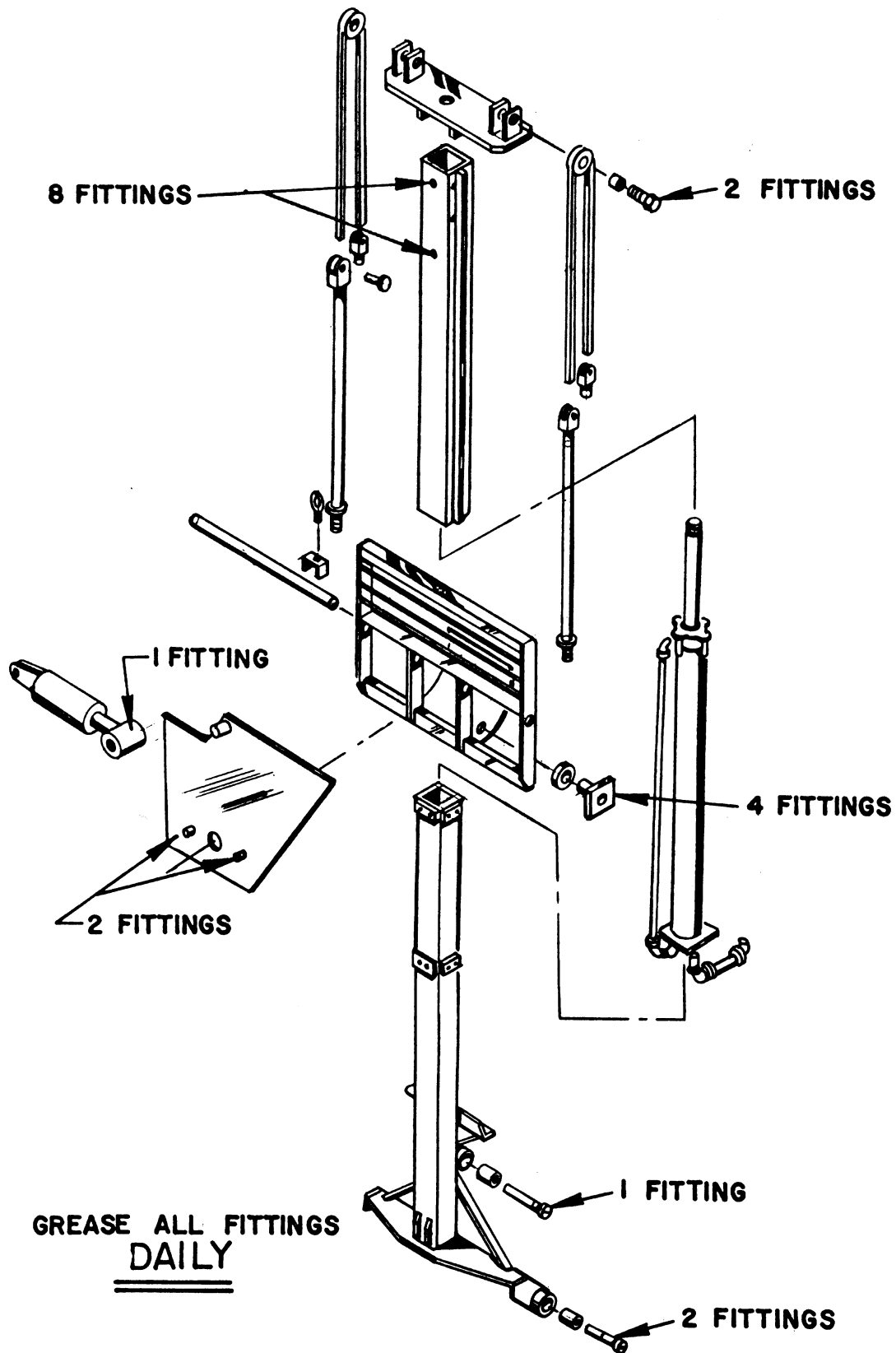
LUBRICATION CHART
 MODEL " 400 "

<u>ITEM</u>	<u>PART</u>	<u>LUBRICANT</u>	<u>SERVICE</u>	<u>CHANGE</u>
1	Oscillation Frame	Super Permalube Grease	Daily	---
2	Lift Arm, Tilt Linkage Toggle & Cyl. Pivots	Super Permalube Grease	Daily	---
3	Transverse Frame Rollers	Super Permalube Grease	Daily	---
4	Tower	Super Permalube Grease	Daily	---
5	Brake Pivot Shaft	Super Permalube Grease	Daily	---
6	Engine: Below 32° F.	AMOCO 200 SAE 10W	Daily	100 Hrs.
	Above 32° F.	AMOCO 200 SAE 30	Daily	100 Hrs.
	Oil Filter Element			300 Hrs.
	Air Cleaner: Dry	Dump Dust Cover	Daily	As Req.
	Radiator	Perma-Guard Anti-Freeze	Daily	Yearly
	Battery	Distilled Water	Daily	---
7	Torque Converter (See Note)	AMOCO Dexron ATF	Daily	300 Hrs.
	Torque Converter Filter Element			300 Hrs.
8	Hydraulic Tank	Rykon Oil No. 21	Daily	Yearly
9	Brake Cylinder	Brake Fluid	Weekly	---
10	Drive Shaft	Super Permalube Grease	Weekly	---
11	Shuttle Gear Linkage	Super Permalube Grease	Weekly	---
	Shuttle Gear Linkage	AMOCO 200 SAE 20	Weekly	---
12	Emergency Brake	Super Permalube Grease	Weekly	---
	Emergency Brake	AMOCO 200 SAE 20	Weekly	---
13	Front & Rear Steering	Super Permalube Grease	Weekly	---
14	Axle Ball Joints	Super Permalube Grease	Weekly	---
15	Forward & Reverse Controls	Super Permalube Grease	Weekly	---
16	Steering Cylinders & Boosters	Super Permalube Grease	Weekly	---
17	Pump Drive Shaft	Super Permalube Grease	Weekly	---
18	Tie Rod Ends	Super Permalube Grease	Weekly	---
19	Axles-Diff. & Planetary Hubs:			
	Below 32° F.	American MP Gear SAE 80	Monthly	Yearly
	Above 32° F.	American MP Gear SAE 90	Monthly	Yearly
20	Drop Transmission:			
	Below 32° F.	American MP Gear SAE 80	Monthly	Yearly
	Above 32° F.	American MP Gear SAE 90	Monthly	Yearly

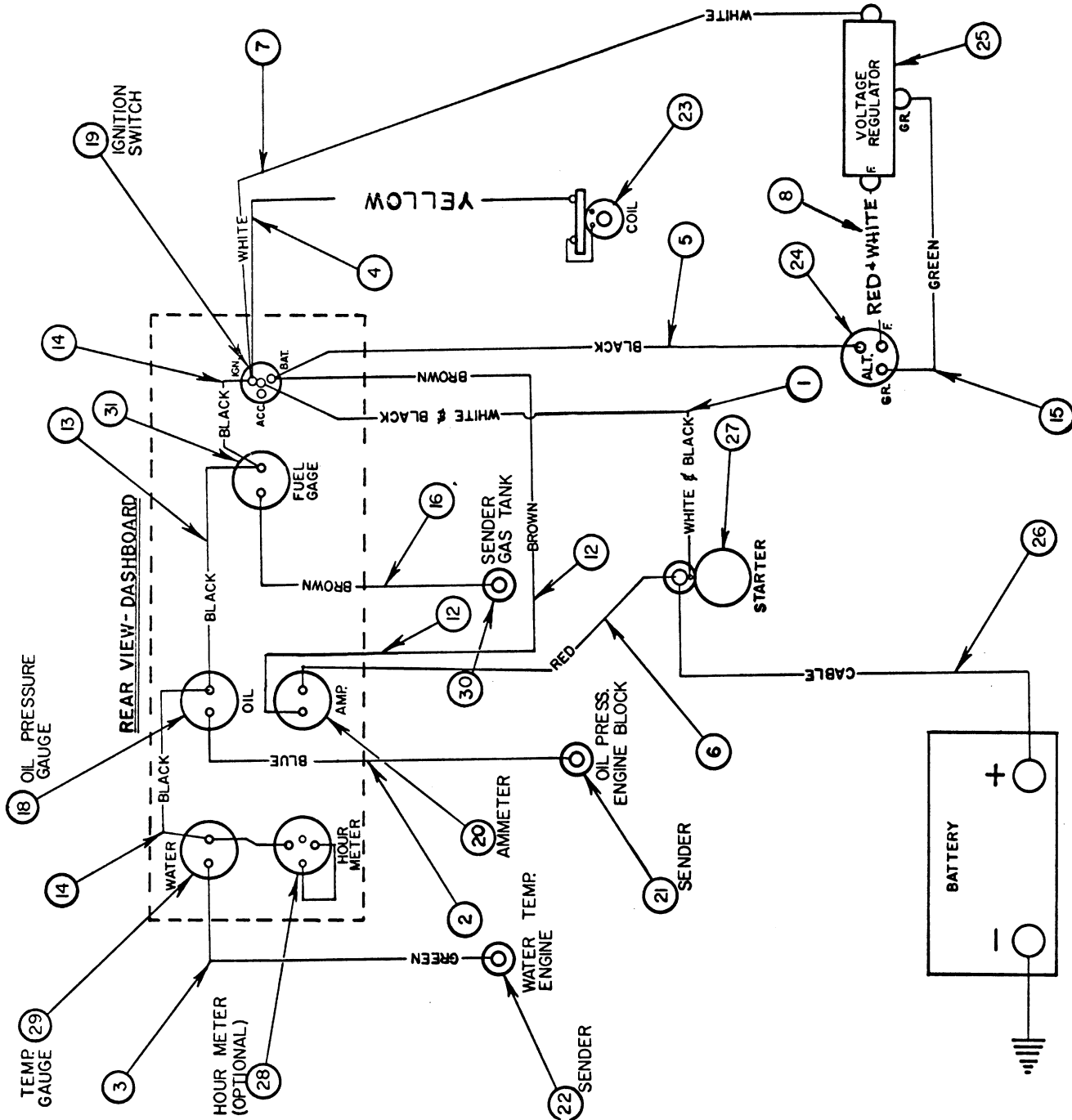
TIRE PRESSURES - RIGHT FRONT 48# - LEFT FRONT 50# - REAR 40#

NOTE: USE AMERICAN OIL COMPANY LUBRICANTS SHOWN OR EQUAL

CHANGE TORQUE CONVERTER OIL AFTER FIRST 20 HOURS OPERATION ON NEW MACHINES. AFTER THAT CHANGE EVERY 300 HOURS OPERATION. CHANGE CONVERTER OIL FILTER AT SAME INTERVAL.



TOWER LUBRICATION POINTS



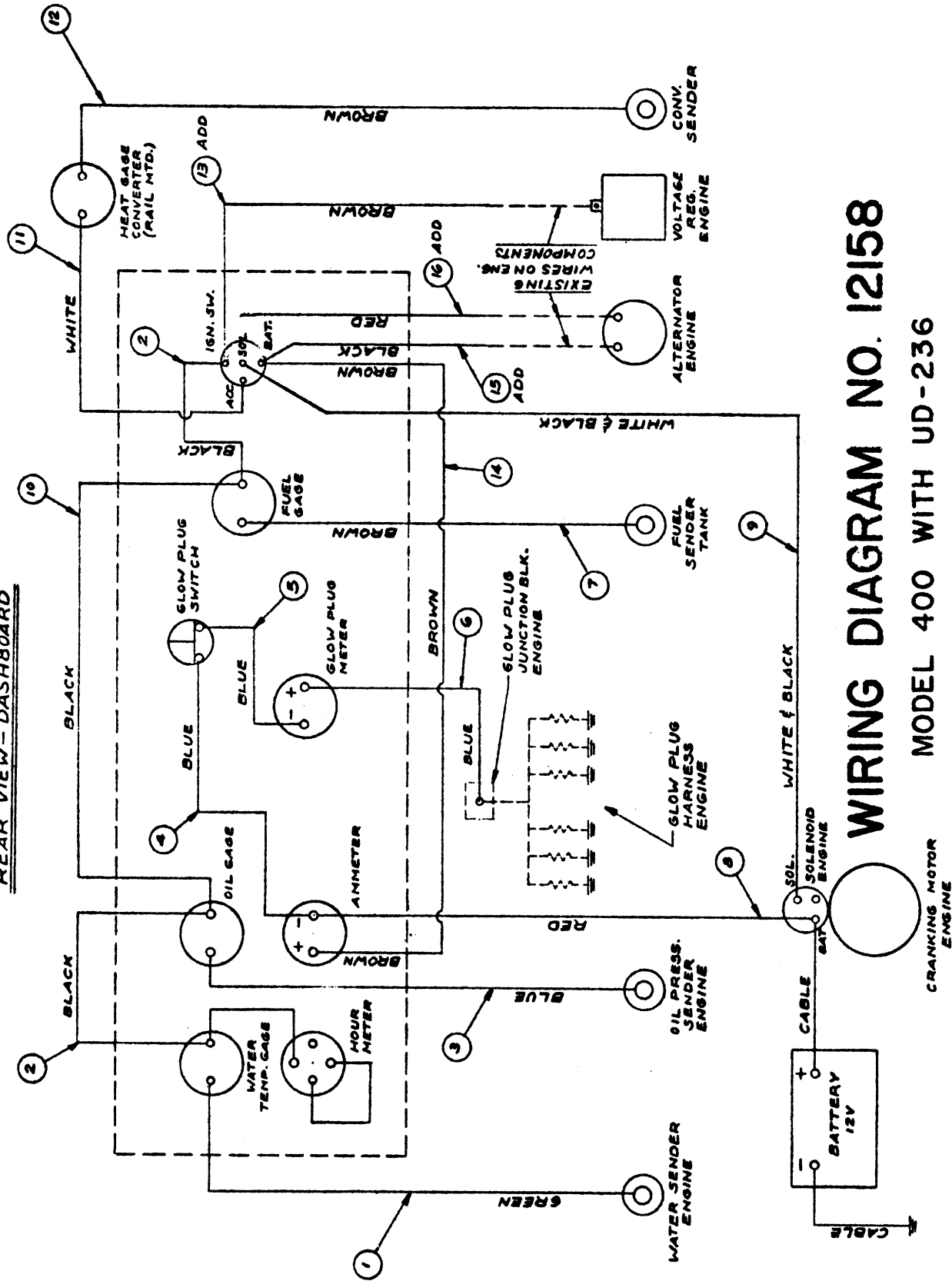
WIRING DIAGRAM 11684

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

WIRING DIAGRAM
NO. 11,684

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1			Black & White	1
2			Blue	1
3			Green	1
4			Yellow	1
5			Black	1
6			Red	1
7			White	1
8			Red & White	1
9			Loom	1
10			Loom	1
11			Loom	1
12			Brown	1
13			Black	1
14			Black	2
15			Green	1
16			Brown	1
17			Loom	1
18	P-12633		Oil Pressure Gauge	1
19	P-12634		Ignition Switch	1
20	P-12635		Ammeter	1
21	P-12636		Sender	1
22	P-13016		Sender	1
23	P-12638		Coil	1
24	P-13015		Alternator	1
25	P-12640		Voltage Regulator	1
26	P-12641		Cable	1
27	P-12642		Starter	1
28	P-12631		Hour Meter (Optional)	1
29	P-12632		Water Temperature Gauge	1
30	P-12964		Sender	1
31	P-12963		Fuel Gauge	1
32			Loom	1

REAR VIEW - DASHBOARD



WIRING DIAGRAM NO. 12158

MODEL 400 WITH UD-236
INTERNATIONAL DIESEL ENGINE

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

WIRING DIAGRAM
 MODEL 400 DIESEL
 NO. 12,158

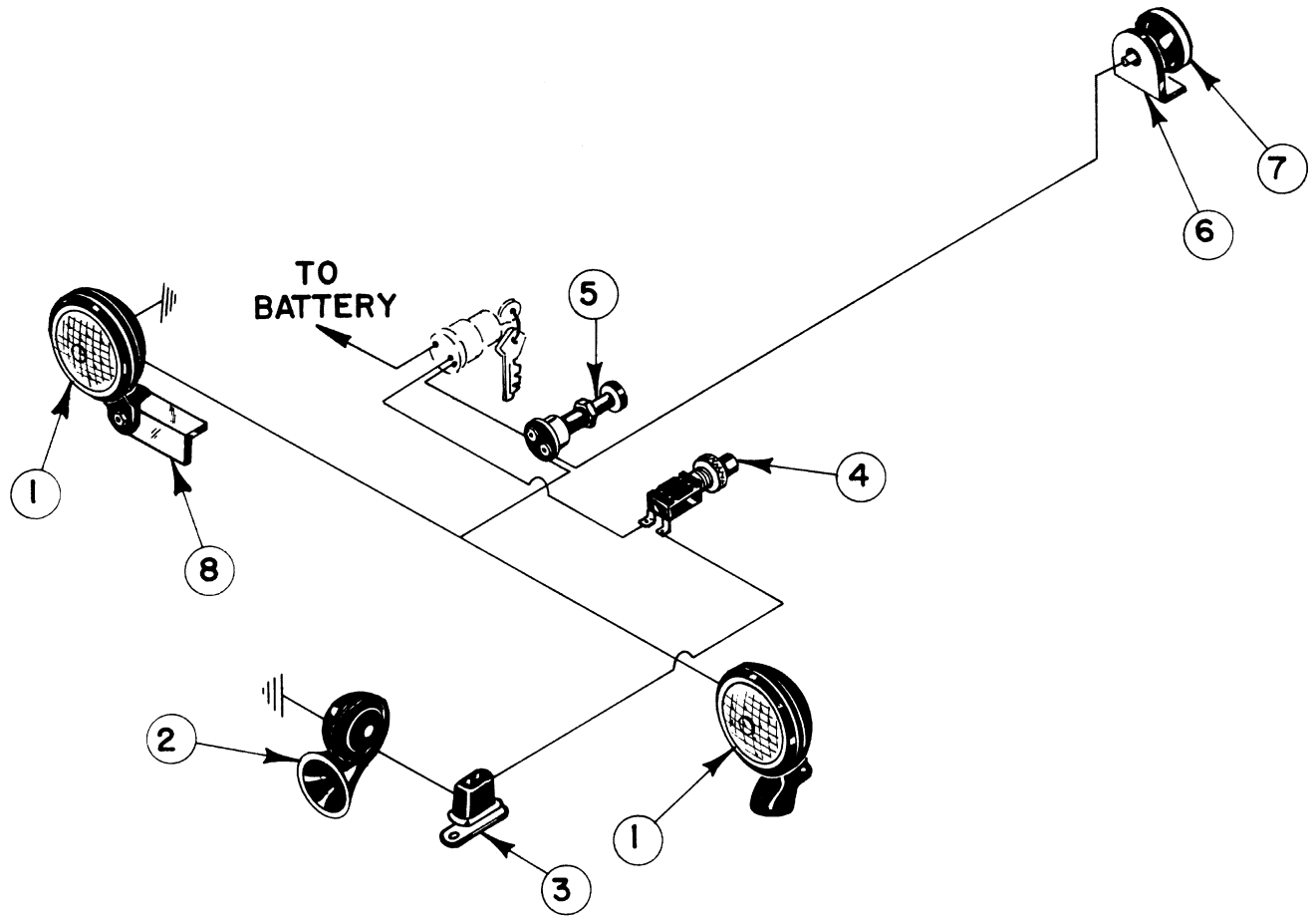
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1			Green (90 x 16 Ga.)	1
2			Black (6 x 16 Ga.)	2
3			Blue (100 x 16 Ga.)	1
4			Blue (8 x 10 Ga.)	1
5			Blue (6 x 10 Ga.)	1
6			Blue (115 x 10 Ga.)	1
7			Brown (96 x 16 Ga.)	1
8			Red (100 x 10 Ga.)	1
9			White & Black (105 x 14 Ga.)	1
10			Black (15 x 16 Ga.)	1
11			White (110 x 14 Ga.)	1
12			Brown (50 x 14 Ga.)	1
13			Brown (72 x 12 Ga.)	1
14			Brown (20 x 12 Ga.)	1
15			Black (72 x 10 Ga.)	1
16			Red (77 x 12 Ga.)	1
17			Loom (27 x 3/16 Dia.)	1
18			Loom (26 x 1/4 Dia.)	1
19			Loom (16 x 1/4 Dia.)	1
20			Loom (67 x 3/4 Dia.)	1

NOTE:

1. See Drawing # 8977 for Wiring Diagram on Lights.
2. Item (17) 3/16 Loom covers Item (3) Blue Wire.
3. Item (18) 1/4 Loom covers Items (1) & (6) Green & Blue Wires.
4. Item (19) 1/4 Loom covers Items (8) & (9) Red & White Black Wires.
5. Item (20) 3/4 Loom covers Items (1) thru (16) All Wires.

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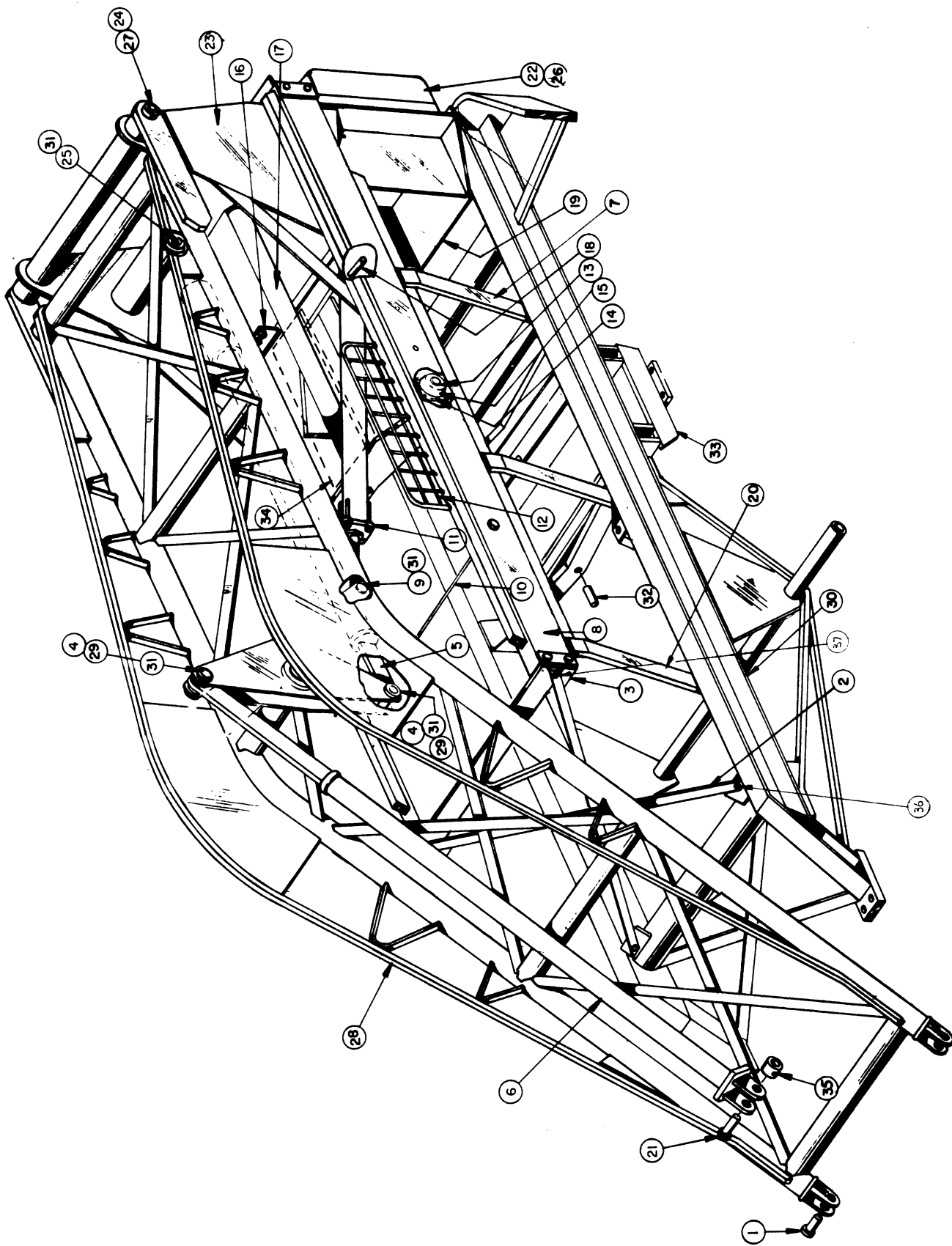
ELECTRICAL SYSTEM
NO. 8977



LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

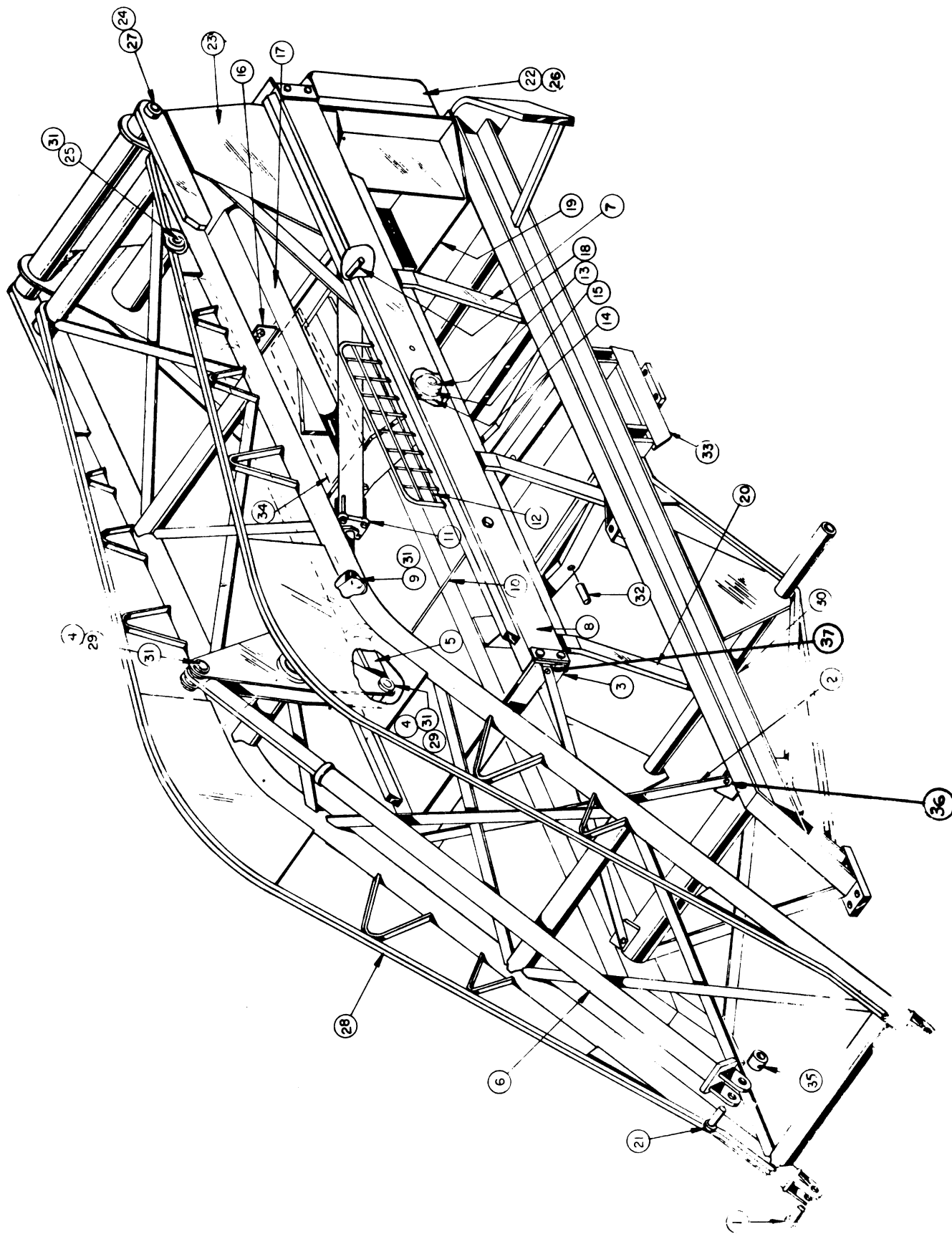
ELECTRICAL SYSTEM
NO. 8977

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-11532		Headlight	2
2	P-11533		Horn	1
3	P-11192		Relay	1
4	P-10249		Horn Button	1
5	P-11534		Light Switch	1
6	7838		Tail Light Bracket	1
7	P-11535		Tail Lamp	1
8	8975		Head Light Bracket	1





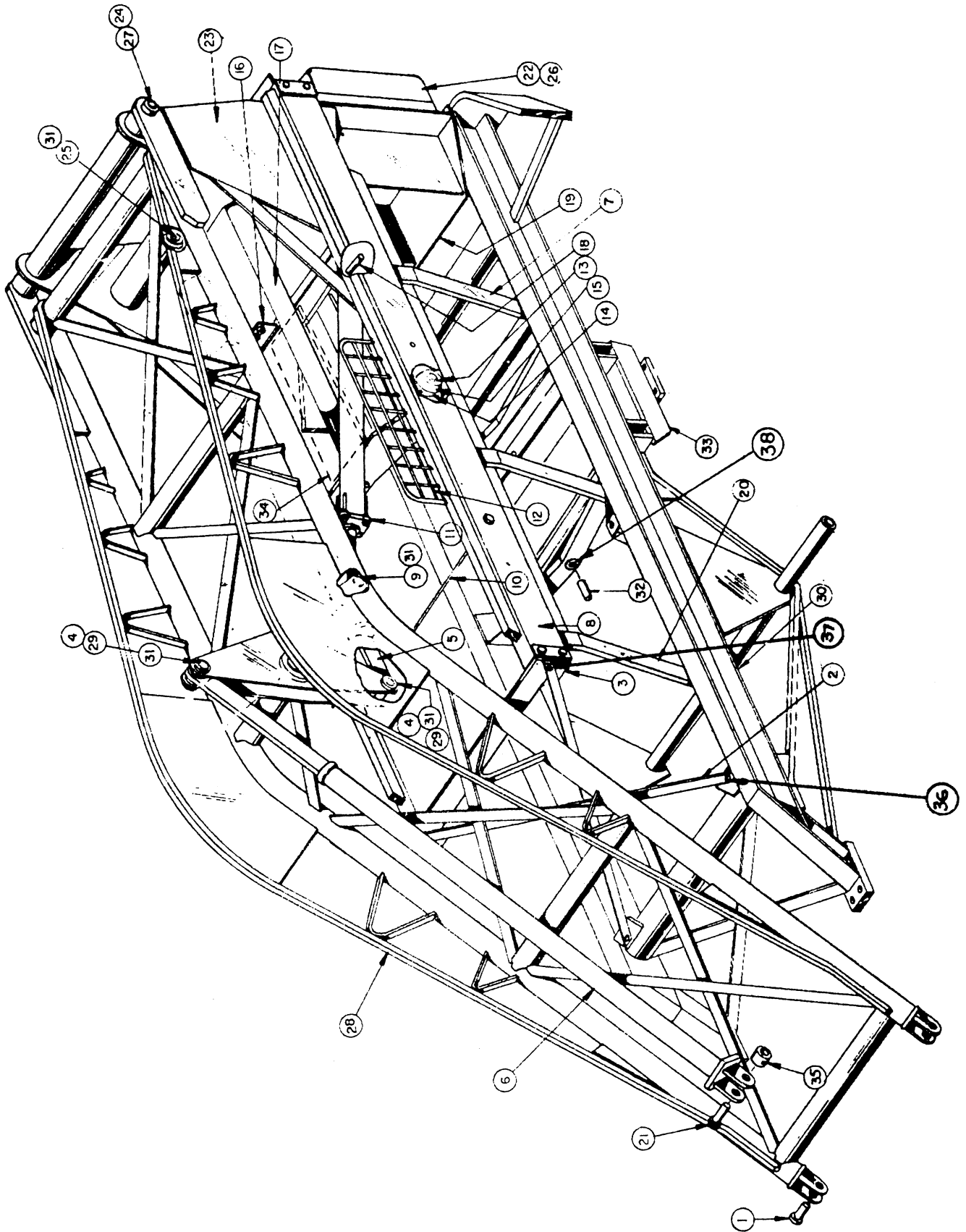
REF.	PART NO.	DESCRIPTION	REQ.
1	7072	Pivot Pin	2
2	11,503	X Brace	2
3	6901	Front Frame Bracket	1
4	11,129	Tilt Cylinder Pin	2
5	11,522	Tilt Cylinder Assembly	1
6	11,518	Front Parrallel Arm	1
7	11,453	Upright Supports	2
8	11,542	Transfer Frame	1
9	5565	Pivot Pin	2
10	11,153	Truss Rod	2
11	11,544	Hoist Cylinder Assembly	2
12	8789	Operator Side Shield	1
13	6902	Bushing	4
14	6832	Spindle	4
15	6826	Roller	4
16	11,452	Hose Terminal	1
17	11,545	Transfer Cylinder Assembly	1
18	6899	Hoist Cylinder Pin	2
19	11,460	Supply Tank	1
20	11,589	Upright Support	4
21	6964	Pin	1
22	6493	Counterweight	1
23	11,456	Transfer Carriage	1
24	11,601	Pivot Shaft	1
25	11,128	Pin	1
26	11,502	Counterweight Bracket	2
27	11,194	Bushing	2
28	11,398	Lift Arm	1
29	2727	Bushing	2
30	11,450	Main Frame (Use 12,008 for Int. D)	1
31	11,353	Collar	7
32	11,540	Pivot Pin (Use 12,025 for Int. D.)	2
33	11,468	Rear Oscillation Frame	1
34	11,521	Hose Support (Use 12,167 for Int. D.)	1
35	1150	Collar	1
36	P-13518	Capscrew	2
37	P-13519	Capscrew	2



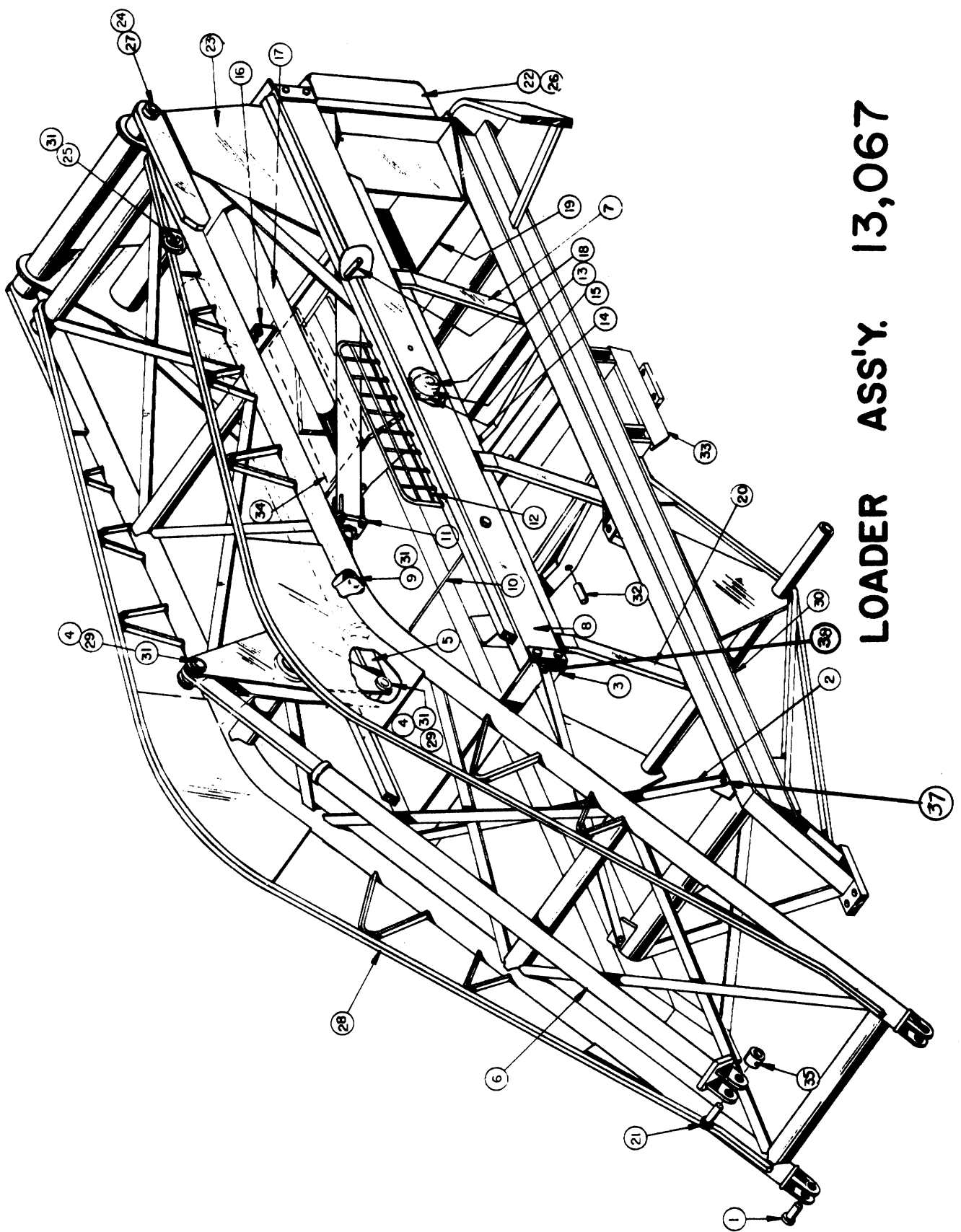
1238



REF.	PART NO.	DESCRIPTION	REQ.
1	7072	Pivot Pin	2
2	11,503	X Brace	2
3	6901	Front Frame Bracket	1
4	11,129	Tilt Cylinder Pin	2
5	12,263	Tilt Cylinder Assembly	1
6	12,257	Front Parrallel Arm	1
7	11,453	Upright Supports	2
8	11,542	Transfer Frame	1
9	5565	Pivot Pin	2
10	11,153	Truss Rod	2
11	11,544	Hoist Cylinder Assembly	2
12	8789	Operator Side Shield	1
13	6902	Bushing	4
14	6832	Spindle	4
15	6826	Roller	4
16	11,452	Hose Terminal	1
17	11,545	Transfer Cylinder Assembly	1
18	6899	Hoist Cylinder Pin	2
19	11,460	Supply Tank	1
20	11,589	Upright Support	4
21	6964	Pin	1
22	6493	Counterweight	1
23	11,456	Transfer Carriage	1
24	11,601	Pivot Shaft	1
25	11,128	Pin	1
26	11,502	Counterweight Bracket	2
27	11,194	Bushing	2
28	12,350	Lift Arm	1
29	2727	Bushing	2
30	11,450	Main Frame (Use 12,008 for Int. D.)	1
31	11,353	Collar	7
32	11,540	Pivot Pin (Use 12,025 for Int. D.)	2
33	11,468	Rear Oscillation Frame	1
34	11,521	Hose Support (Use 12,167 for Int. D.)	1
35	1150	Collar	1
36	P-13518	Capscrew	2
37	P-13519	Capscrew	2



<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7072		Pivot Pin	2
2	11,503		X-Brace	2
3	6901		Front Frame Bracket	1
4	11,129		Tilt Cylinder Pin	2
5		13,024	Tilt Cylinder Ass'y (Page 102)	1
6	13,035		Front Parallel Arm	1
7	11,453		Upright Supports	2
8	11,542		Transfer Frame	1
9	5565		Pivot Pin	2
10	11,153		Truss Rod	2
11		13,006	Hoist Cylinder (Page 100)	1
12	8789		Operator Side Shield	1
13	6902		Bushing	4
14	6832		Spindle	4
15	6826		Roller	4
16	11,452		Hose Terminal	1
17		11,545	Transverse Cylinder (Page 104)	1
18	6899		Hoist Cylinder Pin	2
19	11,460		Supply Tank	1
20	11,589		Upright Support	4
21	6964		Pin	1
22	6493		Counterweight	1
23	13,031		Transfer Carriage	1
24	13,028		Pivot Shaft	1
25	11,128		Pin	1
26	11,502		Counterweight Bracket	2
27	11,194		Bushing	2
28	13,032		Lift Arm	1
29	2727		Bushing	2
30	11,450		Main Frame(S/N 850-887 Use 13,500)	1
31	11,353		Collar	7
32	11,540		Pivot Pin (S/N 850-887 Use 13,375)	1
33	11,468		Rear Osc.Frame(S/N850-887 Use 13,348)	1
34	11,521		Hose Support	1
35	1150		Collar	1
36	P-13518		Capscrew	2
37	P-13519		Capscrew	2
38	6532		Bushing	2

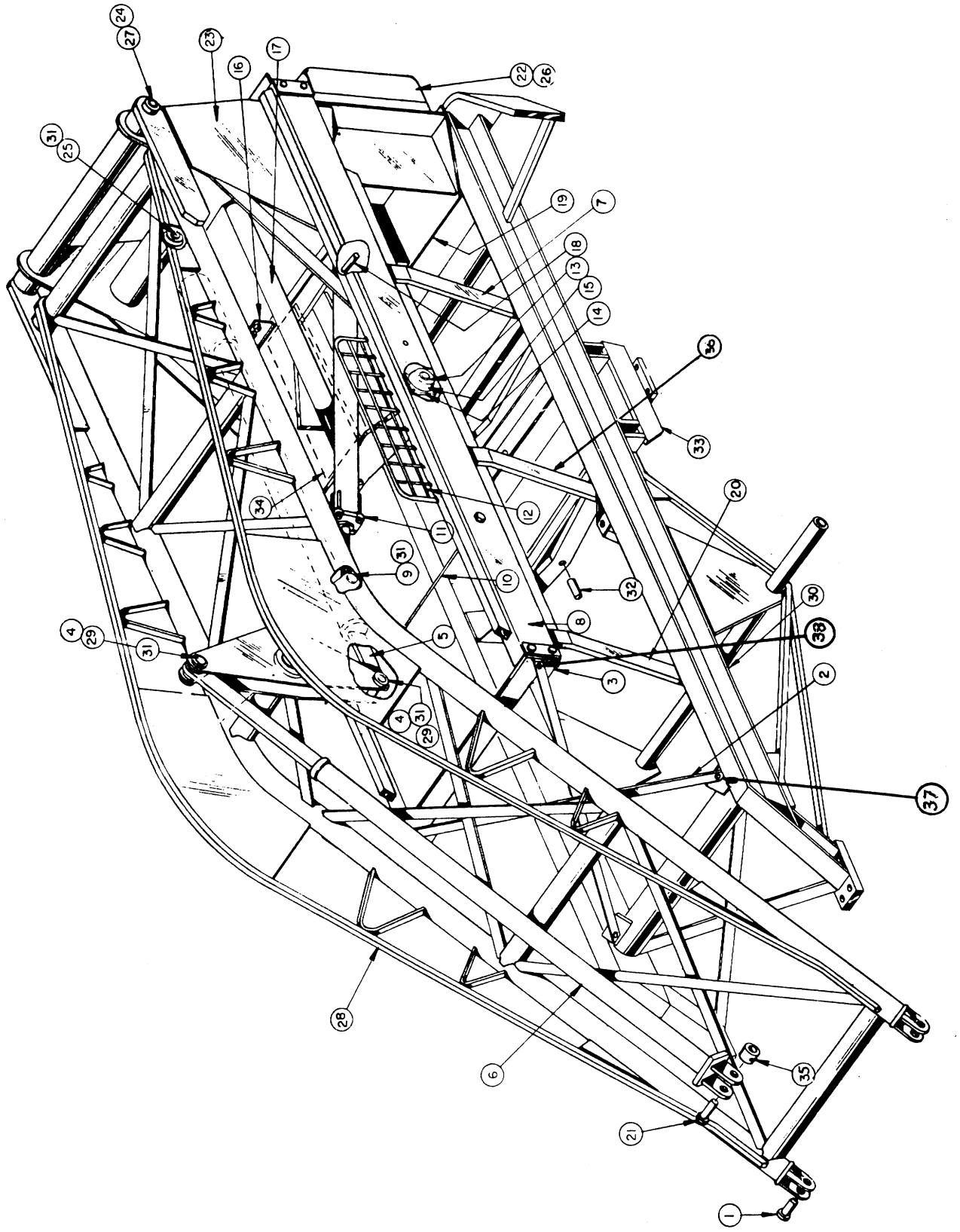


LOADER ASS'Y. 13,067

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

LOADER ASSEMBLY
 NO. 13,067

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7072		Pivot Pin	2
2	11,503		X-Brace	2
3	6901		Front Frame Bracket	1
4	11,129		Tilt Cylinder Pin	2
5		13,024	Tilt Cylinder Ass'y (Page 102)	1
6	13,035		Front Parallel Arm	1
7	11,453		Upright Supports	2
8	11,542		Transfer Frame	1
9	5565		Pivot Pin	2
10	11,153		Truss Rod	2
11		13,006	Hoist Cylinder Ass'y (Page 100)	1
12	8789		Operators Side Shield	1
13	6902		Bushing	4
14	6832		Spindle	4
15	6826		Roller	4
16	11,452		Hose Terminal	1
17		11,545	Transverse Cylinder Ass'y (Page 104)	1
18	6899		Hoist Cylinder Pin	2
19	11,460		Supply Tank	1
20	11,589		Upright Support	4
21	6964		Pin	1
22	6493		Counterweight	1
23	13,031		Transfer Carriage	1
24	13,028		Pivot Shaft	1
25	11,128		Pin	1
26	11,502		Counterweight Bracket	2
27	11,194		Bushing	2
28	13,032		Lift Arm	1
29	2727		Bushing	2
30	12,008		Main Frame Weldment	1
31	11,353		Collar	7
32	12,025		Pivot Pin	1
33	11,468		Rear Oscillation Frame	1
34	12,167		Hose Support	1
35	1150		Collar	1
36	11,540		Pivot Pin	1
37	P-13518		Capscrew	2
38	P-13519		Capscrew	2



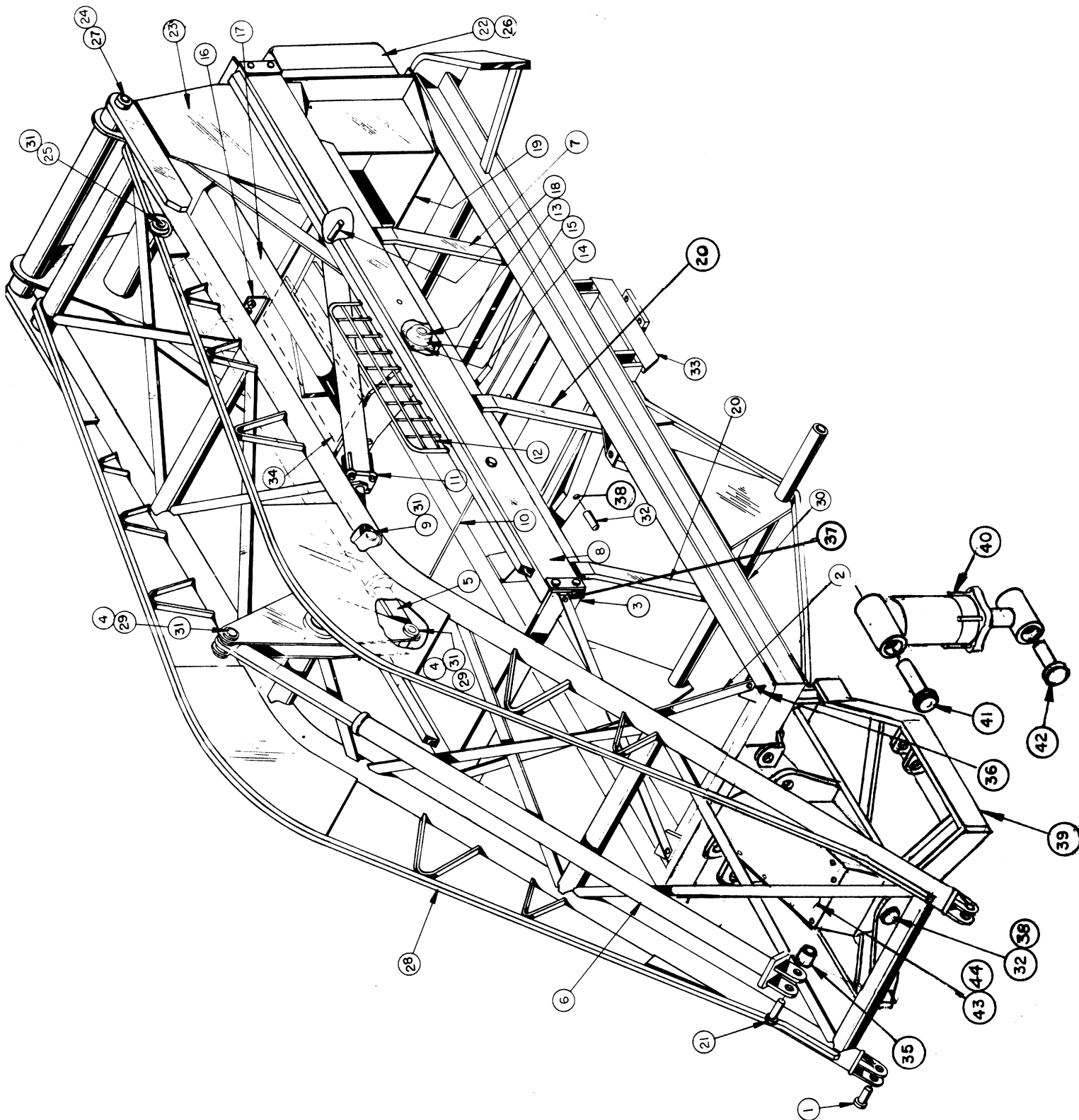
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

LOADER ASSEMBLY

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7072		Pivot Pin	2
2	11,503		X-Brace	2
3	6901		Front Frame Bracket	1
4	11,129		Tilt Cylinder Pin	2
5		13,024	Tilt Cylinder Ass'y. (Page 102)	1
6	13,035		Front Parallel Arm	1
7	11,453		Upright Supports	2
8	13,426		Transfer Frame(S/N 1121 THRU Use 13,991)	1
9	5565		Pivot Pin	2
10	11,153		Truss Rod	2
11		13,006	Hoist Cylinder Ass'y. (Page 100)	2
12	8789		Operators Side Shield	1
13	6902		Bushing	4
14	6832		Spindle	4
15	6826		Roller	4
16	13,399		Hose Terminal	1
17		11,545	Transverse Cylinder Ass'y. (Page104)	1
18	6899		Hoist Cylinder Pin	2
19	13,358		Supply Tank	1
20	11,589		Upright Support	3
21	6964		Pin	1
22	6493		Counterweight	1
23	13,031		Transfer Carr.(S/N 1121 THRU Use 13,990)	1
24	13,028		Pivot Shaft	1
25	11,128		Pin	1
26	11,502		Counterweight Bracket	2
27	11,194		Bushing	2
28	13,032		Lift Arm	1
29	2727		Bushing	2
30	13,366		Main Frame Weldm't	1
31	11,353		Collar	7
32	13,375		Pivot Pin	2
33	13,348		Rear Oscillation Frame	1
34	13,441		Hose Support	1
35	1150		Collar	1
36	13,417		Support, Upright	1
37	P-13518		Capscrew	2
38	P-13519		Capscrew	2

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LOADER ASSEMBLY
MODEL 400 T.F.



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LOADER ASSEMBLY

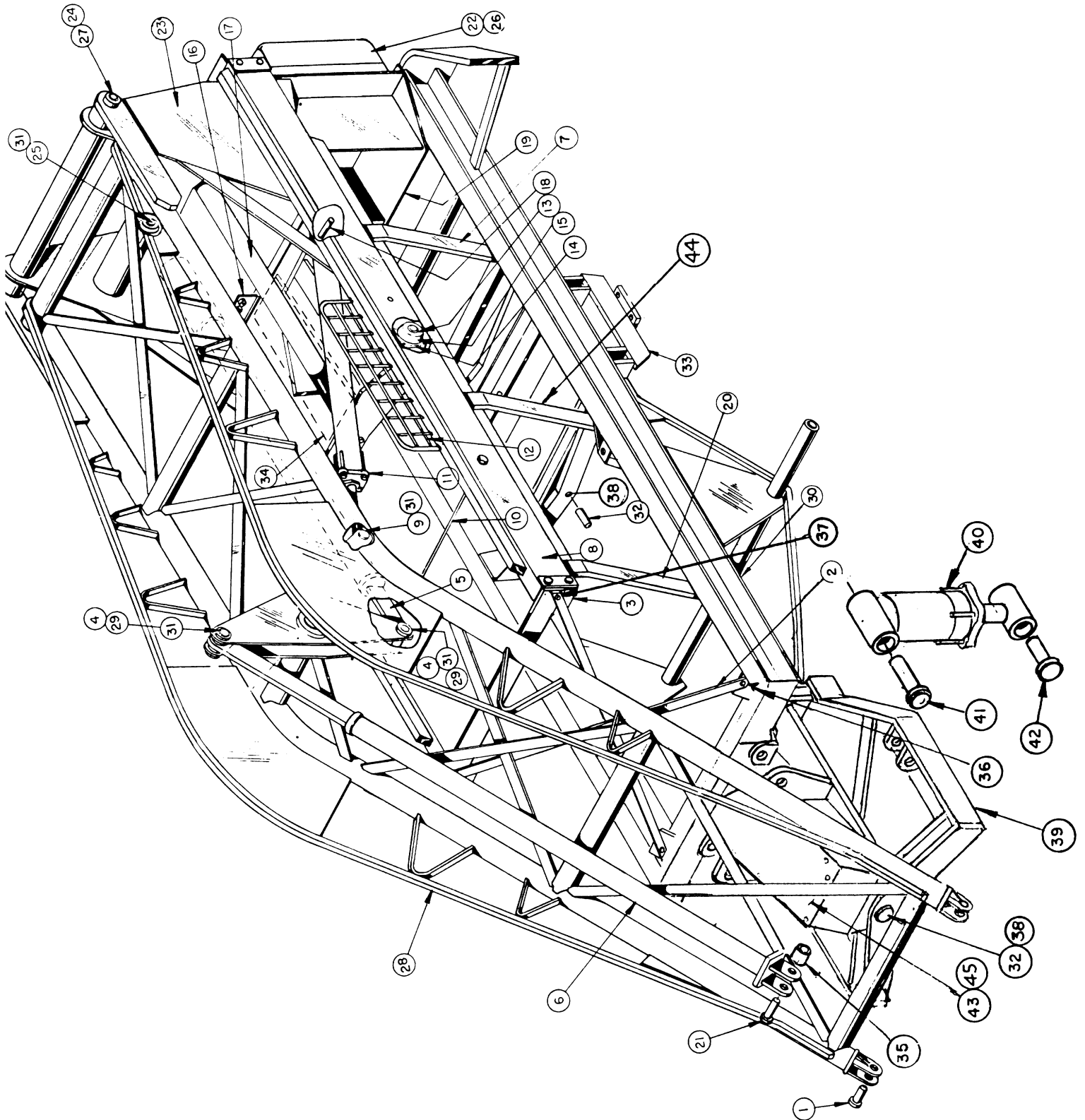
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7072		Pivot Pin	2
2	11,503		X-Brace	2
3	6901		Front Frame Bracket	1
4	11,129		Tilt Cylinder Pin	2
5		13,024	Tilt Cylinder Ass'y (Page 102)	1
6	13,035		Front Parallel Arm	1
7	11,453		Upright Supports	2
8	11,542		Transfer Frame	1
9	5565		Pivot Pin	2
10	11,153		Truss Rod	2
11		SEE NOTE	Hoist Cylinder Ass'y (Page 100)	1
12	8789		Operator Side Shield	1
13	6902		Bushing	4
14	6832		Spindle	4
15	6826		Roller	4
16	11,452		Hose Terminal	1
17		11,545	Transverse Cylinder Ass'y (Page 104)	1
18	6899		Hoist Cylinder Pin	2
19	11,460		Supply Tank	1
20	11,589		Upright Support	4
21	6964		Pin	1
22	6493		Counterweight	1
23	13,031		Transfer Carr. (S/N 1335 THRU use 14,153)	1
24	13,028		Pivot Shaft	1
25	11,128		Pin	1
26	11,502		Counterweight Bracket	2
27	11,194		Bushing	2
28	13,032		Lift Arm	1
29	2727		Bushing	2
30	13,696		Main Frame Weldment	1
31	11,353		Collar	7
32	5272		Pivot Pin	4
33	13,704		Rear Oscillation Frame	1
34	11,521		Hose Support	1
35	1150		Collar	1
36	P-13518		Capscrew	2
37	P-13519		Capscrew	2
38	6532		Bushing	2
39	13,680		Frame, Front Oscillation	1
40		13,690	Cylinder, Side Tilt (Page 39)	2
41	13,703		Pin, Upper Side Tilt Cylinder	2
42	6531		Pin, Lower Side Tilt Cylinder	2
43	13,714		Shield, Front Frame	1
44	COM'L		Screw, Self Tap. Hex Hd. 1/4" x 1/2" Long	6

NOTE:

Use 13,006 for S/N 456 - 1334
 Use 14,020 for S/N 1335 THRU

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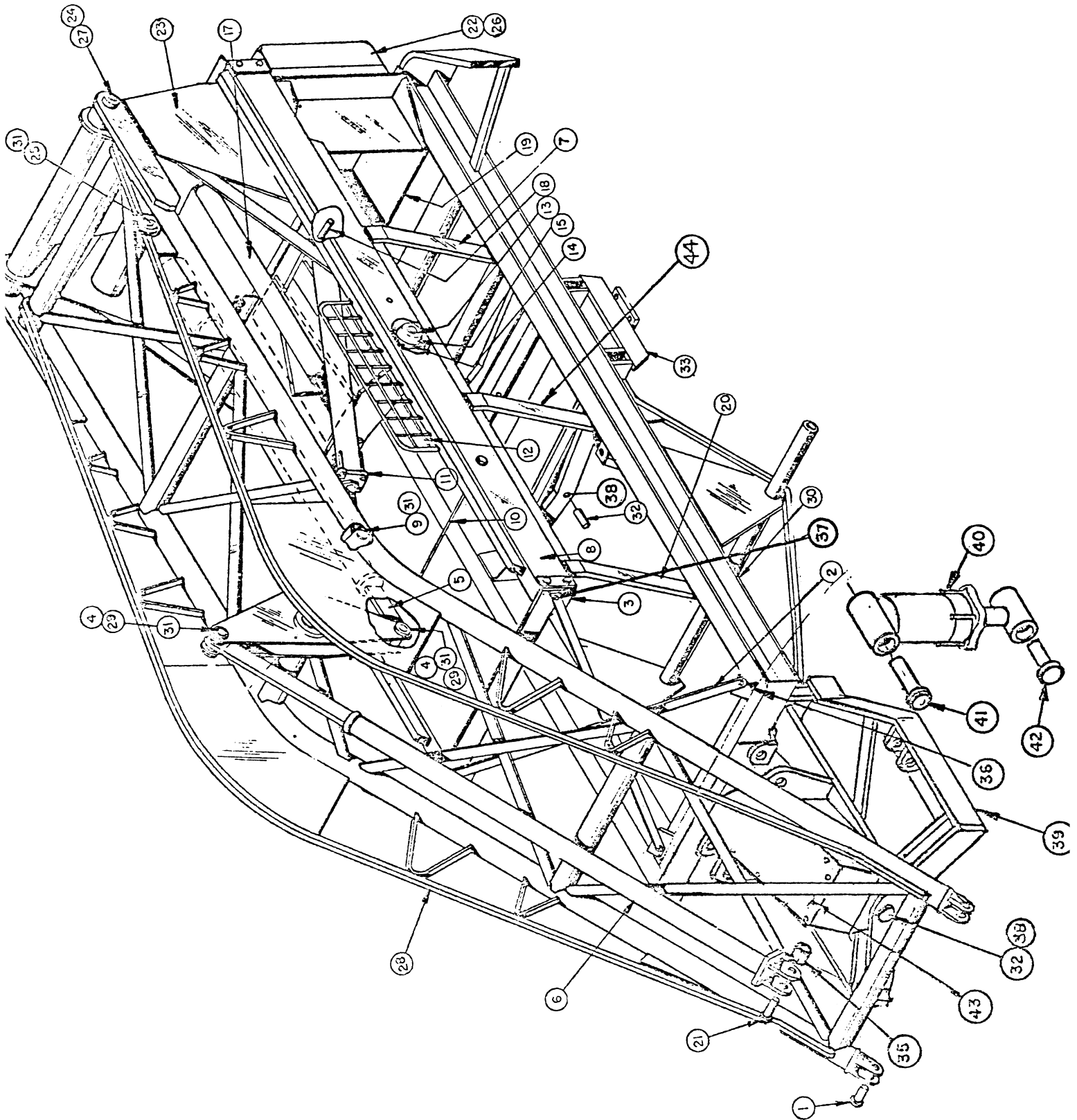
LOADER ASSEMBLY
MODEL 400 WAUKESHA T.F.



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

LOADER ASSEMBLY

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7072		Pivot Pin	2
2	11,503		X-Brace	2
3	6901		Front Frame Bracket	1
4	11,129		Tilt Cylinder Pin	2
5		13,024	Tilt Cylinder Ass'y (Page 102)	1
6	13,035		Front Parallel Arm	1
7	11,453		Upright Supports	2
8	13,426		Transfer Frame (S/N 1109-1333 Use 13,991)	1
9	5565		Pivot Pin	2
10	11,153		Truss Rod	2
11		13,006	Hoist Cylinder Ass'y (Page 100)	1
12	8789		Operator Side Shield	1
13	6902		Bushing	4
14	6832		Spindle	4
15	6826		Roller	4
16	13,399		Hose Terminal	1
17		11,545	Transverse Cylinder Ass'y (Page 104)	1
18	6899		Hoist Cylinder Pin	2
19	13,358		Supply Tank	1
20	11,589		Upright Support	3
21	6964		Pin	1
22	6493		Counterweight	1
23	13,031		Transfer Carr.(S/N 1109-1333 Use 13,990)	1
24	13,028		Pivot Shaft	1
25	11,128		Pin	1
26	11,502		Counterweight Bracket	2
27	11,194		Bushing	2
28	13,032		Lift Arm	1
29	2727		Bushing	2
30	13,870		Main Frame Weldment	1
31	11,353		Collar	7
32	5272		Pivot Pin	4
33	13,704		Rear Oscillation Frame	1
34	13,441		Hose Support	1
35	1150		Collar	1
36	P-13518		Capscrew	2
37	P-13519		Capscrew	2
38	6532		Bushing	4
39	13,680		Frame, Front Oscillation	1
40		13,690	Cylinder, Side Tilt (Page 39)	2
41	13,703		Pin, Upper Side Tilt Cylinder	2
42	6531		Pin, Lower Side Tilt Cylinder	2
43	13,714		Shield, Front Frame	1
44	13,417		Support, Upright	1
45	COM'L		Screw, Self Tap. Hex Hd. 1/4" x 1/2" Long	6



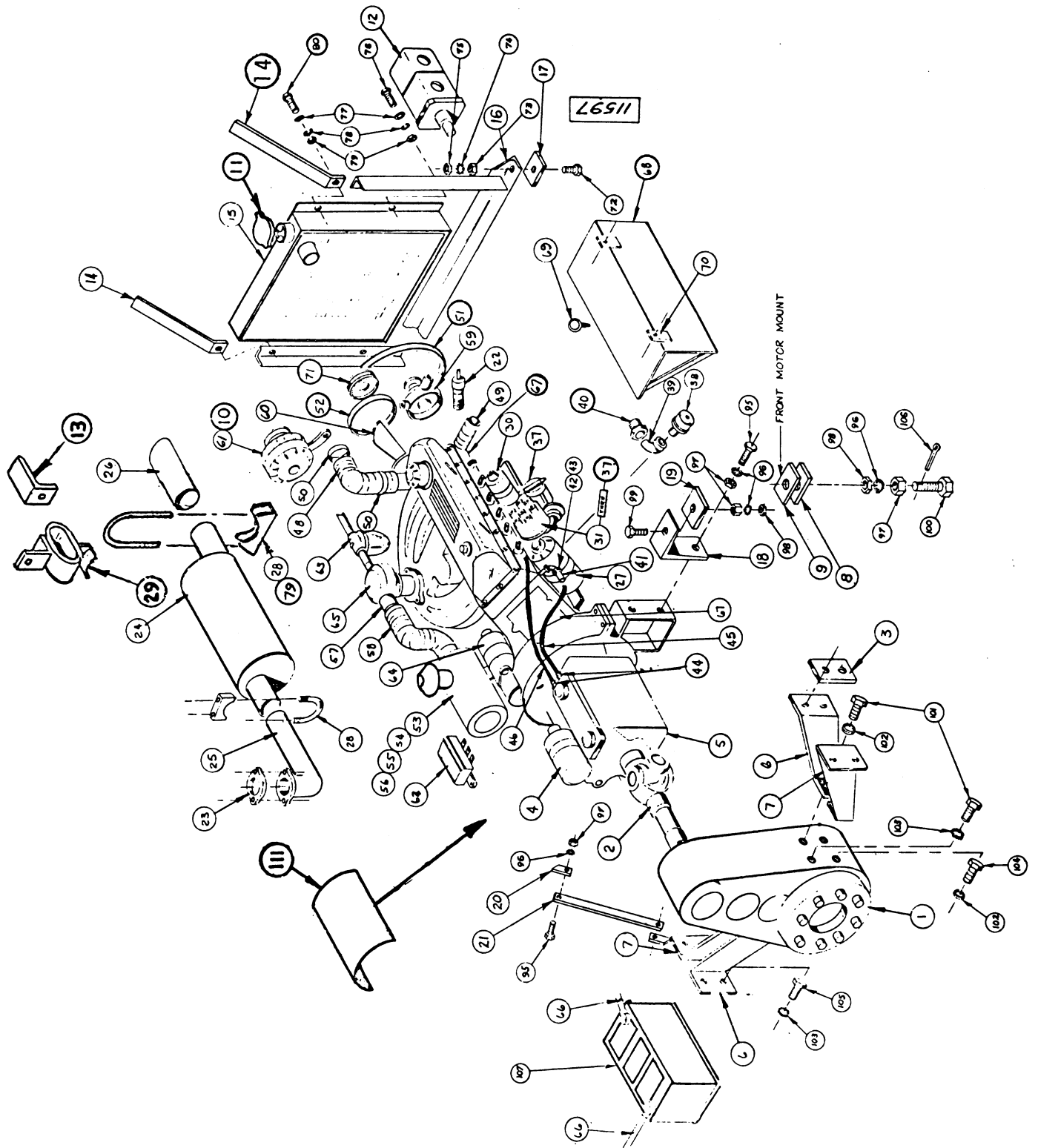
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

LOADER ASSEMBLY
 400 DIESEL TF

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7072		Pivot Pin	2
2	11503		X-Brace	2
3	6901		Front Frame Bracket	1
4	11129		Tilt Cylinder Pin	2
5		14022	Tilt Cylinder Ass'y (Page 101)	1
6	13035		Front Parallel Arm	1
7	11453		Upright Supports	2
8	13991		Transfer Frame (S/N 1334-1499 Use 11,542)	1
9	5565		Pivot Pin	2
10	11153		Truss Rod	2
11		14020	Hoist Cylinder Ass'y (Page 100)	1
12	8789		Operator Side Shield	1
13	6902		Bushing	4
14	6832		Spindle	4
15	6826		Roller	4
17		11545	Transverse Cyl. Ass'y (Page 104)	1
18	6899		Hoist Cylinder Pin	2
19	13358		Supply Tank (S/N 1334-1499 Use 11,460)	1
20	11589		Upright Support	3
21	6964		Pin	1
22	6493		Counterweight	1
23	14153		Transfer carriage	1
24	13028		Pivot Shaft	1
25	11128		Pin	1
26	11502		Counterweight Bracket	2
27	11194		Bushing	2
28	13032		Lift Arm	1
29	2727		Bushing	2
30	13870		Main Frame (S/N 1334-1499 Use 13,696)	1
31	11353		Collar	7
32	5272		Pivot Pin	4
33	13704		REar Oscillation Frame	1
35	1150		Collar	1
36	P-13518		Capscrew 5/8-11 x 1 1/4 (Grade 8)	2
37	P-13519		Capscrew 5/8-11 x 1 1/2 (Grade 5)	2
38	6532		Bushing	4
39	13680		Frame, Front Oscillation	1
40		SEE NOTE	Cylinder, Side Tilt (Page 39)	2
41	13703		Pin, Upper Side Tilt Cylinder	2
42	6531		Pin, Lower Side Tilt Cylinder	2
43	13714		Shield, Front Frame	1
44	13417		Support, Upright	1

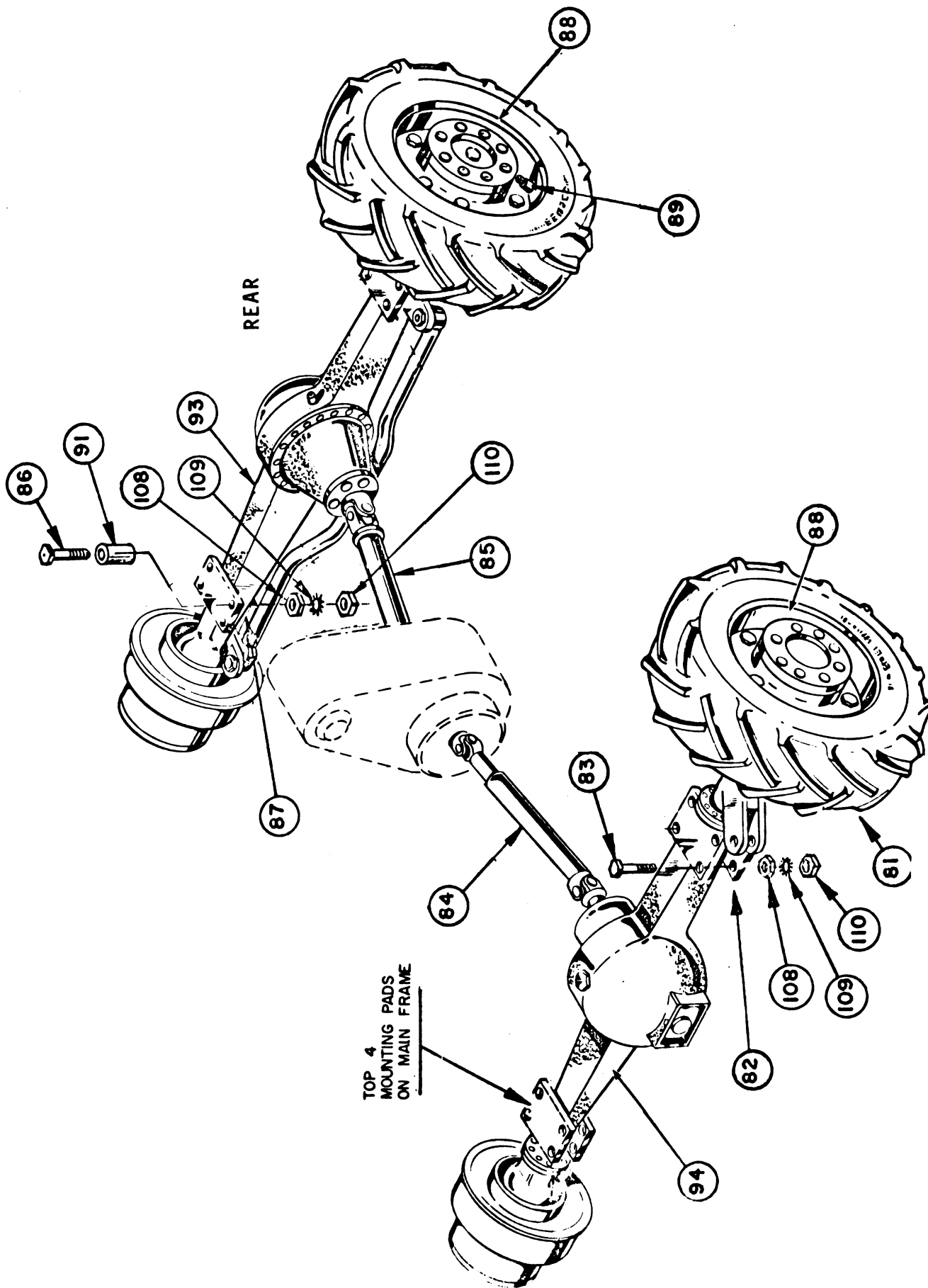
NOTE:

For S/N 1334-1499 Use 13,690
 For S/N 1500 THRU Use 14,031





REF.	PART NO.	DESCRIPTION	REQ.
		DRIVE TRAIN ASSEMBLY NO. 11,597	
1	P-11686	Drop Box	1
2	11,553	Drive Shaft	1
3	11,528	Shim	As Req
4	P-12089	Oil Filter	1
5	P-11687	Reversomatic	1
6	11,527	Hanger Bracket	2
7	11,526	Hanger Bracket	2
8	11,615	Plate	1
9	11,620	Shock Resistor	1
10	11,907	Alternator Bracket	1
11	P-13704	Radiator Cap	1
12	11,590	Pump Drive Assembly	1
13	12,813	Bracket, Angle	1
14	12,369	Brace	2
15	P-13038	Radiator	1
16	11,749	Radiator Support Weldment	1
17	11,586	Pad	2
18	11,501	Mounting Angle	2
19	11,569	Rubber Pad	2
20	11,646	Lug	4
21	9388	Brace	2
22	P-13026	Sending Unit (Water)	1
23	P-13025	Gasket	1
24	P-13024	Muffler	1
25	11,642	Exhaust Weldment	1
26	11,643	Tail Pipe	1
27	P-13027	Oil Filter (Engine)	1
28	P-12169	Muffler Clamp	1
29	P-13340	Muffler Clamp Bracket	1
30	P-12638	Coil	1
31	P-13028	Distributor (Complete)	1
32	P-13029	Rotor	1
33	P-13030	Cover Plate	1
34	P-13031	Point Set	1
35	P-13032	Condenser	1
36	P-13033	Distributor Cap	1
37	P-12947	Resistor	1
38	P-12636	Oil Sender	1
39	P-10201	Street Ell	1
40	P-10690	Bushing	1



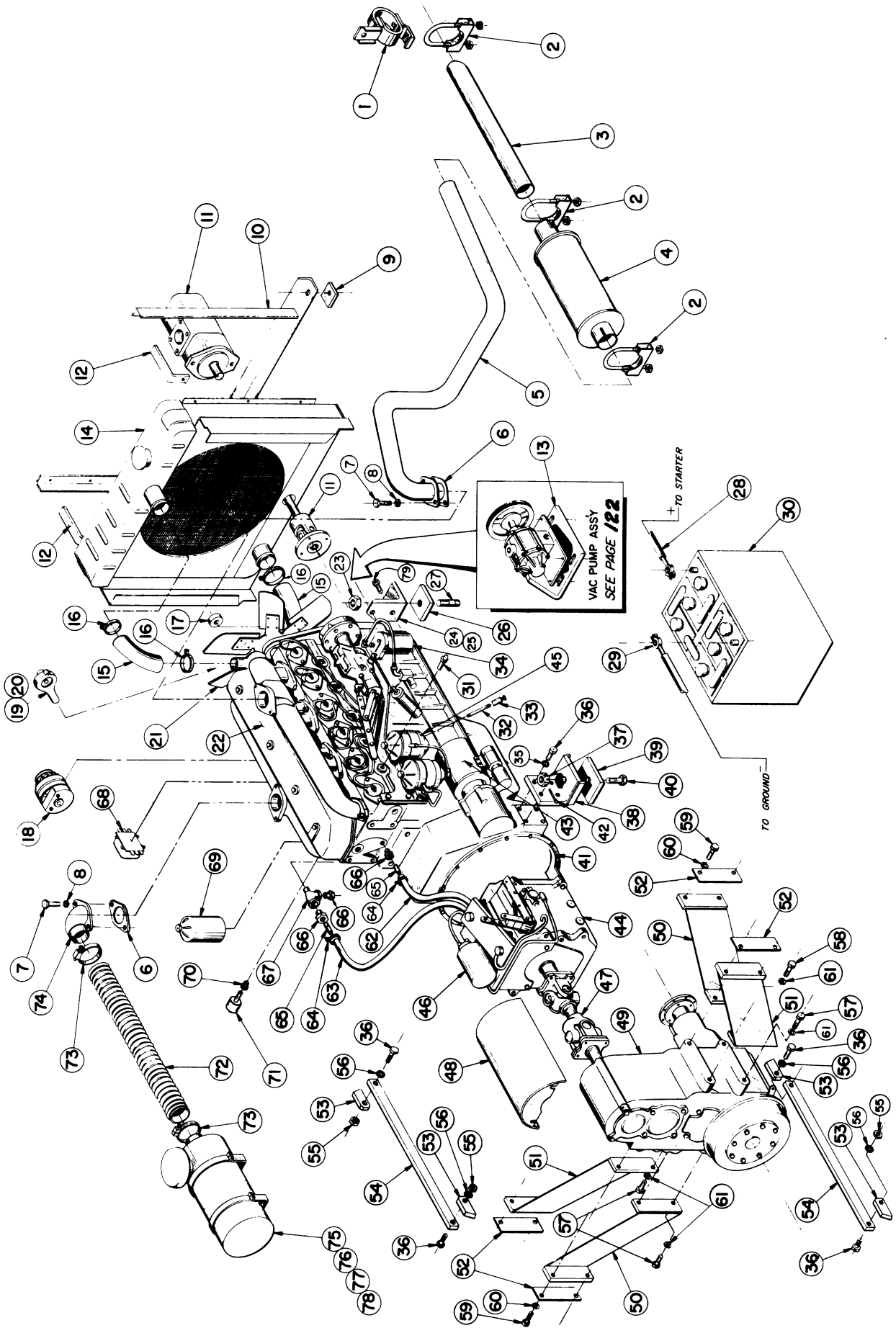
DRIVE TRAIN ASS'Y. 11597 (CHASSIS SECTION) (CONTINUED)



REF.	PART NO.	DESCRIPTION	REQ.
DRIVE TRAIN ASS'Y NO. 11,597 (Continued)			
41	N-10228	Pipe	1
42	P-10224	Elbow	1
43	P-10788	Nipple	1
44	P-10178	Hose Clamp	4
45	P-13035	Hose	1
46	P-13034	Hose	1
47	P-13043	Fuel Pump	1
48	P-13037	Radiator Hose (Top)	1
49	P-13036	Radiator Hose (Bottom)	1
50	P-10600	Clamp, Radiator Hose	4
51	P-13041	Fan Belt	1
52	P-13042	Water Pump Belt	1
53	P-12163	Air Cleaner	1
54	P-12164	Air Stack	1
55	P-12165	Mtg. Bands	1
56	P-12179	Air Filter Element	1
57	11,666	Adapter	1
58	P-11511	Flex Tubing	1
59	P-13044	Water Pump	1
60	P-13045	Fan	1
61	P-13046	Alternator	1
62	P-13047	Voltage Regulator	1
63	P-13048	Fuel Filter	1
64	P-13049	Starter	1
65	P-13050	Carbuerator	1
66	P-12641	Cable	2
67	P-13039	Engine	1
68	11,663	Shield	1
69	11,665	Eyebolt	1
70	11,661	Tab	2
71	P-13051	Pulley	1
72	COM'L	Capscrew, 3/8 x 1 3/4 N.C.	2
73	COM'L	Nut, 3/8 N.C.	2
74	COM'L	Shakeproof Washer, 3/8	2
75	COM'L	Jam Nut, 3/8 N.C.	2
76	COM'L	Capscrew, 1/4 x 3/4 N.C.	2
77	COM'L	Flat Washer 1/4	4
78	COM'L	Lockwasher, 1/4	4
79	COM'L	Nut, 1/4 N.C.	4
80	COM'L	Capscrew, 1/4 x 1 N.C.	2

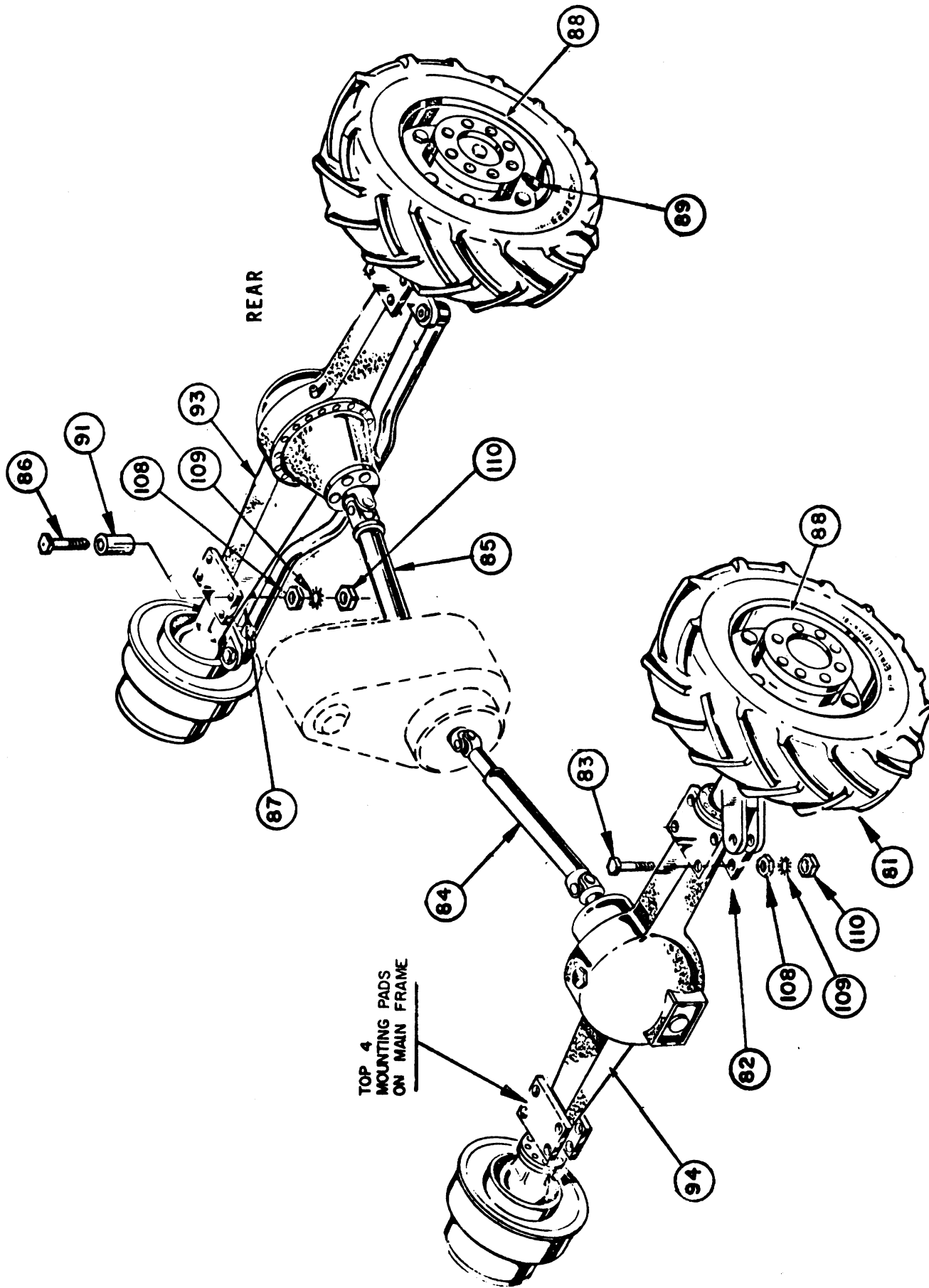


REF.	PART NO.	DESCRIPTION	REQ.
		DRIVE TRAIN ASSEMBLY NO. 11,597 (Continued)	
81	* P-13020	Tire	4
82	11,490	Bottom Pad	2
83	11,473	Bolt	8
84	11,550	Drive Shaft	1
85	11,551	Drive Shaft	1
86	11,474	Bolt	8
87	11,469	Plate	2
88	* 11,592	Disc Weldment for Front Wheels	2
89	* P-13022	Valve Stem	4
90	11,593	Disc Weldment for Rear Wheels	2
91		Spacer, 3/4 Std. Pipe x 3 7/16"	8
92			
93	P-13019	Rear Axle (For S/N 330-538 use P13538)	1
94	P-13018	Front Axle	1
95	COM'L	Capscrew, 1/2 x 1 1/2 N.C.	8
96	COM'L	Shakeproof Washer, 1/2	11
97	COM'L	Nut, 1/2 N.C.	11
98	COM'L	Jam Nut, 1/2 N.C.	3
99	COM'L	Capscrew, 1/2 N.C. x 2 1/2	2
100	COM'L	Full Nut, 1/2 N.C. x 3	1
101	COM'L	Capscrew, 5/8 N.C. x 1 3/4	2
102	COM'L	Lockwasher, 5/8	7
103	COM'L	Shakeproof Washer, 5/8	9
104	COM'L	Capscrew, 5/8 N.C. x 1 1/2	6
105	COM'L	Capscrew, 5/8 N.C. x 1 1/4	8
106	COM'L	Cotter Pin, 1/8 x 1	1
107	P-11188	Battery	1
108	COM'L	Jam Nut, 3/4 N.C.	16
109	COM'L	Shakeproof Washer, 3/4	16
110	COM'L	Nut, 3/4 N.C.	16
111	11,953	Shield, Drive Shaft	1
		NOTE: * For High-Lift Loaders with Duplex Tires, use the following numbers.	
81	P-13494	Tire, Duplex	4
88	12,324	Disc Weldment	4
89	P-13493	Valve Stem	4





REF.	PART NO.	DESCRIPTION	REQ.
		DRIVE TRAIN ASSEMBLY	
1	P-13340	Bracket	1
2	P-13605	Clamp	3
3	12,018	Tail Pipe	1
4	P-13334	Muffler	1
5	12,038	Exhaust Pipe	1
6	P-13025	Gasket	2
7	COM'L	Screw, 3/8 N.C. x 3/4" Long	4
8	COM'L	Washer, Shakeproof 3/8	4
9	11,586	Mtg. Pad	2
10	12,431	Radiator Mtg.	1
11	12,007	Pump Drive Assembly	1
12	12,493	Bracket	2
13	12,470	Vacuum Pump Assembly	1
14	P-13541	Radiator	1
15	P-10598	Hose, Radiator	2
16	P-10600	Clamp	4
17	P-13582	Fan, Spacer	1
18	P-13574	Alternator	1
19	P-13579	Water Pump, Complete	1
20	P-13580	Repair Kit, Water Pump	1
21	P-13578	Fan	1
22	P-13540	Engine	1
23	COM'L	Nut, 3/4" N.F.	2
24	12,027	Mount, Front R.H.	1
25	12,028	Mount, Front L.H.	1
26	12,014	Mounting Pad	2
27	12,011	Stud	2
28	P-13447	Cable	1
29	P-13446	Cable	1
30	P-12181	Battery	1
31	P-13573	Glow Plug	1
32	P-10760	Nipple	2
33	P-10664	Coupling	2
34	P-13584	Fuel Trap Assembly	1
35	COM'L	Lockwasher, 1/2"	8
36	COM'L	Capscrew, 1/2" N.C. x 1 1/2"	12
37	COM'L	Nut, 3/4 N.F. Castellated	2
38	12,029	Motor Mount Bracket	2
39	12,015	Mtg. Pad	2
40	12,012	Bolt	2
41	P-12178	Torque Converter	1
42	COM'L	Cotter Pin, 1/8 x 1 1/4"	2
43	P-13581	Starter	1
44	P-11687	Reversomatic	1
45	P-13577	Fuel Filter	2



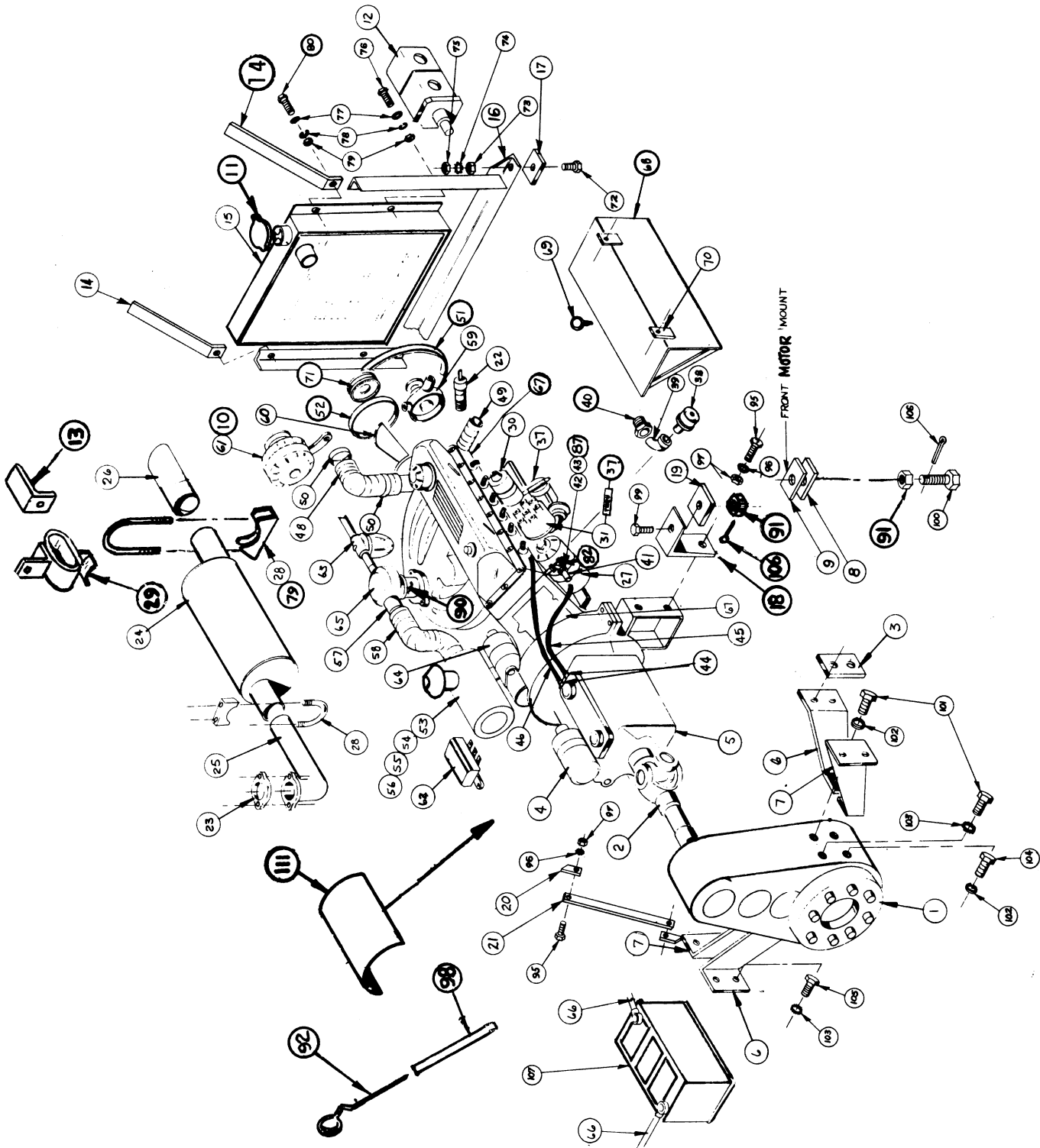
DRIVE TRAIN ASS'Y. 12,825
 (CHASSIS SECTION) (CONTINUED)



REF.	PART NO.	DESCRIPTION	REQ.
DRIVE TRAIN ASSEMBLY (Continued)			
46	P-12089	Oil Filter	1
47	11,553	Drive Shaft Assembly	1
48	12,036	Drive Shaft Shield	1
49	P-11686	Drop Box	1
50	11,527	Mtg. Bracket	2
51	11,526	Mtg. Bracket	2
52	11,528	Shim	As Req.
53	11,646	Lug	4
54	9388	Brace	2
55	COM'L	Nut, 1/2" N.C.	4
56	COM'L	Washer, Shakeproof 1/2"	4
57	COM'L	Screw, 5/8-11 N.C. x 1 1/2	6
58	COM'L	Screw, 5/8-11 N.C. x 1 3/4"	2
59	COM'L	Screw, 5/8-11 N.C. x 1 1/4"	8
60	COM'L	Washer, Shakeproof 5/8"	8
61	COM'L	Lockwasher, 5/8	8
62	COM'L	Hose, Heater 5/8 I.D. x 14" Long	1
63	COM'L	Hose, Heater 5/8 I.D. x 41" Long	1
64	P-10178	Clamp	4
65	N-10228	Nipple	2
66	P-10120	Bushing	3
67	P-13606	Service Tee	1
68	P-13575	Voltage Regulator	1
69	P-13576	Oil Filter	1
70	P-10690	Bushing	1
71	P-13026	Sender	1
72	P-11511	Hose	1
73	P-10600	Clamp	2
74	12,032	Adapter	1
75	P-12163	Air Cleaner	1
76	P-12164	Air Stack	1
77	P-12165	Mtg. Band	1
78	P-12179	Element	1
79	COM'L	Screw, 5/8 x 3 3/4"	2
	COM'L	Screw, 5/8 x 4	2
*81	P-13020	Tire	4
82	11,490	Bottom Pad	2
83	12,775	Bolt (For S/N 101-417, Use 11,473)	8
84	12,827	Drive Shaft (For S/N 101-417, use 11,550)	1
85	12,826	Drive Shaft (For S/N 101-417, use 11,551)	2
86	11,473	Bolt (For S/N 101-417 use 11,474)	8
87	11,469	Plate	2
*88	12,749	Disc Weldment (For S/N 101-417 use 11,592)	4
*89	P-13022	Valve Stem	4
91	N-10863	Spacer	8
92	11,592	Disc Weldment - Rear Wheels ONLY - S/N 101-329	2



REF.	PART NO.	DESCRIPTION	REQ.
DRIVE TRAIN ASSEMBLY (Continued)			
		(For S/N 101-329 use P13019)	
93	P-13681	Axle, Rear (For S/N 330-417 use P13538)	1
94	P-13680	Axle, Front (For S/N 101-417 use P13018)	1
95	COM'L	Capscrew, 1/2 x 1 1/2 N.C.	8
96	COM'L	Shakeproof Washer, 1/2"	11
97	COM'L	Nut, 1/2 N.C.	11
98	COM'L	Jam Nut, 1/2 N.C.	3
99	COM'L	Capscrew, 1/2 N.C. x 2 1/2	2
100	COM'L	Full Nut, 1/2 N.C. x 3	1
101	COM'L	Capscrew, 5/8 N.C. x 1 3/4	2
102	COM'L	Lockwasher, 5/8	7
103	COM'L	Shakeproof Washer, 5/8	9
104	COM'L	Capscrew, 5/8 N.C. x 1 1/2	6
105	COM'L	Capscrew, 5/8 N.C. x 1 1/4	8
106	COM'L	Cotter Pin, 1/8 x 1	1
107			
108	COM'L	Jam Nut, 3/4 N.C.	16
109	COM'L	Shakeproof Washer, 3/4	16
110	COM'L	Nut, 3/4 N.C.	16
NOTE: * For High-Lift Loaders with Duplex Tires, substitute the following numbers.			
81	P-13494	Tire, Duplex	4
88	12,778	Disc Weldment (For S/N 330-417 use 12,324)	4
89	P-13493	Valve Stem	4



DRIVE TRAIN ASS'Y.

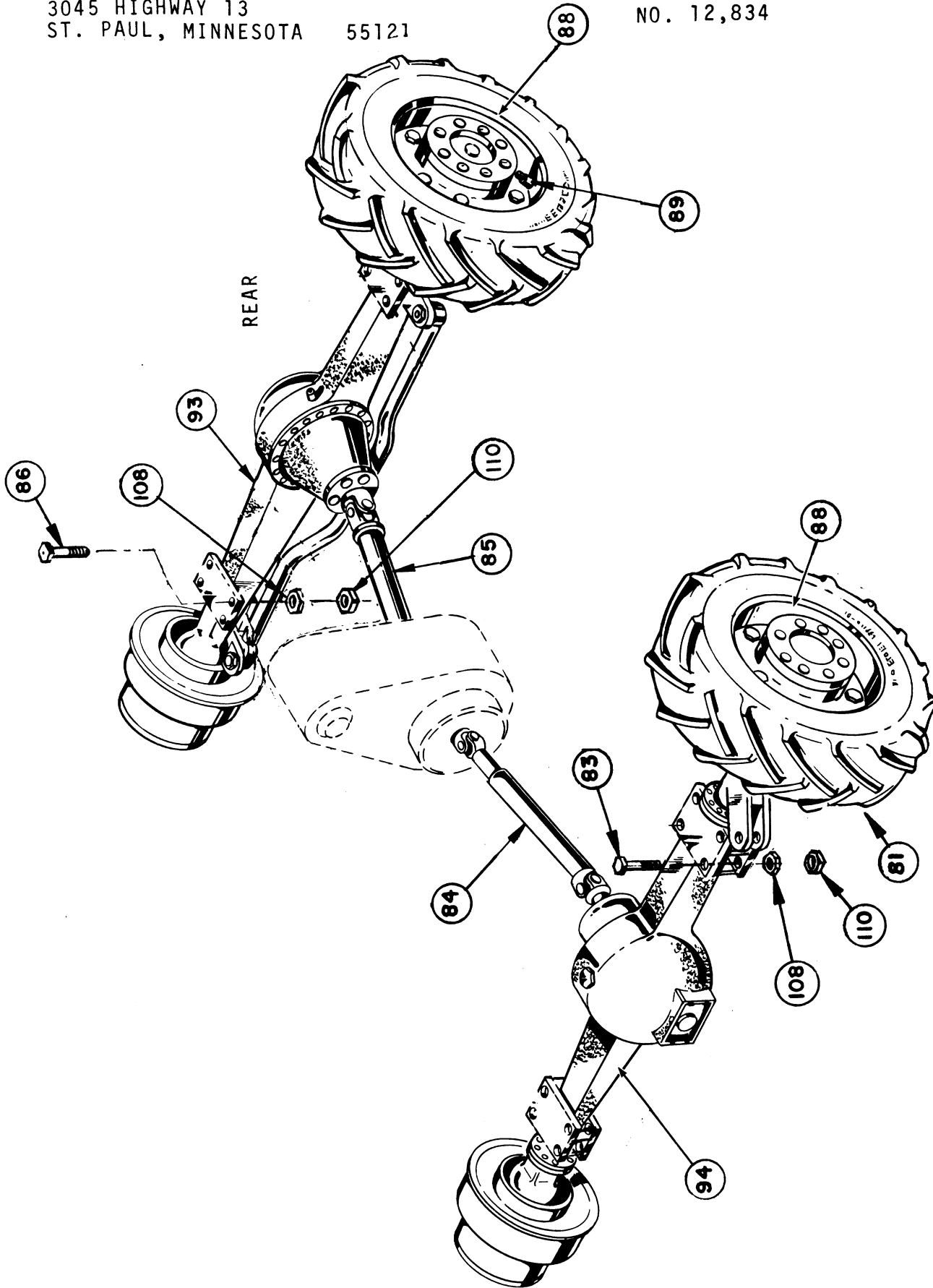
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASSEMBLY
 NO. 12,834

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1		P11686	Drop Box Assembly (Page 106)	1
2		11,553	Drive Shaft Assembly (Page 37)	1
3	11,528		Shim	A/R
4	P13027		Oil Filter	1
5	P11687		Reversomatic	1
6	11,527		Hanger Bracket	2
7	11,526		Hanger Bracket	2
8	11,615		Plate	2
9	11,620		Shock Resistor	1
10	P17897		Alternator Brkt.(Use 11,907B for T.F. Model)	1
11	P13704		Radiator Cap	1
12		11,590	Pump Drive Assembly (Page 86)	1
13	12,813		Bracket, Angle	1
14	12,369		Brace	2
15	P13038		Radiator	1
16	11,749		Radiator Support Weldment	1
17	11,586		Pad	2
18	13,503		Mounting Angle (S/N 101-886, Use 11,501)	2
19	13,534		Rubber Pad (S/N 101-886, Use 11,569)	2
20	11,646		Lug	4
21	9,388		Brace	2
22	P13026		Sending Unit, Water	1
23	P13025		Gasket	1
24	P18199		Muffler(Must Include Adapter, 16694A)	1
25	11,642		Exhaust Weldment	1
26	11,643		Tail Pipe	1
27	P13027		Oil Filter, Engine	1
28	P10548		Muffler Clamp	2
29	P13340		Muffler Clamp Bracket	1
30	P12638		Coil	1
31	P17283		Distributor(Complete) S/N 101-847 Use P13028)	1
32	P12948		Rotor (S/N 101-872, Use P13029)	1
33	P13030		Cover Plate	1
34	P13031		Point Set	1
35	P13032		Condenser	1
36	P17334		Distributor Cap (S/N 101-872 Use P13033)	1
37	P12947		Resistor	1
38	P12636		Oil Sender	1
39	P10201		Street Ell	1
40	P10690		Bushing	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

MODEL 400 High-Lift Loader
NO. 12,834



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASS'Y.
 No. 12,834

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
41	N-10228		Pipe	1
42	P-10184		Tee	1
43	P-10788		Nipple	1
44	P-10178		Hose Clamp	4
45	P-13035		Hose	1
46	P-13034		Hose	1
47	P-13043		Fuel Pump	1
48	P-13037		Radiator Hose (Top)	1
49	P-13036		Radiator Hose (Bottom)	1
50	P-10600		Clamp (Radiator Hose)	4
51	*P-13041		Fan Belt	1
52	P-13042		Water Pump Belt	1
53	P-12163		Air Cleaner	1
54	P-12164		Air Stack	1
55	P-12165		Mounting Bands	1
56	P-12179		Air Filter Element	1
57	11666		Adaptor	1
58	P-11511		Flex Tubing	1
59	P-13044		Water Pump	1
60	P-13045		Fan	1
61	P-13046		Alternator	1
62	P-13047		Voltage Regulator	1
63	P-13048		Fuel Filter	1
64	P-13049		Starter	1
65	P-13050		Carbuerator	1
66	P-16691		Cable	2
67	P-13039		Engine	1
68	11663		Shield	1
69	11665		Eyebolt	1
70	11661		Tab	2
71	P-13051		Pulley	1
72	COM'L		Capscrew, 3/8 x 1 3/4 N.C.	2
73	COM'L		Nut, 3/8 N.C.	2
74	COM'L		Shakeproof Washer, 3/8	2
75	COM'L		Jam Nut, 3/8 N.C.	2
76	COM'L		Capscrew, 1/4 x 3/4 N.C.	2
77	COM'L		Flat Washer, 1/4	4
78	COM'L		Lockwasher, 1/4	4
79	COM'L		Nut, 1/4 N.C.	4
80	COM'L		Capscrew, 1/4 x 1 N.C.	2

*ON TILT FRAME MODELS USE P-17413 FOR REPLACEMENT

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASSEMBLY
 NO. 12,834

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
81	*P13020		Tire	4
82	P10729		Plug, Pipe	2
83	P17653		Bolt, 3/4-16 X 8" (Grade 8)	8
84		**12,827	Drive Shaft (Front Axle) Page 35	1
85		**12,826	Drive Shaft (Rear Axle) Page 33	1
86	P17652		Bolt, 3/4-16 X 3" (Grade 8)	8
87	P10691		Bushing	1
88	*12,749		Disc Weldment	4
89	*P13022		Valve Stem	4
90	P13557		Governor	1
91	COM'L		Nut, Castellated 1/2"-20	3
92	P13550		Dipstick	1
93	P13681		Rear Axle	1
94	P13680		Front Axle	1
95	P17658		Capscrew, 1/2-13 X 1-3/4" (Grade 8)	4
96	COM'L		Lockwasher, 1/2"	4
97	COM'L		Nut, Jam 1/2"-13	4
98	P16895		Tube	1
99	COM'L		Capscrew, 1/2-20 X 2 1/2	2
100	COM'L		Capscrew, 1/2-20 X 2-3/4"	1
101	COM'L		Capscrew, 5/8"-11 X 1-3/4"	2
102	COM'L		Lockwasher, 5/8"	7
103	COM'L		Washer, Shakeproof 5/8"	9
104	COM'L		Capscrew, 5/8"-11 X 1 1/2	6
105	COM'L		Capscrew, 5/8"-11 X 1 1/2	8
106	COM'L		Cotter Pin 1/8 X 1	1
107	P11188		Battery	1
108	COM'L		Nut, Jam 3/4-16	16
110	COM'L		Nut, 3/4-16	16
111	11,953		Shield, Drive Shaft	1
112	14,011		Relay Kit, Starter	1
113	P15493		Drive Plate Adapter (Not Shown)	REF.
114	P12178		Torque Converter (Not Shown)	REF.
115	P16888		Ring Gear	REF.
116	P16893		Flywheel	REF.
117	P17856		Starter	REF.
118	P14056		Thermostat Housing	REF.

FOR HIGH-LIFT LOADERS WITH DUPLEX TIRES, USE THE FOLLOWING:

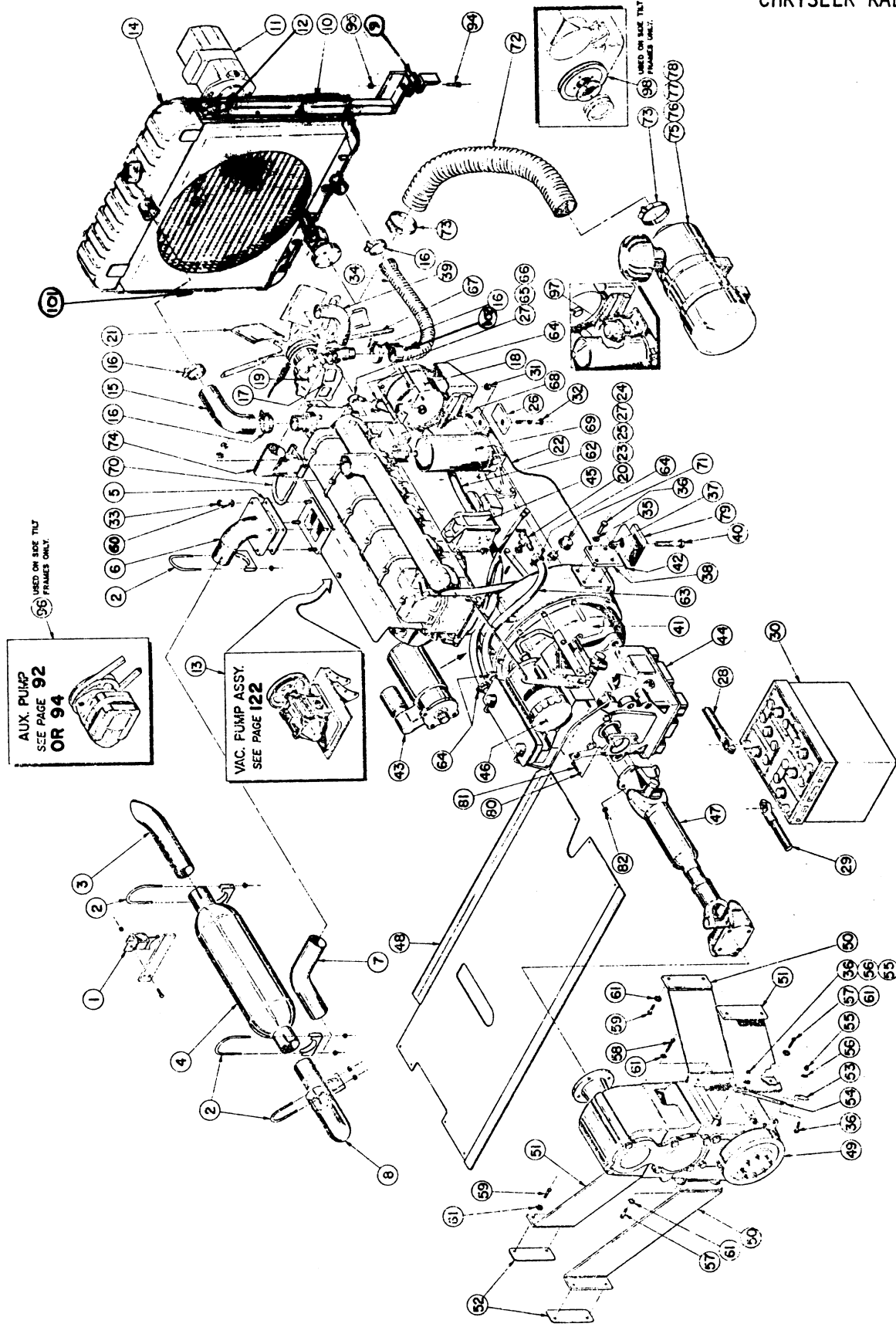
81	P13494		Tire, Duplex	4
88	12,778		Disc Weldment	4
89	P13493		Valve Stem	4

** For S/N 1162 THRU 1220 & 1222 Use 14,049 Drive Shaft (Front Axle)
 and 14,050 Drive Shaft (Rear Axle)

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASSEMBLY
 400 WAUKESHA DIESEL
 NO. 13,471 YOUNG RAD. OR
 CHRYSLER RAD.

NOT SHOWN: FUEL INJECTION PUMP
 ITEM # 99



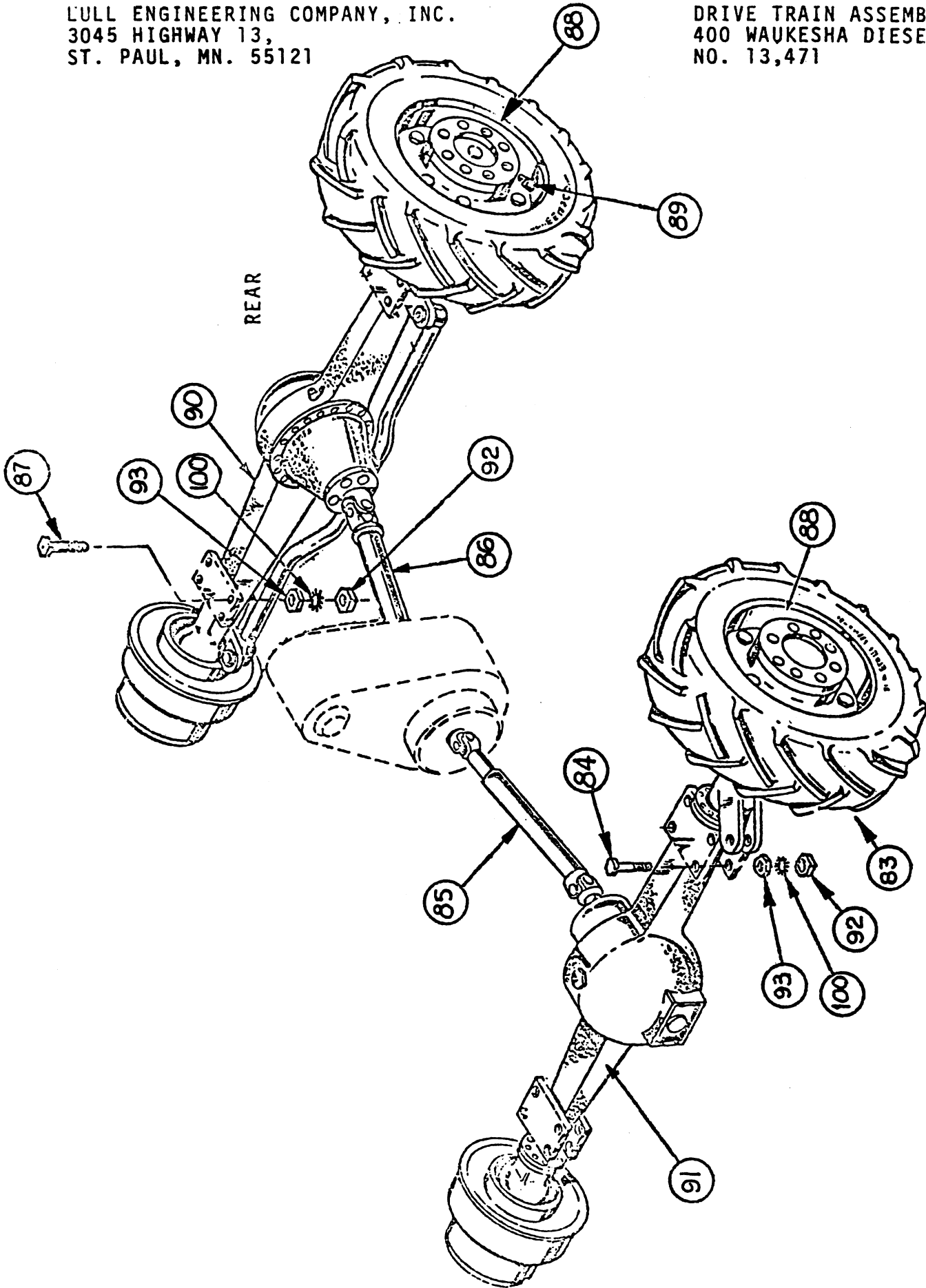
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASSEMBLY
 400 WAUKESHA DIESEL
 NO. 13,471 (Young Rad. OR
 CHRYSLER RAD.)

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-16175		Bracket	1
2	P-12169		Clamp	4
3	P-14148		Tail Pipe	1
4	P-14149		Muffler	1
5	P-16912		Gasket, Exhaust	1
6	13,420		Adapter, Exhaust	1
7	13,423		Pipe, Exhaust	1
8	P-14150		Pipe, Exhaust	1
9	11,586		Pad, Mounting Radiator	2
10 **	14,414		Mounting, Radiator	1
11		13,403	Pump Drive Ass'y (Page 86)	1
12 **	15,466		Bracket, Radiator Support	2
13		13,467	Vacuum Pump Ass'y (Page 122)	1
14 ***	14,406		Radiator	1
15 **	P-17921		Hose, Radiator Upper	1
16	P-10600		Clamp	4
17	P-17440		Gasket, Water Pump	1
18	P-17318		Alternator	1
19	P-17319		Pump, Water	1
20	P-10184		Tee	1
21	P-17320		Fan	1
22	P-16500		Engine, Waukesha	1
23	P-16675		Drain Cock	1
24	P-10691		Bushing	1
25	P-10774		Nipple	1
26	13,544		Engine Mounting Pad	4
27	N-10410		Pipe	2
28	P-13447		Cable	1
29	P-14824		Cable	1
30	P-12181		Battery	1
31	COM'L		Nut, Cast. 1/2" N.F.	2
32	COM'L		Bolt, 1/2" N.F. x 3 1/2" Long	2
33	COM'L		Nut, 3/8 N.F.	4
34 **	P-17682		Hose, Radiator	1
35	COM'L		Lockwasher, 1/2"	8
36	COM'L		Cap screw, 1/2" N.C. x 1 1/2"	12
37	COM'L		Nut, 3/4 N.F. Cast.	2
38	13,365		Motor Mnt. Bracket	2
39	P-17466		Hose, Radiator	1
40	12,012		Bolt	2
41		P-17723	Torque Converter	1
42	COM'L		Cotter Pin, 1/8" x 1 1/4"	2
43	P-17321		Starter	1
44	P-17236		Reversomatic	1
45	P-17316		Fuel Filter	1
46	P-12089		Oil Filter	1
47		13,371	Drive Shaft Ass'y (Page 37)	1
48	13,401		Drive Shaft Shield	1
49	P-11686		Drop Box	1
50	11,527		Mounting Bracket	2
51	11,526		Mounting Bracket	2

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MN. 55121

DRIVE TRAIN ASSEMBLY
400 WAUKESHA DIESEL
NO. 13,471



DRIVE TRAIN ASS'Y. 13471
(CHASSIS SECTION) (CONTINUED)

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASSEMBLY
 400 WAUKESHA DIESEL
 NO. 13,471 (YOUNG RAD. OR
 CHRYSLER RAD.)

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
52	11528		Shim	AS REQ.
53	11646		Lug	4
54	9388		Brace	2
55	COM'L		Nut, 1/2" N.C.	4
56	COM'L		Washer, Lock 1/2"	4
57	COM'L		Screw, 5/8-11 N.C. x 1 1/2"	6
58	COM'L		Screw, 5/8-11 N.C. x 1 3/4"	2
59	COM'L		Screw, 5/8-11 N.C. x 1 1/4"	8
60	COM'L		Lockwasher, 3/8	4
61	COM'L		Lockwasher, 5/8	16
62	COM'L		Hose, Heater 5/8 I.D. x 46"	1
63	COM'L		Hose, Heater 5/8 I.D. x 14"	1
64	P-10178		Clamp	4
65	P-10187		Nipple	1
66	P-10224		Elbow	1
67	P-17323		Fan Belt	2
68	P-14586		Voltage Regulator	1
69	P-17317		Oil Filter	1
70	P-17169		Clamp	1
71	P-13026		Sender, Oil	1
72	P-17205		Hose	1
73	P-14045		Clamp	1
74	13458		Adapter	1
75	P-17135		Air Cleaner	1
76	P-17136		Cap	1
77	P-17137		Mounting Band	1
78	P-17276		Element	1
79	13543		Shock Resistor, Rear Engine Mtg.	2
80	COM'L		Lockwasher 7/16	8
81	P-13522		Screw	8
82	COM'L		Nut, 7/16-20 N.F.	8
83	P-13020		Tire	4
84	COM'L		Bolt, 3/4-16 N.F. x 8" (Grade 8)	8
85		*12827	Drive Shaft, Front Axle (Page 35)	1
86		*12826	Drive Shaft, Rear Axle (Page 33)	1
87	COM'L		Bolt, 3/4"-16 N.F. x 3" (Grade 8)	1
88	12749		Disc Weldment	4
89	P-13022		Valve Stem	4
90	P-13681		Rear Axle	1
91	P-13680		Front Axle	1
92	COM'L		Nut, Jam 3/4 N.C.	16
93	COM'L		Nut, 3/4 N.C.	16
94	COM'L		Bolt, 3/8 x 1 3/4" N.C.	2
95	COM'L		Nut, 3/8 N.C.	2
96		P-17415	Auxiliary Pump (Page 92 or 94)	1
97	P-17573	P-17329	Fuel Pump	1
98	13394		Pulley Assembly	1
99	P-17354		Fuel Injection Pump (NOT SHOWN)	1
100	Com'l		Washer, Shakeproof	16
101	14415		Mounting, Radiator Left Half	1

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASSEMBLY
 400 WAUKESHA DIESEL
 NO. 13471 (YOUNG RAD. OR
 CHRYSLER RAD.)

*NOTE: For S/N 1162 thru 1220 & 1222 use 14049, Front Drive Shaft,
 and 14050, Rear Drive Shaft. All others use 12827 & 12826.

For High-Lift Loaders with Duplex Tires substitute the
 following numbers.

83	P-13494	Tire, Duplex	4
88	12778	Disc. Weldment	4
89	P-13493	Valve Stem	4

NOTE: ITEM # 41 is USED WITH P-17722 STARTING AT S/N 1025

** NOTE: For S/N 1182-1666, If Young Radiator, substitute the following numbers:

"A"	10	12,431	Mounting, Radiator	1
	12	13,976	Bracket, Radiator support	2
	15	P-10599	Hose, Radiator Upper	1
	34	P-16889	Hose, Radiator	1

*** NOTE: If Young Radiator needs replacement, Chrysler Radiator only available.
 Items 10, 12, 15, 34, 101 will also need replacement. New radiator
 mount, part 11438, is also required, as below

	10	14414	R.H. Mounting Radiator	1
	12	15466	Bracket Radiator Support	2
	14	14406	Radiator Chrysler	1
	15	P17921	Hose Radiator Upper	1
	34	P17682	Hose Radiator Lower	1
	101	P14415	Mounting Radiator Left Half	1
		11438	Mount	2
	102	15688	Shield	1
		com'1	Capscrew, 1/4"N.F. x 1 1/2"lg.	1
		com'1	Nut, 1/4"	1

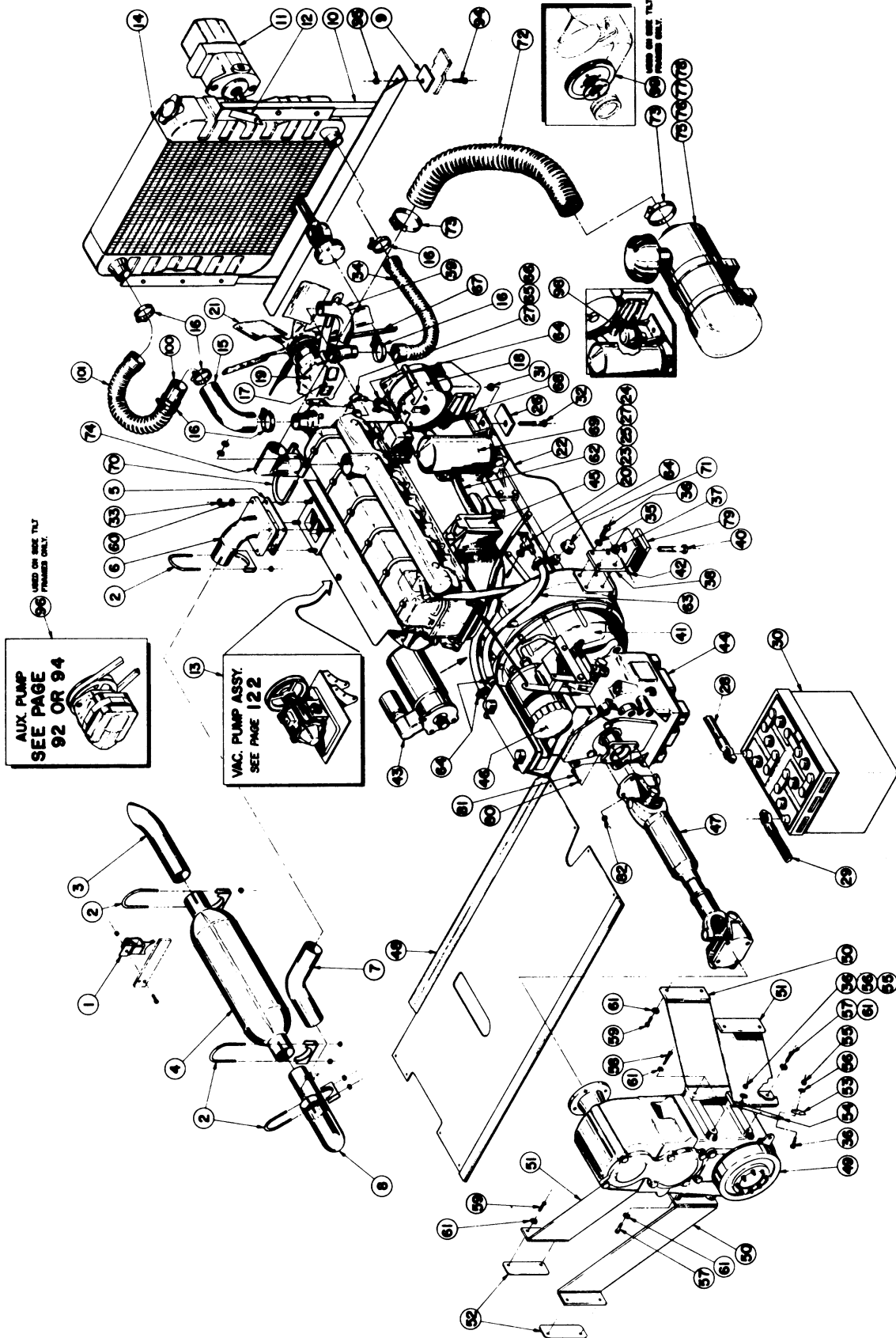
REVISION

ECO #

"A"

1109

NOT SHOWN: FUEL INJECTION PUMP
 ITEM # 102



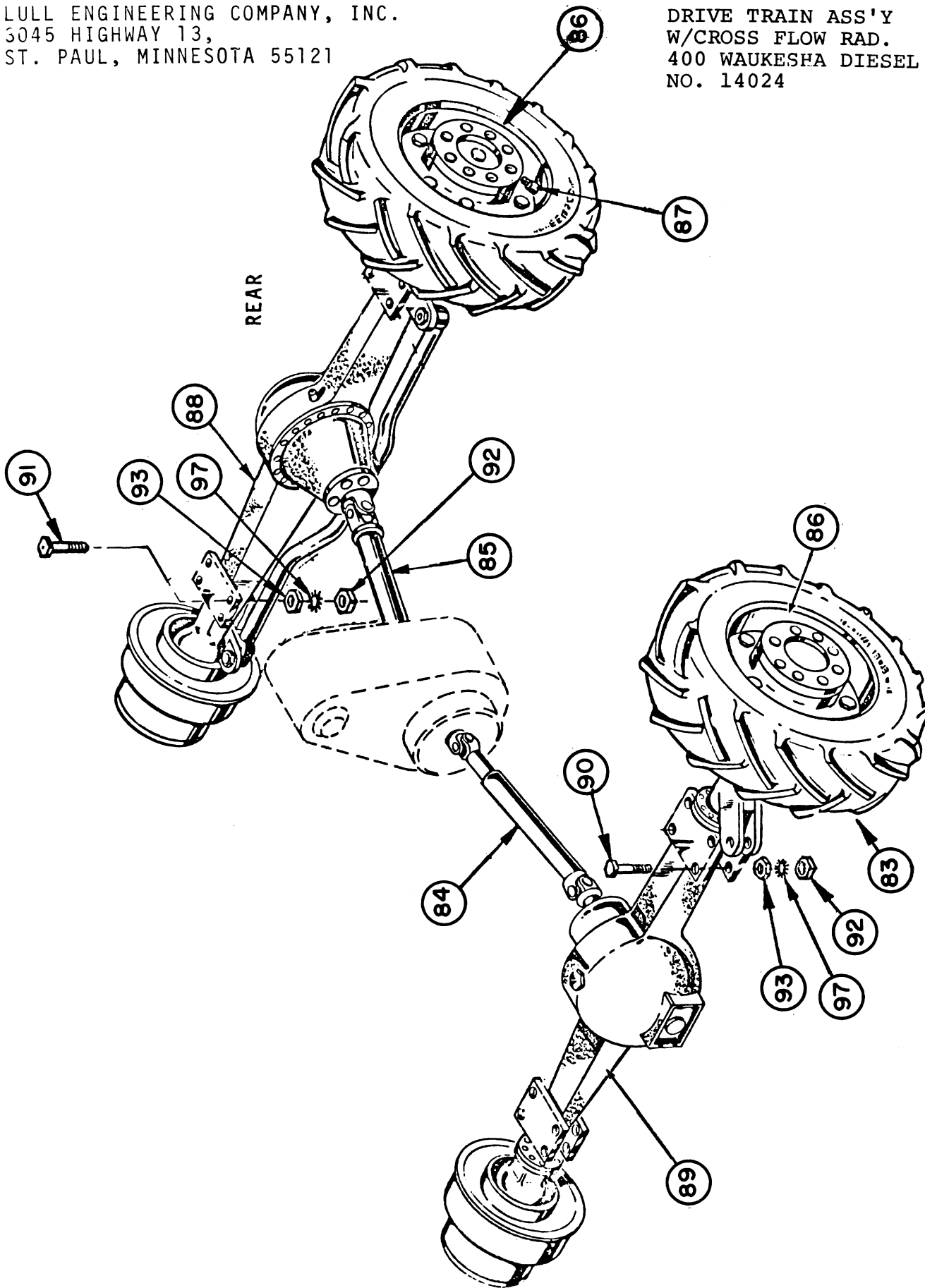
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASSEMBLY
 400 WAUKESHA DIESEL
 NO. 14,024 (CROSS FLOW RAD.)

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-16175		Bracket	1
2	P-12169		Clamp	4
3	P-14148		Tail Pipe	1
4	P-14149		Muffler	1
5	P-16912		Gasket, Exhaust	1
6	13420		Adapter, Exhaust	1
7	13423		Pipe, Exhaust	1
8	P-14150		Pipe, Exhaust	1
9	11586		Pad, Mounting Radiator	2
10	13970		Mounting Radiator	1
11		13403	Pump Drive Ass'y. (Page 86)	1
12	13976		Bracket, Radiator Support	2
13		13467	Vacuum Pump Ass'y (Page 122)	1
14	13962		Radiator	1
15	P-10599		Hose Radiator, Upper	1
16	P-10600		Clamp	4
17	P-17440		Gasket, Water Pump	1
18	P-17318		Alternator	1
19	P-17319		Pump, Water	1
20	P-10184		Tee	1
21	P-17320		Fan	1
22	P-16500		Engine, Waukesha	1
23	P-16675		Drain Cock	1
24	P-10691		Bushing	1
25	P-10774		Nipple	1
26	13544		Engine Mounting Pad	4
27	N-10410		Pipe	2
28	P-13447		Cable	1
29	P-14824		Cable	1
30	P-12181		Battery	1
31	Com'1		Nut, Castle-1/2" N.F.	2
32	Com'1		Bolt, 1/2" N.F. x 3 1/2" LG.	2
33	Com'1		Nut, 3/8 N.F.	4
34	P-16889		Hose, Radiator	1
35	Com'1		Lock Washer 1/2"	8
36	Com'1		Cap Screw, 1/2" N.C. x 1 1/2" LG.	12
37	Com'1		Nut, 3/4 N.F. Castle	2
38	13365		Motor Mnt. Bracket	2
39	P-17466		Hose, Radiator	1
40	12012		Bolt	2
41		P-17723	Torque Converter	1
42	Com'1		Cotter Pin (1/8 x 1 1/4" LG.)	2
43	P-17321		Starter	1
44	P-17236		Reversomatic	1
45	P-17316		Fuel Filter	1
46	P-12089		Oil Filter	1
47		13371	Drive Shaft Ass'y (Page 37)	1
48	13401		Drive Shaft Shield	1
49	P-11686		Drop Box	1
50	11527		Mounting Bracket	2
51	11526		Mounting Bracket	2
52	11528		Shim	AS REQ.

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASS'Y
W/CROSS FLOW RAD.
400 WAUKESHA DIESEL
NO. 14024



DRIVE TRAIN ASS'Y. 14024
(CHASSIS SECTION) (CONTINUED)

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASSEMBLY
 400 WAUKESHA DIESEL
 NO. 14,024 (CROSS FLOW RAD.)

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
53	11646		Lug	4
54	9388		Brace	2
55	Com'l		Nut, 1/2" N.C.	4
56	Com'l		Lockwasher - 1/2"	4
57	Com'l		Capscrew, 5/8-11 N.C. x 1 1/2	6
58	Com'l		Capscrew, 5/8-11 N.C. x 1 3/4	2
59	Com'l		Capscrew, 5/8-11 N.C. x 1 1/4	8
60	Com'l		Lockwasher - 3/8"	4
61	Com'l		Lockwasher - 5-8"	16
62	Com'l		Hose, Heater 5/8 I.D. x 46"	1
63	Com'l		Hose, Heater 5/8 I.D. x 14"	1
64	P-10178		Clamp	4
65	P-10187		Nipple	1
66	P-10224		Elbow	1
67	P-17323		Fan Belt	2
68	P-14586		Voltage Regulator	1
69	P-17317		Oil Filter	1
70	P-17169		Clamp	1
71	P-13026		Sender, Oil	1
72	P-17205		Hose, 28" LG.	1
73	P-14045		Clamp	1
74	13458		Adapter	1
75	P-17135		Air Cleaner	1
76	P-17136		Cap	1
77	P-17137		Mounting Band	1
78	P-17276		Element	1
79	13543		Shock Resistor	2
80	Com'l		Lockwasher - 7/16	8
81	P-13522		Screw	8
82	Com'l		Nut - 7/16 -20N.F.	8
83	P-13020		Tire	4
84		*12827	Drive Shaft, Front Axle (Page 35)	1
85		*12826	Drive Shaft, Rear Axle (Page 33)	1
86	12749		Disc Weldment	4
87	P-13022		Valve Stem	4
88	P-13681		Rear Axle	1
89	P-13680		Front Axle	1
90	Com'l		Bolt, (3/4"-16 N.F. x 8") Grade 8	8
91	Com'l		Bolt, (3/4"-16 N.F. x 3") Grade 8	8
92	Com'l		Nut, Jam-3/4 -16 N.F.	16
93	Com'l		Nut, Hex-3/4 -16 N.F.	16
94	Com'l		Bolt, 3/8 x 1 3/4" N.C.	2
95	Com'l		Nut, Hex-3/8 -16 N.C.	2
96		P-17415	Auxiliary Pump (Page 92 or 94)	1
97	Com'l	P-17329		Washer-Shakeproof-3/4"
98	P-17573		Fuel Pump	1
99	13394		Pulley Assembly	1

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

DRIVE TRAIN ASSEMBLY
 400 WAUKESHA DIESEL
 NO. 14,024 (CROSS FLOW RAD.)

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
100	N-10510		Tubing	1
101	P-17434		Hose, Radiator	1
102	P-17354		Fuel Injection Pump (NOT SHOWN)	

*NOTE: For S/N 1162 thru 1220 & 1222, use 14049, Front Drive Shaft and 14050, Rear Drive Shaft. All others use 12827 & 12826.

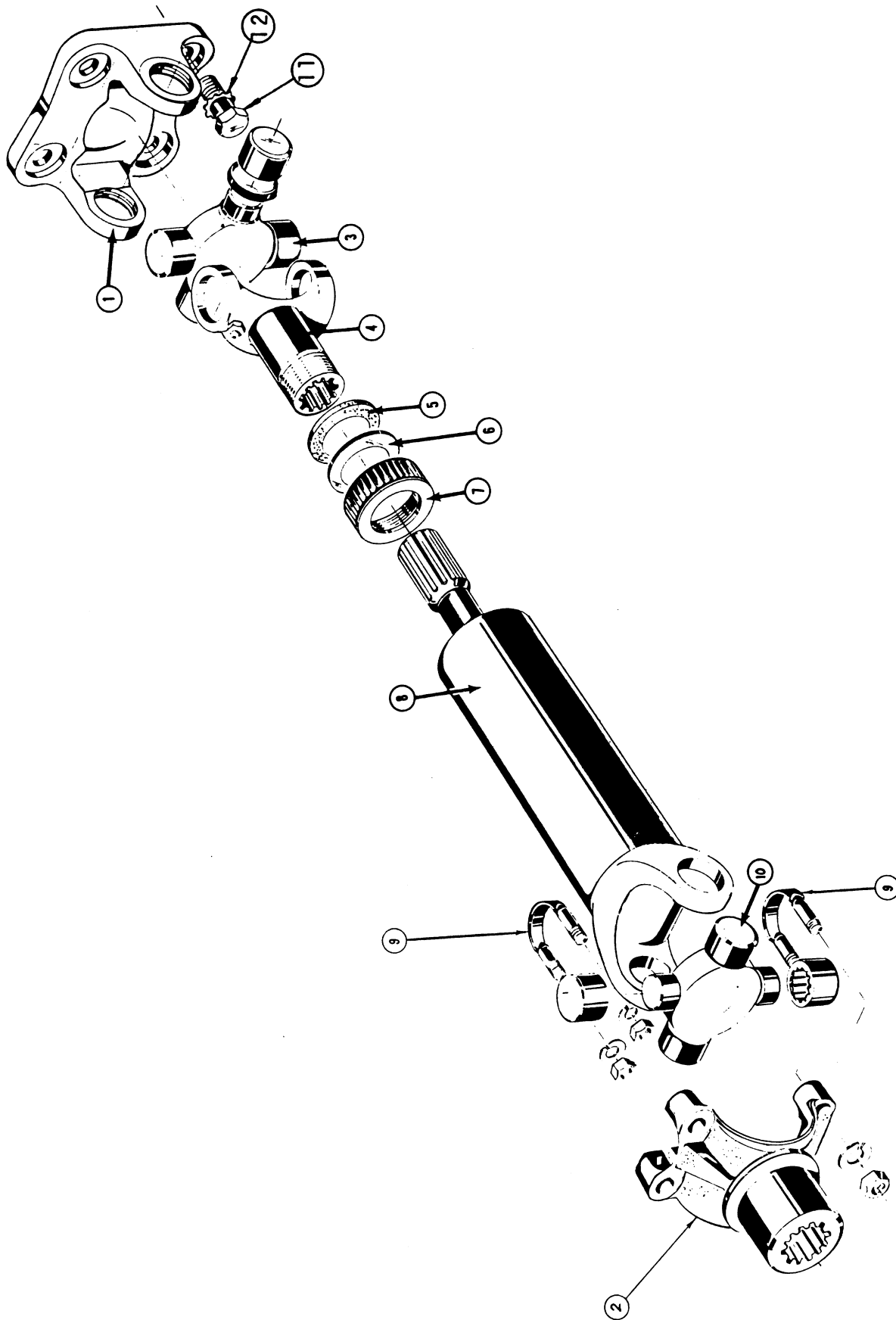
NOTE: For High-Lift Loaders with Duplex Tires substitute the following numbers.

83	P-13494	Tire, Duplex	4
88	12778	Disc. Weldment	4
89	P-13493	Valve Stem	4

NOTE: ITEM # 41 IS USED WITH P-17722 STARTING AT S/N 1025.

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

DRIVE SHAFT ASSEMBLY



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

DRIVE SHAFT ASSEMBLY

ITEM NO.	PART NO.	ASSEMBLY NO.	DESCRIPTION	NO REQ.
1	See Note A		Yoke Flange	1
2	P13002		Axle Spline Adapter	1
3	P11702		Bearing Kit	1
4	P11700		Yoke Sleeve	1
5	P11699		Cork Washer	1
6	P11698		Steel Washer	1
7	P11693		Dust Cap	1
8	See Note B		Tube Assembly	1
9	P13001		U-Bolts	2
10	P13000		Bearing Kit	1
11	P13520		Bolt, Hex	4
12	COM'L		Washer, Shakeproof 1/2"	4

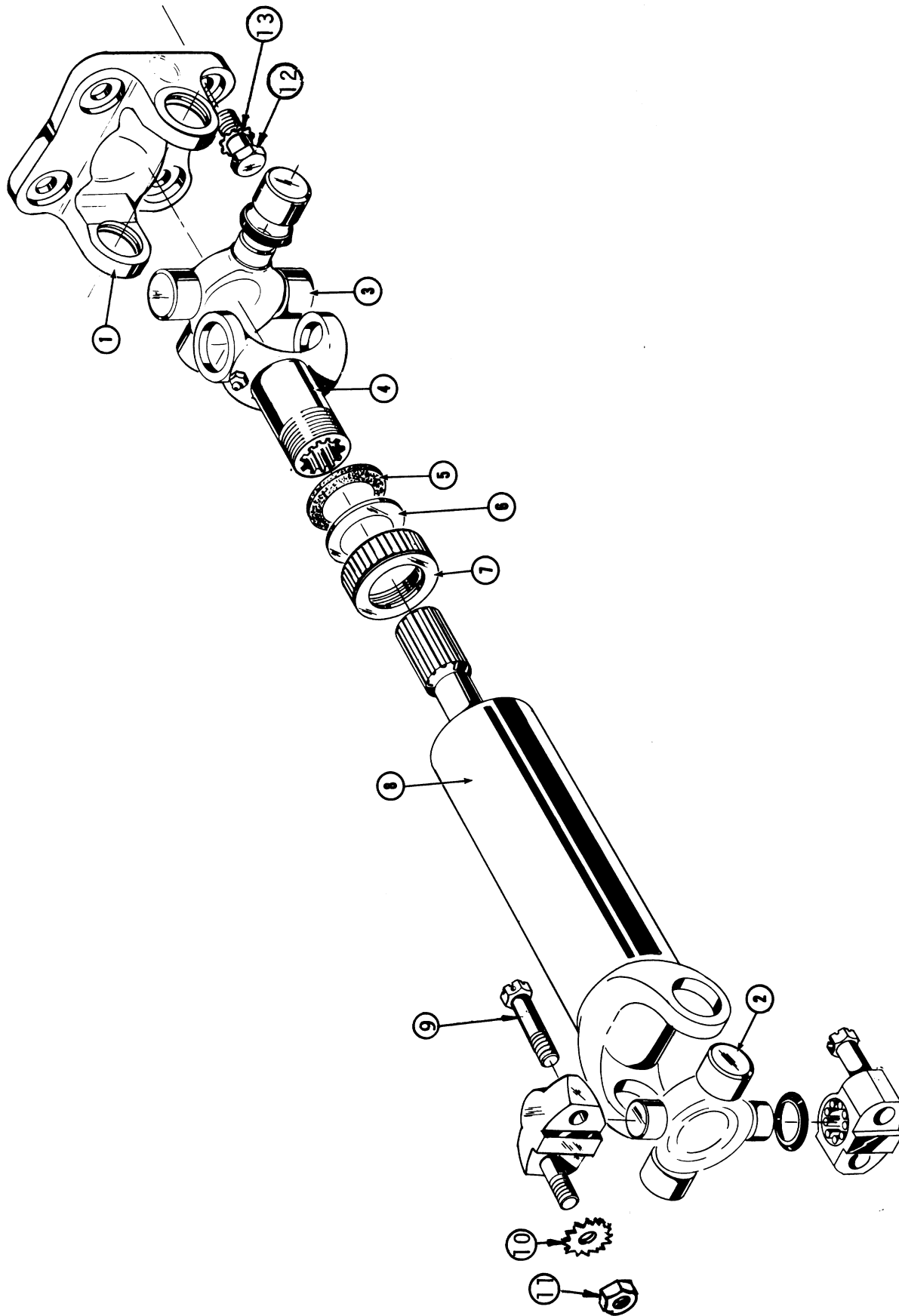
NOTES: A) For Rockwell Axles Use P11695.

For Napco Axles Use P11701, except for S/N 1162-1220 & 1222 W/225's, Use P11695.

B) For Rockwell Axles (Rear Only) Use 11,552.

For Napco Axles (Rear Only) Use 12,831, except for S/N 1162-1220 & 1222 W/225's, Use 14,051.

For Napco Axles (Front Only) Use 12,832, except for S/N 1162-1220 & 1222 W/225's, Use 12,831.



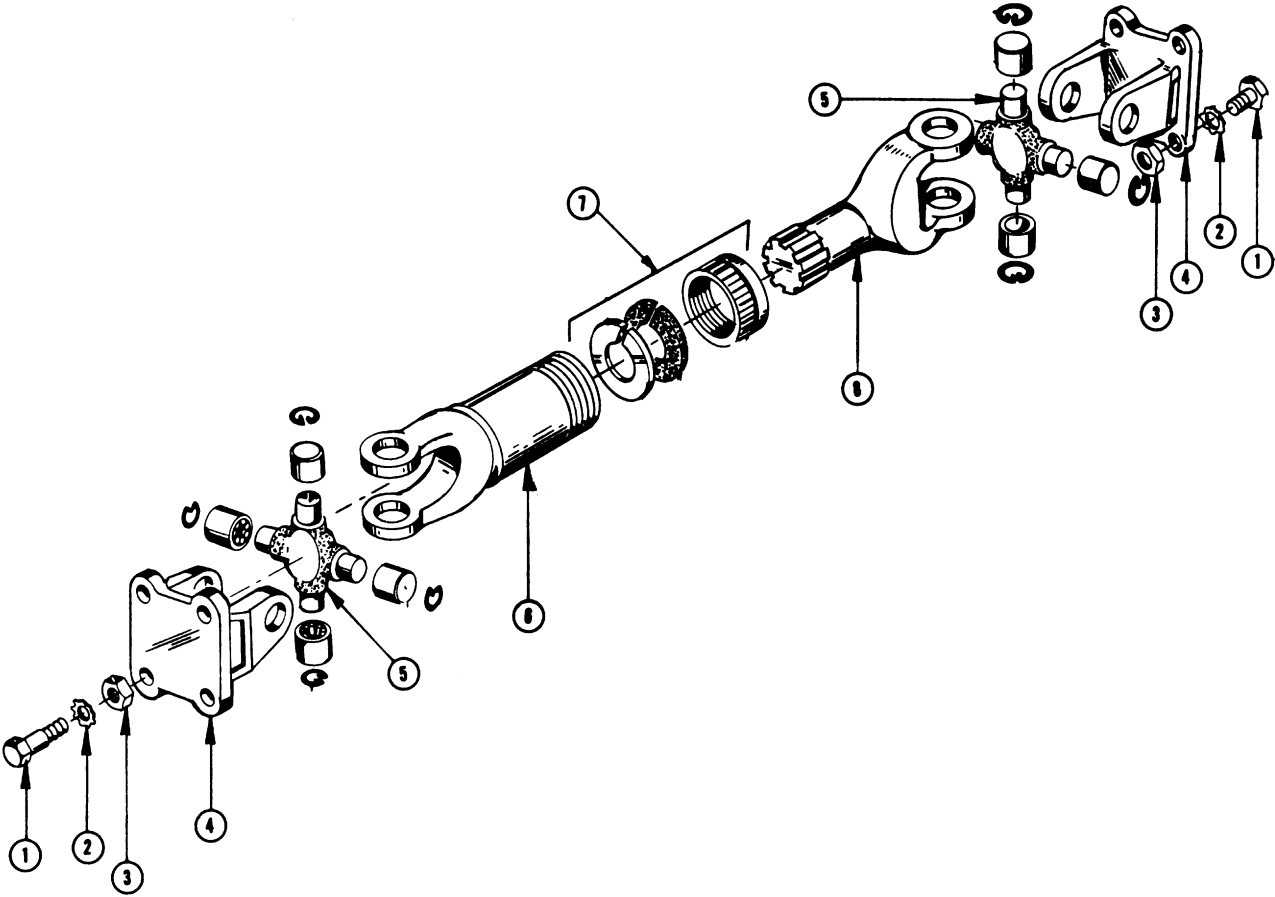
DRIVE SHAFT ASS'Y. 11550
(DROP CASE TO FRONT AXLE)



REF.	PART NO.	DESCRIPTION	REQ.
		DRIVE SHAFT ASSEMBLY NO. 11,550	
1	P-12992	Yoke Flange	1
2	P-11696	Bearing Kit	1
3	P-11702	Bearing Kit	1
4	P-11700	Yoke Sleeve	1
5	P-11699	Cork Washer	1
6	P-11698	Steel Washer	1
7	P-11693	Dust Cap	1
8	11,549	Tube Assembly	1
9	P-13521	Bolt, Hex	4
10	COM'L	Washer, Shakeproof 3/8"	4
11	COM'L	Nut, Hex 3/8-24 NF	4
12	P-13520	Bolt, Hex	4
13	COM'L	Washer, Shakeproof 1/2"	4

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DRIVE SHAFT ASSEMBLY
(ENGINE TO DROP BOX)



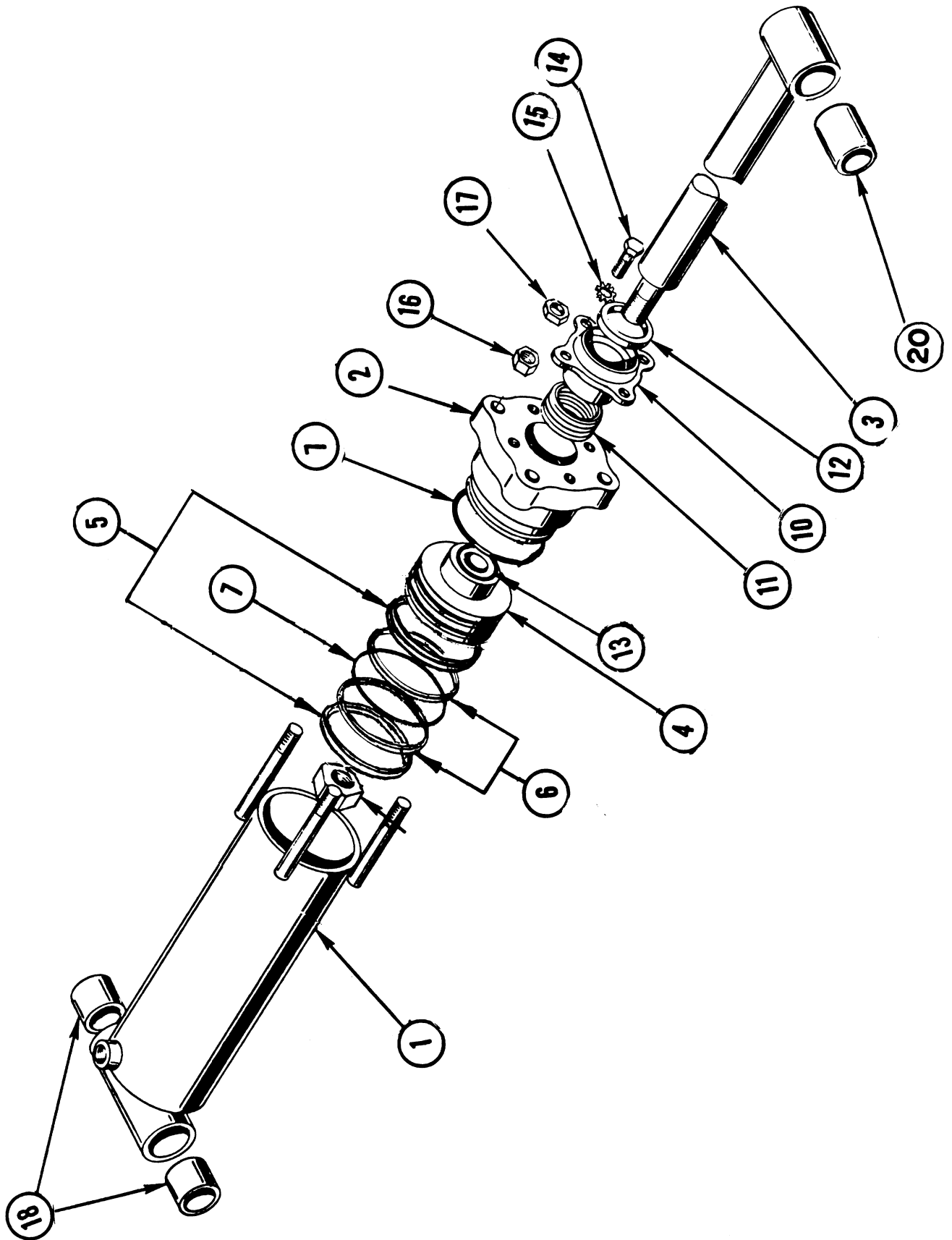
LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

DRIVE SHAFT ASSEMBLY
ENGINE TO DROP BOX

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-13522		Bolt, Hex	8
2	COM'L		Washer, Shakeproof 3/8"	8
3	COM'L		Nut, Hex 3/8-24 NF	8
4	P-12992		Yoke, Flange	2
5	P-12993		Cross and Bearing Kit	2
6	P-12994		Yoke, Slip (Use P11690 For Waukesha)	1
7	P-12995		Dust Cap Group	1
8	P-12996		Yoke Shaft (Use 13370 for Waukesha)	1

LULL ENGINEERING COMPANY, INC.
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TILT CYLINDER ASSEMBLY
"400" SIDE TILT
NO. 13,690



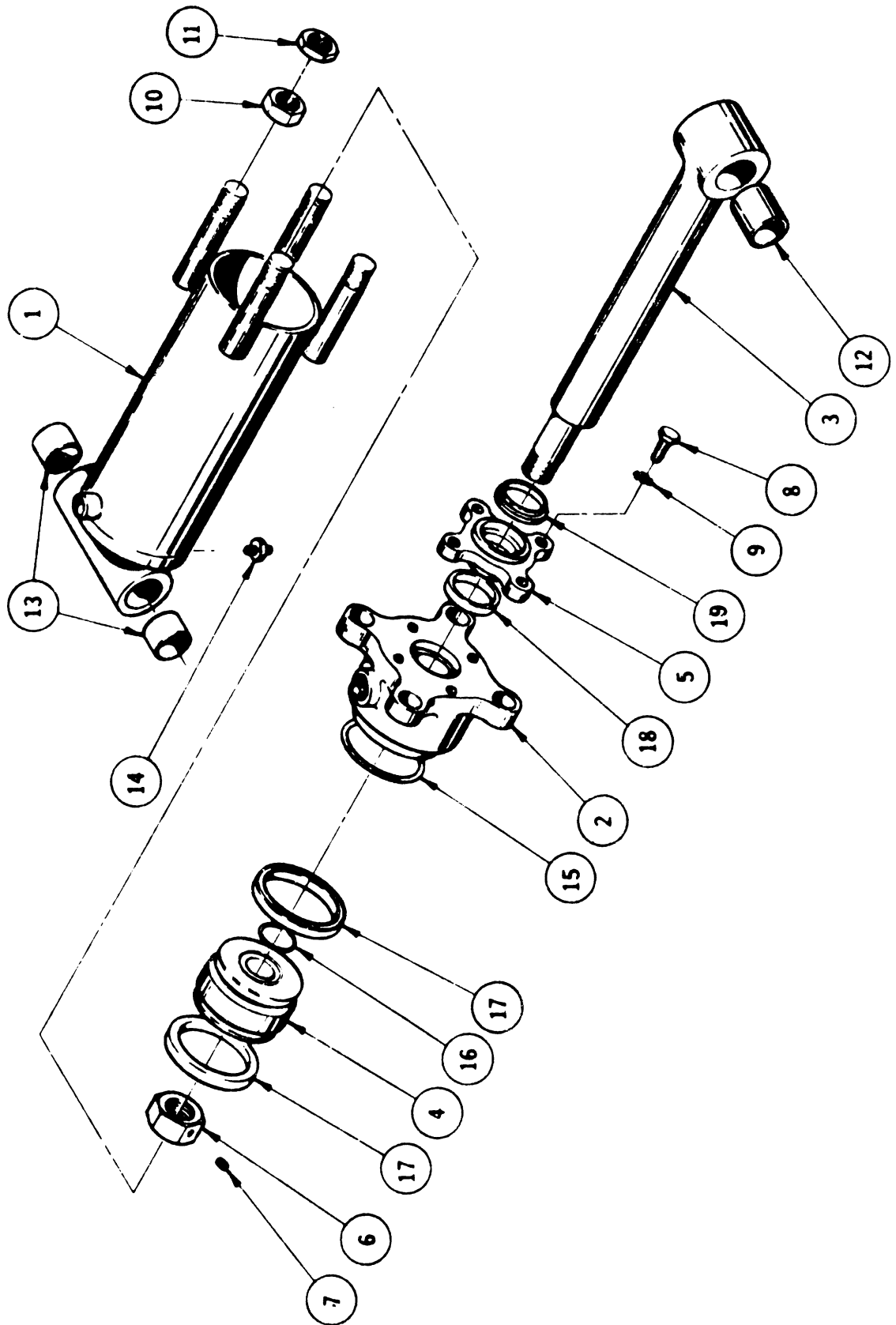
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

TILT CYLINDER ASSEMBLY
 400 SIDE TILT
 NO. 13,690

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13,689		Cylinder Tube Weldment	1
2	545		Head, Cylinder	1
3	13,686		Rod, Piston Weldment	1
4	13,687		Piston	1
5	P-11347		Ring Assembly	2
6	P-17303		Ring, Piston Back Up	2
7	P-10316		O-Ring	2
8	215		Nut, Special	1
9	COM'L		Setscrew, 1/4-20 N.C. x 3/8 C.P.	1
10	5146		Gland	1
11	P-10304		V-Packing	1
12	P-10307		Klozure	1
13	P-11576		O-Ring	1
14	COM'L		Capscrew, 5/16" N.C. x 1 1/2" Long	4
15	COM'L		Washer, Shakeproof 5/16"	4
16	COM'L		Nut, Hex 1/2" N.F.	4
17	COM'L		Nut, Jam 1/2" N.F.	4
18	4873		Bushing	2
19	COM'L		Fitting, Zerk 1/8" N.P.T.	1
20	13,691		Bushing	1

LULL ENGINEERING COMPANY, INC.
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CYLINDER ASS'Y, TILT
400 HIGH-LIFT LOADER
NO. 14031



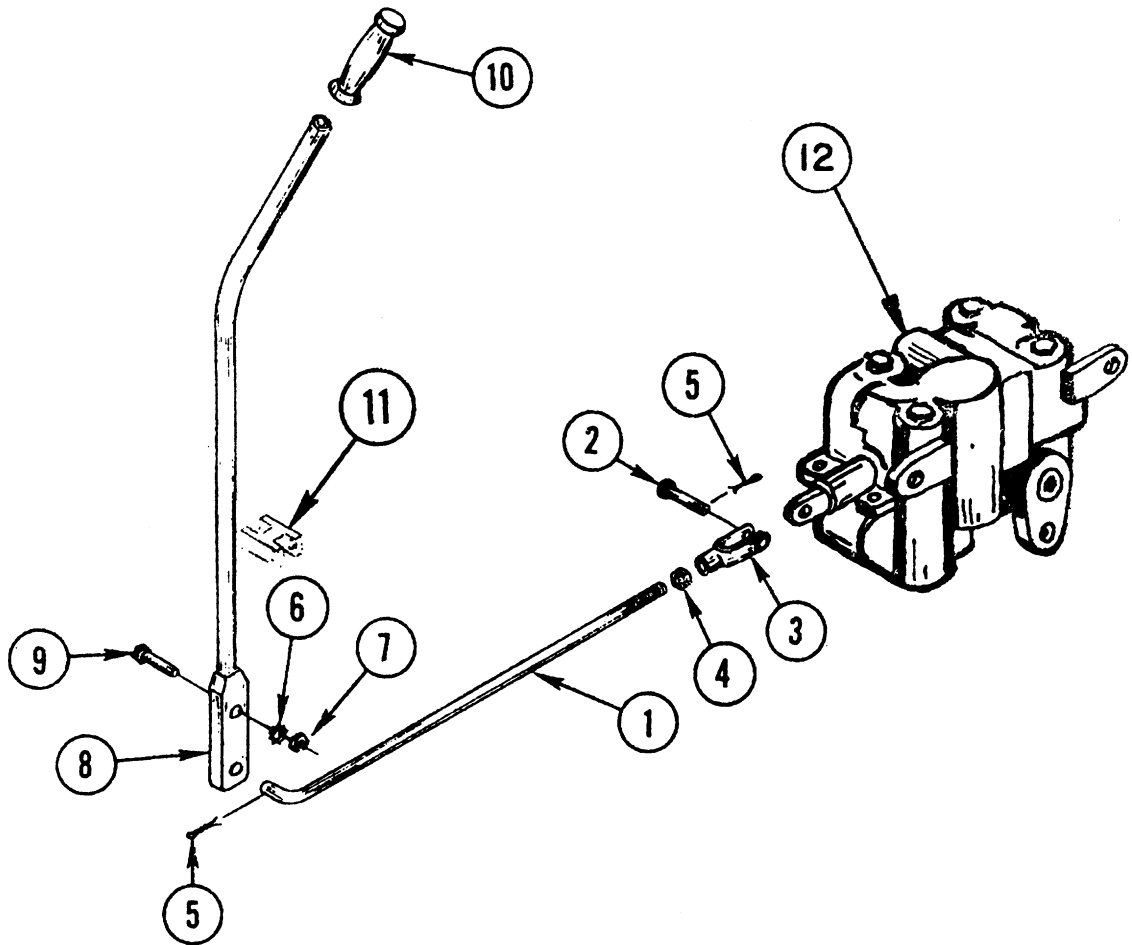
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

CYLINDER ASS'Y, TILT
 400 HIGH-LIFT LOADER
 NO. 14031

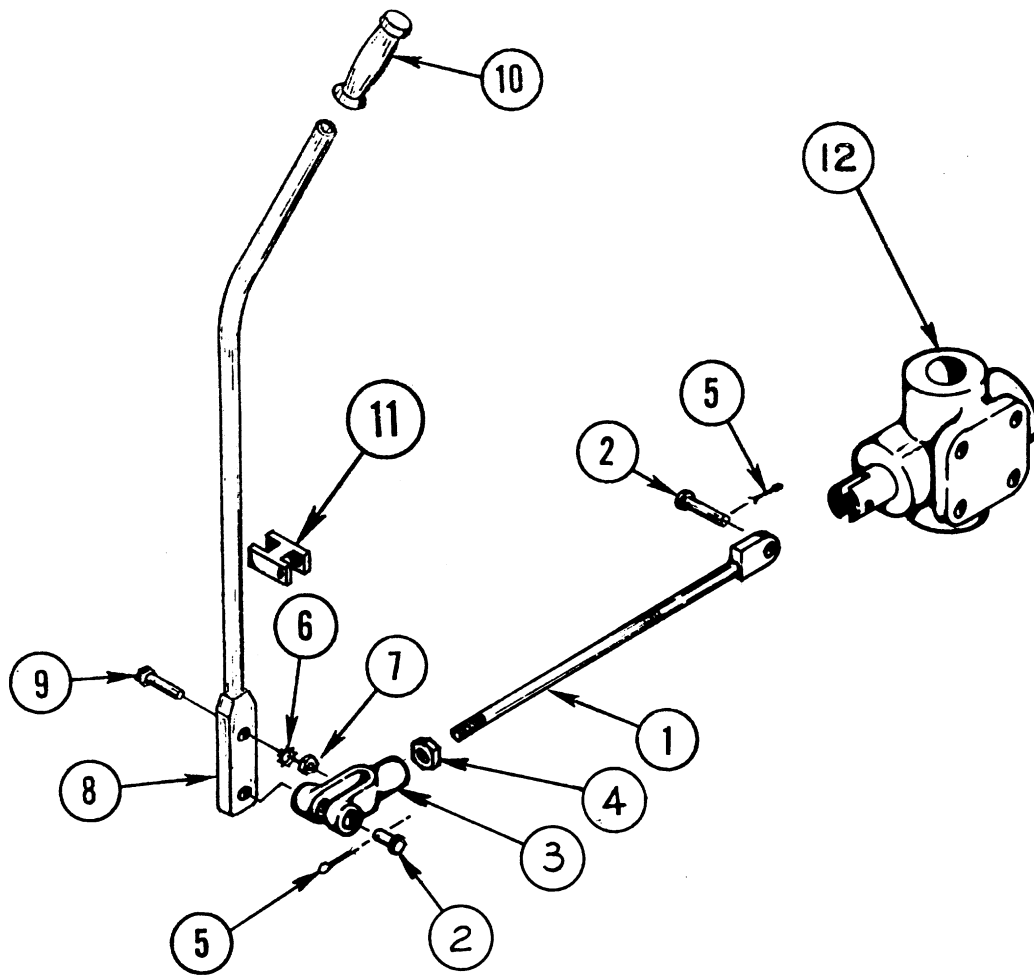
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13689		Cylinder Tube, Weldm't	1
2	545		Head, Cylinder	1
3	13686		Rod, Piston, Weldment	1
4	14009		Piston	1
5	14013		Gland	1
6	215		Nut, Piston	1
7	Com'l		Setscrew (1/4-20 NC - 3/8 CP)	1
8	Com'l		Capscrew (5/16 NC x 1" LG.)	4
9	Com'l		Washer, Shakeproof (5/16)	4
10	Com'l		Nut, Hex (1/2 NF)	4
11	Com'l		Nut, Jam (1/2 NF)	4
12	13691		Bushing	1
13	4873		Bushing	2
14	P-16611		Zerk (1/8 NPT)	1
15	P-10316		O-Ring (3 3/4 ID x 4 OD x 1/8 WA)	1
16	P-11576		O-Ring (1 1/2 ID x 1 5/8 OD x 1/16)	1
17	P-17457		Seal, Piston	2
18	P-17458		Seal, Rod	1
19	P-17459		Wiper, Rod	1

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
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SIDE TILT CONTROL ASSEMBLY
 NO. 13,871



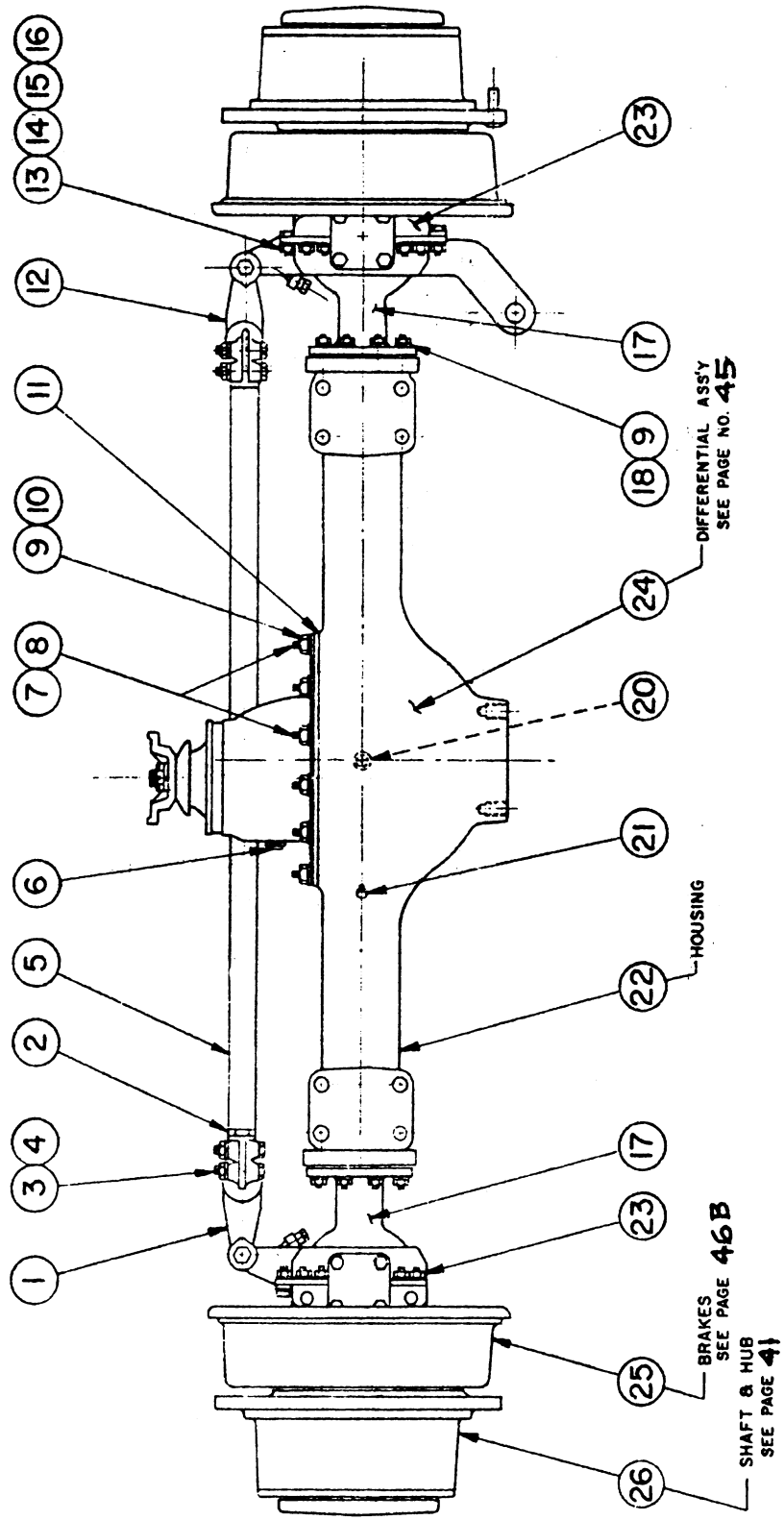
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13,872		Valve Connector Link	1
2	P-10512		Clevis Pin	1
3	P-10193		Clevis	1
4	COM'L		Nut, 3/8-24 NF Hex Jam	1
5	COM'L		Cotter Pin, 1/8 x 7/8	2
6	COM'L		Shakeproof Washer, 3/8	1
7	COM'L		Nut, 3/8-24 NF Hex	1
8	3481		Side Tilt Lever	1
9	COM'L		Capscrew, 3/8-24 NF x 2 1/4 Hex Hd.	1
10	P-10194		Rubber Grip	1
11	8702		Lock	1
12		P-13005	Valve Ass'y (Page 130)	1



<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13,923		Valve Connector Link	1
2	P-10509		Clevis Pin	2
3	P-10508		Clevis	1
4	COM'L		Nut, 3/8-24 NF Hex Jam	1
5	COM'L		Cotter Pin, 1/8 x 7/8	2
6	COM'L		Shakeproof Washer, 3/8	1
7	COM'L		Nut, 3/8-24 NF Hex	1
8	3481		Side Tilt Lever	1
9	COM'L		Capscrew, 3/8-24 NF x 2 1/4 Hex Hd.	1
10	P-10194		Rubber Grip	1
11	8702		Lock	1
12		P-17393	Valve Ass'y (Page 130)	1

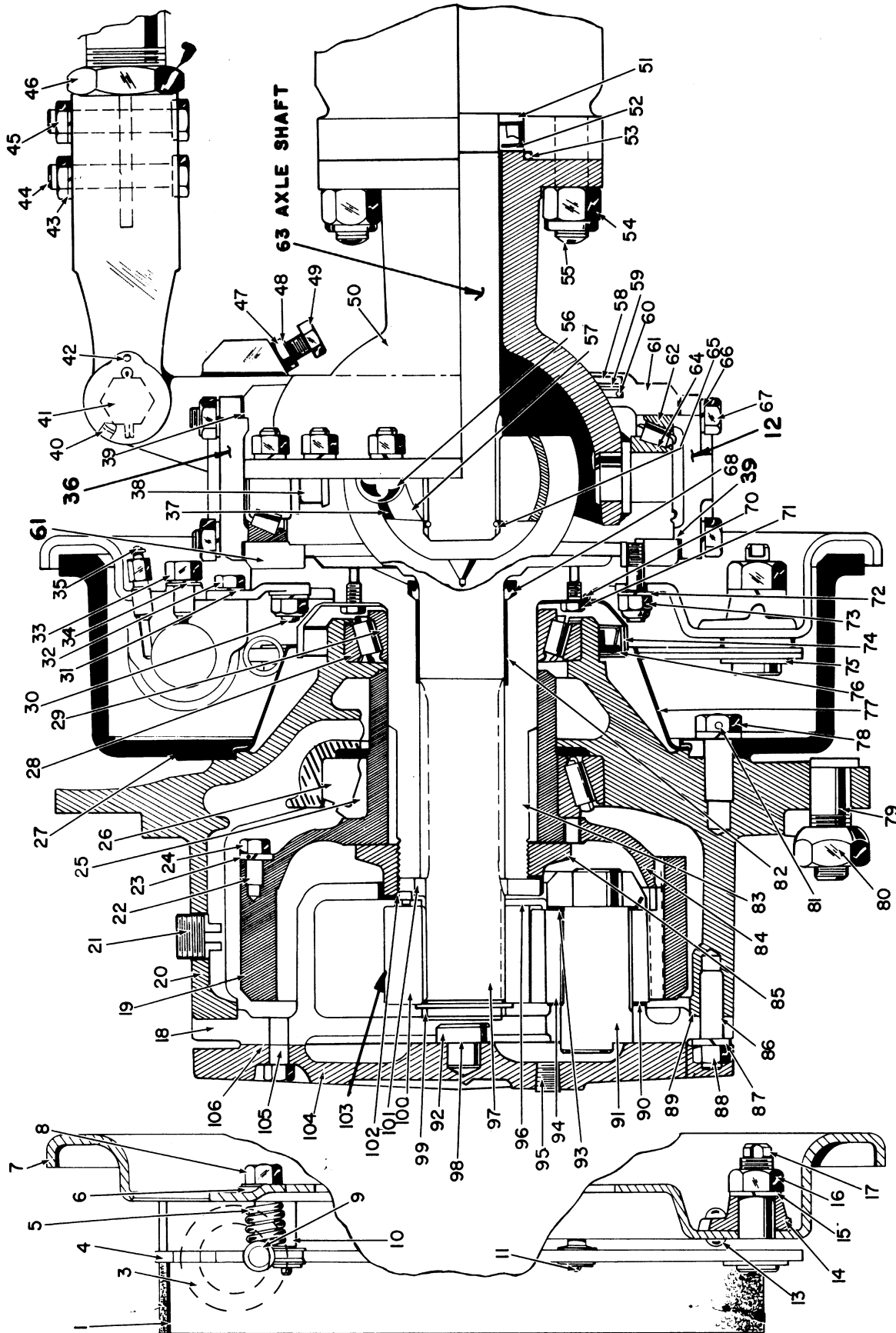
P-13018 FRONT AXLE ASS'Y

FOR LULL MODEL 400 HIGH LIFTS





REF.	PART NO.	DESCRIPTION	REQ.
		P-13018 FRONT AXLE ASSEMBLY	
1	P-13422	Yoke - Tie Rod (12 Thd)	1
2	P-13103	Nut - Tie Rod Lock	1
3	P-13101	Bolt - Tie Rod Yoke Clamp	4
4	P-13102	Nut - Tie Rod Yoke Clamp Bolt	4
5	P-13423	Tie Rod	1
6	P-13202	Plug - Diff. Case Oil Filler	1
7	P-13200	Stud, Long	4
8	P-13201	Stud, Short	10
9	P-13199	Nut	14
10	P-13198	Washer	14
11	P-13208	Gasket	1
12	P-13424	Yoke - Tie Rod	1
13	P-13425	Capscrew	20
14	P-13426	Nut	24
15	P-12652	Lockwasher	24
16	P-13427	Capscrew	4
17	P-13428	Socket	2
18	P-13111	Stud	16
19	P-13112	Nut	16
20	P-13429	Plug, Drain	1
21	P-13391	Breather	1
22	P-13430	Housing	1
23	P-13414	Flange - Steering Knuckle - R. & LH	2
24	P-13415	Diff. Carrier Ass'y.	1
25	P-13413	Brake Assembly	2
26	P-13432	Shaft & Hub Assembly	2



P-13432 OUTER END



REF.	PART NO.	DESCRIPTION	REQ.
		P-13018 FRONT AXLE, OUTER END P-13432	
1	P-13687	Brake Shoe Assembly	4
2			
3	P-13258	Wheel Cylinder Assembly	2
4	P-13257	Cylinder Push Rod	4
5	P-13259	Brake Spring	4
6	P-13064	Washer	4
7	P-13065	Backing Plate	
8	P-13066	Adjusting Cam	4
9	P-13067	Return Spring	2
10	P-13068	Pin	4
11	P-13069	Brake Pin	4
12	P-13756	Cap, Lower	2
13	P-13071	Rivet	8
14	P-13072	Anchor Bracket	2
15	P-13073	Washer	4
16	P-13074	Nut	4
17	P-13075	Anchor Pin	4
18	P-13076	Spider	2
19	P-13077	Gear	2
20	P-13078	Hub	2
21	P-13079	Plug	2
22	P-13080	Capscrew	16
23	P-13081	Lock	8
24	P-13082	Lockwire	8
25	P-13083	Cone	2
26	P-13084	Cup	2
27	P-13085	Brake Drum	2
28	P-13318	Cup	2
29	P-13086	Cone	2
30	P-13087	Stud	2
31	P-13380	Lockwasher	4
32	P-13089	Capscrew	4
33	P-13090	Inlet Connection	2
34	P-13091	Gasket	2
35	P-13092	Bleeder Screw	2
36	P-13755	Cap, Upper	2
37	P-13094	Cage	2
38	P-13095	Pin	4
39	P-13096	Shims	8
40	P-13097	Bushing	2



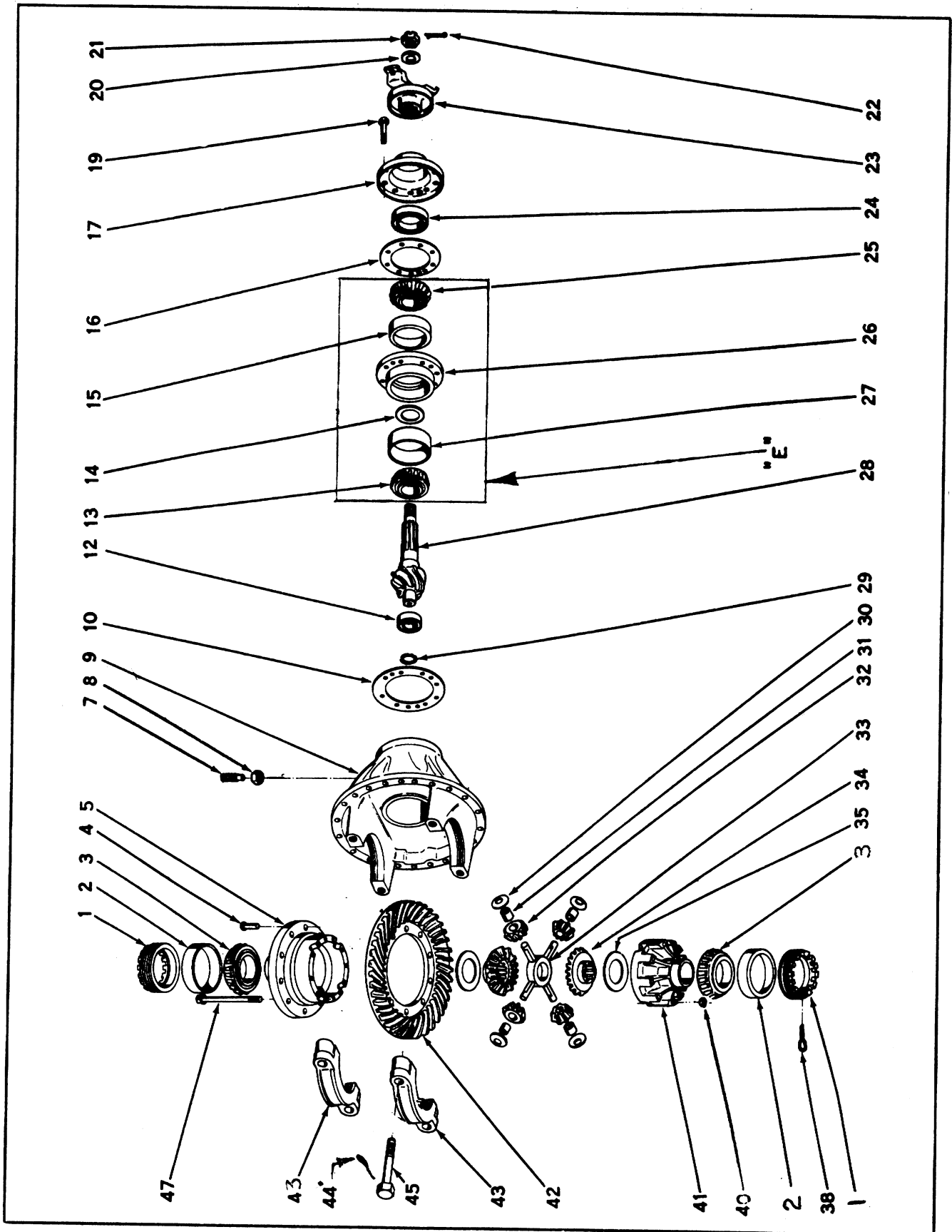
REF.	PART NO.	DESCRIPTION	REQ.
		P-13018 FRONT AXLE, OUTER END P-13432 (CONTINUED)	
41	P-13098	Bolt	2
42	P-13099	Pin	2
43	P-12582	Lockwasher	4
44	P-13101	Bolt	4
45	P-13102	Nut	4
46	P-13103	Tie Rod Nut	1
47	P-13104	Spacer	2
48	P-13105	Shim	12
49	P-13106	Capscrew	2
50	P-13107	Trunnion Socket	2
51	P-13108	Washer	2
52	P-13109	Oil Seal	2
53	P-13110	O-Ring	2
54	P-13111	Stud	16
55	P-13112	Nut	16
56	P-13113	Ball	12
57	P-13114	Race	2
58	P-13115	Snap Ring	2
59	P-13116	Washer	2
60	P-13117	Oil Seal	2
61	P-13414	Flange	2
62	P-13119	Cup	4
63	P-13197	Shaft	2
64	P-13120	Cone	4
65	P-13121	Snap Ring	2
66	P-12582	Lockwasher	16
67	P-13122	Capscrew	16
68	P-13123	Oil Seal	2
69			
70	P-13125	O-Ring	2
71	P-13126	Capscrew	12
72	P-13127	Washer	12
73	P-13128	Nut	24
74	P-13129	Retainer	2
75	P-13130	"C" Washer	4
76	P-13131	Oil Seal	2
77	P-13132	Oil Slinger	2
78	P-13133	Capscrew	20
79	P-13134	Stud	24
80	P-13135	Nut	24



REF.	PART NO.	DESCRIPTION	REQ.
		P-13018 FRONT AXLE, OUTER END P-13432	
81	P-13136	Lockwire	24
82	P-13137	Bushing	2
83	P-13138	Spindle	2
84	P-13139	Hub	2
85	P-13140	Nut	2
86	P-13141	Stud	24
87	P-12582	Lockwasher	24
88	P-12590	Nut	24
89	P-13144	O-Ring	2
90	P-13145	Washer	6
91	P-13146	Shaft	6
92	P-13147	Thrust Button	2
93	P-13148	Washer	6
94	P-13149	Pinion	6
95	P-13150	Plug	2
96	P-13151	Washer	2
97	P-13152	Universal Joint	2
98	P-13153	Shim	REQ.
99	P-13154	Snap Ring	2
100	P-13155	Gear	2
101	P-13156	Lock	4
102	P-13157	Pin	4
103	P-13268	Gear	2
104	P-13158	Cover	2
105	P-13159	Capscrew	16
106	P-13160	Gasket	2

P-13415

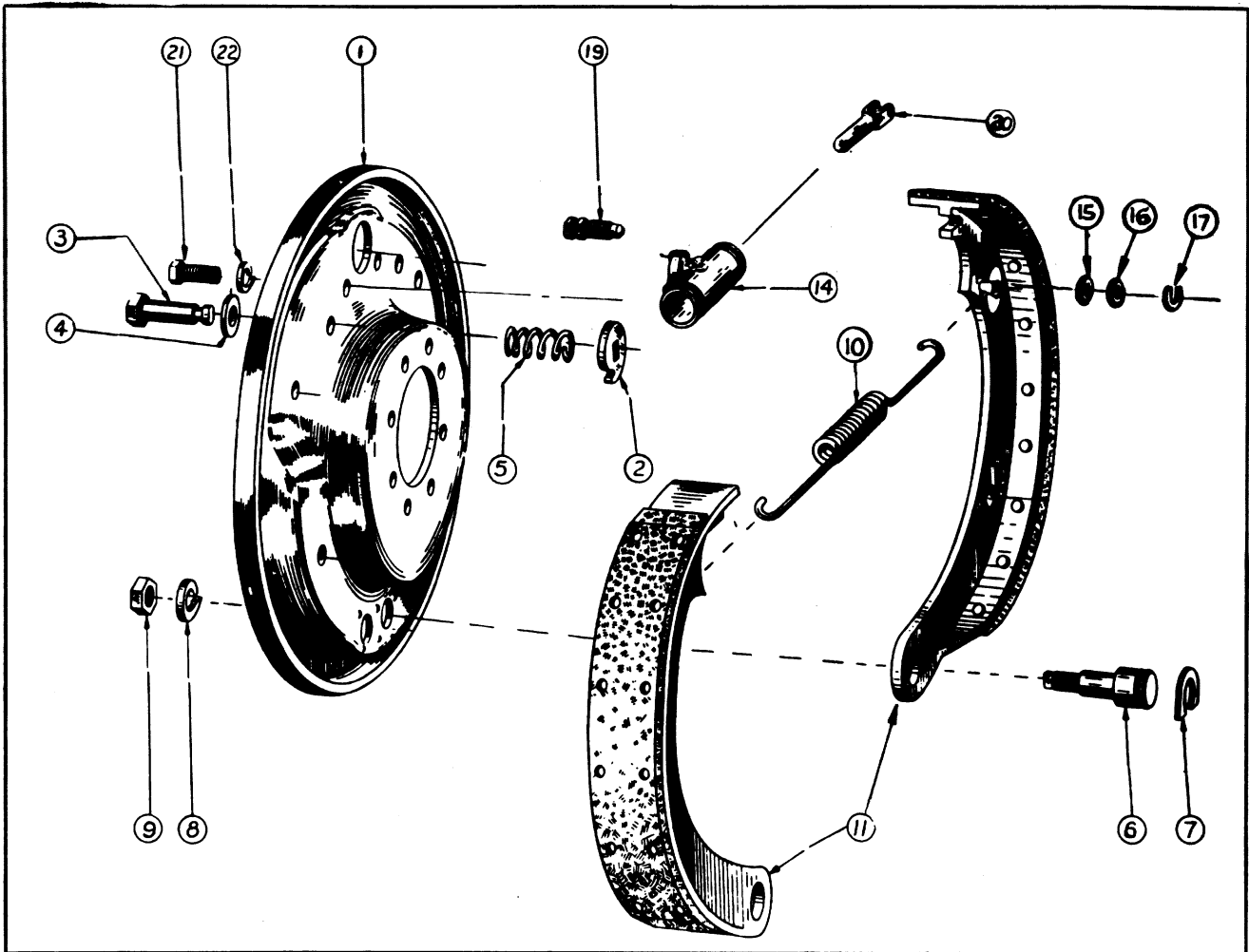
DIFFERENTIAL ASSY USED ON P-13018 FRONT AXLE



<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>REQ.</u>
A	P-13415	Diff. Carrier Assembly, Complete	1
B	P-13416	Diff. Carrier & Cap Assembly (Items 9, 43, 44 & 45)	1
C	P-13417	Diff. Case Assembly (Items 5, 40, 41, & 47)	1
D	P-13418	Drive Gear & Pinion Assembly (Items 28 & 42)	1
E	P-13419	Pinion Forward Bearing Cage Assembly (Items 13, 14, 15, 25, 26, 27)	1
1	P-13177	Ring, Adjusting	2
2	P-13180	Cup, Bearing	2
3	P-13179	Cone, Bearing	2
4	P-13185	Rivet	12
5	N.S.S.	Flange Half (Order Item "C")	1
7	P-13172	Screw, Adjusting	1
8	P-13171	Locknut	1
9	N.S.S.	Carrier, Diff. (Order Item "B")	1
10	P-13420	Shim, Thin	3
	P-13421	Shim, Medium	2
	P-13168	Shim, .003	1
12	P-13173	Bearing, Rear	1
13	N.S.S.	Cone, Bearing (Order Item "E")	1
14	N.S.S.	Spacer (Order Item "E")	1
15	N.S.S.	Cup, Bearing (Order Item "E")	1
16	P-13205	Gasket	1
17	P-13204	Cover & Oil Seal Assembly	1
19	P-13166	Bolt	8
20	P-13164	Washer	1
21	P-13163	Nut	1
22	P-13401	Pin, Cotter	1
23	N.S.S.	Companion Yoke & Slinger Assembly	1
24	P-13165	Seal, Oil	1
25	N.S.S.	Cone (Order Item "E")	1
26	N.S.S.	Cage (Order Item "E")	1
27	N.S.S.	Cup, Bearing (Order Item "E")	1
28	N.S.S.	Pinion, Drive (Order Item "D")	1
29	P-13174	Ring Lock	1
30	P-13186	Washer, Thrust	1
31	N.S.S.	Bushing, (Order Item # 32)	4
32	P-13187	Gear	4
33	P-13190	Spider	1
34	P-13182	Gear, Side	2
35	P-13183	Washer, Thrust	2
38	P-13296	Pin	2
40	P-13292	Nut (Included in Item "C")	12
41	N.S.S.	Plain Half, Diff. (Order Item "C")	1
42	N.S.S.	Gear Drive (Order Item "D")	1
43	N.S.S.	Cap, Bearing (Order Item "B")	2
44	N.S.S.	Lockwire (Included in Item "B")	4
45	P-13195	Bolt (Included in Item "B")	4
47	P-13405	Bolt (Included in Item "C")	8

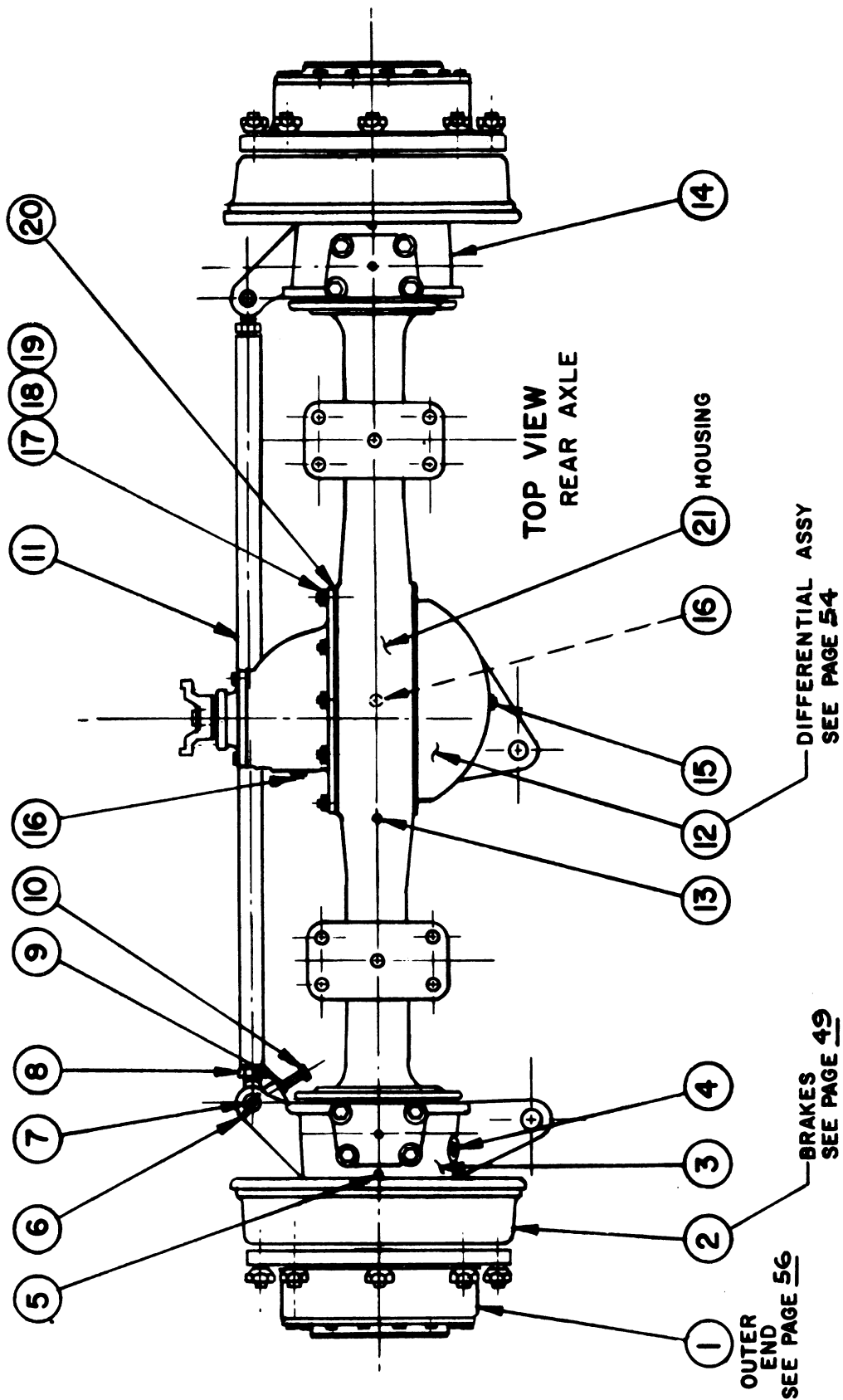
N.S.S. = Not Serviced Separately

P-13413 BRAKE ASS'Y FOR P-13018 AXLE ASS'Y



<u>ITEM NO.</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-13065	Back Plate Assembly	2
2	P-13255	Cam	4
3	P-13066	Cam Bolt Assembly	4
4	P-13064	Washer	4
5	P-13259	Spring	4
6	P-13075	Anchor Pin	4
7	P-13130	"C" Washer	4
8	P-13073	Washer, Shakeproof	4
9	P-13074	Nut	4
10	P-13067	Return Spring	2
11	P-13687	Brake Shoe	4
14	P-13258	Wheel Cylinder Complete	2
15	P-13267	Washer, Guide Pin	16
16	P-13265	Washer, Guide Pin	16
17	P-13266	"C" Washer	8
19	P-13092	Bleeder Screw	4
20	P-13257	Push Rod	1
21	P-13089	Cap screw	4
22	P-13380	Lockwasher	4

REAR AXLE ASS'Y

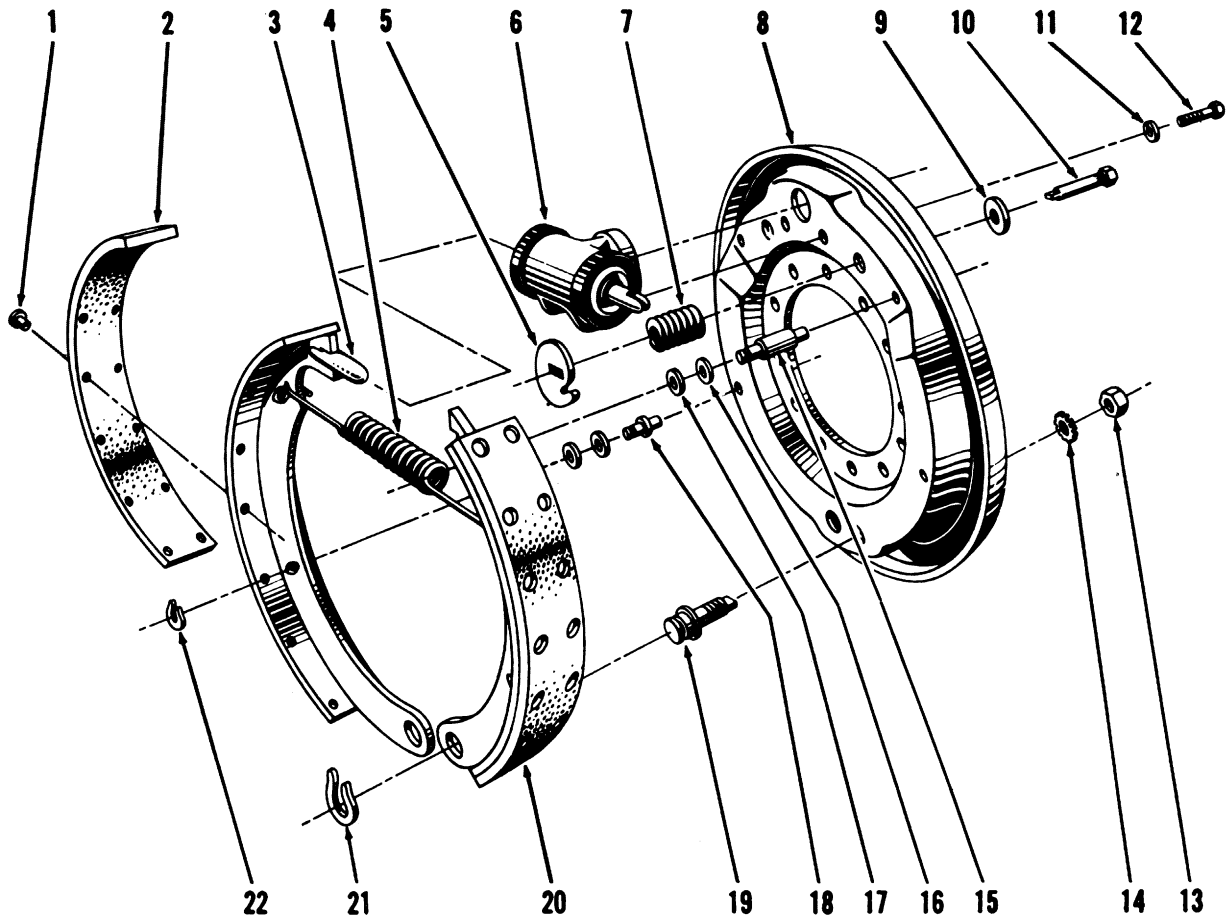




REF.	PART NO.	DESCRIPTION	REQ.
		REAR AXLE ASSEMBLY	
1	P-13568 *	Rear Axle Outer End	2
2	P-13394	Brake Assembly	2
3	P-13386	Steering Knuckle L.H.	1
4	P-13387	Plug	1
5	P-13092	Bleeder Screw	2
6	P-13388	Cotter Key	2
7	P-13389	Tie Rod End Ass'y	2
8	P-13313	Locknut Tie Rod End	2
9	P-13316	Nut	1
10	P-13390	Stopscrew	2
11	P-13314	Tie Rod	1
12	P-13395	Rear Axle Differential Ass'y	1
13	P-13391	Oil Breather	1
14	P-13212	Steering Knuckle R.H.	1
15	P-12650	Plug	1
16	P-13202	Plug, Filler and Drain	2
17	P-13276	Stud - Carrier to Housing	10
18	P-13277	Nut	10
19	P-13278	Lockwasher Carrier to Housing	10
20	P-13279	Gasket	1
21	P-13392	Housing	1

* For S/N 101-329, Use P13393.

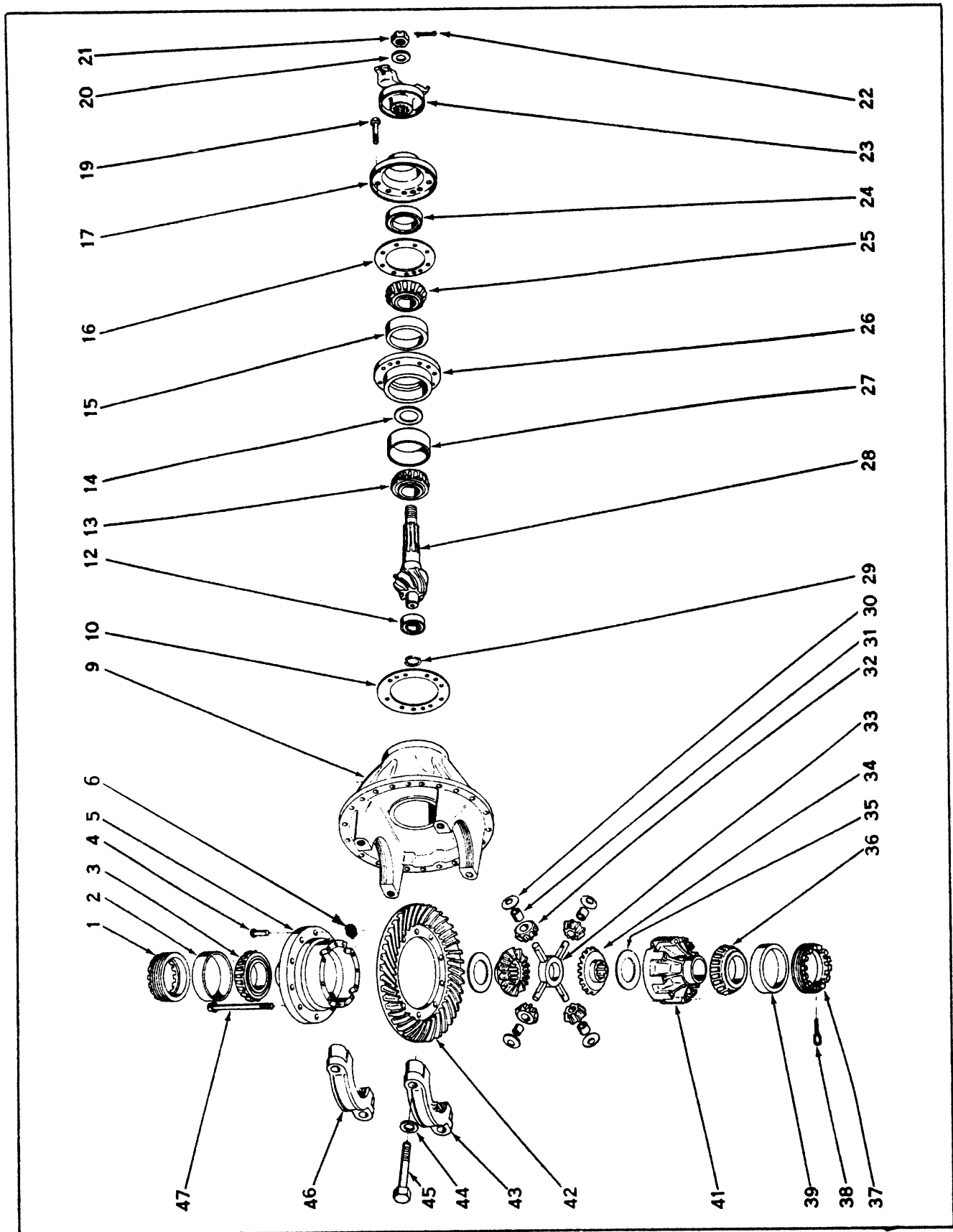
P-13394 BRAKE ASS'Y ON REAR AXLES P-13019 & P-13538



(AMOUNTS SHOWN PER AXLE)

ITEM NO.	PART NO.	DESCRIPTION	NO. REQ.
1	P-13070	Rivet	56
2	P-13060	Lining	4
3	P-13257	Push Rod	4
4	P-13067	Return Spring	2
5	P-13255	Adjusting Cam	4
6	P-13258	Wheel Cylinder (less inlet & bleeder)	2
7	P-13259	Adjusting Spring	2
8	P-13371	Backing Plate Ass'y (Items 5,7,10,15 & 18)	2
9	P-13064	Washer	4
10	P-13260	Adjusting Bolt (Includes Item # 9)	4
11	P-13380	Lockwasher	4
12	P-13089	Capscrew	4
13	P-13074	Nut Anchor Pin	4
14	P-13073	Shakeproof Washer	4
15	P-13068	Guide Pin, Long	4
16	P-13267	Washer Guide Pin	8
17	P-13265	Washer, Guide Pin	8
18	P-13069	Guide Pin, Short	4
19	P-13075	Pin Brake Shoe Anchor	4
20	P-13059	Brake Shoe & Lining Ass'y (Includes 1 & 2)	4
21	P-13264	"C" Washer, Anchor Pin	4
22	P-13266	"C" Washer, Guide Pin	8
23	P-13092	Bleeder Screw	2
A	P-13410	Brake Ass'y Complete	1

P-13395 DIFFERENTIAL ASS'Y USED ON REAR AXLE P-13019 & P-13538

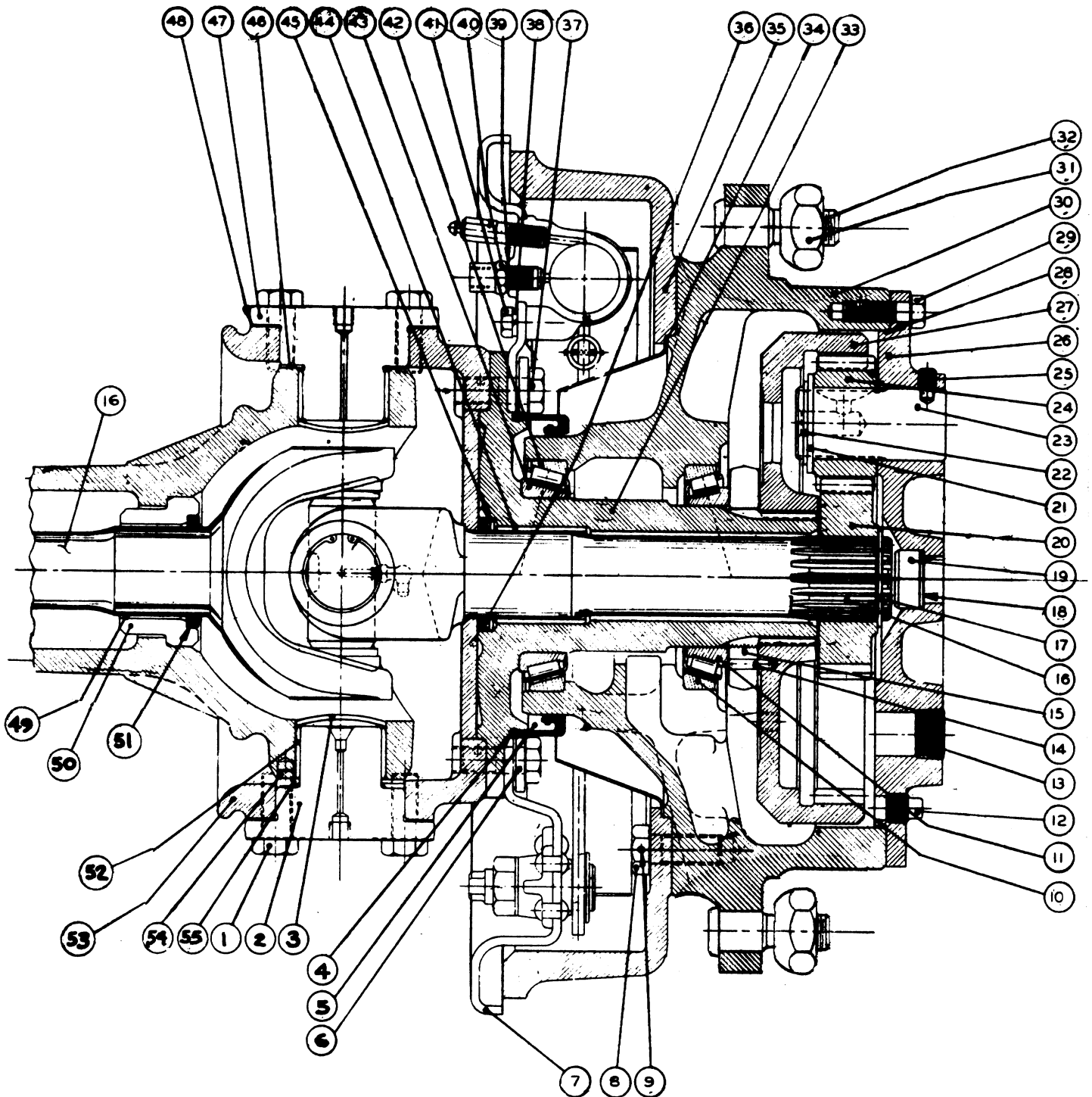


<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>REQ.</u>
A	P-13274	Differential Carrier Assembly-Complete	1
B	P-13406	Diff. Carrier & Cap Assembly (Includes Items 9 & 43 thru 46)	1
C	P-13407	Diff. Case Assembly (Includes Items 5, 41 and 47)	1
D	P-13408	Drive Gear & Pinion Assembly (Includes Items 28 & 42) Ratio 5:31-1	1
E	P-13409	Pinion F.W.D. Bearing Cage Assembly (Includes Items 13,14,15,25,26 & 27)	1
1	P-13298	Adjusting Ring	1
2	P-13281	Cup, Bearing	1
3	P-13280	Cone, Bearing	1
4	P-13398	Capscrew	12
5	N.S.S.	Flange Half Diff. (Order Item "C")	1
6	P-13292	Nut	12
9	N.S.S.	Carrier Diff. (Order Item "B")	1
10	P-13273	Shims, Bearing Cage (.003 & .005)	A/R
12	P-13301	Bearing, Rear	1
13	N.S.S.	Cone, Bearing (Order Item "E")	1
14	N.S.S.	Spacer (Order Item "E")	1
15	N.S.S.	Cup, Bearing (Order Item "E")	1
16	P-13272	Gasket	1
17	P-13176	Cover & Oil Seal Assembly	1
19	P-13399	Bolt	8
20	P-13164	Washer	1
21	P-13400	Nut	1
22	P-13401	Cotter Pin	1
23	P-13402	Yoke & Slinger Assembly	1
24	P-13308	Oil Seal	1
25	N.S.S.	Cone, Bearing (Order Item "E")	1
26	N.S.S.	Cage, Order Item "E")	1
27	N.S.S.	Cup, Bearing (Order Item "E")	1
28	N.S.S.	Pinion, Drive (Order Item "D")	1
29	P-13300	Lock Ring	1
30	P-13286	Thrust Washer	4
31	N.S.S.	Bushing (Order Item 32)	4
32	P-13403	Differential Pinion	4
33	P-13284	Spider	1
34	P-13283	Side Gear	2
35	P-13282	Thrust Washer	2
36	P-13397	Cone Bearing	1
37	P-13298	Ring, Adjusting	1
38	P-13296	Pin, Cotter	2
39	P-13396	Cup, Bearing	1
41	N.S.S.	Diff. Case Plain Half (Order Item "C")	1
42	N.S.S.	Gear Drive (Order Item "D")	1
43	N.S.S.	Cap, Bearing (Order Item "B")	1
44	N.S.S.	Washer (Include in Item "B")	4
45	P-13404	Bolt (Include in Item "B")	4
46	N.S.S.	Cap (Order Item "B")	1
47	P-13405	Bolt (Included in Item "C")	8

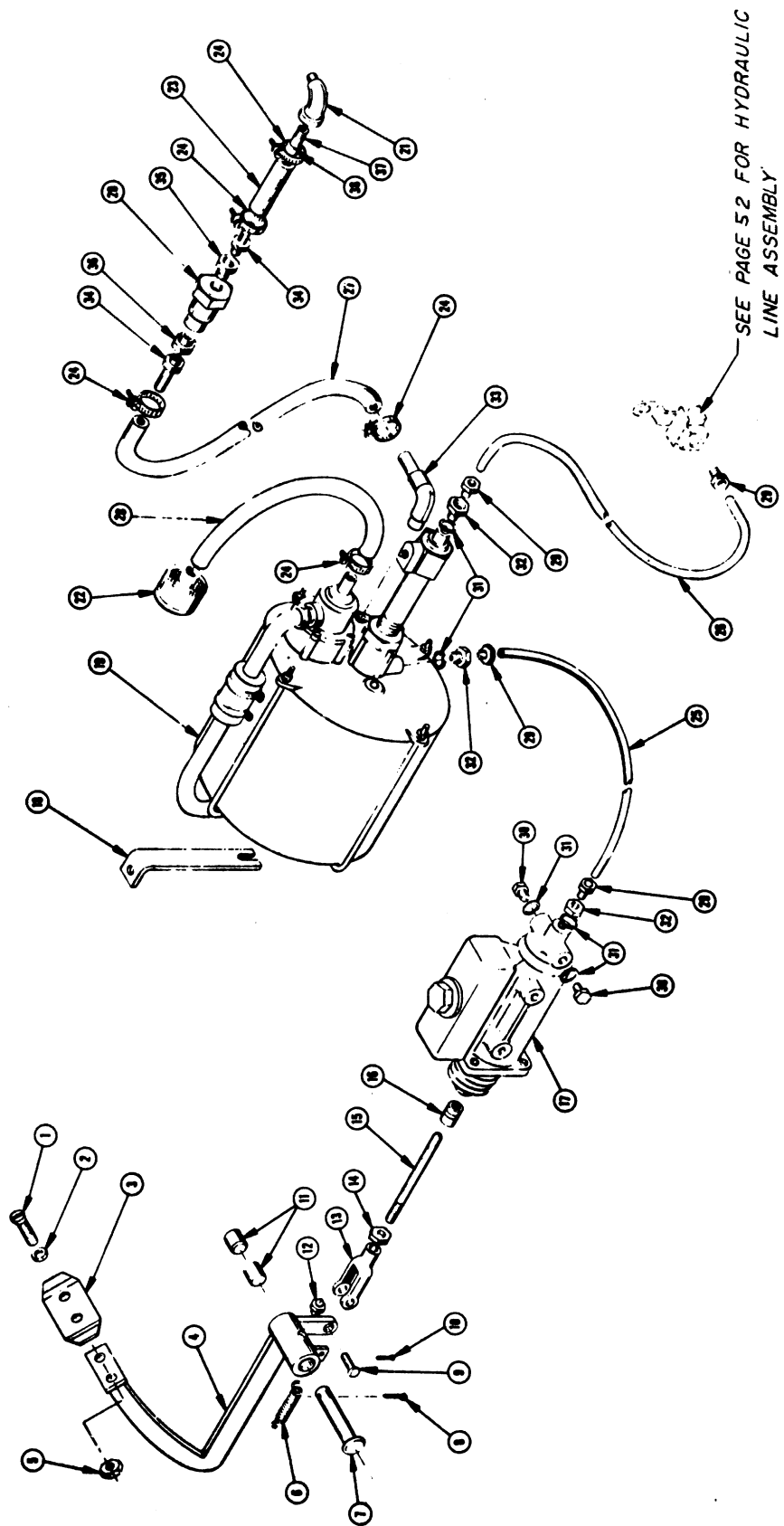
N.S.S.= Not Serviced Separately

P-13019 REAR AXLE ASS'Y,

P-13393 OUTER END



<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>REQ.</u>
1	P-13369	Capscrew - Steering Cap	16
2	P-13249	Cap, Steering Knuckle - Lower	2
3	P-13370	Plug, Steering Bearing	4
4	P-13242	O-Ring - Brake to Spindle	2
5	P-13219	Oil Seal - Hub Bearing	2
6	P-13216	Spacer, Brake to Steering Knuckle	2
7	P-13371	Backing Plate - Brake	2
8	P-13133	Capscrew - Brake Drum to Hub	20
9	P-13372	Lockwire - Brake Drum to Hub	2
10	P-13225	Cup, Hub Bearing - Outer	2
11	P-13226	Cone, Hub Bearing - Outer	2
12	P-13238	Plug, Planetary Spider Drain	2
13	P-13202	Plug, Planetary Spider Filler	2
14	P-13373	Pin, Hub Bearing Adjusting Nut	2
15	P-13374	Nut, Hub Bearing Adjusting	2
16	P-13299	Universal Joint & Drive Shaft	2
17	P-13375	Snap Ring	2
18	P-13376	Shim	A/R
19	P-13229	Button - Axle Shaft Thrust	2
20	P-13227	Gear, Planetary Sun (20T)	2
21	P-13239	Washer - Planet Pinion Thrust	6
22	P-13240	Snap Ring Planet Pinion Shaft	6
23	P-13236	Shaft - Planet Pinion	6
24	P-13377	Pinion - Planetary	6
25	P-13237	Setscrew - Planet Pinion Shaft	6
26	P-13224	Spider - Planetary Pinion	2
27	P-13378	Gear Planet - Final Drive Ring	2
28	P-13144	O-Ring Planet - Spider to Hub	2
29	P-13222	Capscrew - Planet - Spider to Hub	32
30	P-13221	Hub, Wheel For S/N 330 thru, Use P-13567	2
31	P-13135	Nut, Wheel Stud	16
32	P-13134	Stud - Wheel Hub	16
33	P-13228	Spindle - Steering Knuckle	2
34	P-13241	Deflector - Hub Bearing Oil	2
35	P-13215	Drum, Brake	2
36	P-13379	Oil Seal - Universal Joint & Spindle	2
37	P-13217	Capscrew - Brake to Stering Knuckle	24
38	P-13380	Lockwasher, Wheel	2
39	P-13411	Gasket - Inlet Connector	2
40	P-13412	Inlet Connector	2
41	P-13089	Capscrew - Wheel Cylinder	4
42	P-13220	Cup - Hub Bearing - Inner	2
43	P-13218	Cone - Hub Bearing - Inner	2
44	P-13381	Bushing - Steering Knuckle Spindle	2
45	P-13244	Washer, Univ. Joint & Spindle Oil Seal	2
46	P-13210	Washer, Steering Thrust (Upper)	2
47	P-13211	Cap - Steering Knuckle (Upper)	2
48	P-13382	Shim, Steering Cap & Arm	8
	P-13383	Shim, Steering Cap & Arm	8
	P-13250	Shim, Steering Cap & Arm	8
49	P-13254	Bushing, Univ. Joint Shaft Retainer	2
50	P-13253	Retainer - Universal Joint Shaft	2
51	P-13379	Oil Seal-Universal Joint Shaft Retainer	2
52	P-13209	Bushing - Steering Knuckle	4
53	P-13212	Steering Knuckle, R.H.	1
	P-13386	Steering Knuckle, L.H.	1
54	P-13385	Pin, Steering Thrust Washer (Lower)	2
55	P-13246	Washer, Steering Thrust	

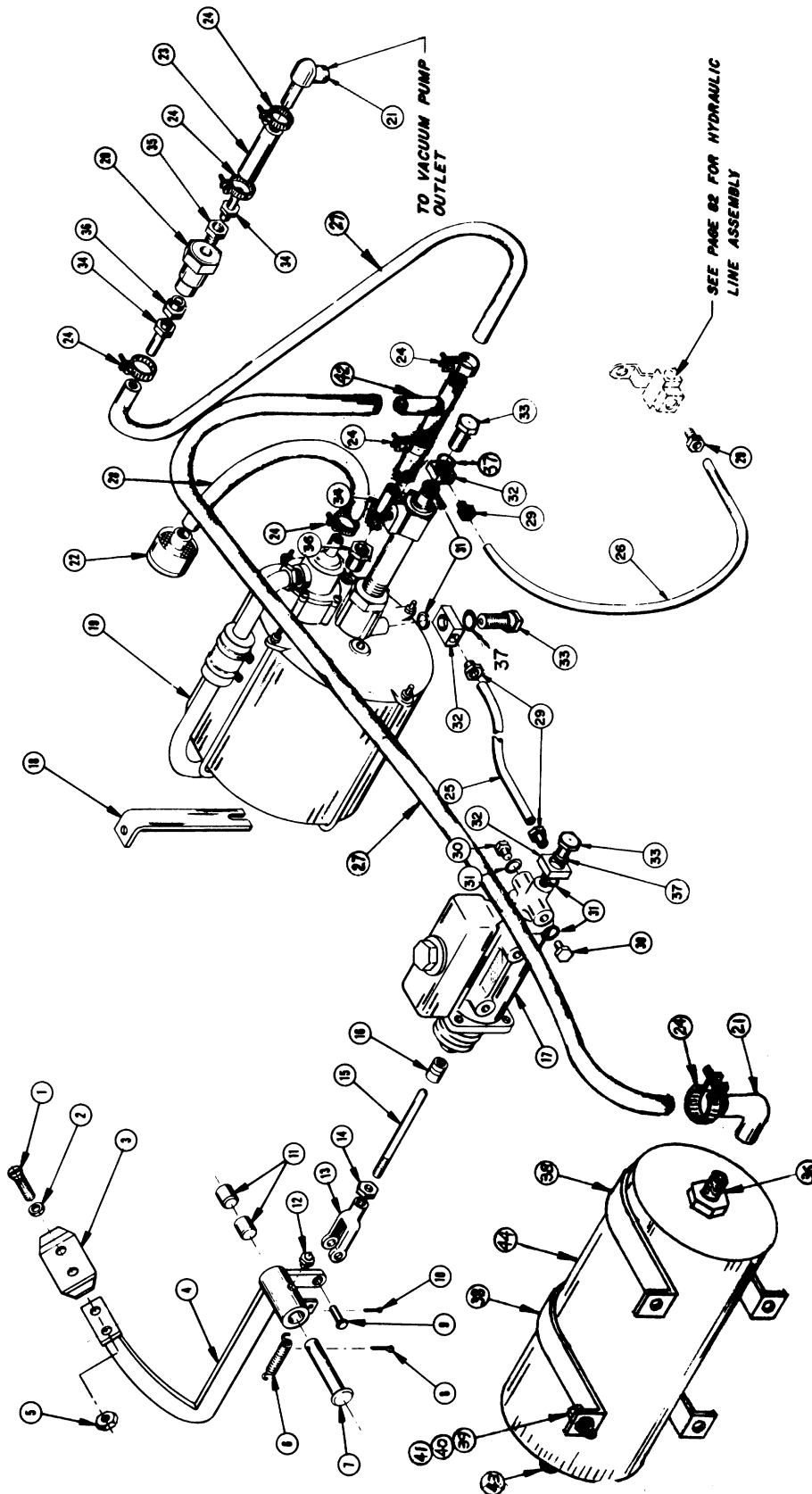


LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

BRAKE & HYDROVAC ASSEMBLY
 NO. 9386

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	COM'L		Bolt-Flathead 5/16 x 1	2
2	COM'L		Lockwasher 5/16	2
3	7048		Pedal	1
4	2498		Pedal Brake	1
5	COM'L		Nut, Hex 5/16 - 18 NC	2
6	P-10581		Spring	1
7	3458		Pivot, Pedal Brake	1
8	COM'L		Cotter Pin, 1/8 x 1 3/8	1
9	P-10514		Clevis Pin, 1/2	1
10	COM'L		Cotter Pin, 3/32 x 1	1
11	7122		Bushing	2
12	P-15272		Zerk, 1/8 NPT Strt	1
13	P-10513		Clevis, 1/2 -20 NF	1
14	COM'L		Hex Jam Nut, 1/2 -20 NF	1
15	9137		Push Rod	1
16	3512		Brake Rod Guide	1
17	* P-11710		Master Cylinder	1
18	9204		Hanger Strap	1
19	P-11711		Hydrovac	1
20	P-11707		Check Valve	1
21	P-10201		90 Street (L)	1
22	P-11709		Breather	1
23	COM'L		Hose, 1/2 ID x 10	1
24	P-11724		Hose Clamp	5
25	COM'L		Tubing, 1/4 OD x 24"	1
26	COM'L		Tubing, 1/4 OD x 18"	1
27	COM'L		Hose, 1/2 ID Bendix 84"	1
28	COM'L		Hose, 1/2 ID Bendis 23"	1
29	P-11712		Standard Nut	3
30	P-11713		Bolt	2
31	P-11714		Gasket	5
32	P-11722		Bushing	3
33	P-11723		Elbow	1
34	P-11725		Adapter Coupling	2
35	P-10181		Bushing, 3/4 to 3/8	1
36	P-10120		Bushing, 1/2 to 3/8	1
37	P-10759		Nipple, 1/8 x 2 1/2	1
38	P-10664		Coupling, 1/8 STD	1

* Repair Kit - Order P11742

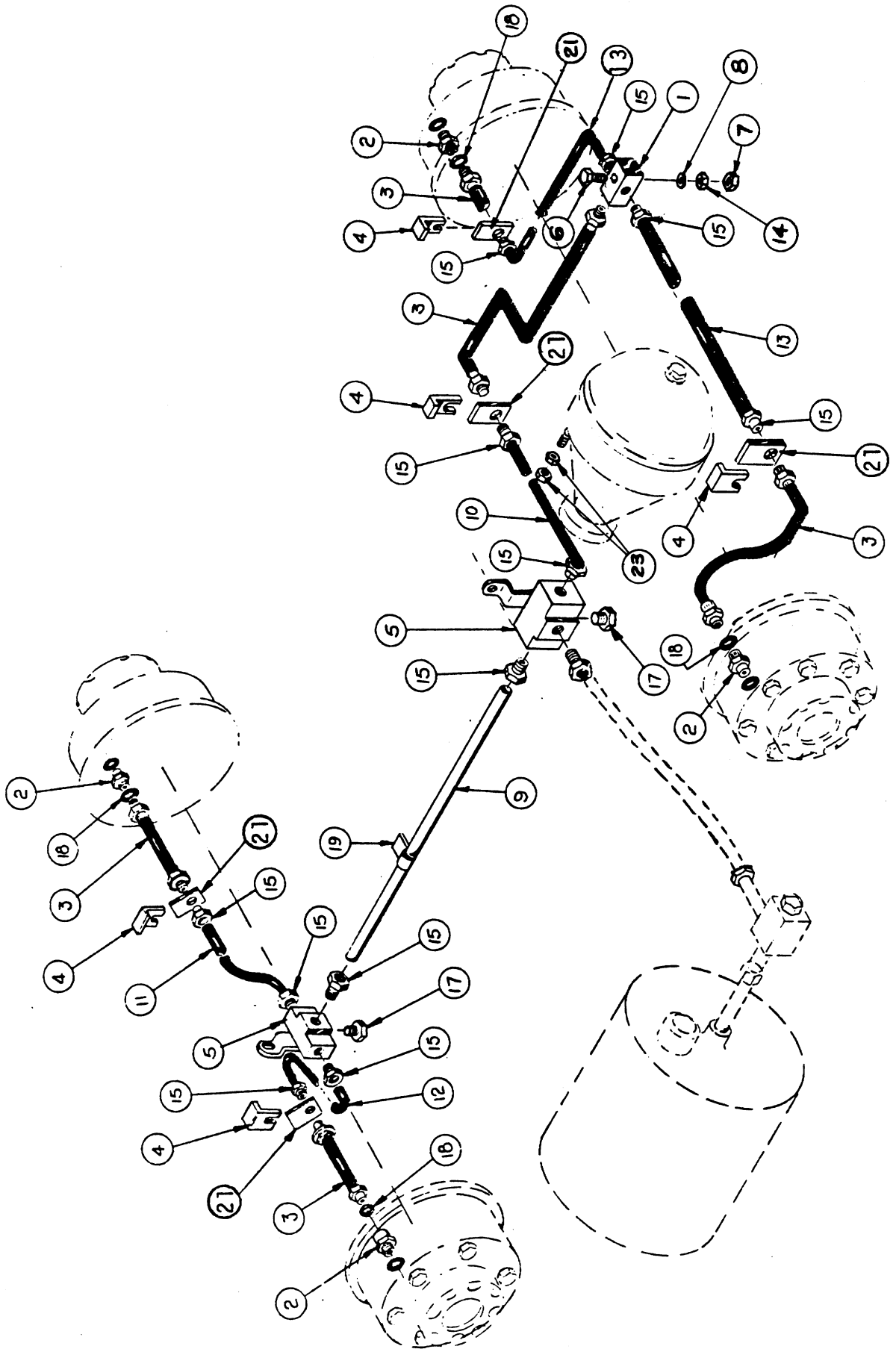


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BRAKE & HYDROVAC ASSEMBLY
 NO. 13,468
 DIESEL

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	COM'L		Bolt, Flathead 5/16 x 1"	2
2	COM'L		Lockwasher 5/16"	2
3	7048		Pedal	1
4	2498		Brake Pedal	1
5	COM'L		Nut, Hex 5/16-18 N.C.	2
6	P-10581		Spring	1
7	3458		Brake Pedal Pivot	1
8	COM'L		Pin, Cotter 1/8 x 1 3/8"	1
9	P-10514		Pin, Clevis	1
10	COM'L		Pin, Cotter 3/32 x 1"	1
11	7122		Bushing	2
12	COM'L		Zerk 1/8 NPT Straight	1
13	P-10513		Clevis	1
14	COM'L		Nut, Hex Jam	1
15	9137		Push Rod	1
16	3512		Brake Rod Guide	1
17	* P-11710		Master Cylinder	1
18	9204		Hangar Strap	1
19	P-11711		Hydrovac	1
20	P-11707		Check Valve	1
21	P-11580		Elbow, Adapter	2
22	P-11709		Breather	1
23	P-16160		Hose	1
24	P-11724		Hose Clamp	8
25	P-16193		Tubing	1
26	P-16191		Tubing	1
27	P-16160		Hose 1/2" x 10" Lg.	1
28	P-11407		Loom	1
29	P-15294		Nut, Standard	4
30	P-11713		Bolt	2
31	P-12506		Gasket	5
32	P-15299		Coupling	3
33	P-11721		Bolt	3
34	P-11725		Coupling Adapter	3
35	P-10181		Bushing	1
36	P-10120		Bushing	3
37	P-15280		Gasket	3
38	P-18064		Straps	4
39	COM'L		Hex Nut (1/4" - 20 N.C.)	4
40	COM'L		Lockwashers 1/4"	4
41	COM'L		Bolt (1/4" - 20 N.C XI")	4
42	P-18063		TEE - 1/2" Hose	1
43	P-10279		Plug, 1/2" N.P.T	1
44	P-18065		Reservoir Tank	1
46	P-16160		Hose 1/2" x 36" Lq.	

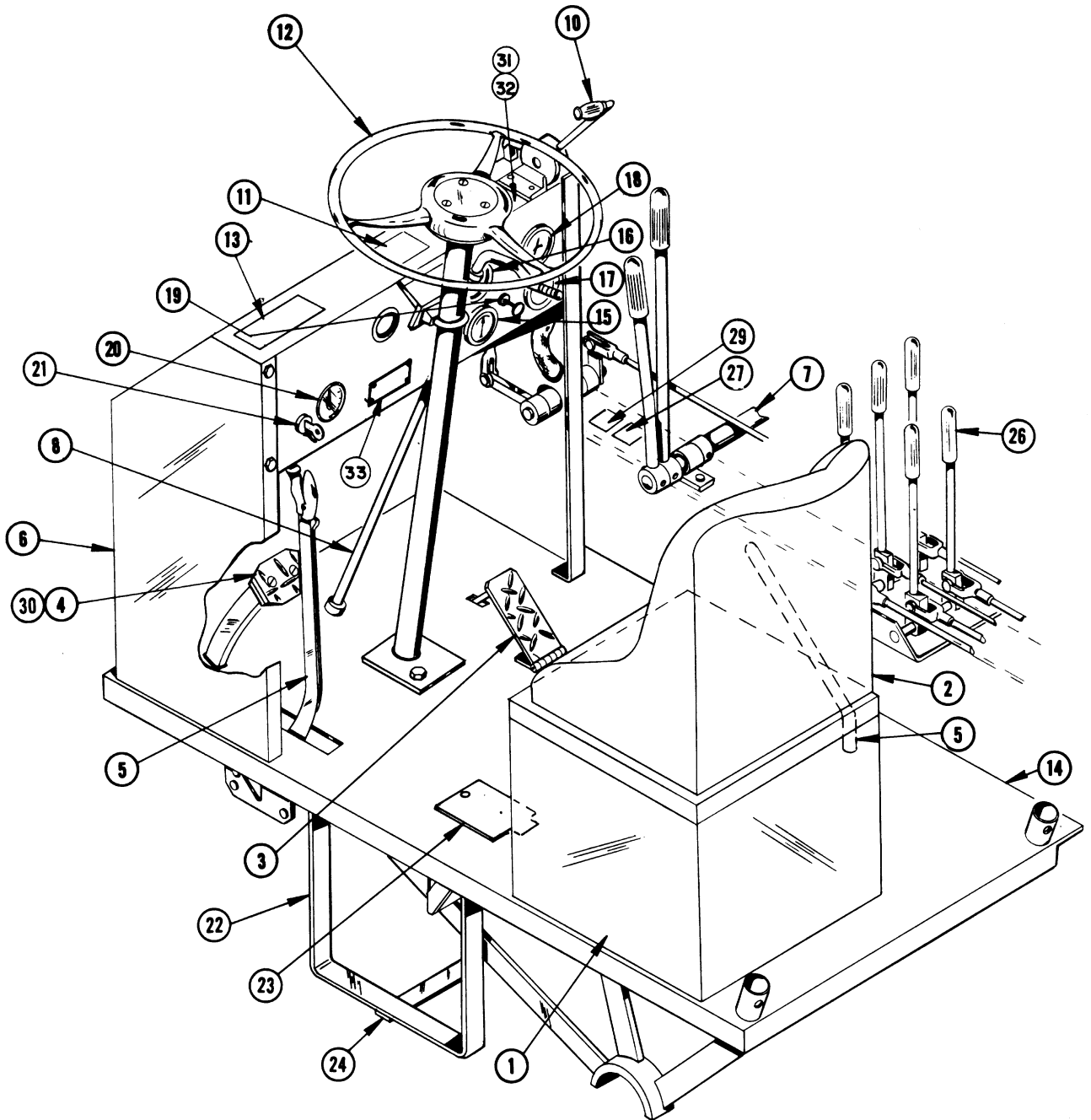
* Repair Kit - Order P11742
 * * Vaccum Tank Kit, Order 15391C



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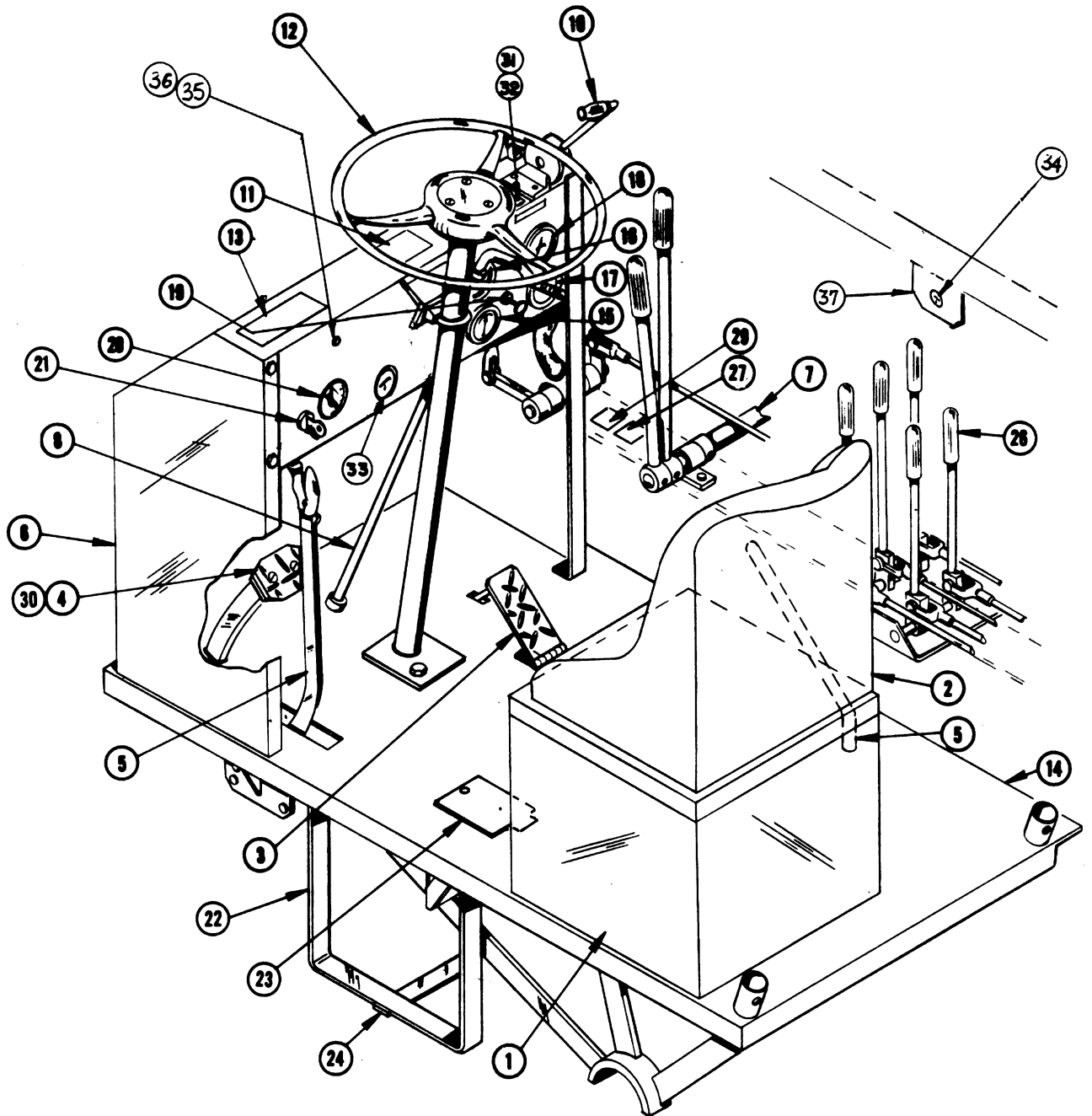
BRAKE LINE ASSEMBLY
 NO. 11558

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-11704		Junction Block	1
2	P-11703		Connector	4
3	P-11705		Brake Hose	5
4	P-11715		Clip, Horse Shoe	5
5	P-11706		Tee	2
6	Com'l		Bolt, 3/8 x 1 1/4 NC	1
7	Com'l		Nut, 3/8 NC	1
8	Com'l		Shakeproof Washer 3/8	1
9	Com'l		Tubing, 1/4 O.D. x 88 1/2" Long	1
10	Com'l		Tubing, 1/4 O.D. x 27" Long	1
11	Com'l		Tubing, 1/4 O.D. x 40" Long	1
12	Com'l		Tubing, 1/4 O.D. x 12" Long	1
13	Com'l		Tubing, 1/4 O.D. x 21 1/2" Long	2
14	Com'l		Nut, Jam 3/8- 16 NC.	1
15	P-11712		Connector Nut	12
16				
17	P-11726		Plug	2
18	P-11719		Gasket	4
19	11523		Clip	As Req.
20				
21	11902		Bracket	5
22	11982		Clip(Alternative)	1
23	Com'l		Nut Jam 5/16 -18 NC	4



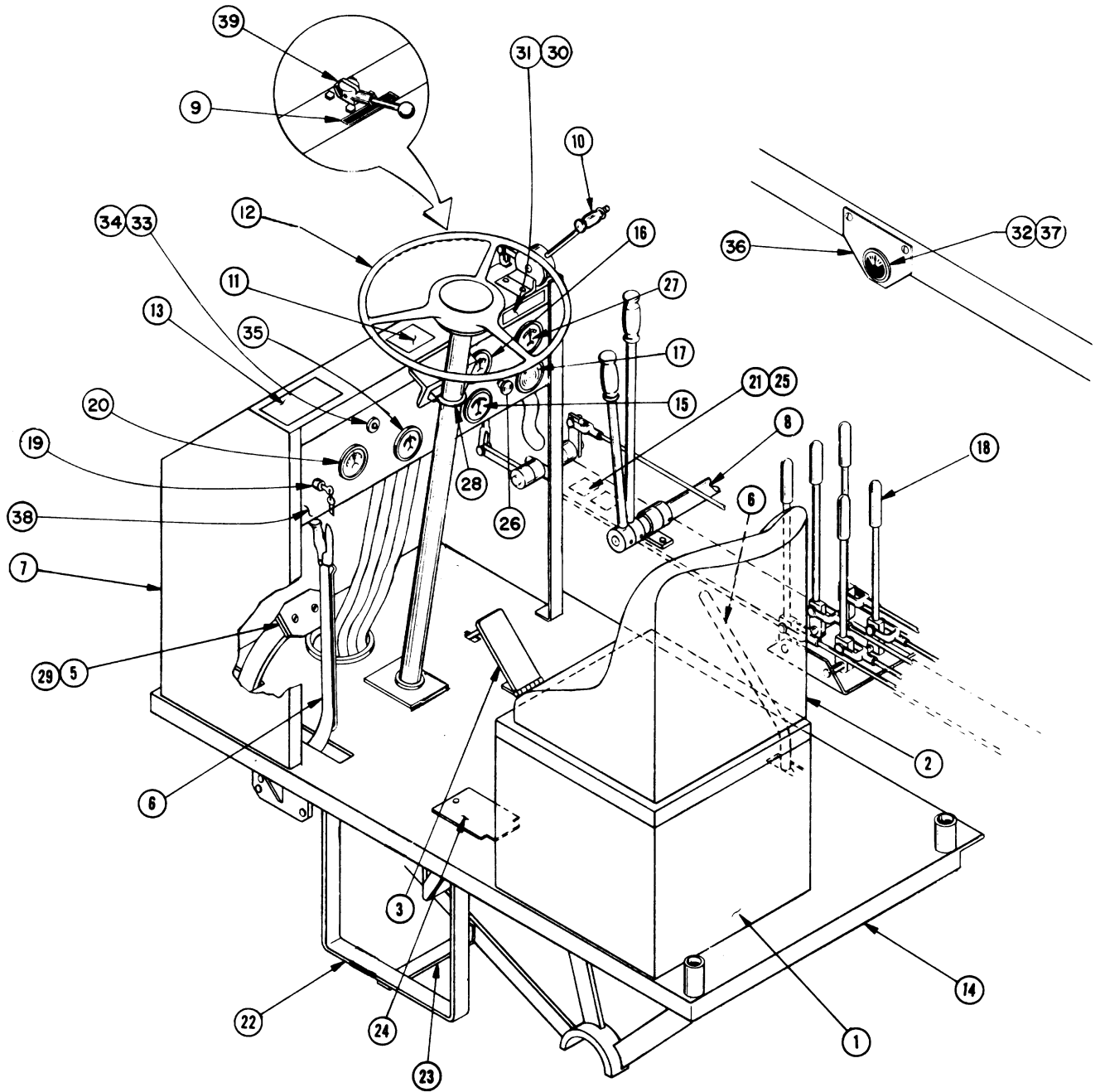


REF.	PART NO.	DESCRIPTION	REQ.
		OPERATORS PLATFORM - MODEL "400"	
1	6952	Seat Stand & Tool Box	1
2	P-12394	Seat Assembly	1
3	11,570	Throttle Assembly	1
4	9386	Brake	1
5	11,556	Disconnect Brake	1
6	3638	Panel	1
7	11,557	Shifting	1
8	11,580	Steering, Rear	1
9			1
10	11,554	Torque Converter Control Ass'y	1
11	7371	Hydraulic Diagram	1
12	11,581	Front Steering	1
13	625	Tag, Serial No.	1
14	11,496	Platform	1
15	P-12635	Amp. Gauge	1
16	P-12633	Oil Gauge	1
17	P-12631	Hour Meter (Optional)	1
18	P-12632	Water Gauge	1
19	P-11675	Choke	1
20	P-12963	Fuel Gauge	1
21	P-12634	Switch, Ignition	1
22	11,680	Step	1
23	6578	Cover	1
24	8803	Support	1
25	P-13566	Temperature Sender, Torq. Converter	1
26	11,555	Control, Hydraulic Valve	1
27	464	Tag, Shift	1
28			1
29	11,653	Tag, Gear	1
30	11,558	Hydraulic Brake Line	1
31	7524	Revers-o-matic Instructions	1
32	7521	Caution Tag	1
33	11,756	Caution Tag	1
34	P-13592	Light, Caution for Torq. Converter	1





REF.	PART NO.	DESCRIPTION	REQ.
		OPERATORS PLATFORM - 400 DIESEL	
1	6952	Seat Stand & Tool Box	1
2	P-12394	Seat Assembly	1
3	12,005	Throttle Assembly	1
4	9386	Brake	1
5	11,556	Disconnect Brake	1
6	12,151	Panel	1
7	11,557	Shifting	1
8	11,580	Steering (Rear)	1
9			
10	11,554	Torque Converter Control Ass'y	1
11	7371	Hydraulic Diagram	1
12	11,581	Front Steering	1
13	625	Tag, Serial Number	1
14	11,496	Platform	1
15	P-12635	Amp Gauge	1
16	P-12633	Oil Gauge	1
17	P-12631	Hour Meter (Optional)	1
18	P-12632	Water Gauge	1
19	P-13445	Choke	1
20	P-12963	Fuel Gauge	1
21	P-12634	Ignition Switch	1
22	11,680	Step	1
23	6578	Cover	1
24	8803	Support	1
25			
26	11,555	Control, Hydraulic Valve	1
27	464	Shift Tag	1
28			
29	11,653	Gear Tag	1
30	11,558	Hydraulic Brake Line	1
31	7524	Reversomatic Instructions	1
32	7521	Caution Tag	1
33	P-13453	Meter Glow Plug	1
34	P-13593	Gauge, Temp. Torq. Converter	1
35	P-13454	Switch, Glow Plug	1
36	P-13455	Cup Switch	1
37	12,553	Bracket, Mounting	1



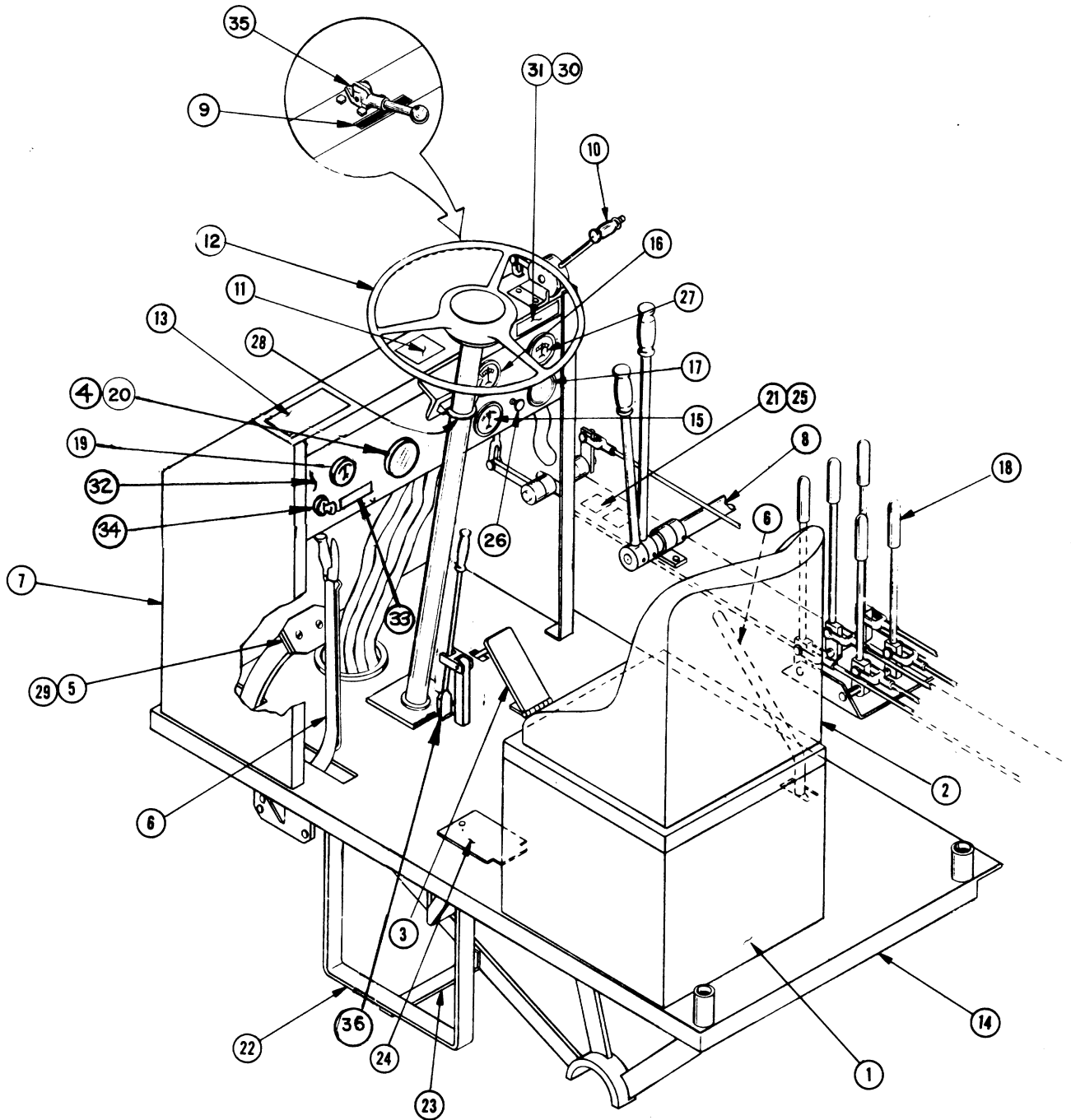
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

OPERATOR'S PLATFORM ASS'Y
 NO. 13,068

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	6952		Seat Stand & Tool Box	1
2	P-12394		Seat Assembly	1
3		12,005	Throttle Assembly (Page 70)	1
4				
5		9386	Brake Assembly (Page 50)	1
6		11,556	Disconnect, Brake (Page 72)	1
7	12,151		Panel	1
8		11,557	Shifting Assembly (Page 64)	1
9	12,750		Tag, Steering Selector	1
10		11,554	Torque Converter Control Ass'y (P-62)	1
11	7371		Hydraulic Diagram	1
12		13,090	Orbitrol Steering Ass'y (Page 68)	1
13	625		Tag, Serial Number	1
14	11,496		Platform	1
15	P-12635		Amp Gauge	1
16	P-12633		Oil Gauge	1
17	P-12631		Hour Meter (Optional)	1
18		11,555	Hydraulic Valve Control Ass'y (P-76)	1
19	P-12634		Switch, Ignition	1
20	P-12963		Gauge, Fuel	1
21	11,653		Tag, Gear	1
22	11,680		Step	1
23	8803		Support	1
24	6578		Cover	1
25	464		Tag, Shift	1
26	P-13445		Engine Shutoff	1
27	P-12632		Water Gauge	1
28	P-11676		Clamp	1
29		11,558	Brake Line Assembly (Page 52)	1
30	7521		Caution Tag	1
31	7524		Reversomatic Instructions	1
32	P-13594		Sender Temp Control	1
33	P-13455		Cup, Switch	1
34	P-13454		Switch, Glow Plug	1
35	P-13453		Meter, Glow Plug	1
36	12,553		Bracket, Mtg. (Temp. Gauge T.C.)	1
37	P-13593		Gauge, Temp. (Torq. Conv.)	1
38	12,152		Dashboard	1
39		P-13714	Valve, Steering Selector	1

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OPERATOR'S PLATFORM ASSEMBLY
NO. 13,759

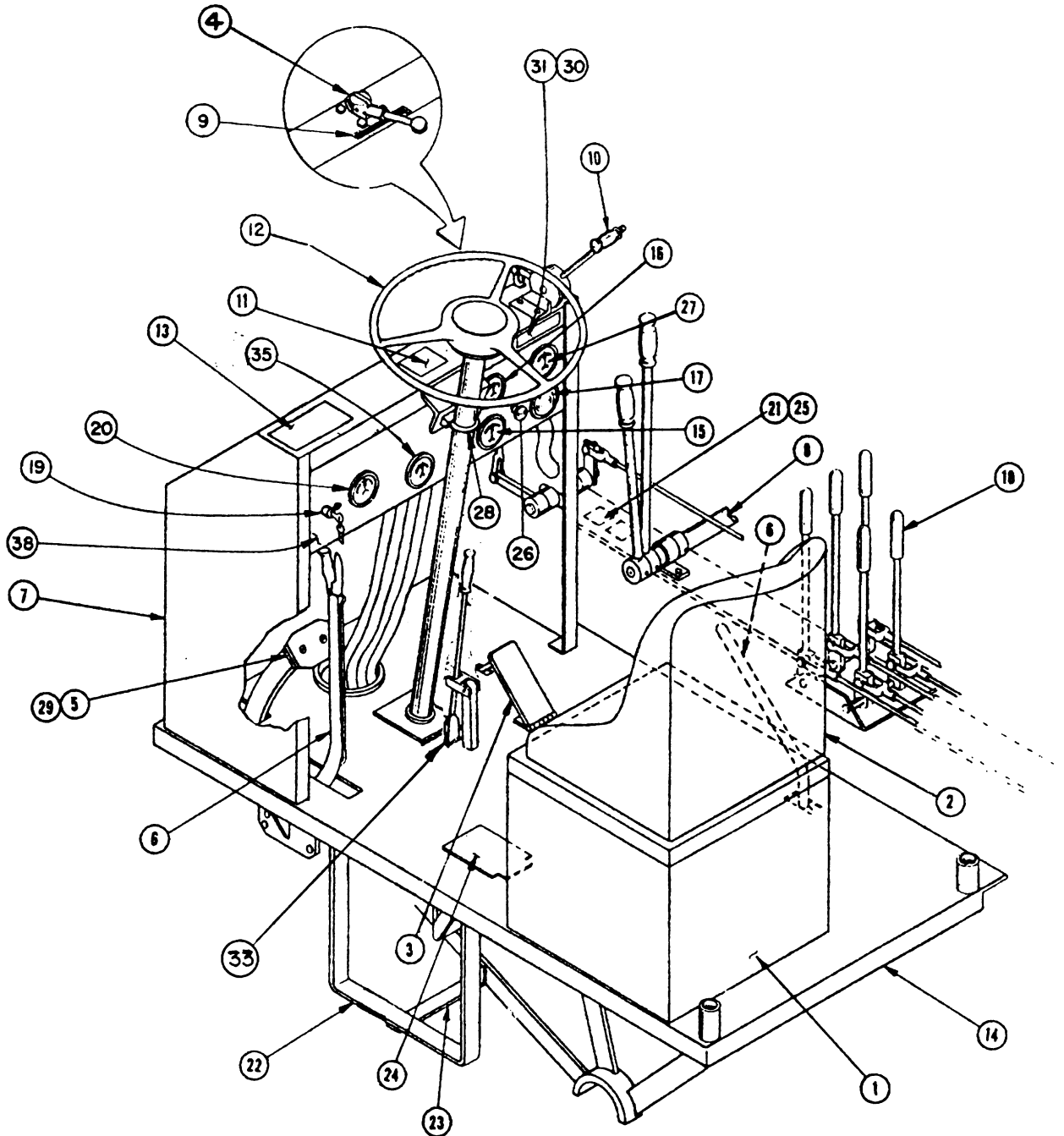


<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	6952		Seat Stand	1
2	P-12394		Seat Assembly	1
3		13,794 *	Throttle Assembly (Page 70)	1
4	P-13566		Temp. Sender Torq. Converter	1
5		9386	Brake Assembly (Page 50)	1
6		11,556	Brake, Disconnect (Page 72)	1
7	3638		Panel	1
8		11,557	Shifting Assembly (Page 64)	1
9	12,750		Tag, Steering Selector	1
10		12,888 **	Torq. Conv. Control Ass'y (Page 62)	1
11	7371		Hydraulic Diagram	1
12	13,090		Orbitrol Steering Ass'y (Page 68)	1
13	625		Tag, Serial Number	1
14	13,762		Platform (Non-Tilt Models, Use 11,496)	1
15	P-12635		Gauge, Amp.	1
16	P-12633		Gauge, Oil	1
17	P-12631		Hour Meter	1
18		11,555	Hydraulic Valve Control Ass'y (P-76)	1
19	P-12963		Gauge, Fuel	1
20	P-13592		Caution Light, Torq. Converter	1
21	11,653		Tag, Gear	1
22	11,680		Step	1
23	8803		Support	1
24	6578		Cover	1
25	464		Tag, Shift	1
26	P-16688		Choke	1
27	P-12632		Gauge, Water	1
28	P-11676		Clamp	1
29		11,558	Hydraulic Brake Line (Page 52)	1
30	7521		Caution Tag	1
31	7524		Reversomatic Instructions	1
32	8648		Dashboard	1
33	11,756		Caution Tag	1
34	P-12634		Switch, Ignition	1
35		P-13714	Steering Selector Valve	1
36		13,871	Side Tilt Control Ass'y (Page 41)	1

* Use 11,570 For Non-Tilt Models
 * * Use 11,554 For Models without Cabs.

LULL ENGINEERING COMPANY, INC.
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OPERATOR'S PLATFORM ASSEMBLY

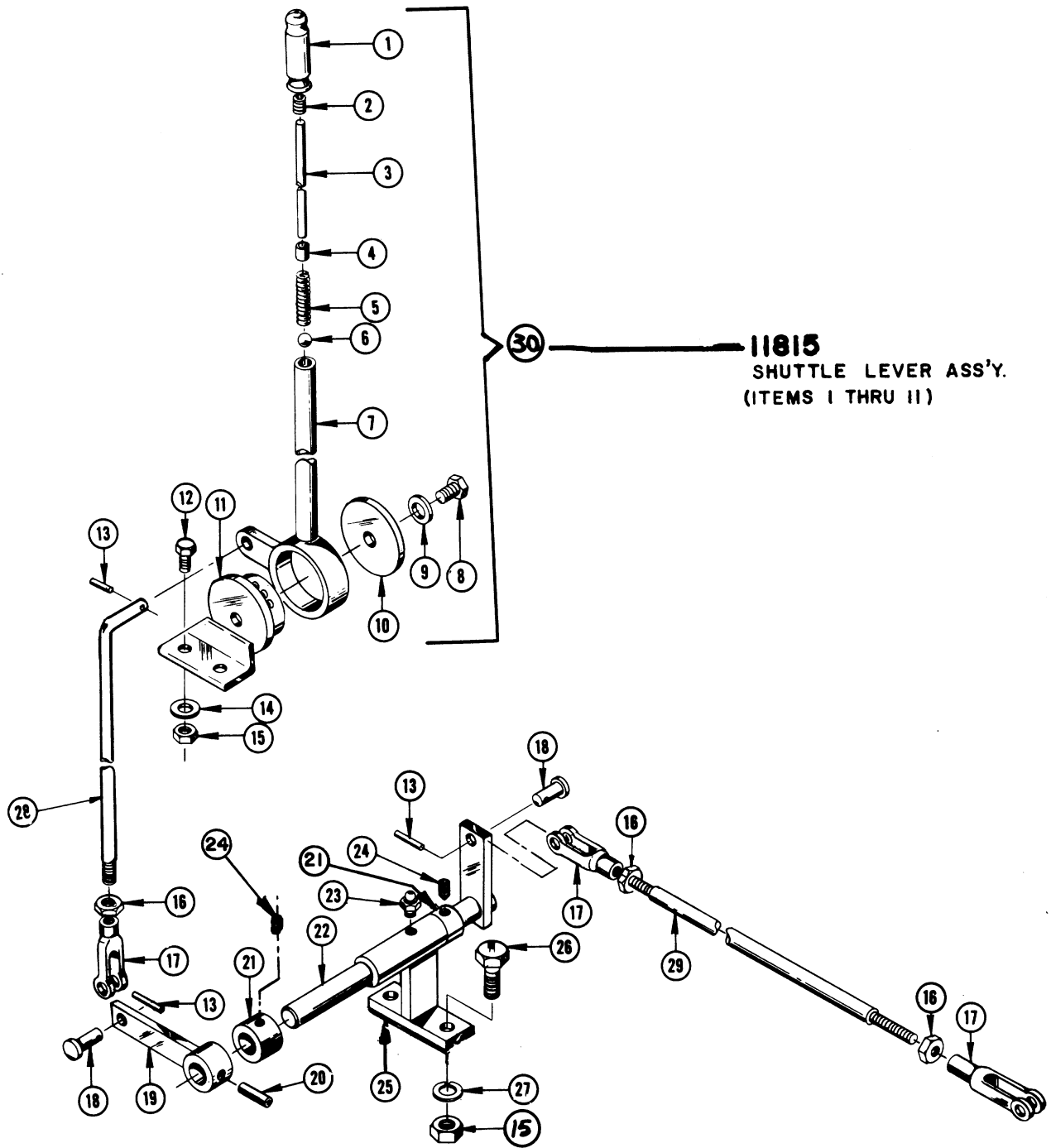


LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
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OPERATOR'S PLATFORM ASSEMBLY
 NO. 14,027

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	6952		Seat Stand and Tool Box	1
2	P-12394		Seat Assembly	1
3		13,796 *	Throttle Assembly (Page 70)	1
4		P-13714	Valve, Steering Selector (Page 66)	1
5		13,468	Brake Assembly (Page 50)	1
6		11,556	Disconnect, Brake (Page 72)	1
7	12,151		Panel	1
8		11,557	Shifting Assembly (Page 64)	1
9	12,750		Tag, Steering Selector	1
10		13,464 **	Torq. Conv. Control Ass'y (Page 62)	1
11	7371		Hydraulic Diagram	1
12		13,090	Orbitrol Steering Ass'y (Page 68)	1
13	625		Tag, Serial Number	1
14	13,762		Platform(Non-Tilt Models Use, 11.496)	1
15	P-12635		Amp. Gauge	1
16	P-12633		Oil Gauge	1
17	P-12631		Hour Meter	1
18		14,028 ***	Hyd. Valve Control Ass'y (Page 76)	1
19	P-12634		Switch, Ignition	1
20	P-12963		Gauge, Fuel	1
21	11,653		Tag, Gear	1
22	11,680		Step	1
23	8803		Support	1
24	6578		Cover	1
25	464		Tag, Shift	1
26	P-13445		Engine Shutoff	1
27	P-12632		Water Gauge	1
28	P-11676		Clamp	1
29		13,952 ****	Brake Line Ass'y (Page 52)	1
30	7521		Caution Tag	1
31	7524		Reversomatic Instructions	1
32	P-13594		Sender, Temp. Control	1
33		13,871	Side Tilt Control (Page 41)	1
35	P-13593		Gauge, Temp. (Torq. Conv.)	1
38	12,152		Dashboard	1

* Use 13,466 For Non-Tilt Models.
 ** Use 13,465 for Models with Cabs.
 *** Use 13,462 for S/N 799-1107.
 **** Use 11,558 for S/N 799-1107.



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

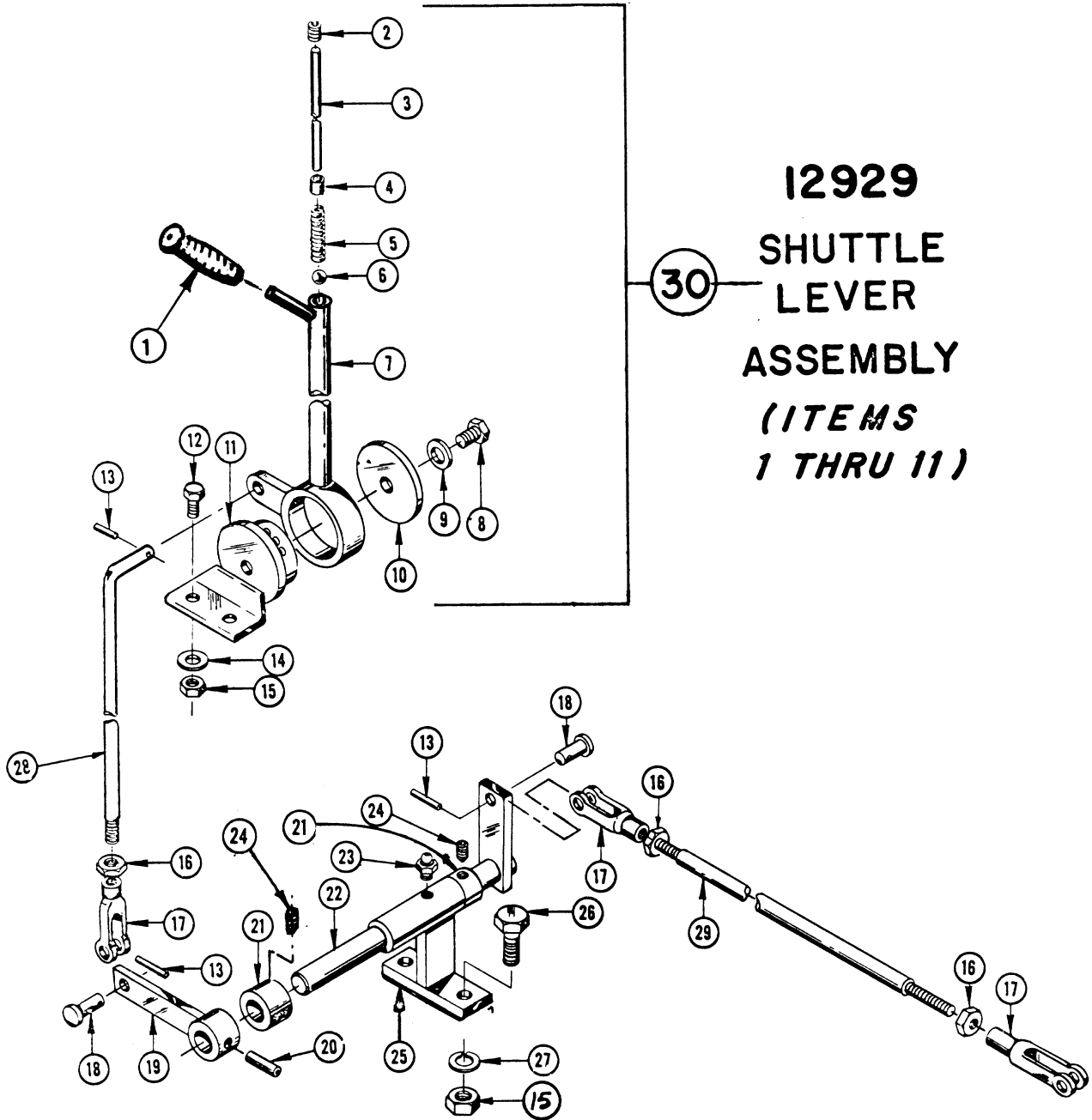
TORQUE CONVERTER CONTROL ASS'Y
 NO. 11,554

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10194		Rubber Grip	1
2	COM'L		Setscrew, 3/8-16 NC x 1/2"	1
3	7440		Push Rod	1
4	12,885		Spacer (For S/N 101-923, Use 7435)	1
5	7439		Spring	1
6	P-10039		Steel Ball	1
7	12,883		Control Handle (S/N 101-923, Use 7433)	1
8	COM'L		Capscrew, 3/8-16 NC x 1/2	1
9	COM'L		Lockwasher, 3/8"	1
10	7434		Washer	1
11	3393		Hand Lever Pivot	1
12	COM'L		Screw, 1/4 x 3/4	2
13	COM'L		Cotter Pin, 3/32 x 3/4 Long	2
14	COM'L		Lockwasher, 1/4	4
15	COM'L		Nut, 1/4	4
16	COM'L		Jam Nut, 5/16 x 18 NC	3
17	P-10043		Clevis	1
18	P-10042		Clevis Pin	2
19	9142		Arm	1
20	P-10377		Roll Pin	1
21	9140		Boss	2
22	11,657		Control Shaft	1
23	COM'L		Zerk, 1/8 N.P.T. (ST.)	1
24	COM'L		Setscrew, 3/8	2
25	11,535		Support	1
26	COM'L		Screw, 1/4 x 1 3/4	2
27	COM'L		Lockwasher, 1/4	4
28	3384		Link	1
29	11,533		Control Rod (For Waukesha Use 13,400)	1
30	11,815		Shuttle Lever Ass'y (Items 1 thru 11)	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
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TORQUE CONVERTER CONTROL ASSEMBLY
NO. 13,465

USE ON ALL MODELS AFTER S/N 1056.



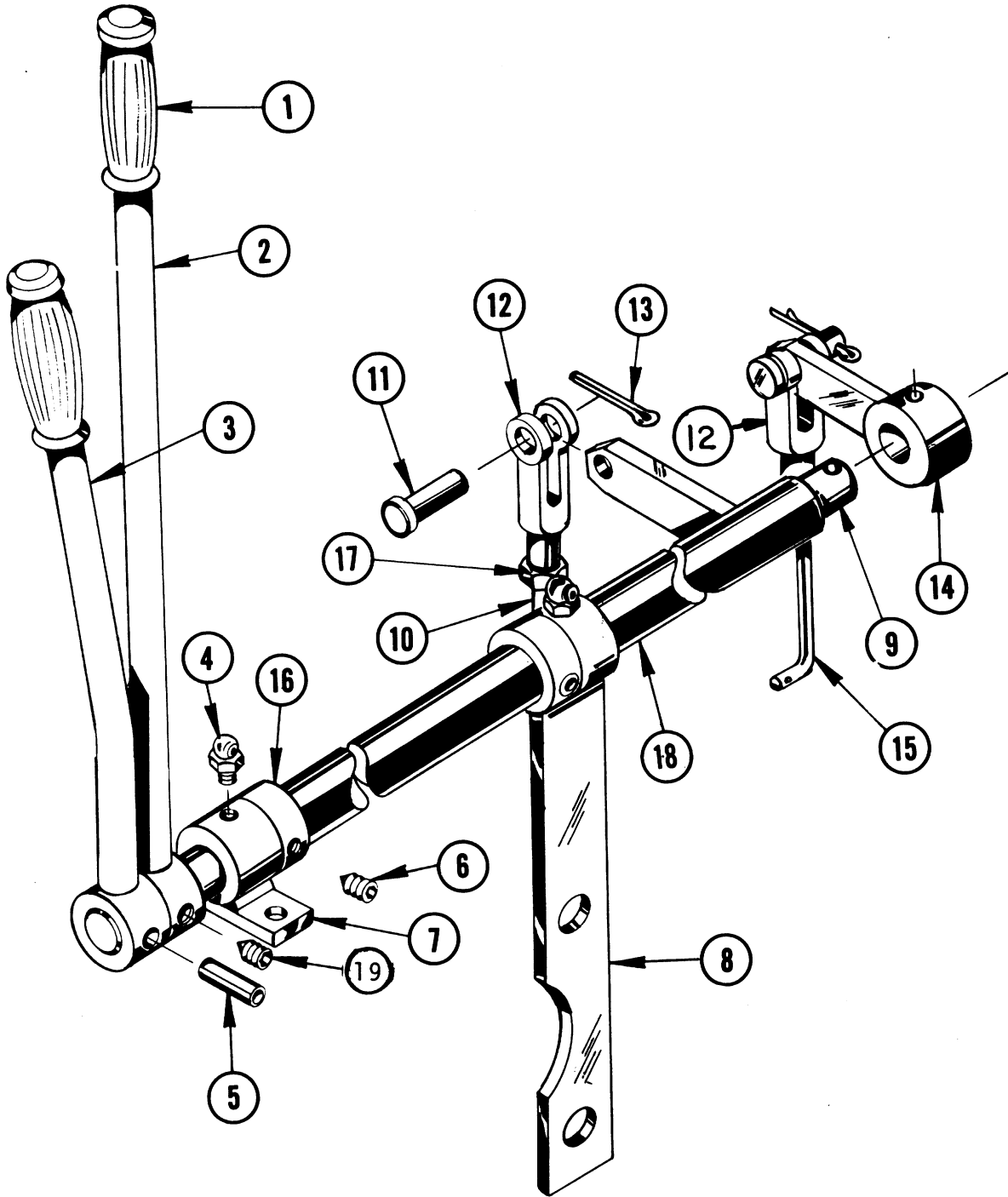
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

TORQUE CONVERTER CONTROL ASS'Y
 NO. 13,465

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10194		Rubber Grip	1
2	COM'L		Setscrew, 3/8-16 NC x 1/2"	1
3	12,885		Push Rod (For S/N 100-449, Use 7440)	1
4	7435		Spacer	1
5	7439		Spring	1
6	P-10039		Steel Ball	1
7	12,886		Control Handle (For S/N 100-449, Use 9868)	1
8	COM'L		Capscrew, 3/8-16 NC x 1/2	1
9	COM'L		Lockwasher, 3/8"	1
10	7434		Washer	1
11	3393		Hand Lever Pivot	1
12	COM'L		Screw, 1/4 x 3/4	2
13	COM'L		Cotter Pin, 3/32 x 3/4 Long	2
14	COM'L		Lockwasher, 1/4	4
15	COM'L		Nut, 1/4	4
16	COM'L		Jam Nut, 5/16 x 18 NC	3
17	P-10043		Clevis	1
18	P-10042		Clevis Pin	2
19	9142		Arm	1
20	P-10377		Roll Pin	1
21	9140		Boss	2
22	11,657		Control Shaft	1
23	COM'L		Zerk, 1/8 N.P.T. (ST.)	1
24	COM'L		Setscrew, 3/8	2
25	11,535		Support	1
26	COM'L		Screw, 1/4 x 1 3/4	2
27	COM'L		Lockwasher, 1/4	4
28	3384		Link	1
29	11,533		Control Rod (For Waukesha, Use 13,400)	1
30	12,929		Shuttle Lever Ass'y (Items 1 thru 11)	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
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SHIFTING ASSEMBLY
NO. 11,557



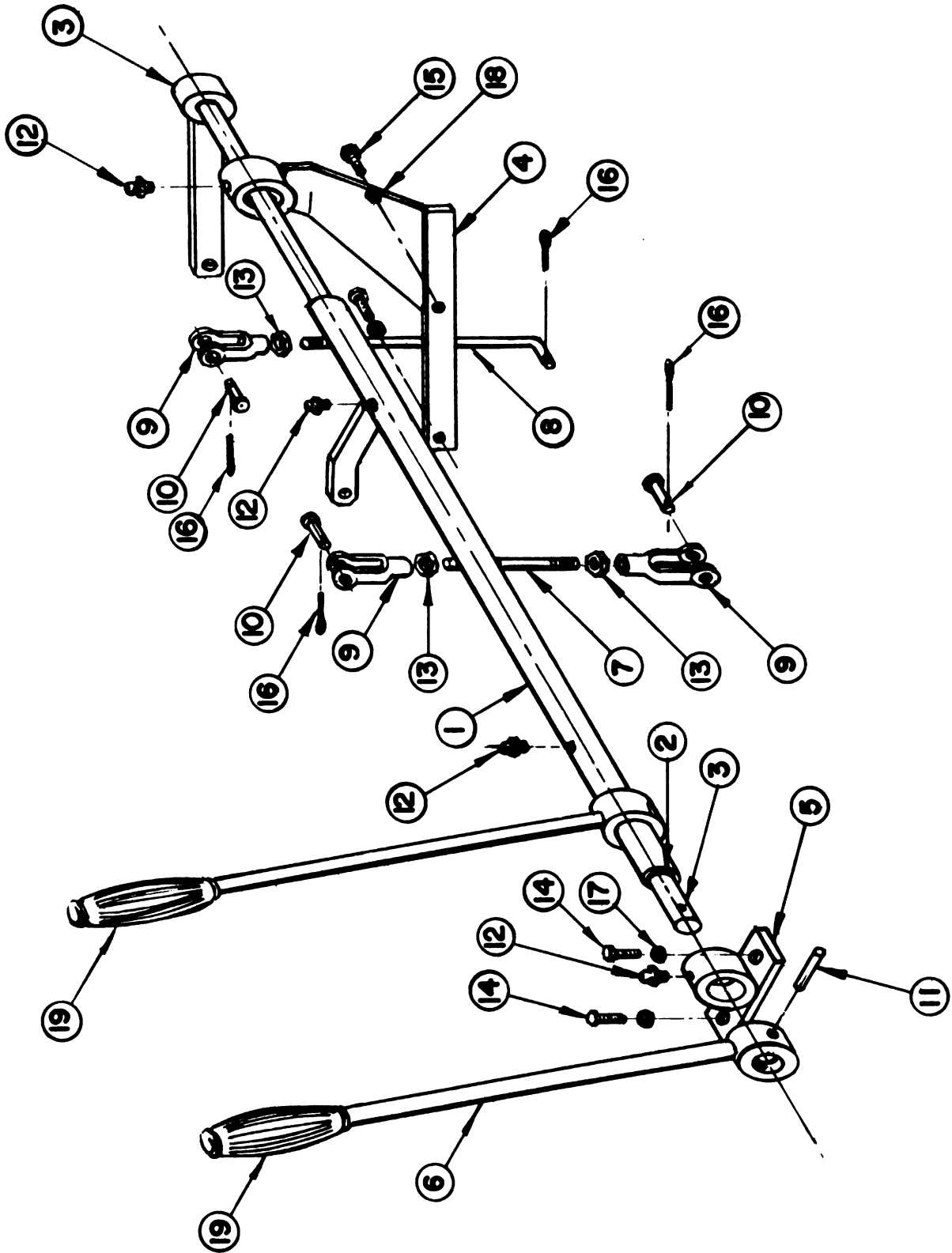
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

SHIFTING ASSEMBLY
 NO. 11,557

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-12162		Handle Grip	2
2	9876		Lever	1
3	9875		Lever	1
4	COM'L		Zerk, 1/4 x 90°	2
5	P-10378		Roll Pin	1
6	COM'L		Setscrew, Cup Point 1/4 NC x 1/4	2
7	9871		Support	1
8	11,530		Support	1
9	9877		Shaft	1
10	9107		Control Rod	1
11	P-10040		Clevis Pin	2
12	P-10193		Clevis	2
13	COM'L		Cotter Pin, 3/32 x 1"	4
14	9092		Arm	1
15	9122		Control Rod	1
16	9873		Collar	1
17	COM'L		Jam Nut, 3/8 N.F.	2
18	9872		Housing, Shaft	1
19	P-13504		Setscrew, Socket Hd., Half Dog	3

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
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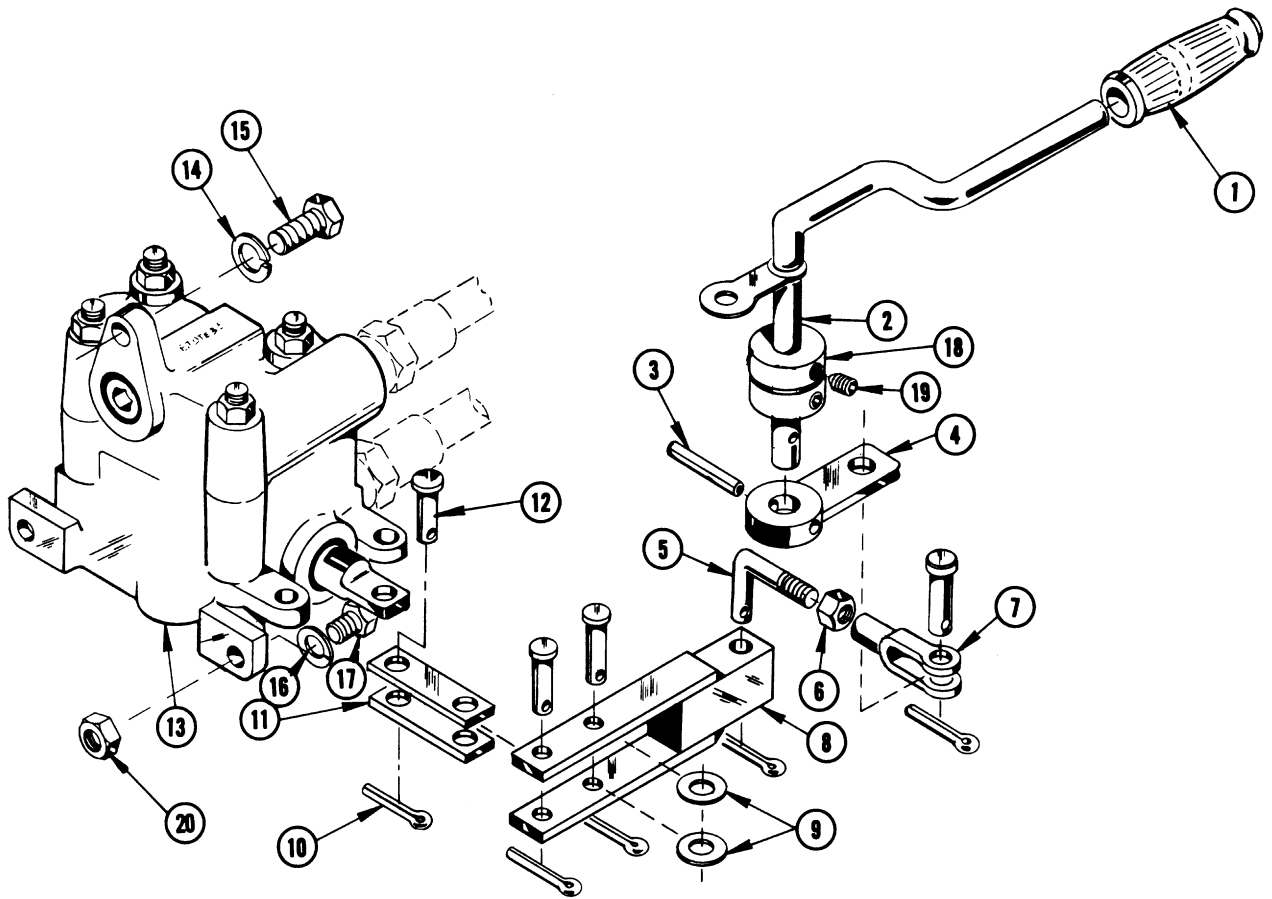
SHIFTING ASSEMBLY
NO. 11,557



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

SHIFTING ASSEMBLY
 NO. 11,557

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13,930		Housing, Shaft	1
2	9325		Bushing	2
3	13,937		Shaft, Inner	1
4	13,927		Support	1
5	9871		Support	1
6	9875		Lever	1
7	13,942		Rod, Control	1
8	13,966		Rod, Control	1
9	P-10193		Clevis	2
10	P-10040		Pin, Clevis	3
11	P-10378		Pin, Roll	1
12	COM'L		Zerk 1/4 N.F.	4
13	COM'L		Nut, Jam 3/8 N.F.	3
14	COM'L		Capscrew, 1/4 N.C. x 1 1/4"	2
15	COM'L		Capscrew, 3/8 N.C. x 1 1/4"	2
16	COM'L		Cotter Pin, 3/32 x 1	4
17	COM'L		Washer, Shakeproof 1/4"	2
18	COM'L		Washer, Shakeproof 3/8"	2
19	P-12162		Handle, Grip	2

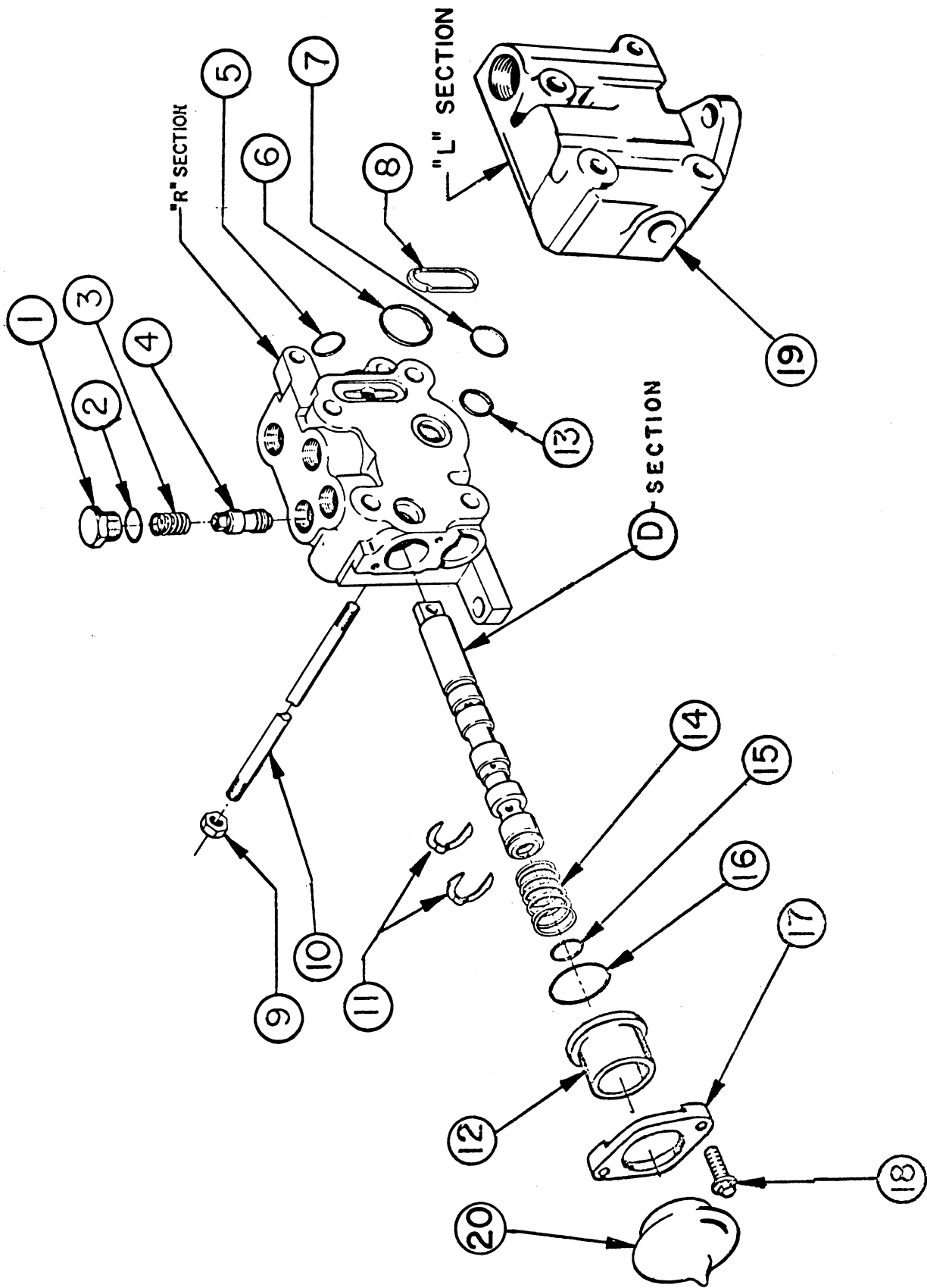


REAR STEERING CONTROL ASS'Y.

11580



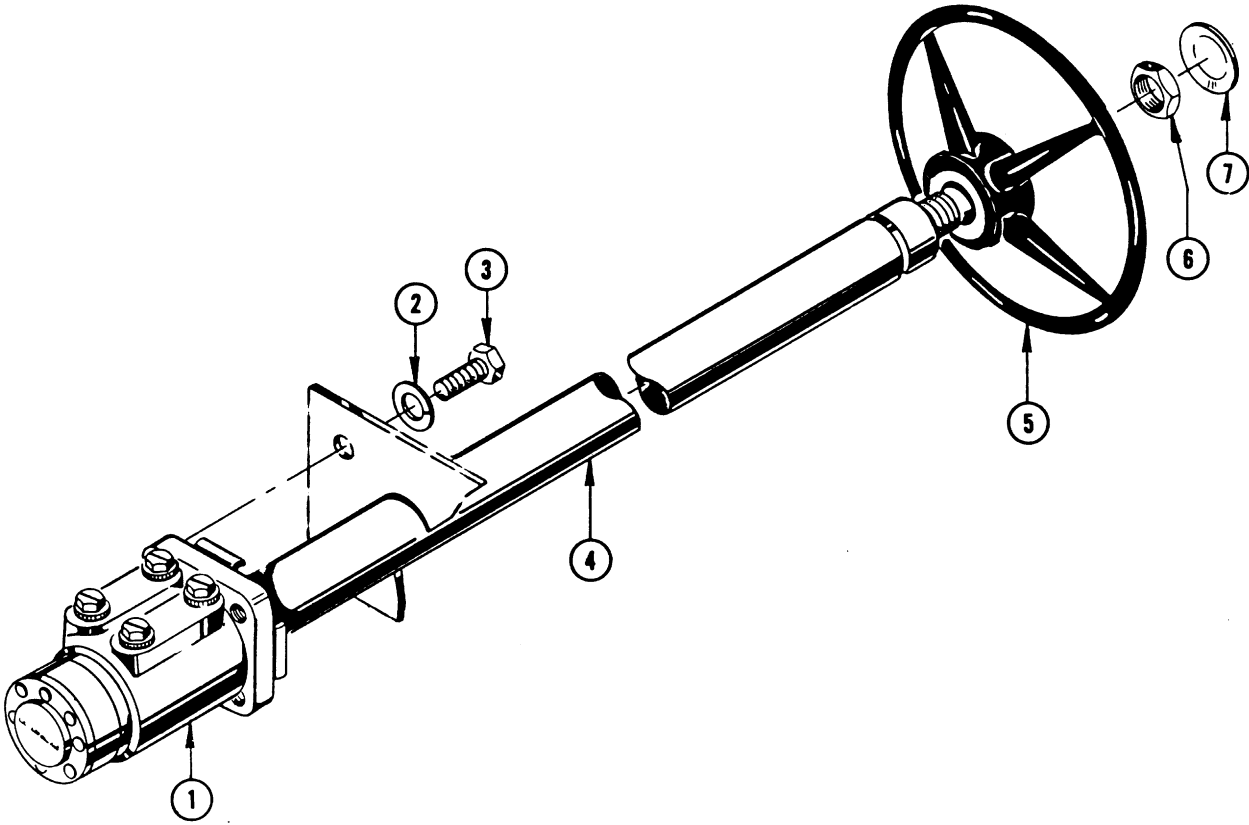
REF.	PART NO.	DESCRIPTION	REQ.
REAR STEERING CONTROL ASSEMBLY # 11,580			
1	P-10194	Rubber Grip	1
2	3489	Control Lever	1
3	COM'L	Roll Pin 3/16 x 1 1/4 Long	1
4	9863	Arm	1
5	11,613	Link	1
6	COM'L	Jam Nut 3/8 N.F.	1
7	P-10193	Clevis	1
8	11,579	Lever	1
9	COM'L	Flat Washer 3/8	2
10	COM'L	Cotter Key 3/32 x 1" Long	5
11	11,582	Link	2
12	P-10040	Clevis Pin	4
13	P-13005	Valve	1
14	COM'L	Lockwasher 3/8	1
15	COM'L	Capscrew 3/8 x 1 N.C.	1
16	COM'L	Lockwasher 7/16	2
17	COM'L	Capscrew 7/16 x 1 1/2 N.C.	2
18	3814	Boss	2
19	COM'L	Setscrew 1/4-20 N.C.	2
20	COM'L	Nut 7/16 N.C.	2





REF.	PART NO.	DESCRIPTION	REQ.
VALVE ASSEMBLY NO. P-13005			
1	P-12285	Plug	
2	P-12295	O-Ring	
3	P-12296	Spring	
4	P-12297	Control Valve	
5	P-12298	O-Ring	
6	P-12299	Seal	
7	P-12300	Seal	
8	P-12301	Retainer	
9	P-12307	Nut	
10	P-12308	Stud	
11	P-12309	Washer "C"	
12	P-12310	Sleeve	
13	P-12316	Seal	
14	P-12315	Spring	
15	P-12314	Quad Ring	
16	P-12313	O-Ring	
17	P-12312	Retainer	
18	P-12311	Screw	
19	P-13339	"L" Section	
20	P-13317	Dust Cap	

LULL ENGINEERING COMPANY, INC.
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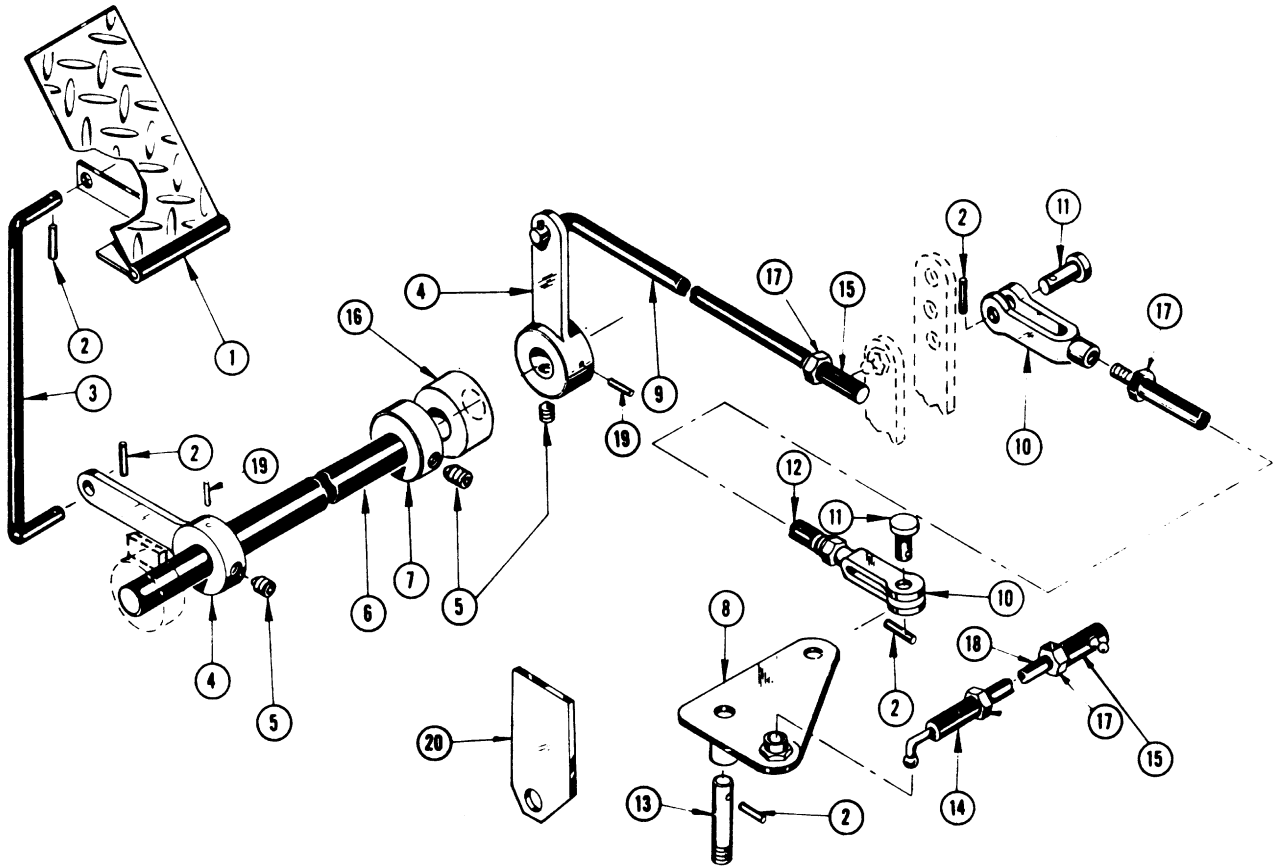


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ST. PAUL, MINNESOTA 55121

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-13608		Orbitrol	1
2	COM'L		Lockwasher, 3/8"	2
3	COM'L		Capscrew, 3/8 x 1 1/2 NC	2
4	P-13008		Column	1
5	P-13006		Steering Wheel	1
6	P-13009		Nut	1
7	P-16186		Wheel Cap	1

LULL ENGINEERING COMPANY, INC.
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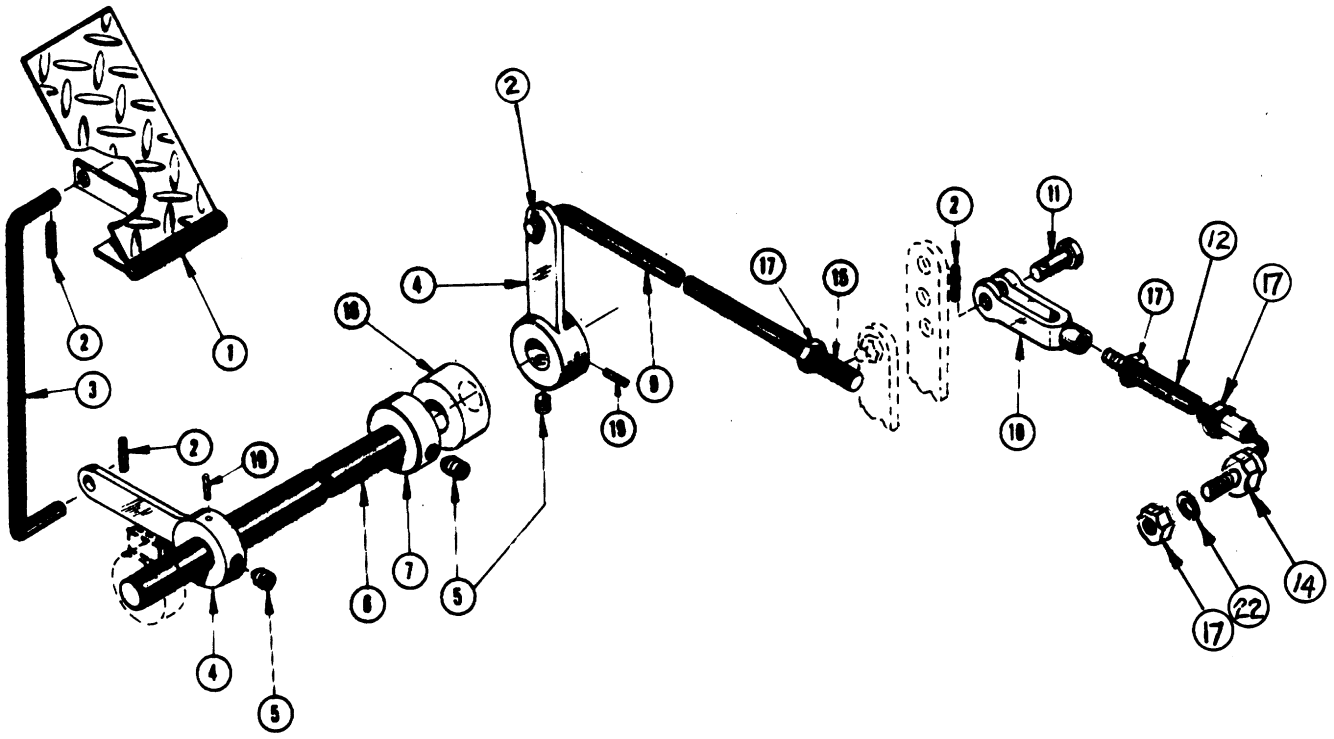
THROTTLE ASSEMBLY
NO. 11,570



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

THROTTLE ASSEMBLY
 NO. 11,570

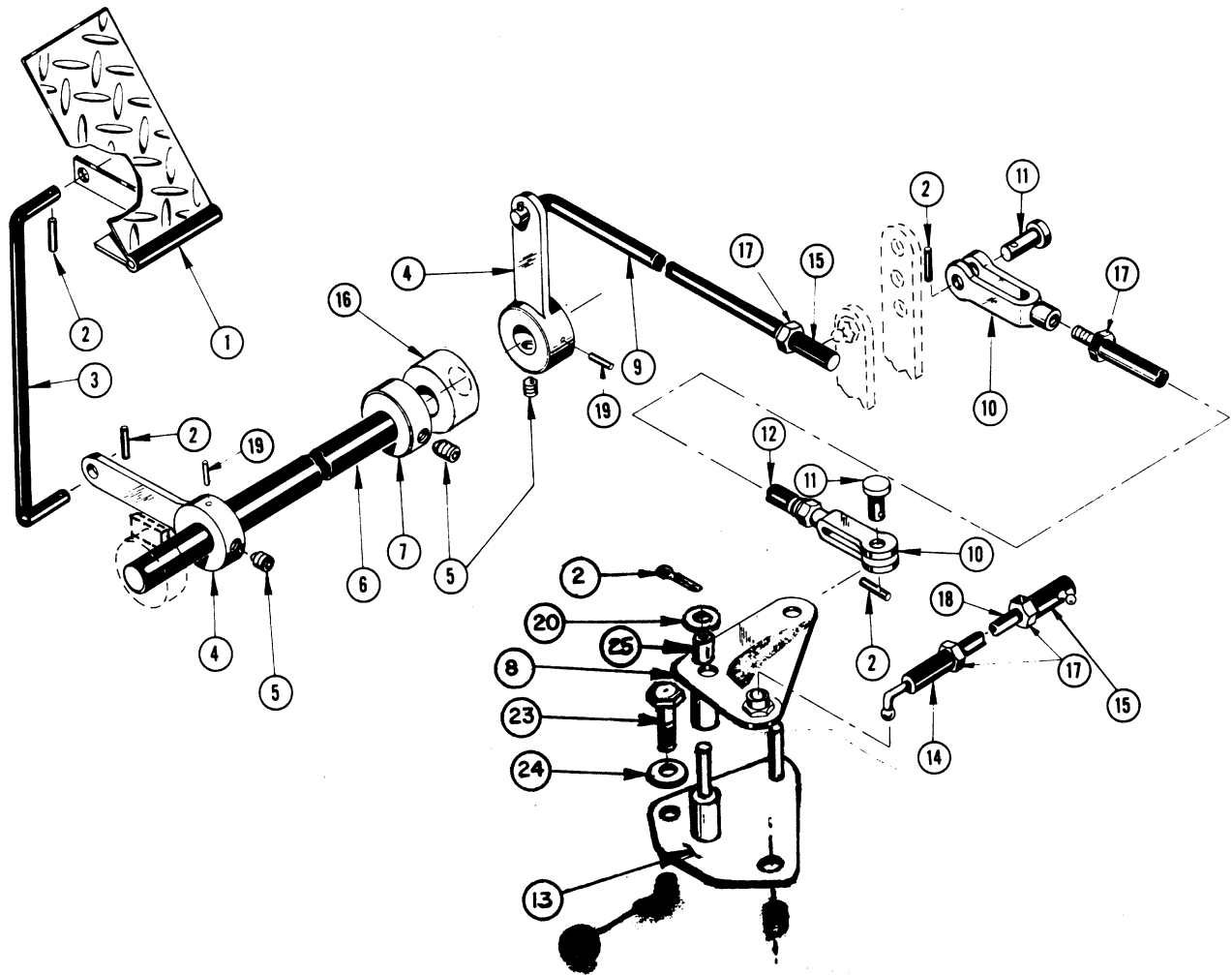
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7121		Gas Pedal	1
2	COM'L		Cotter Key, 3/32 x 1/2 Long	6
3	3152		Throttle Link	1
4	11,576		Throttle Arm Weldment	2
5	COM'L		Setscrew, 1/4 - 20 N.C.	3
6	3145		Shaft	1
7	11,565		Collar	1
8	11,568		Throttle Crank	1
9	11,567		Throttle Linkage	1
10	P-10508		Clevis	2
11	P-10509		Clevis Pin	2
12	11,566		Throttle Linkage	1
13	11,621		Throttle Stud	1
14	P-12979		Ball Joint	1
15	P-10505		Ball Joint	2
16	12,927		Collar	1
17	COM'L		Nut, 1/4 -28 N.F.	5
18	11,574		Throttle Linkage	1
19	COM'L		Roll Pin, 1/8 x 1	2
20	11,622		Throttle Stop	1
21	P-12746		Spring, Throttle Lever	1



THROTTLE ASS'Y.



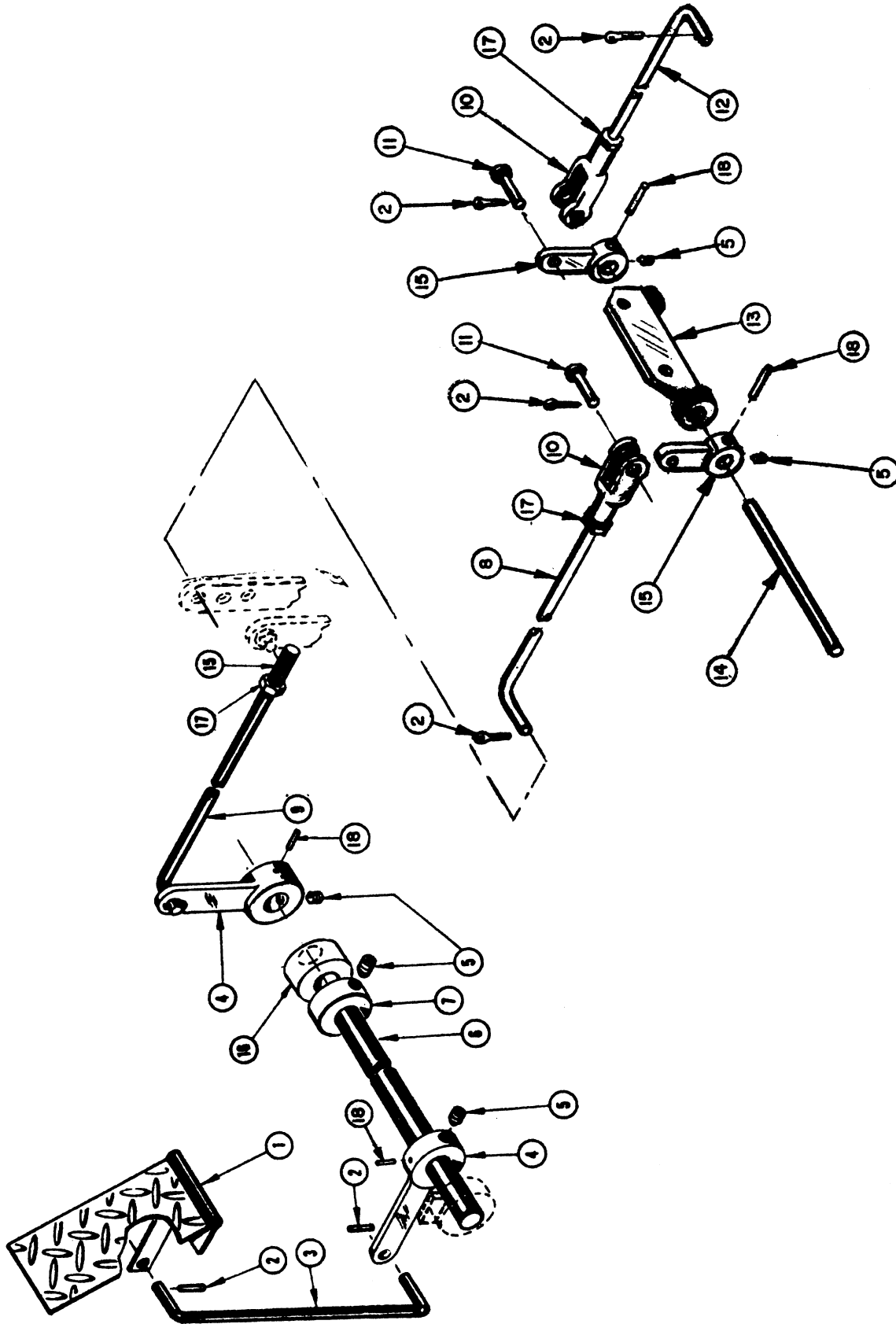
REF.	PART NO.	DESCRIPTION	REQ.
		THROTTLE ASSEMBLY - NO. 12,005 MODEL "400" DIESEL	
1	7121	Gas Pedal	1
2	COM'L	3/32 x 1/2 Long	4
3	3152	Throttle Link	1
4	11,576	Throttle Arm Weldment	2
5	COM'L	Setscrew, 1/4-20 N.C.	3
6	3145	Shaft	1
7	11,565	Collar	1
8			
9	11,567	Throttle Linkage	1
10	P-10508	Clevis	1
11	P-10509	Clevis Pin	1
12	12,009	Throttle Linkage	1
13			
14	P-12979	Ball Joint	1
15	P-10505	Ball Joint	1
16	12,927	Collar	1
17	COM'L	Nut, 1/4-28 N.F.	4
18			
19	COM'L	Roll Pin, 1/8 x 1	2
20			
21	P-12746	Spring, Throttle Lever (Not Shown)	1
22	COM'L	Shakeproof, 1/4	1



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

THROTTLE ASSEMBLY
 NO. 11,570

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7121		Gas Pedal	1
2	COM'L		Cotter Key, 3/32 x 1/2 Long	6
3	3152		Throttle Link	1
4	11,576		Throttle Arm Weldment	2
5	COM'L		Setscrew, 1/4-20 N.C.	3
6	3145		Shaft	1
7	11,565		Collar	1
8	13,895		Throttle Crank	1
9	11,567		Throttle Linkage	1
10	P-10508		Clevis	2
11	P-10509		Clevis Pin	2
12	11,566		Throttle Linkage	1
13	13,891		Pivot, Throttle Weldment	1
14	P-12979		Ball Joint	1
15	P-10505		Ball Joint	2
16	12,927		Collar	1
17	COM'L		Nut, 1/4-28 N.F.	5
18	13,901		Throttle Linkage	1
19	COM'L		Roll Pin, 1/8 x 1	2
20	COM'L		Washer, 5/16"	1
21	P-12746		Spring, Throttle Lever	1
22				
23	COM'L		Capscrew, 1/4-20 N.C. x 3/4	2
24	COM'L		Washer, 1/4"	2
25	P-17570		Bushing	1
26	14674		Stand-off (if Req.-Check your Machine)	2



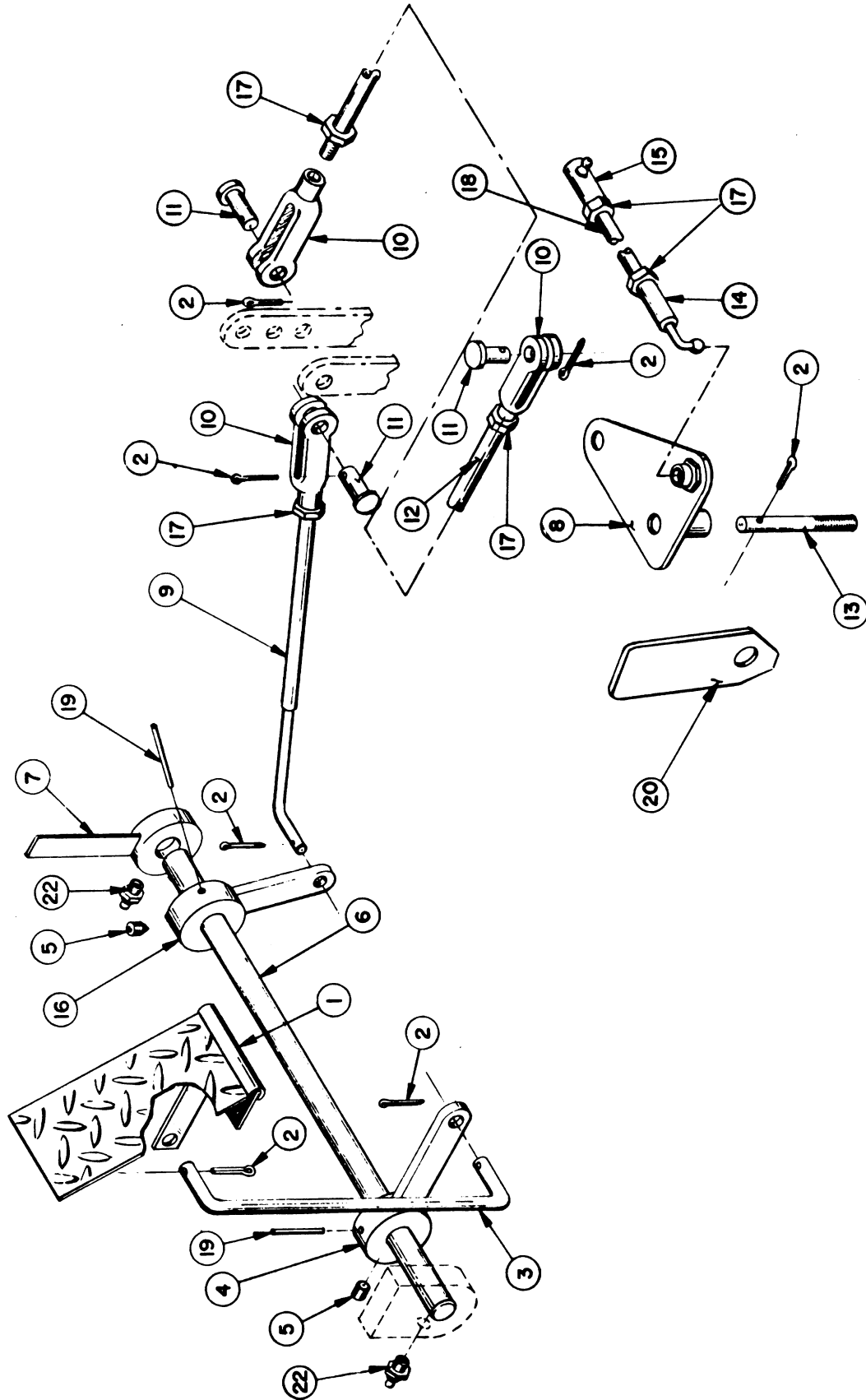
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

THROTTLE ASSEMBLY
 NO. 13,466

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7121		Gas Pedal	1
2	COM'L		Cotter Key, 3/32 x 1/2 Long	7
3	3152		Throttle Link	1
4	11,576		Throttle Arm Weldment	2
5	COM'L		Setscrew, 1/4-20 N.C.	5
6	3145		Shaft	1
7	11,565		Collar	1
8	13,402		Link, Throttle	1
9	13,398		Throttle Linkage	1
10	P-10508		Clevis	1
11	P-10509		Clevis Pin	1
12	13,411		Throttle Linkage	1
13	13,408		Bracket	1
14	13,419		Shaft, Linkage	1
15	10,577		Arm, Throttle	2
16	12,927		Collar	1
17	COM'L		Nut, 1/4-28 N.F.	3
18	COM'L		Roll Pin, 1/8" x 1" Long	4

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

THROTTLE ASSEMBLY
MODEL 400 T.F.
NO. 13,794



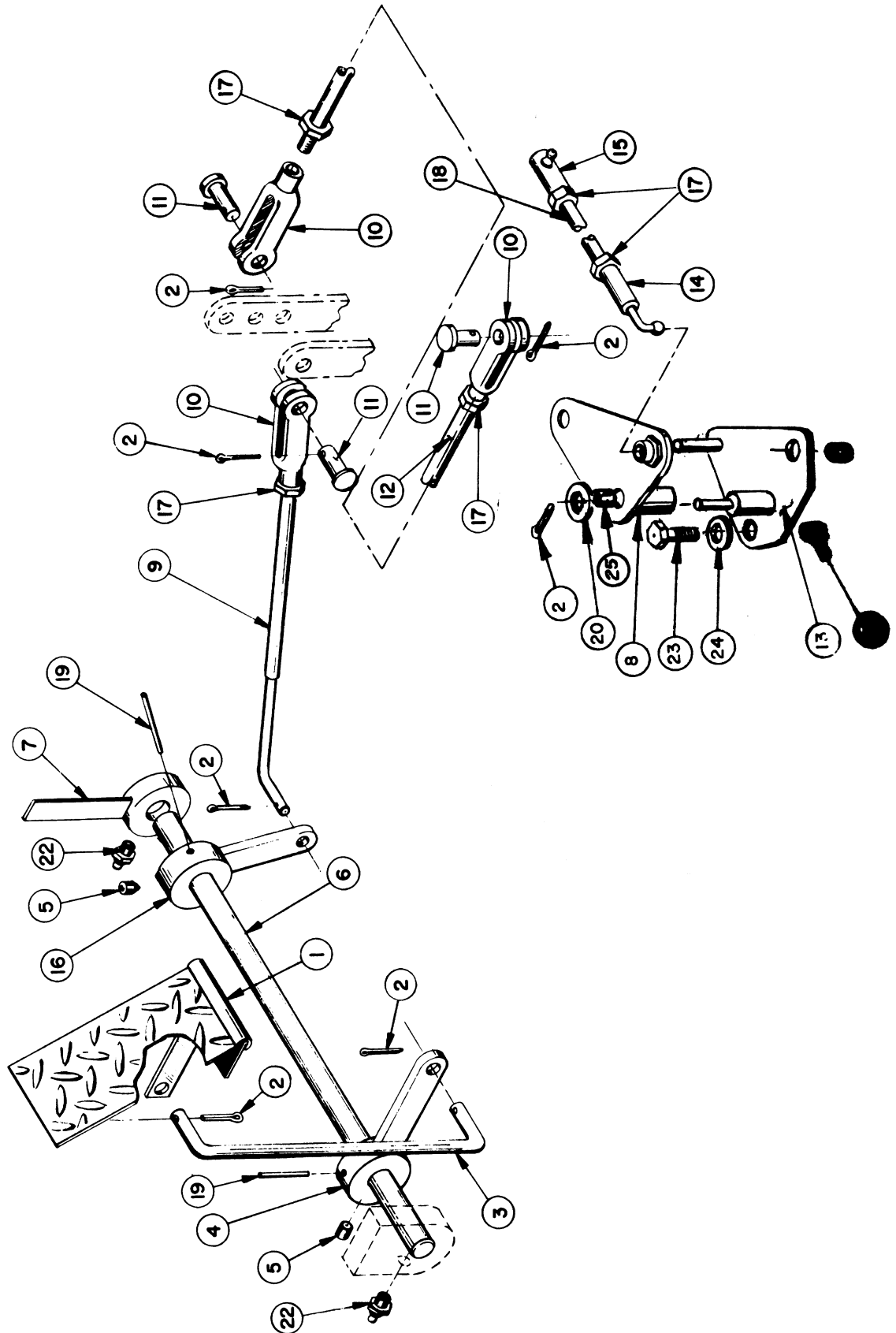
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

THROTTLE ASSEMBLY
 NO. 13,794

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7121		Gas Pedal	1
2	COM'L		Cotter Key 3/32 x 1/2 Long	7
3	3152		Throttle Link	1
4	10,575		Throttle Arm Weldment	1
5	COM'L		Setscrew, 1/4-20 N.C.	2
6	13,790		Shaft	1
7	13,709		Bracket, Throttle	1
8	11,568		Throttle Crank	1
9	13,398		Throttle Linkage	1
10	P-10508		Clevis	3
11	P-10509		Clevis Pin	3
12	11,566		Throttle Linkage	1
13	11,621		Throttle Stud	1
14	P-12979		Ball Joint	1
15	P-10505		Ball Joint	1
16	10,577		Throttle Arm	1
17	COM'L		Nut, 1/4-28 N.F.	5
18	11,574		Throttle Linkage	1
19	COM'L		Pin, Roll 1/8 x 1	2
20	11,622		Throttle Stop	1
21	P-12746		Spring, Throttle Lever	1
22	P-16611		Zerk, Grease	2

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
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THROTTLE ASSEMBLY
MODEL 400 T.F. (GAS)
NO. 13,794



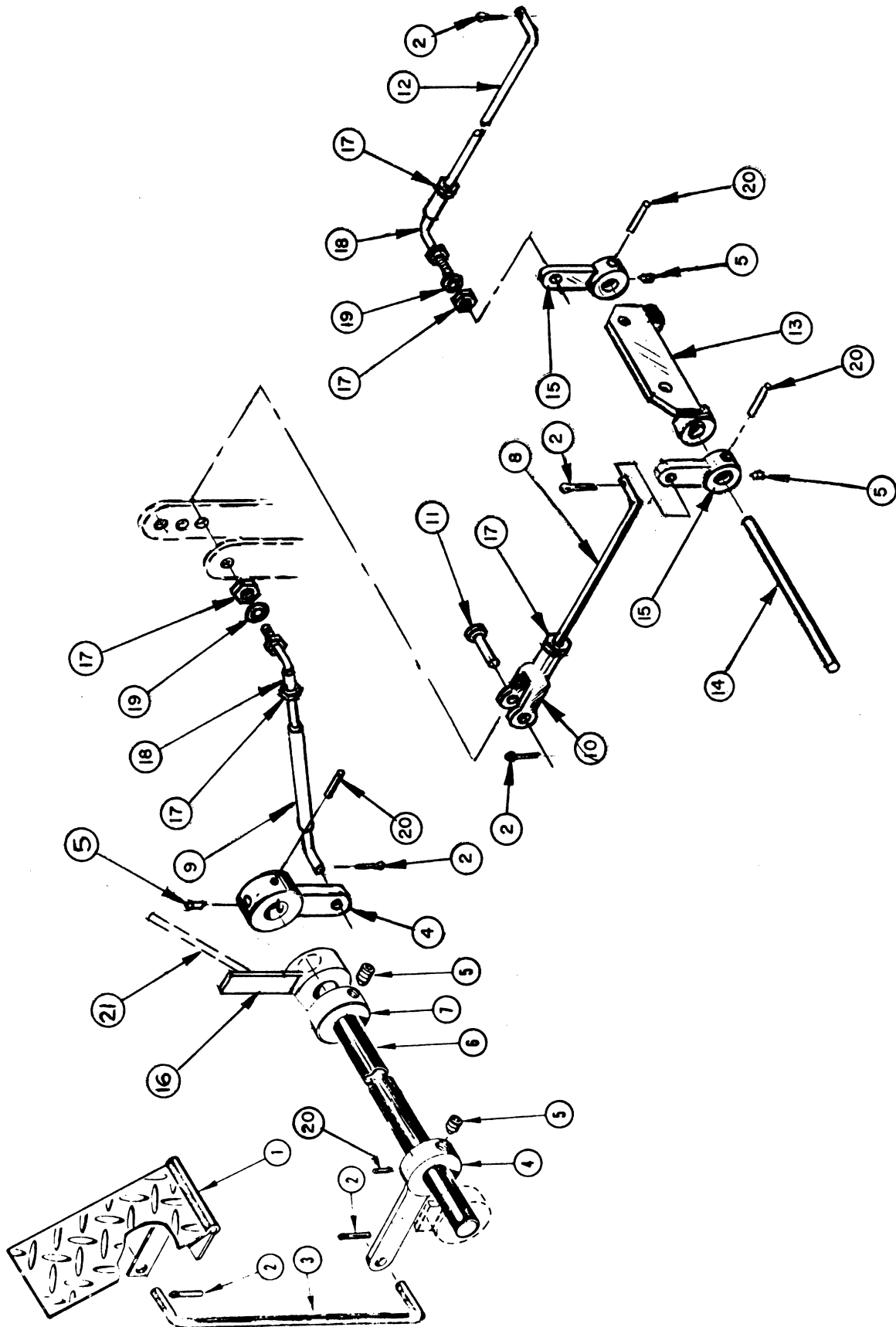
LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

THROTTLE ASSEMBLY
NO. 13,794

<u>ITEM</u> <u>NO.</u>	<u>PART</u> <u>NO.</u>	<u>ASSEMBLY</u> <u>NO.</u>	<u>DESCRIPTION</u>	<u>NO.</u> <u>REQ.</u>
1	7121		Gas Pedal	1
2	COM'L		Cotter Key, 3/32 x 1/2 Long	7
3	3152		Throttle Link	1
4	10,575		Throttle Arm Weldment	1
5	COM'L		Setscrew, 1/4-20 N.C.	2
6	13,790		Shaft	1
7	13,709		Bracket, Throttle	1
8	13,895		Throttle Crank	1
9	13,398		Throttle Linkage	1
10	P-10508		Clevis	3
11	P-10509		Clevis Pin	3
12	11,566		Throttle Linkage	1
13	13,891		Pivot, Throttle Weldment	1
14	P-12979		Ball Joint	1
15	P-10505		Ball Joint	1
16	10,577		Throttle Arm	1
17	COM'L		Nut, 1/4-28 N.F.	5
18	13,901		Throttle Linkage	1
19	COM'L		Roll Pin, 1/8 x 1	2
20	COM'L		Washer, 5/16"	1
21	P-12746		Spring, Throttle Lever	1
22	P-16611		Zerk, Grease	2
23	COM'L		Capscrew, 1/4-20 N.C. x 3/4 Long	2
24	COM'L		Washer, 1/4"	2
25	P-17570		Bushing	1
26	14674		Stand-off (if Req. Check your machine)	2

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

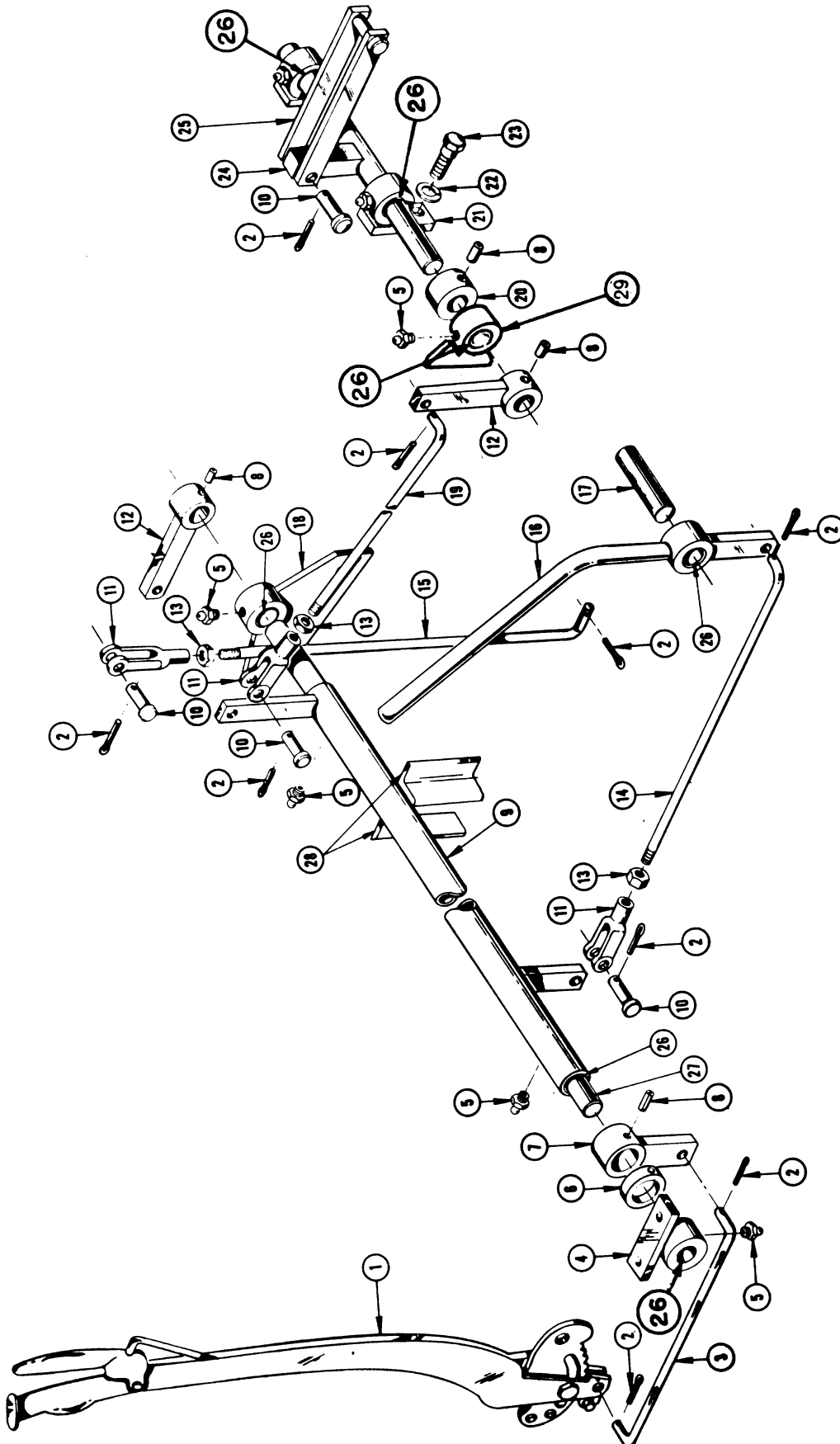
THROTTLE ASSEMBLY
400 WAUKESHA SIDE TILT
NO. 13,796



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

THROTTLE ASSEMBLY
 NO. 13,796

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7121		Gas Pedal	1
2	COM'L		Cotter Key, 3/32 x 1/2"	6
3	3152		Link Throttle	1
4	11,576		Arm, Throttle	2
5	COM'L		Setscrew, 1/4-20 N.C.	5
6	13,790		Shaft	1
7	11,565		Collar	1
8	13,402		Link, Throttle	1
9	13,682		Rod, Throttle	1
10	P-10508		Clevis	1
11	P-10509		Pin, Clevis	1
12	13,411		Link, Throttle	1
13	13,408		Bracket	1
14	13,419		Shaft, Linkage	1
15	10,577		Arm, Throttle	2
16	13,709		Hangar, Throttle	1
17	COM'L		Nut, 1/4-28 N.F.	5
18	P-12979		Ball Joint	2
19	COM'L		Washer, Shakeproof 1/4"	2
20	COM'L		Roll Pin, 1/8" x 1"	3
21	N-10482		Rod	1



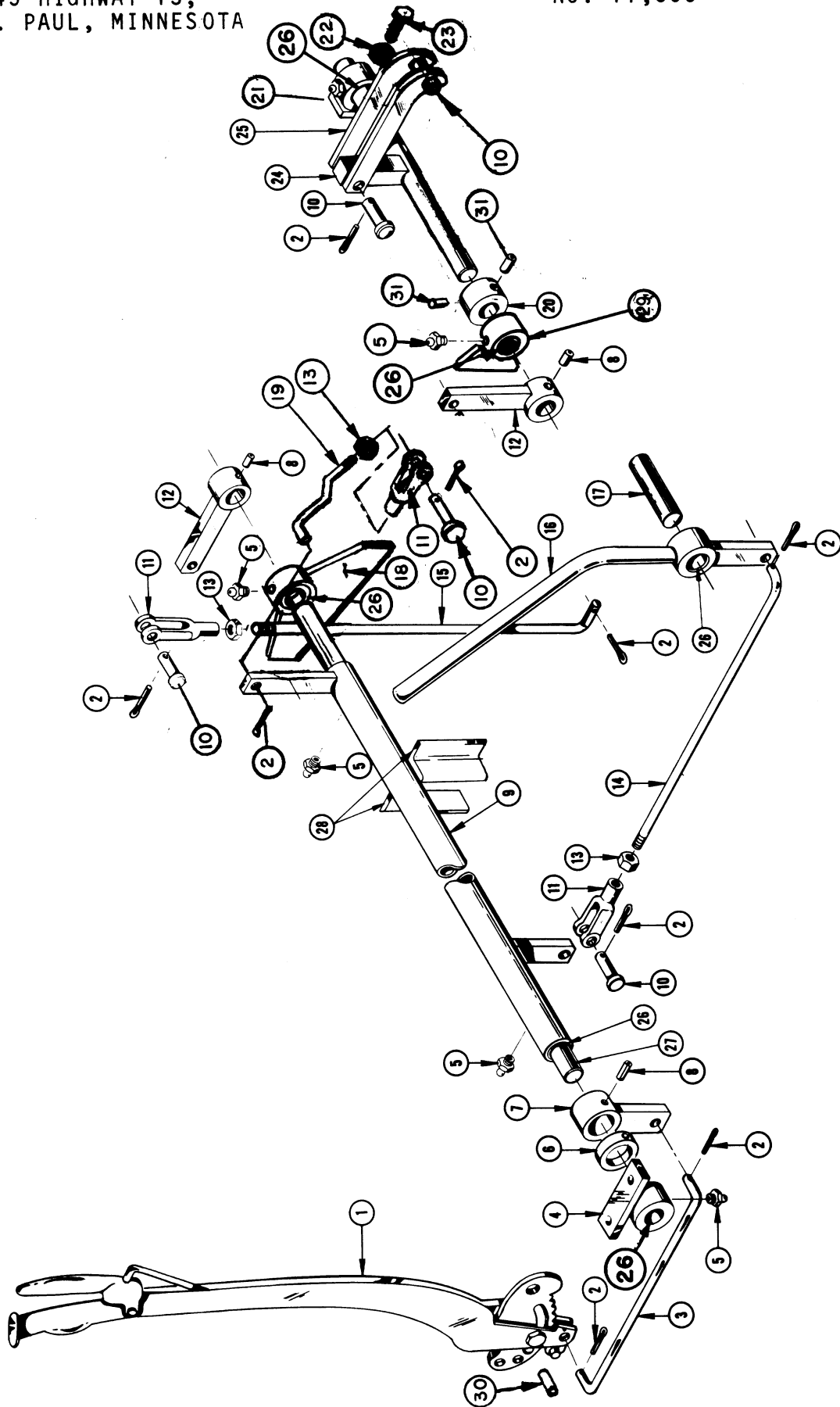
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

BRAKE & DISCONNECT ASSEMBLY
 NO. 11,556

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10527		Brake Handle	1
2	COM'L		Cotter Pin 3/32 x 1	9
3	3653		Rod	1
4	9099		Shaft Support	1
5	COM'L		Zerk Fitting 1/8	8
6	11,591		Spacer	1
7	3656		Arm	1
8	P-10378		Roll Pin	4
9	9113		Shaft Housing	1
10	P-10040		Clevis Pin	3
11	P-10193		Clevis	3
12	9092		Arm	1
13	COM'L		Jam Nut 3/8 N.F.	3
14	9122		Control Rod	1
15	9121		Control Rod	1
16	9115		Disconnect Lever	1
17	9116		Shaft	1
18	11,534		Shaft Support	1
19	9107		Control Rod	1
20	3646		Boss	1
21	9117		Hanger Bracket	1
22	COM'L		Lockwasher 7/16"	2
23	COM'L		Screw 7/16-14 x 2"	2
24	9118		Shaft Lever	1
25	9119		Link	2
26	9325		Bushing	7
27	11,595		Shaft	1
28	11,761		Brace	2
29	9120		Shaft Support	1

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BRAKE & DISCONNECT ASSEMBLY
NO. 11,556



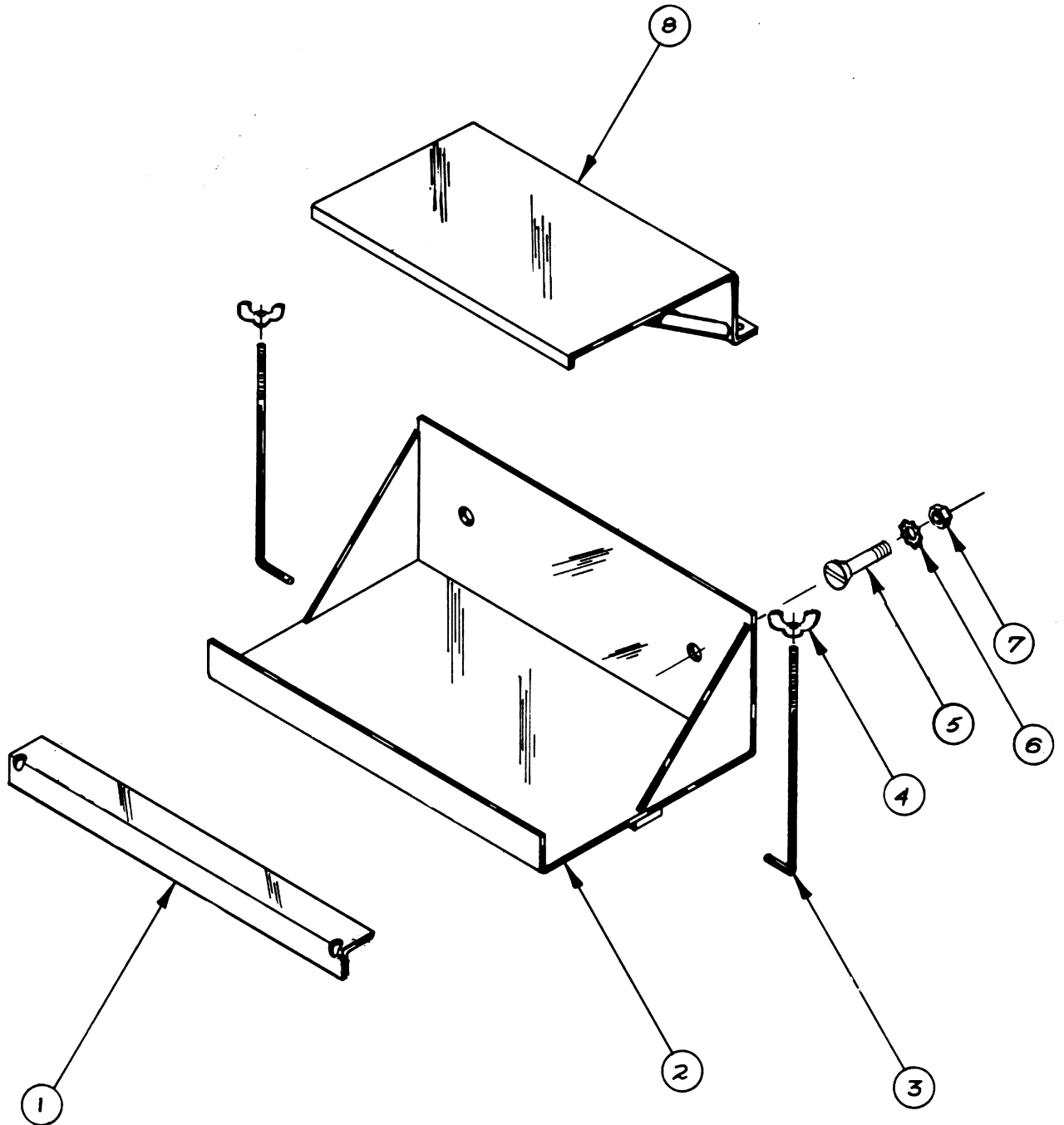
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

BRAKE & DISCONNECT ASSEMBLY
 NO. 11,556

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10527		Brake Handle	1
2	COM'L		Cotter Pin 3/32 x 1"	9
3	3653		Rod	1
4	9099		Shaft Support	1
5	COM'L		Zerk Fitting 1/8"	7
6	9125		Spacer	1
7	3656		Arm	1
8	P-10378		Roll Pin	3
9	9113		Shaft Housing	1
10	P-10040		Clevis Pin	3
11	P-10193		Clevis	3
12	9092		Arm	1
13	COM'L		Jam Nut, 3/8 N.F.	3
14	9122		Control Rod	1
15	9121		Control Rod	1
16	9115		Disconnect Lever	1
17	9116		Shaft	1
18	11534		Shaft Support	1
19	13,948		Control Rod	1
20	4815		Boss	1
21	9117		Hanger Bracket	1
22	COM'L		Lockwasher, 7/16"	1
23	COM'L		Screw 7/15-14 x 2"	1
24	9118		Shaft Lever	1
25	9119		Link	2
26	9325		Bushing	7
27	11,595		Shaft	1
28	11,761		Brace	2
29	9120		Shaft Support	1
30	N-10260		Spacer	3
31	P-13504		Setscrew	2

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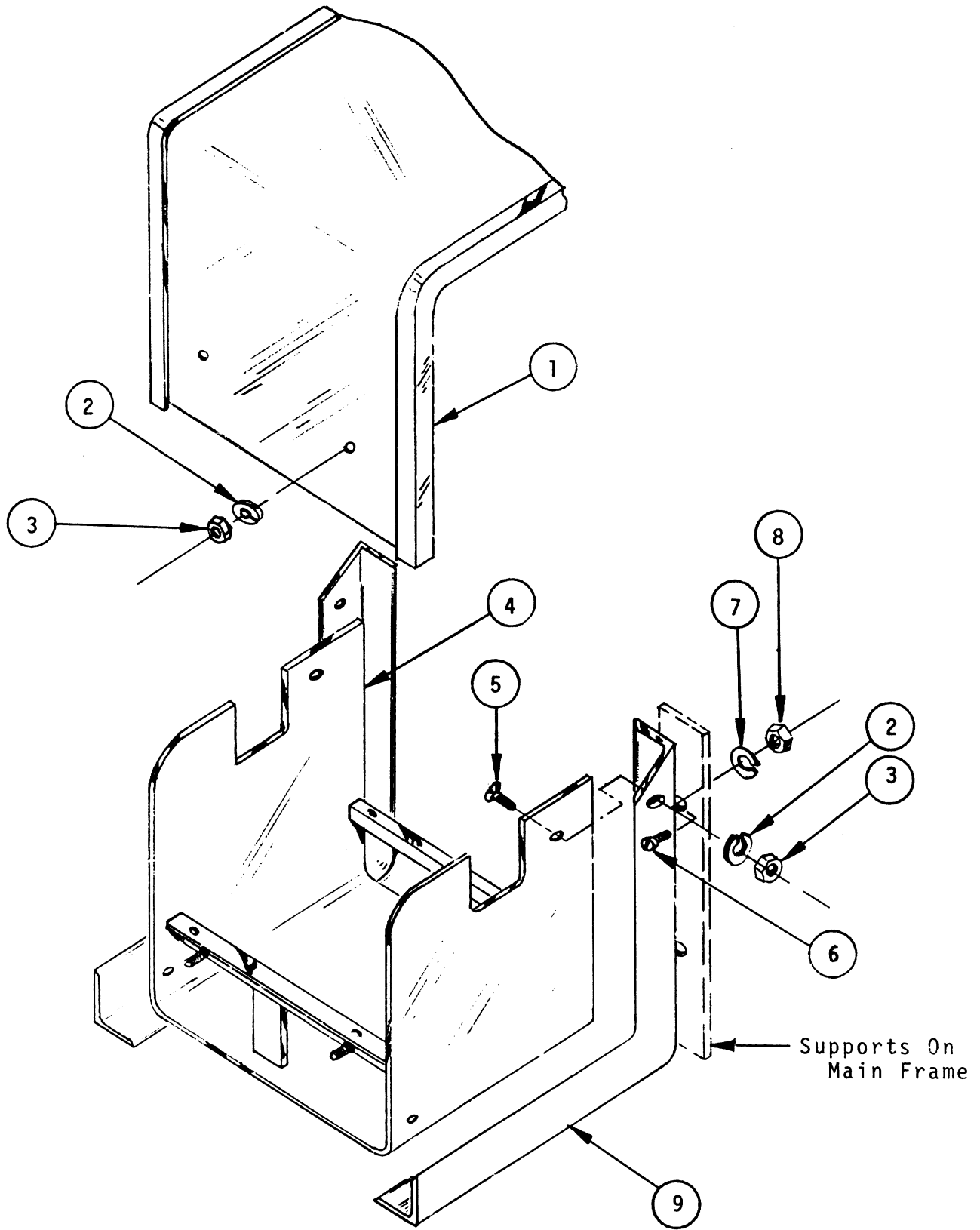
BATTERY SUPPORT ASSEMBLY
NO. 11,651



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BATTERY SUPPORT ASSEMBLY
NO. 11,651

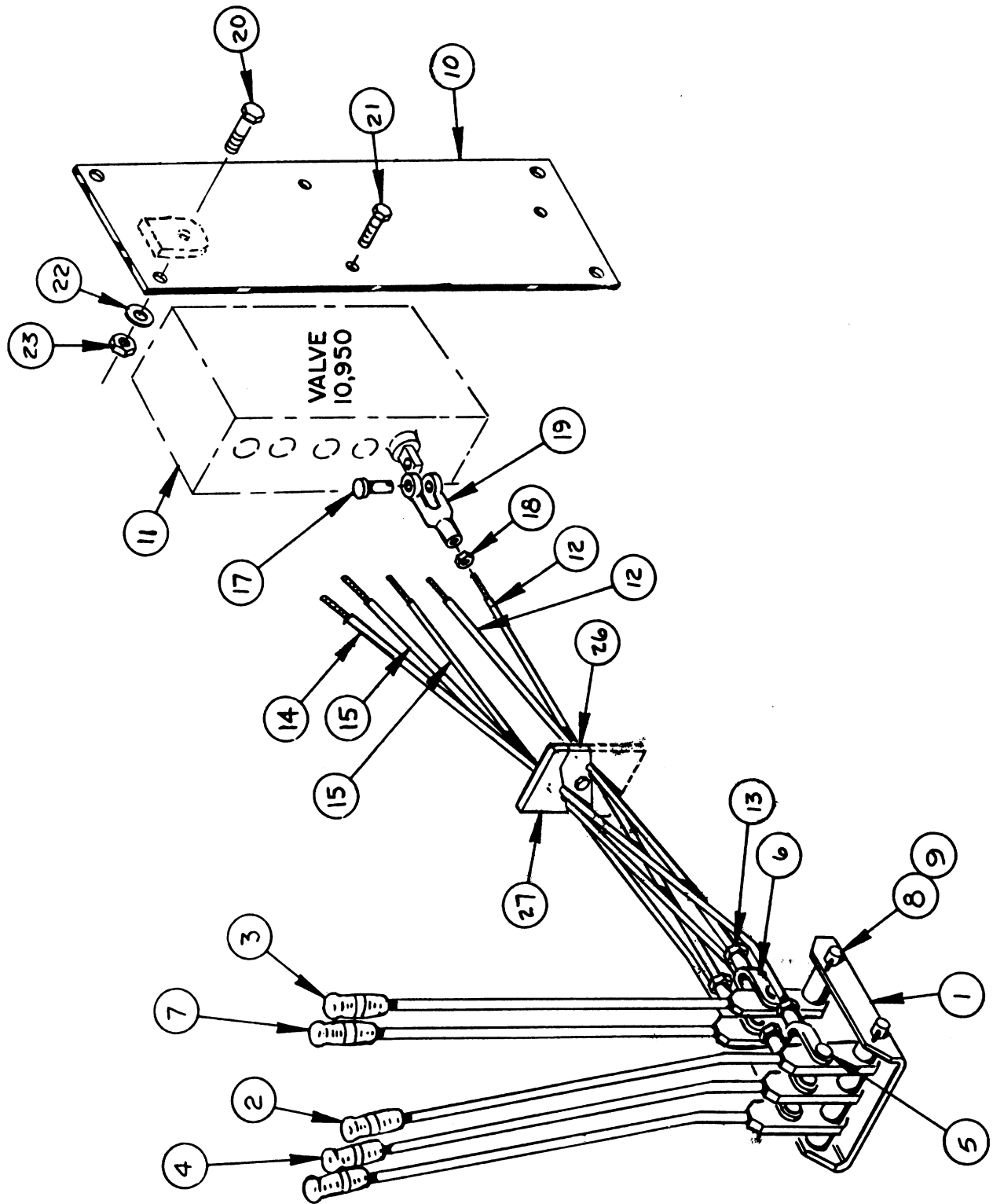
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	3546		Hold Down Strap	1
2	3553		Battery Support Assembly	1
3	3548		Hold Down Rods	2
4	COM'L		Wing Nut, 1/4" - 20 N.C.	2
5	COM'L		Cap Screw, 7/16 - 14 N.C. x 1 Long	2
6	COM'L		Shakeproof Washer, 7/16	2
7	COM'L		Full Nut, 7/16" - 14 N.C.	2
8	11,652		Cover for Battery	1



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BATTERY SUPPORT ASSEMBLY
NO. 11,999

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	10,561		Cover Weldment	1
2	COM'L		Lockwasher, 1/4"	6
3	COM'L		Nut, 1/4-20 NC	6
4	10,556		Battery Box Weldment	1
5	COM'L		Capscrew, Flathead 1/4-20 NC x 1	4
6	COM'L		Capscrew, Flathead 3/8-16 NC x 1 1/4	4
7	COM'L		Lockwasher, 3/8"	4
8	COM'L		Nut, 3/8-16 NC	4
9	10,557		Support Bracket	2



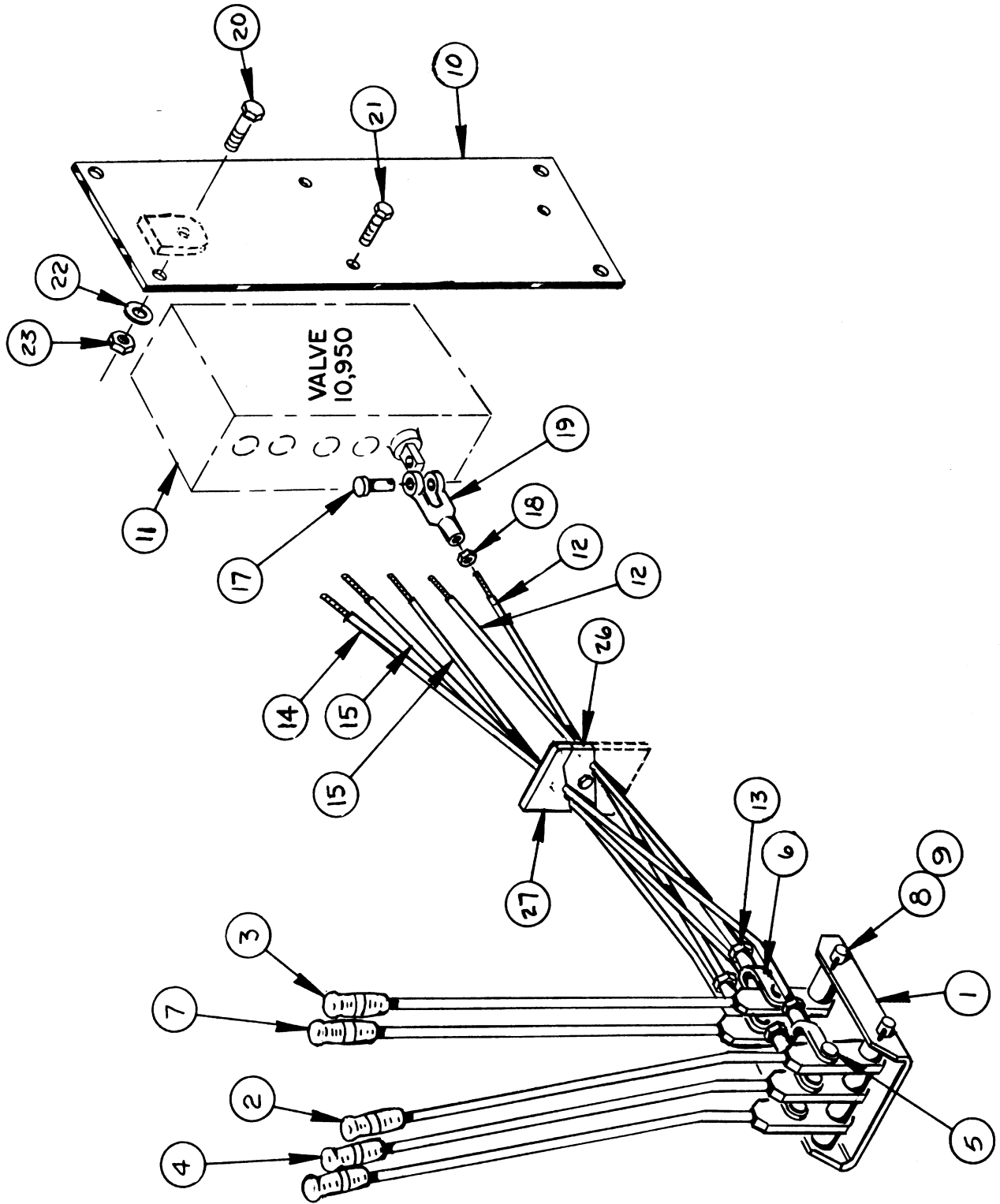
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 ST. PAUL, MINNESOTA 55121

VALVE CONTROL ASSEMBLY
 NO. 11,555

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	8784		Valve Control Handle	1
2	8932		Valve Control Handle	2
3	8934		Valve Control Handle	2
4	8933		Valve Control Handle	1
5	P-10514		Clevis Pin	5
6	P-10333		Clevis	5
7	P-10012		Rubber Grip Handle	5
8	8785		Pivot Shaft	2
9	8786		Spacer	1
10	11,499		Valve Plate	1
11		10,950	Valve Assembly (Page 84)	1
12	11,478		Rod	2
13	COM'L		Jam Nut, 1/2 - 20 N.F.	5
14	11,477		Rod	2
15				
16	11,476		Rod	1
17	P-10040		Clevis Pin	5
18	COM'L		Jam Nut, 3/8 - 24 N.F.	5
19	P-10193		Clevis	5
20	COM'L		Bolt, 1/2 N.C. x 1 1/4	4
21	COM'L		Bolt, 3/8 N.C. x 1 1/4	2
22	COM'L		Lockwasher, 1/2	4
23	COM'L		Nut, 1/2 N.C.	4
24				
25				
26	10,923		Center	1
27	10,922		Top	1

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VALVE CONTROL ASSEMBLY
NO.



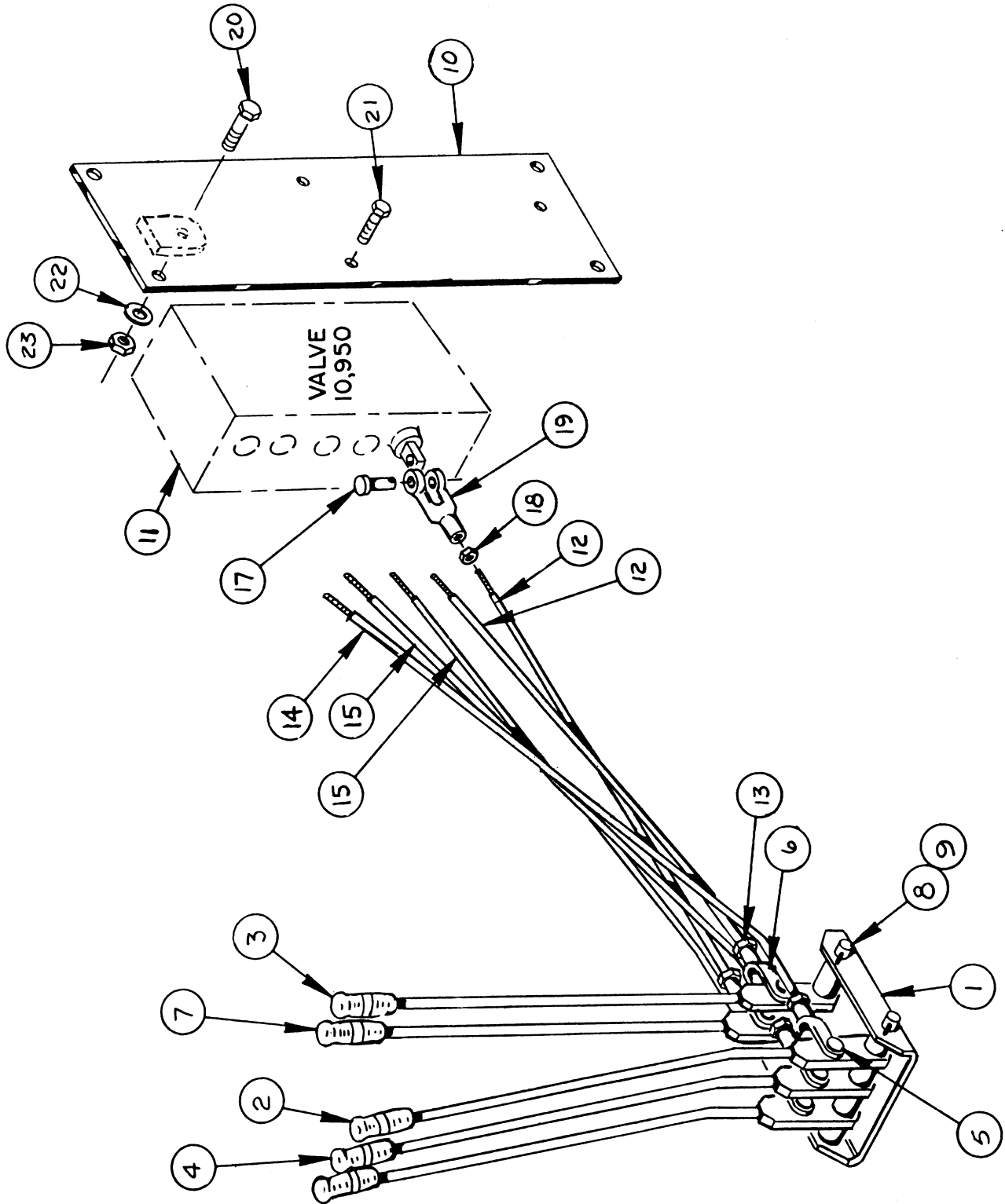
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

VALVE CONTROL ASSEMBLY
 NO. 13,462

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	8784		Valve control Handle	1
2	8932		Valve Control Handle	2
3	8934		Valve Control Handle	2
4	8933		Valve Control Handle	1
5	P-10514		Clevis Pin	5
6	P-10333		Clevis	5
7	P-10012		Rubber Grip Handle	5
8	8785		Pivot Shaft	2
9	8786		Spacer	1
10	10,976		Valve Plate	1
11		10,950	Valve Assembly (Page 84)	1
12	11,304		Rod	2
13	COM'L		Jam Nut, 1/2-20 N.F.	5
14	11,223		Rod	2
15				
16	11,224		Rod	1
17	P-10040		Clevis Pin	5
18	COM'L		Jam Nut, 3/8-24 N.F.	5
19	P-10193		Clevis	5
20	COM'L		Bolt, 1/2 N.C. x 1 1/4	4
21	COM'L		Bolt, 3/8 N.C. x 1 1/4	2
22	COM'L		Lockwasher, 1/2	4
23	COM'L		Nut, 1/2 N.C.	4
24				
25				
26	10,923		Center	1
27	10,922		Top	1

LULL ENGINEERING COMPANY, INC.
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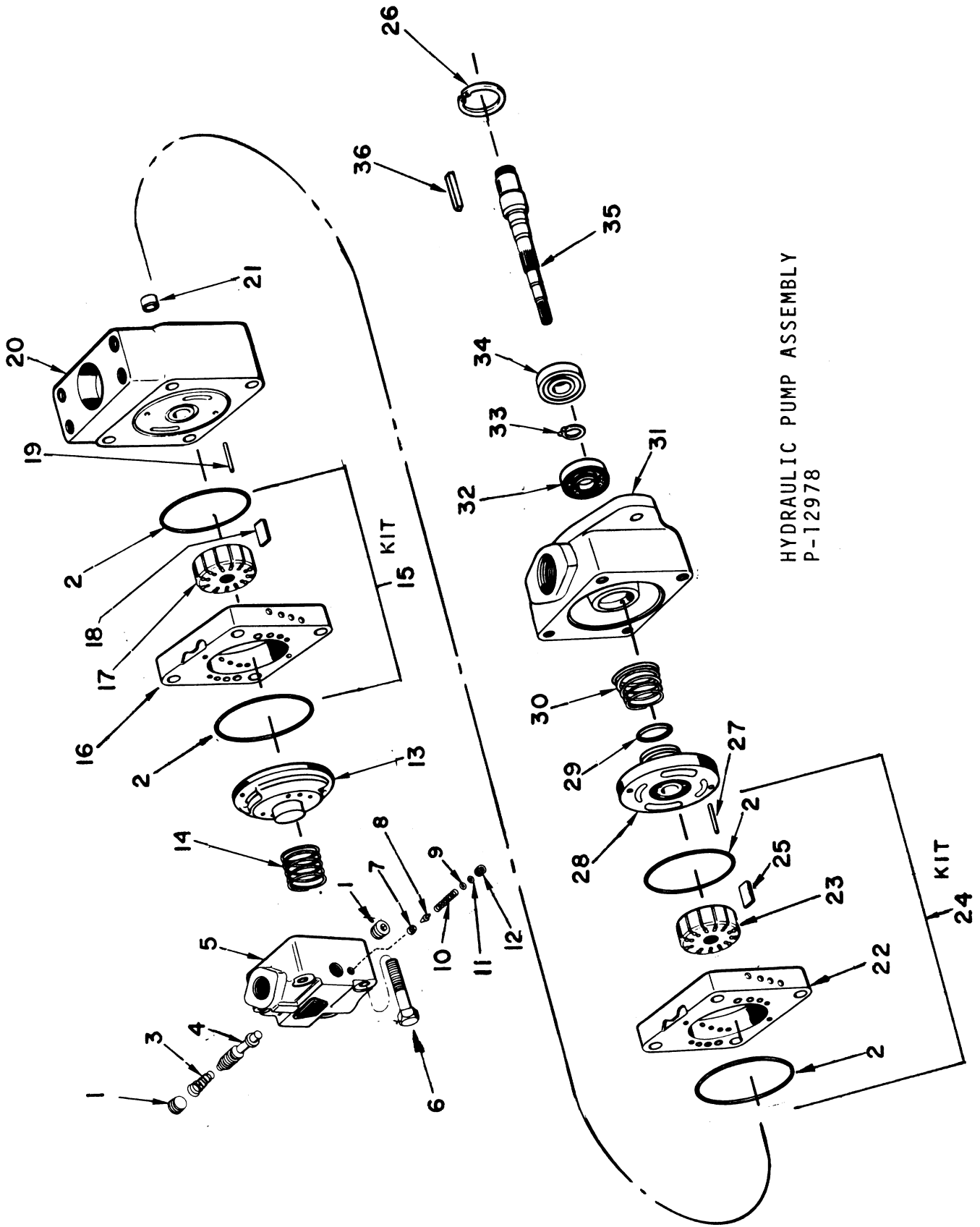
VALVE CONTROL ASSEMBLY
NO. 14,028



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

VALVE CONTROL ASSEMBLY
 NO. 14,028

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	8784		Valve Control Handle	1
2	8932		Valve Control Handle	2
3	8934		Valve Control Handle	2
4	8933		Valve Control Handle	1
5	P-10514		Clevis Pin	5
6	P-10333		Clevis	5
7	P-10012		Rubber Grip Handle	5
8	8785		Pivot Shaft	2
9	8786		Spacer	1
10	10,976		Valve Plate	1
11		10,950	Valve Assembly (Page 84)	1
12	13,992		Rod	2
13	COM'L		Nut, Jam 1/2-20 N.F.	5
14	10,972		Rod	1
15	14,058		Rod	2
17	P-10040		Clevis Pin	5
18	COM'L		Nut, Jam 3/8-24 N.F.	5
19	P-10193		Clevis	5
20	COM'L		Bolt, 1/2 N.C. x 1 1/4	4
21	COM'L		Bolt, 3/8 N.C. x 1 1/4	2
22	COM'L		Lockwasher, 1/2	4
23	COM'L		Nut, 1/2 N.C.	4

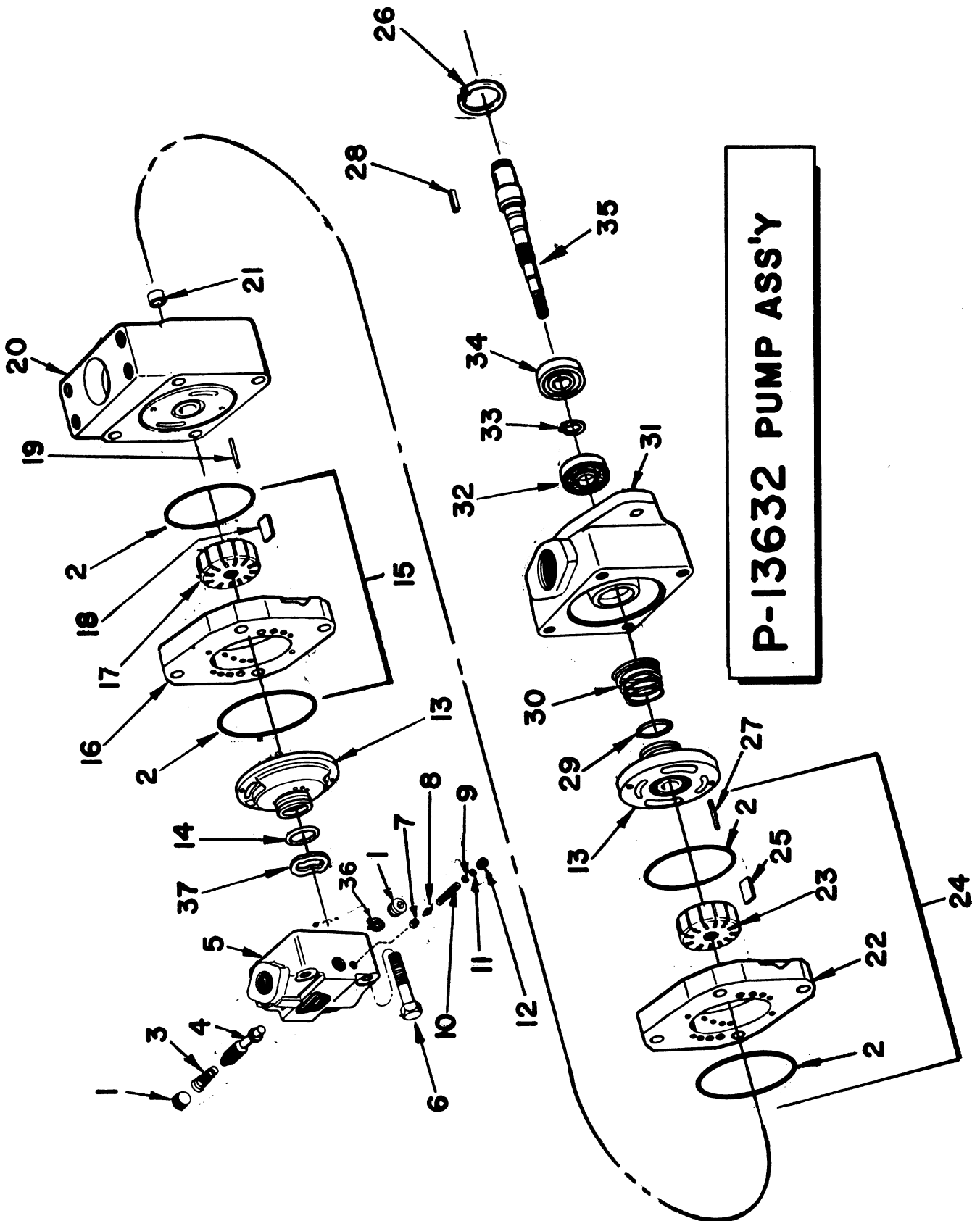


HYDRAULIC PUMP ASSEMBLY
 P-12978



REF.	PART NO.	DESCRIPTION	REQ.
		HYDRAULIC PUMP ASS'Y P-12978	
1	P-12204	Plug	2
2	P-12192	O-Ring	4
3	P-13321	Spring	1
4	P-13322	Piston	1
5	P-13323	Cover	1
6	P-13324	Screw	4
7	P-12102	Seat	1
8	P-13325	Poppet	1
9	P-13326	Shim	1
10	P-13327	Spring	1
11	P-13328	Shim	1
12	P-12440	Plug	1
13	P-12920	Pressure Plate	1
14	P-12919	Spring	1
15	P-13329	Cartridge Kit	1
16	P-13330	Ring	1
17	P-13331	Rotor	1
18	P-13332	Vane Kit (12 Vanes)	1
19	P-13333	Pin	2
20	P-12925	Inlet Body (Includes Bushing)	1
21	P-12926	Bushing	1
22	P-12928	Ring	1
23	P-12929	Rotor	1
24	P-12931	Service Kit	1
25	P-12930	Vane Kit (12 Vanes)	1
26	P-12938	Snap Ring	1
27	P-12927	Pin	2
28	P-12932	Pressure Plate	1
29	P-12210	O-Ring	1
30	P-12933	Spring	1
31	P-12934	Body Outlet	1
32	P-12444	Shaft Seal	1
33	P-12935	Snap Ring	1
34	P-12936	Bearing	1
35	P-12937	Shaft	1
36	P-12939	Key	1

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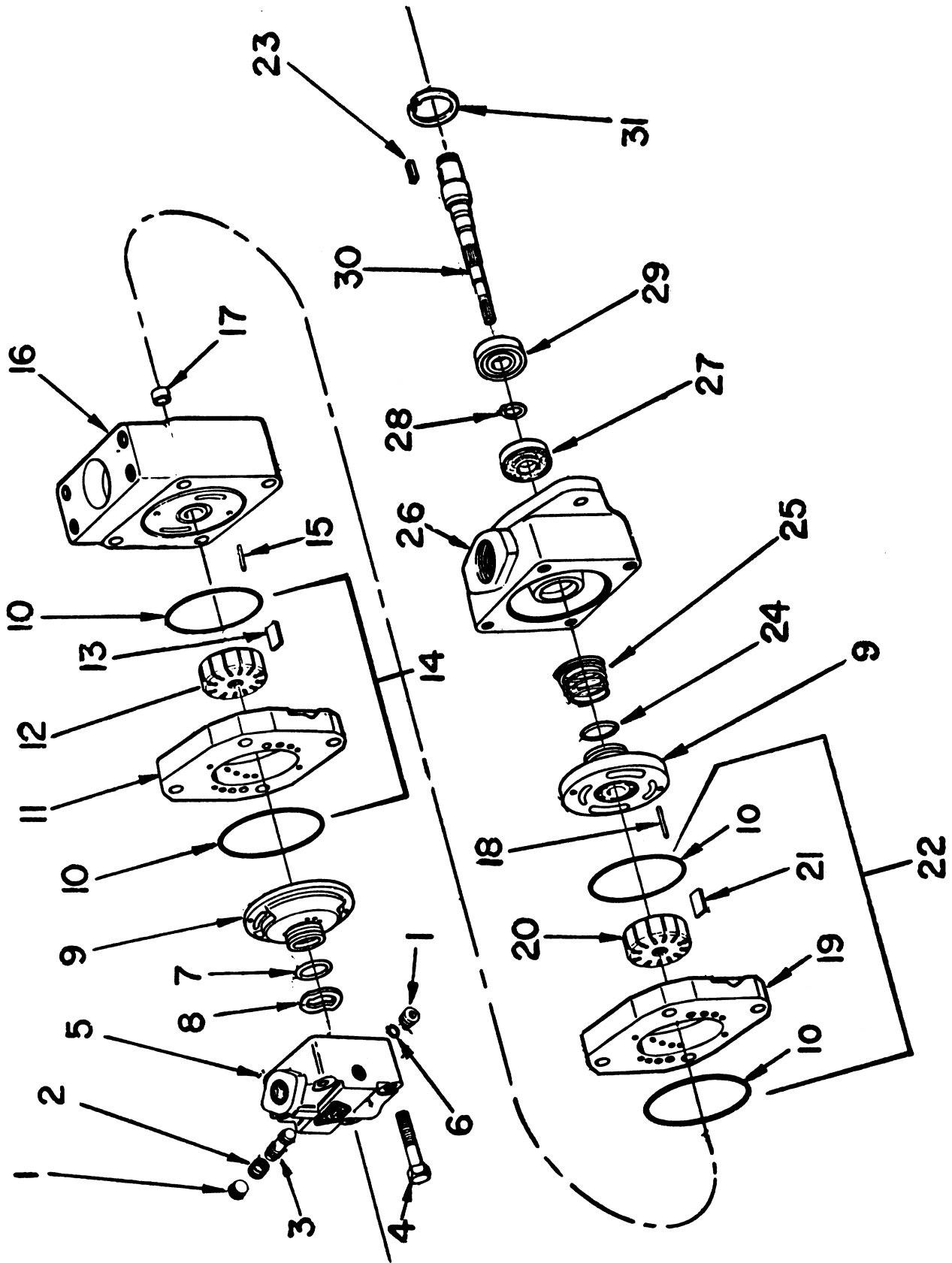


REF.	PART NO.	DESCRIPTION	REQ.
		P-13632 PUMP ASSEMBLY - MODEL 400	
1	P-12204	Plug	2
2	* P-12192	O-Ring	4
3	P-13321	Spring	1
4	P-13322	Piston	1
5	P-13634	Cover	1
6	P-13324	Screw	4
7	P-12102	Seat	1
8	P-13325	Poppet	1
9	P-13639	Shim	1
10	P-13327	Spring	1
11	P-13640	Shim	1
12	P-12440	Plug	1
13	P-13661	Plate	2
14	P-12210	O-Ring	1
15	P-13657	Kit	1
16	P-13641	Ring	1
17	P-13652	Rotor	1
18	P-13645	Vane Kit (12 Vanes)	1
19	P-13649	Pin	2
20	P-12925	Body, Includes P-12926 Bushing	1
21	P-12926	Bushing	1
22	P-13643	Ring	1
23	P-13653	Rotor	1
24	P-13658	Kit	1
25	P-13646	Vane Kit	1
26	P-13938	Snap Ring	1
27	P-12927	Pin	2
28	P-12939	Key	1
29	* P-12210	O-Ring	1
30	P-12933	Spring	1
31	P-12934	Outlet Body	1
32	* P-12444	Seal	1
33	P-12935	Snap Ring	1
34	P-12936	Bearing	1
35	P-12937	Shaft	1
36	P-12205	Snap Ring	1
37	P-13656	Wave Washer	1
38	P-12940	Kit, Seal	1

* These Parts Are Included In
Seal Kit # P-12940

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PUMP ASSEMBLY
NO. P-13770



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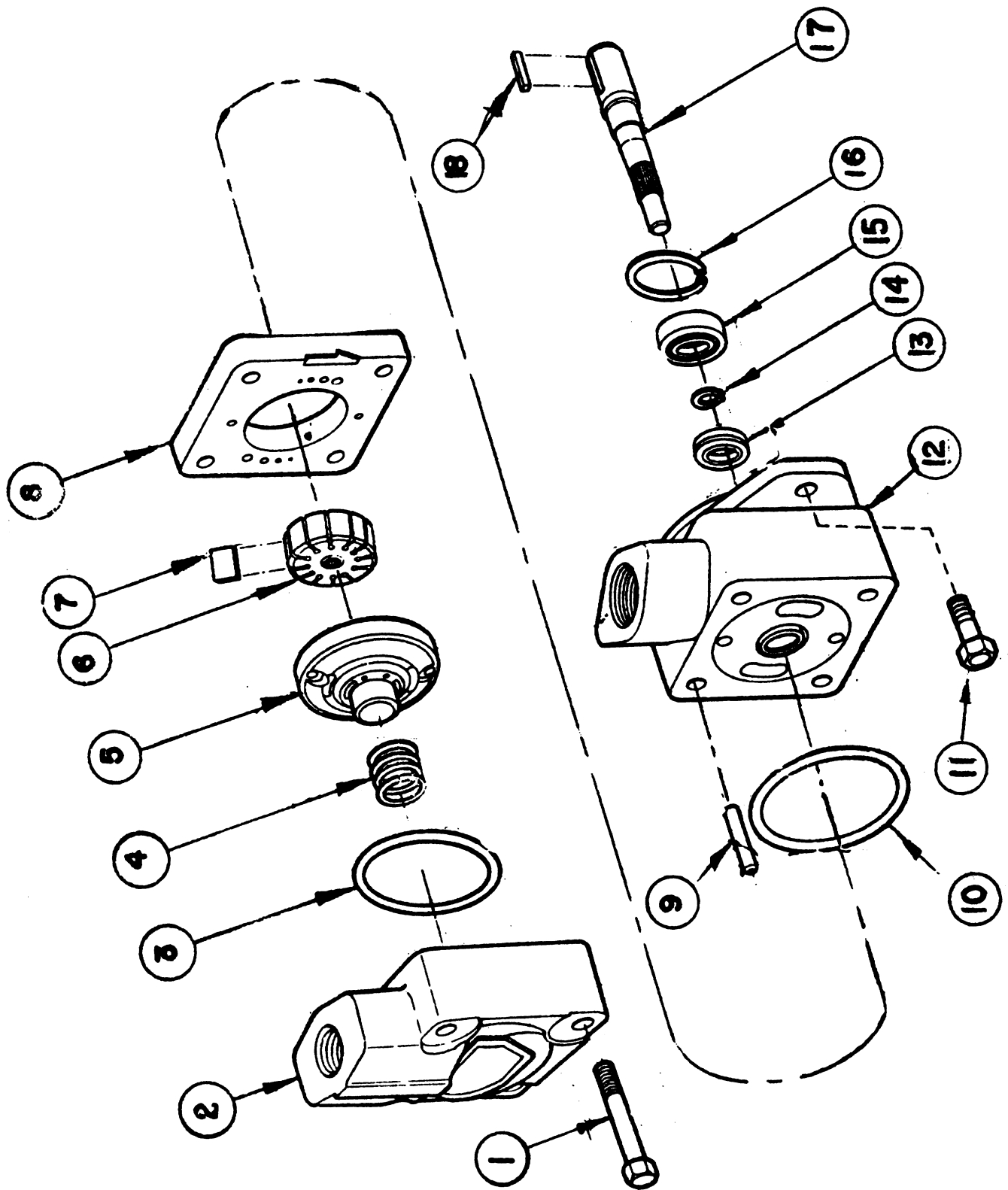
PUMP ASSEMBLY
 NO. P-13770
 S/N 600 - 1617
 NO. P-17807
 S/N 1614,1618 - 1681

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-12204		Plug	2
2	P-12914		Spring	1
3	P-12541		Valve Sub Assembly	1
4	P-13324		Screw	4
5	P-15064		Cover	1
6	P-12205		Snap Ring	1
7	*P-12210		O-Ring	1
8	P-13656		Washer	1
9	P-13661		Pressure Plate	2
10	*P-12192		O-Ring	4
11	P-13641		Ring	1
12	P-13652		Rotor	1
13	P-13645		Vane Kit (12 Vanes)	1
14	P-13657		Kit	1
15	P-13649		Pin	2
16	P-12925		Body (Includes P-12926 Bushing)	1
17	P-12926		Bushing	1
18	P-12927		Pin	2
19	P-13643		Ring	1
20	P-13653		Rotor	1
21	P-13646		Vane Kit (12 Vanes)	1
22	P-13658		Kit	1
23	P-12939		Key (Not Used W/P-17807 Pump)	1
24	P-12210		O-Ring	1
25	P-12933		Spring	1
26	P-12934		Body (Outlet)	1
27	*P-12444		Seal, Shaft	1
28	P-12935		Snap Ring	1
29	P-12936		Bearing	1
30	P-12937		Shaft (Use P-17850 W/P-17807 Pump)	1
31	P-12938		Snap Ring	1
32	P-12940		Seal Kit	1

*Included in P-12940 Seal Kit.

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PUMP ASSEMBLY
NO. P-17329



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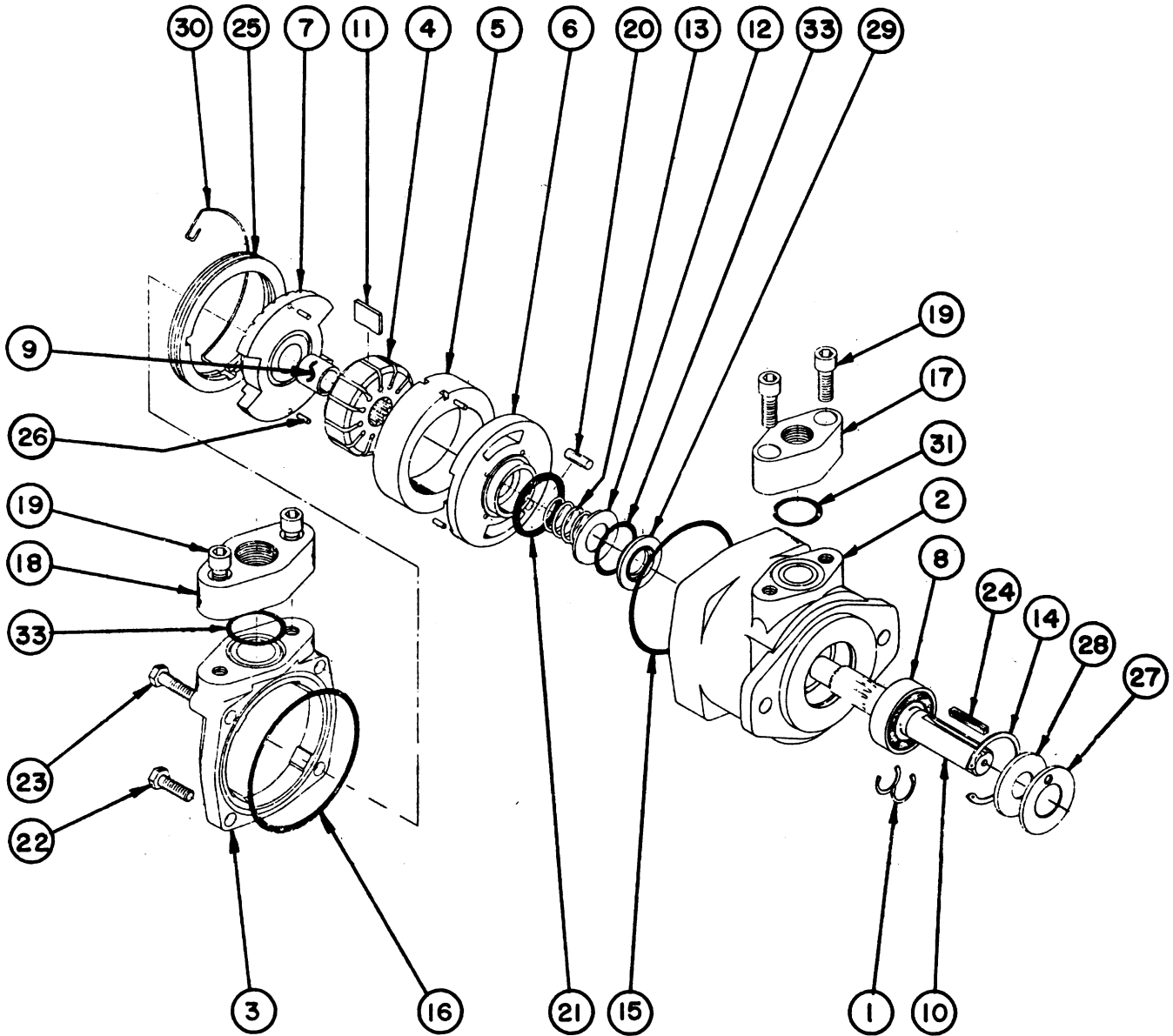
PUMP ASSEMBLY
NO. P-17329

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-17364		Screw	4
2	P-17365		Cover	1
**3	P-17366		O-Ring	1
4	P-17367		Spring	1
5	P-17368		Pressure Plate	1
*6	P-17369		Rotor	1
*7	P-17370		Vane	12
*8	P-17371		Ring	1
9	P-17372		Pin	2
**10	P-17373		O-Ring	1
11	P-17374		Screw	2
12	P-17375		Body	1
**13	P-17376		Seal	1
14	P-17377		Snap Ring	1
15	P-17378		Bearing	1
16	P-12238		Snap Ring	1
17	P-17379		Shaft	1
18	P-17380		Key	1

*P-17381 INCLUDED IN KIT.
**P-17382 INCLUDED IN SEAL KIT.

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PUMP ASSEMBLY
NO. P-17415



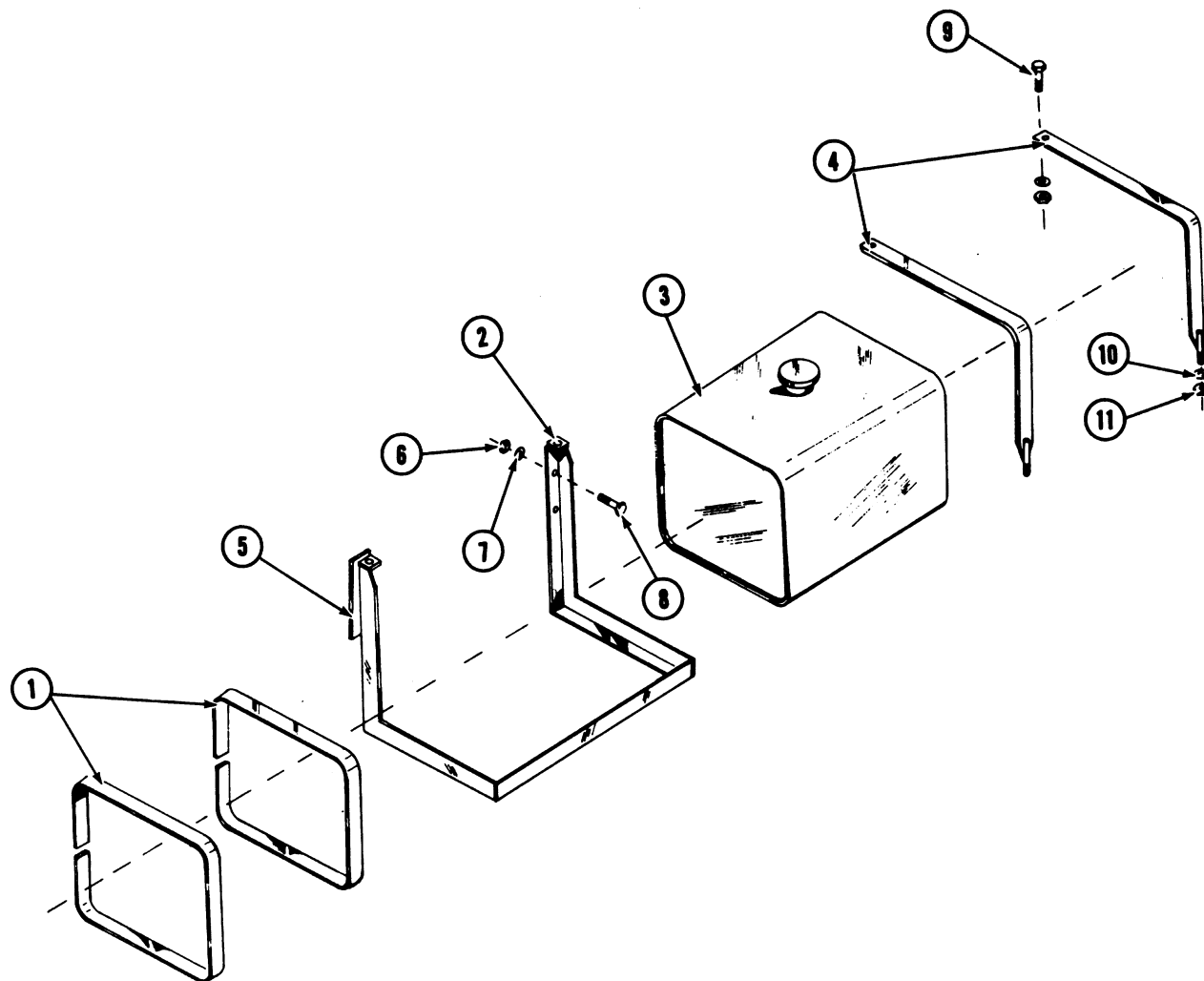
LULL ENGINEERING COMPANY, INC.
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PUMP ASSEMBLY
 NO. P-17415

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-17614		Retainer Ring	2
2	P-17615		Pump Housing	1
3	P-17616		Intake Cover	1
4	P-17617		Rotor	1
5	P-17618		Rotor Ring (3 Gal.)	1
6	P-17619		Exhaust End Plate	1
7	P-17620		Intake End Plate	1
8	P-17621		Main Bearing	1
9	P-17622		Pilot Bearing	1
10	P-17623		Drive Shaft	1
11	P-17624		Vane	12
12	P-17625		Slip Ring Washer	1
13	P-17626		Slip Ring Spring	1
14	P-17627		Bearing Housing Snap Ring	1
15	P-17628		Exhaust Plate Seal	1
16	P-17629		Intake Plate Seal	1
17	P-17630		Exhaust Flange	1
18	P-17631		Intake Flange	1
19	P-17632		Flange Bolt	4
20	P-17633		Exhaust Plate Locking Pin	1
21	P-17634		Exhaust Plate Quad Ring	1
22	P-17635		Int. Cover Screw	2
23	P-17636		Int. Cover Screw	2
24	P-17637		Key	1
25	P-17638		Threaded Ring	1
26	P-17639		Reversing Stop Pin	4
27	P-17640		Dust Shield Retainer	1
28	P-17641		Leather Washer	1
29	P-17642		Slip Ring	1
30	P-17643		Locking Wire	1
31	P-17644		O-Ring	1
32	P-17645		Seal Replacement Service Kit	1
33	P-17646		O-Ring	2

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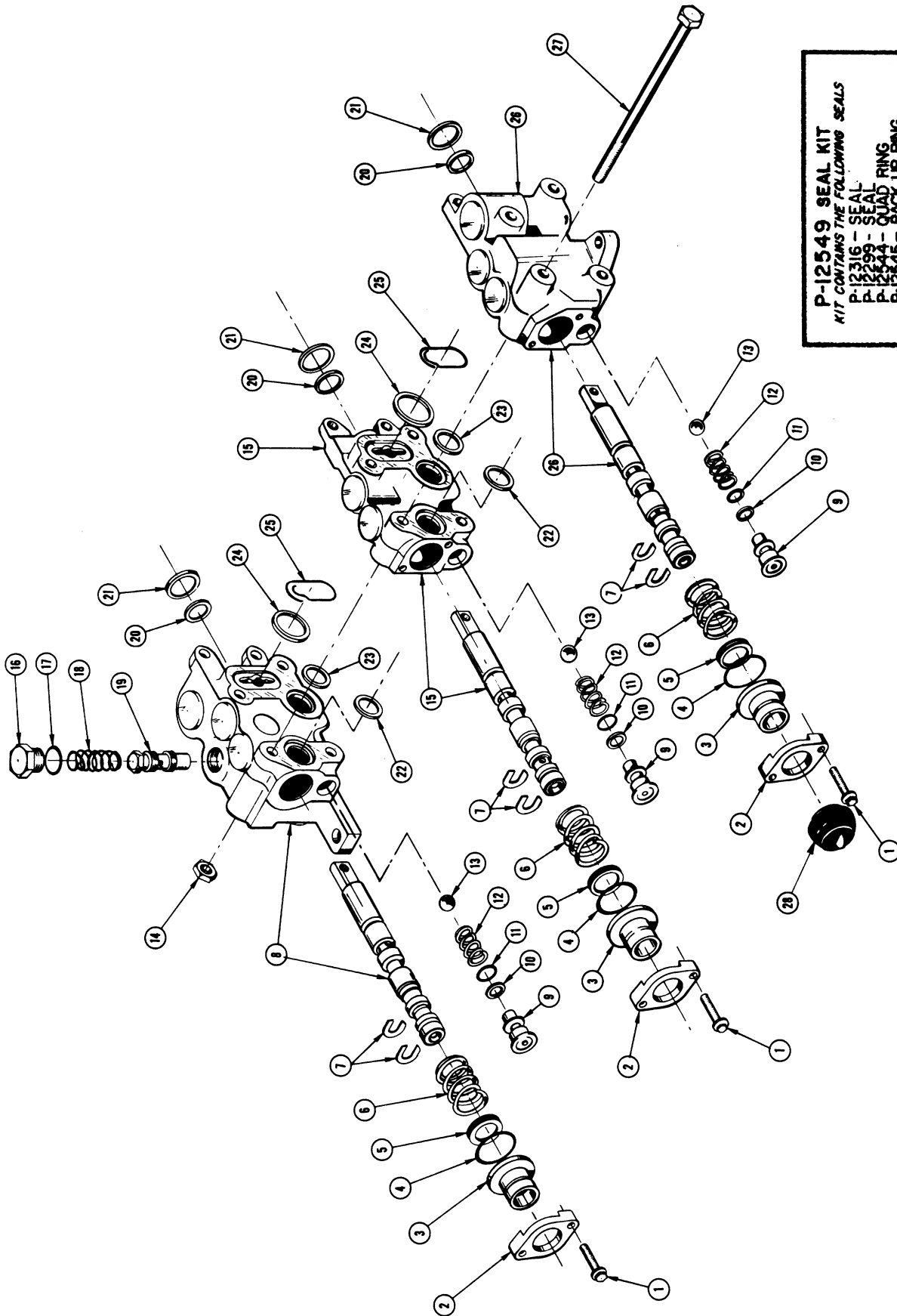
FUEL TANK ASSEMBLY
NO. 8701



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

TANK, Fuel Assembly
 NO. 8701

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10521		Webbing	2
2	8700		Bracket Weldment	1
3	P-11401		Gas Tank	1
4	3530		Strap Weldment	2
5	8698		Support	1
6	COM'L		Full Nut, 5/16" - 18 NC	4
7	COM'L		Lockwasher, 5/16"	4
8	COM'L		Capscrew Flathead 5/16"-18NCx2"	4
9	COM'L		Capscrew, 1/4"-20NC x 3/4" Long	2
10	COM'L		Lockwasher, 1/4"	4
11	COM'L		Full Nut, 1/4" - 20 NC	4



P-12549 SEAL KIT
 KIT CONTAINS THE FOLLOWING SEALS

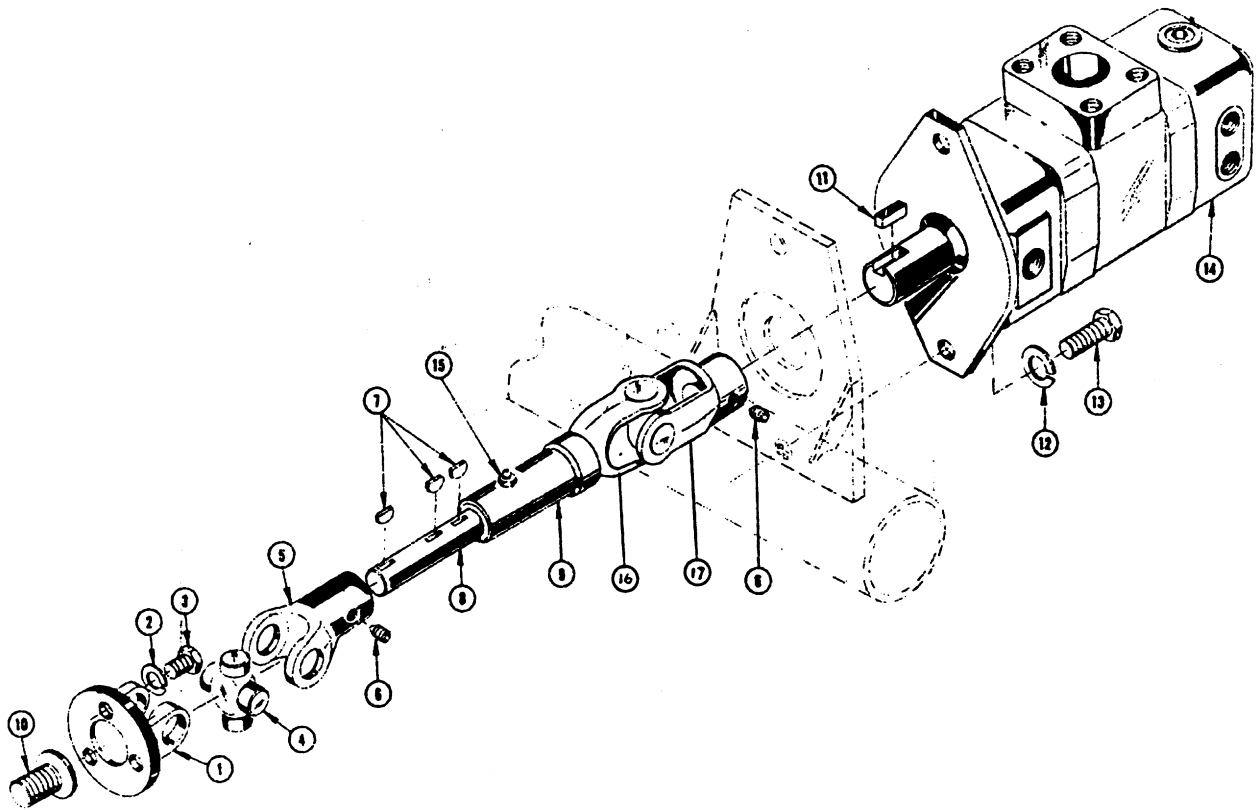
P.12316	- SEAL
P.12299	- SEAL
P.12544	- O-RING
P.12245	- O-RING
P.12301	- O-RING
P.12300	- O-RING
P.12304	- O-RING
P.12305	- O-RING
P.12314	- O-RING
P.12313	- O-RING

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

VALVE ASSEMBLY
 NO. 10,950

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-12311		Screw	10
2	P-12312		Retainer	5
3	P-12310		Sleeve	5
4	*P-12313		O-Ring	5
5	*P-12314		Quad Ring	5
6	P-12315		Spring	5
7	P-12309		C-Washer	10
8	P-12546		Section & Spool	1
9	P-12306		Plug	5
10	*P-12305		Back Up Ring	5
11	*P-12304		O-Ring	5
12	P-12303		Spring	5
13	P-12302		Ball	5
14	P-12307		Nut	8
15	P-12547		Section & Spool	3
16	P-12285		Plug	1
17	P-12295		O-Ring	1
18	P-12296		Spring	1
19	P-12541		Valve Control	1
20	*P-12544		Quad Ring	5
21	*P-12545		Back-UP Ring	5
22	*P-12316		Seal	4
23	*P-12300		Seal	4
24	*P-12299		Seal	4
25	*P-12301		Retainer	4
26	P-12548		Section & Spool	1
27	P-12543		Stud	4
28	P-13317		Dust Cap	3

* Included in P-12549 Seal Kit



HYDRAULIC PUMP DRIVE ASS'Y. 11590

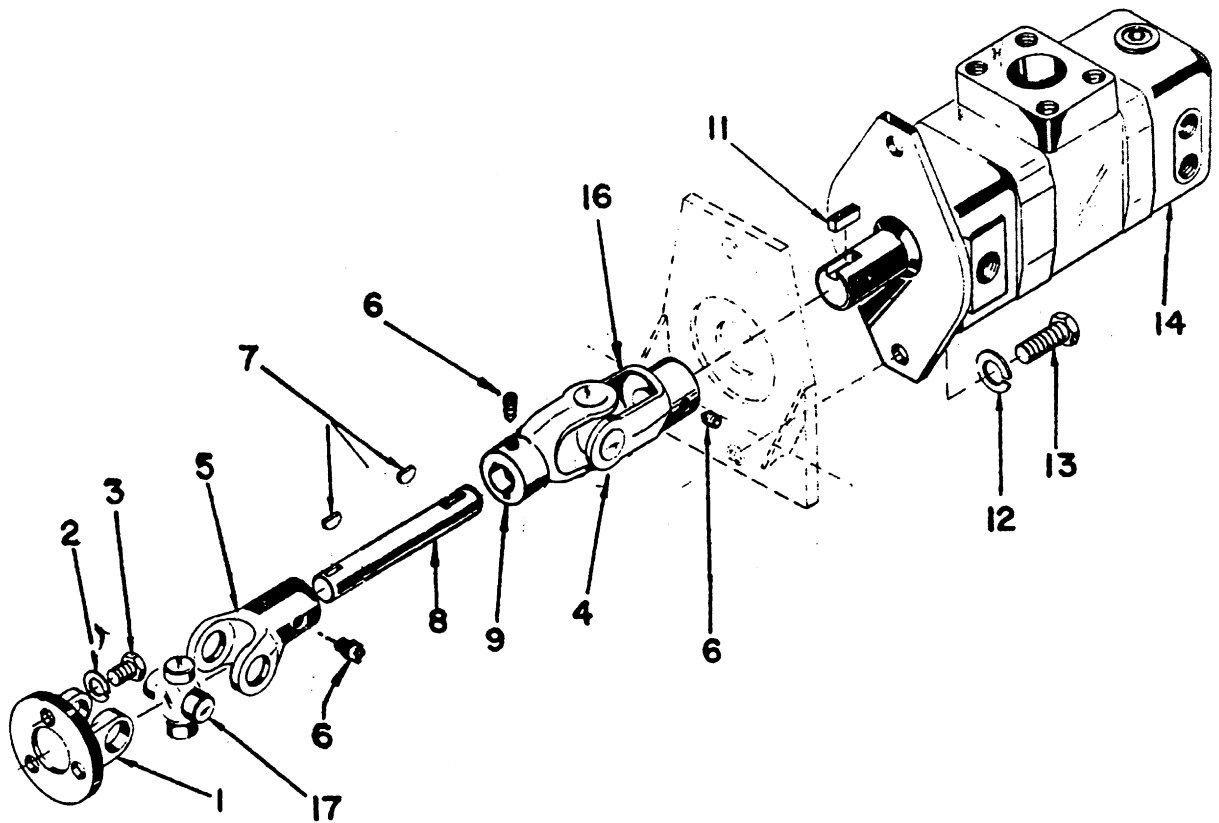
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC PUMP DRIVE ASS'Y
 NO. 11,590

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	11,573		Pump Drive Adapter	1
2	COM'L		Lockwasher, 5/16	3
3	COM'L		Capscrew, 5/16 x 1 1/4 NC	3
4	P-10525		Center Cross Kit	1
5	P-10523		End Yoke	1
6	COM'L		Setscrew, 3/8 x 3/8-16 NC	2
7	P-10517		Woodruff Key	3
8	3518		Shaft	1
9	P-13698		Slip Joint (S/N 101-446, Use P-10515)	1
10	11,571		Special Bolt	1
11	COM'L		Key, 1/4 x 1/4 x 1 1/2 long	1
12	COM'L		Lockwasher	2
13	COM'L		Capscrew, 1/2-13 x 1 NC	2
14		SEE NOTE	Pump, Hydraulic (Page 78)	1
15	COM'L		Zerk, 1/4 NPT Straight	1
16	P-13699		Cross	1
17	P-13700		End Yoke	1

NOTE:

Serial Number 600 and up use Pump # P-13770
 Serial Number 447 thru 599 use #P-13632
 Serial Number 100 thru 446 use #P-12978



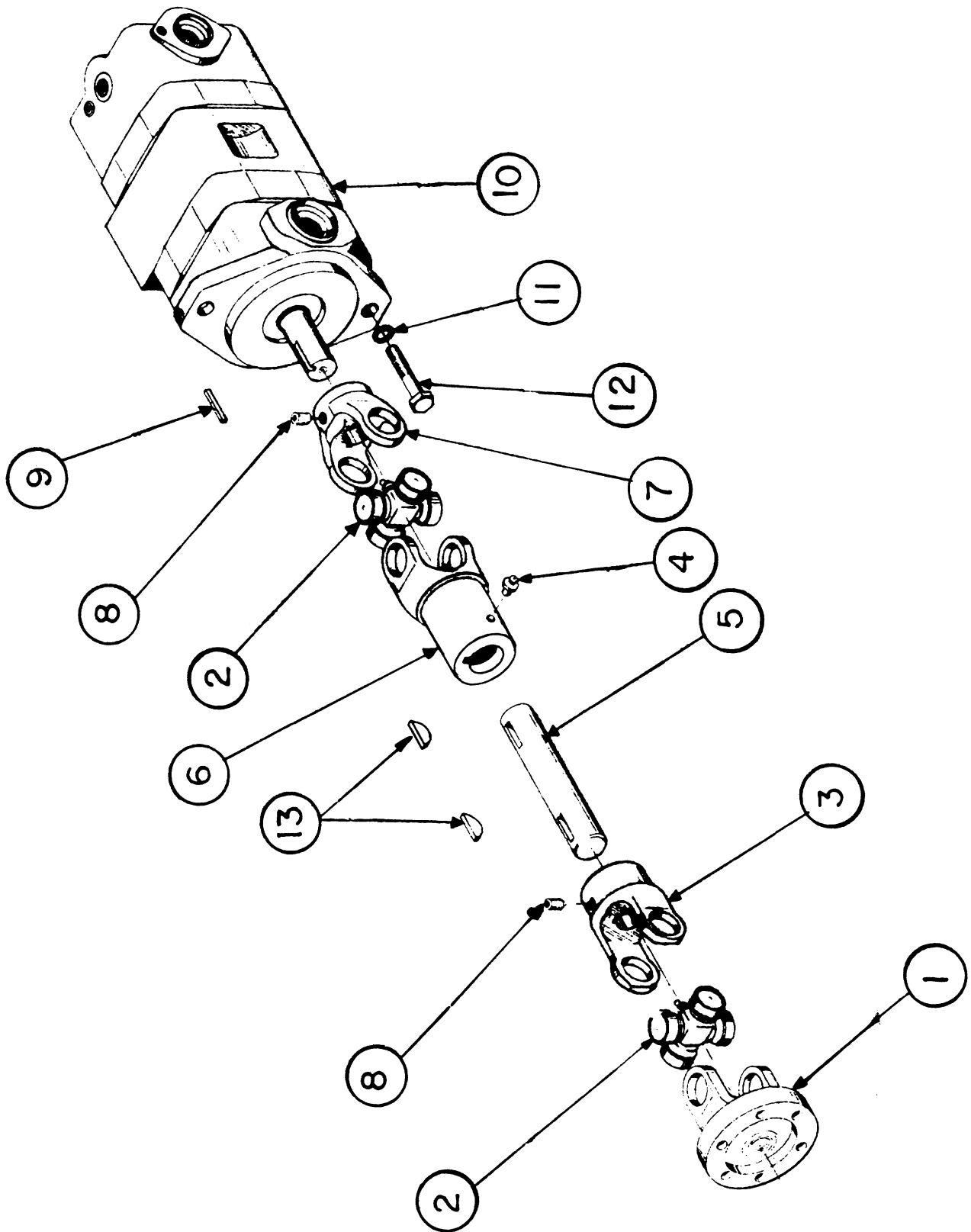
HYDRAULIC PUMP DRIVE ASS'Y. 12007

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC PUMP DRIVE ASS'Y
 NO. 12,007

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	12,137		Drive Adapter Weldment	1
2	COM'L		Lockwasher, 3/8	4
3	COM'L		Capscrew, 3/8 NC x 2	4
4	P-10525		Center Cross Kit	1
5	12,140		End Yoke	1
6	COM'L		Setscrew, 3/8 x 3/8-16 NC	2
7	P-10517		Woodruff Key	2
8	12,010		Shaft	1
9	P-13457		Special End Yoke	1
10				
11	COM'L		Key, 1/4 x 1/4 x 1 1/2 Long	1
12	COM'L		Lockwasher	2
13	COM'L		Capscrew, 1/2-13 x 1 NC	2
14		*P-13770	Pump, Hydraulic (Page 78)	1
15	COM'L		Zerk, 1/4 NPT Straight	1
16	12,043		Special End Yoke	1
17	P-13458		Center Cross Kit	1

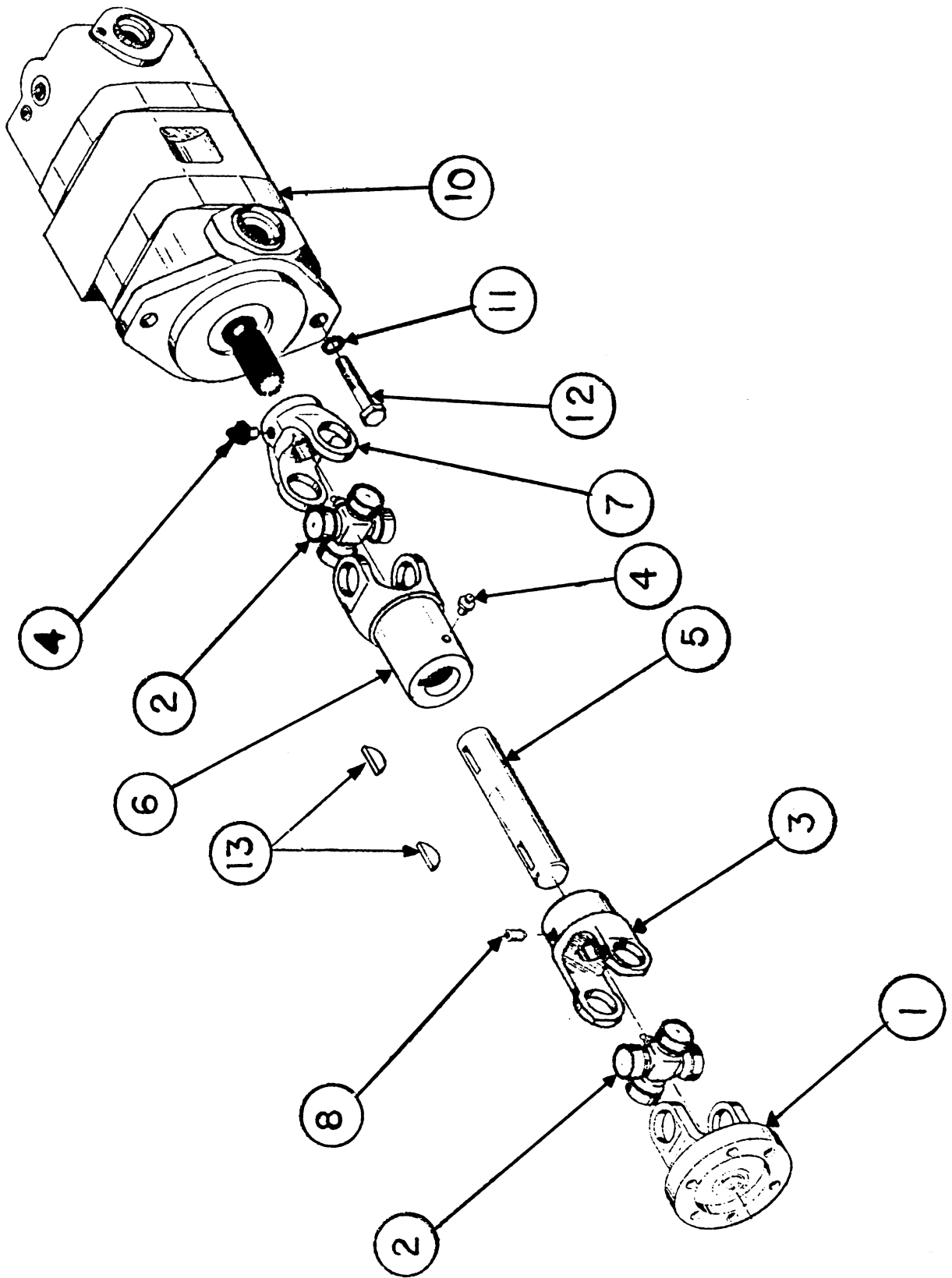
*Serial Number 600 and up use Pump # P-13770
 Serial Number 447 thru 599 use # P-13632
 Serial Number 100 thru 446 use # P-12978



LULL ENGINEERING COMPANY, INC.
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 ST. PAUL, MINNESOTA 55121

HYDRAULIC PUMP DRIVE ASS'Y (GAS)
 NO. 11,590
 S/N 887 to 1613, 1615 to 1617

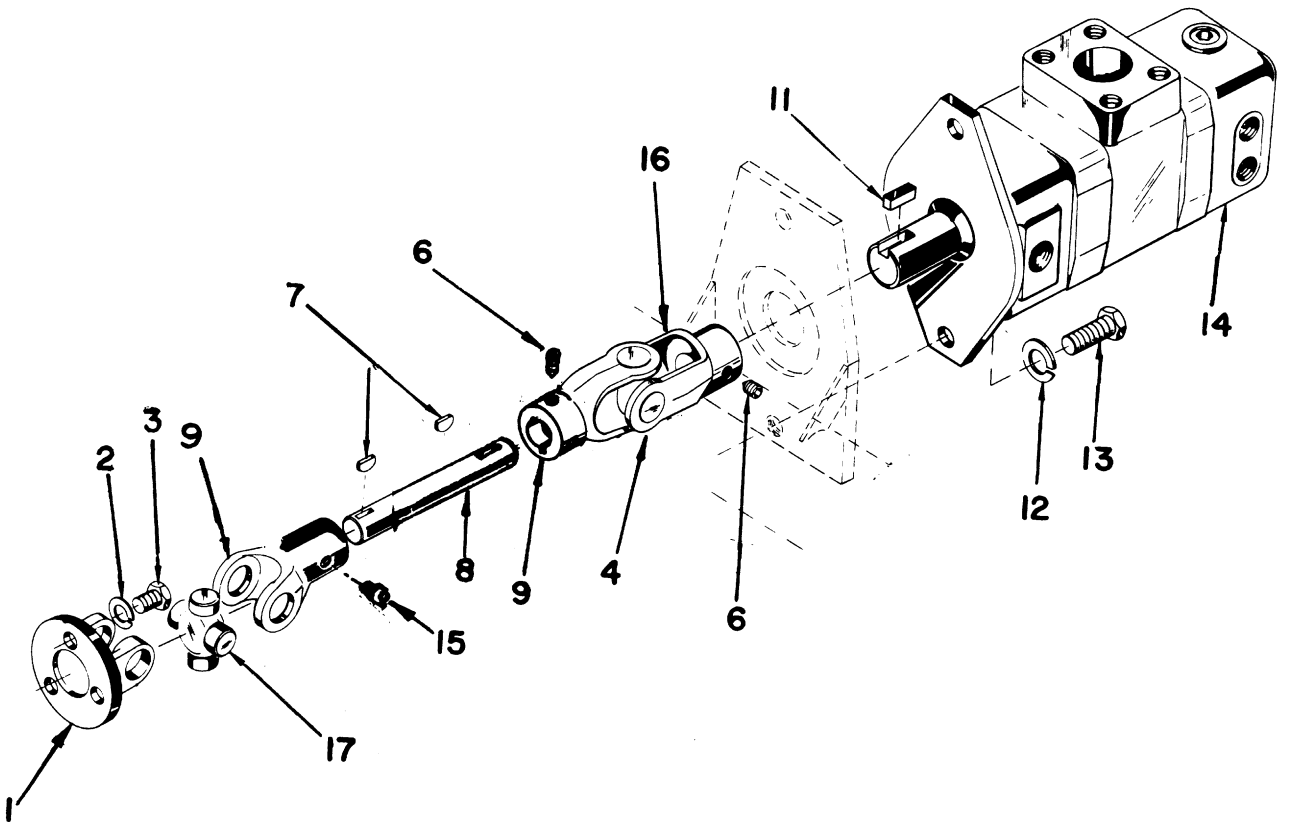
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13,535		Adapter, Pump	1
2	P-13699		Cross Kit	2
3	P-10523		End Yoke	1
4	COM'L		Grease Fitting (1/8 N.P.T.)	1
5	13,806		Shaft	1
6	12,140		End Yoke	1
7	P-10462		End Yoke	1
8	COM'L		Setscrew (3/8-16 NC x 3/8 Cup Point)	2
9	COM'L		Key (3/16 x 3/16 x 1 1/2 Long)	1
10		P-13770	Pump Assembly (Page 78)	1
11	COM'L		Washer, Shakeproof (1/2")	2
12	COM'L		Capscrew (1/2-13 x 1 1/4)	2
13	P-10517		Key	2



LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINN. 55121

HYDRAULIC PUMP DRIVE ASS'Y (GAS)
NO. 14725
S/N 1614,1618 thru

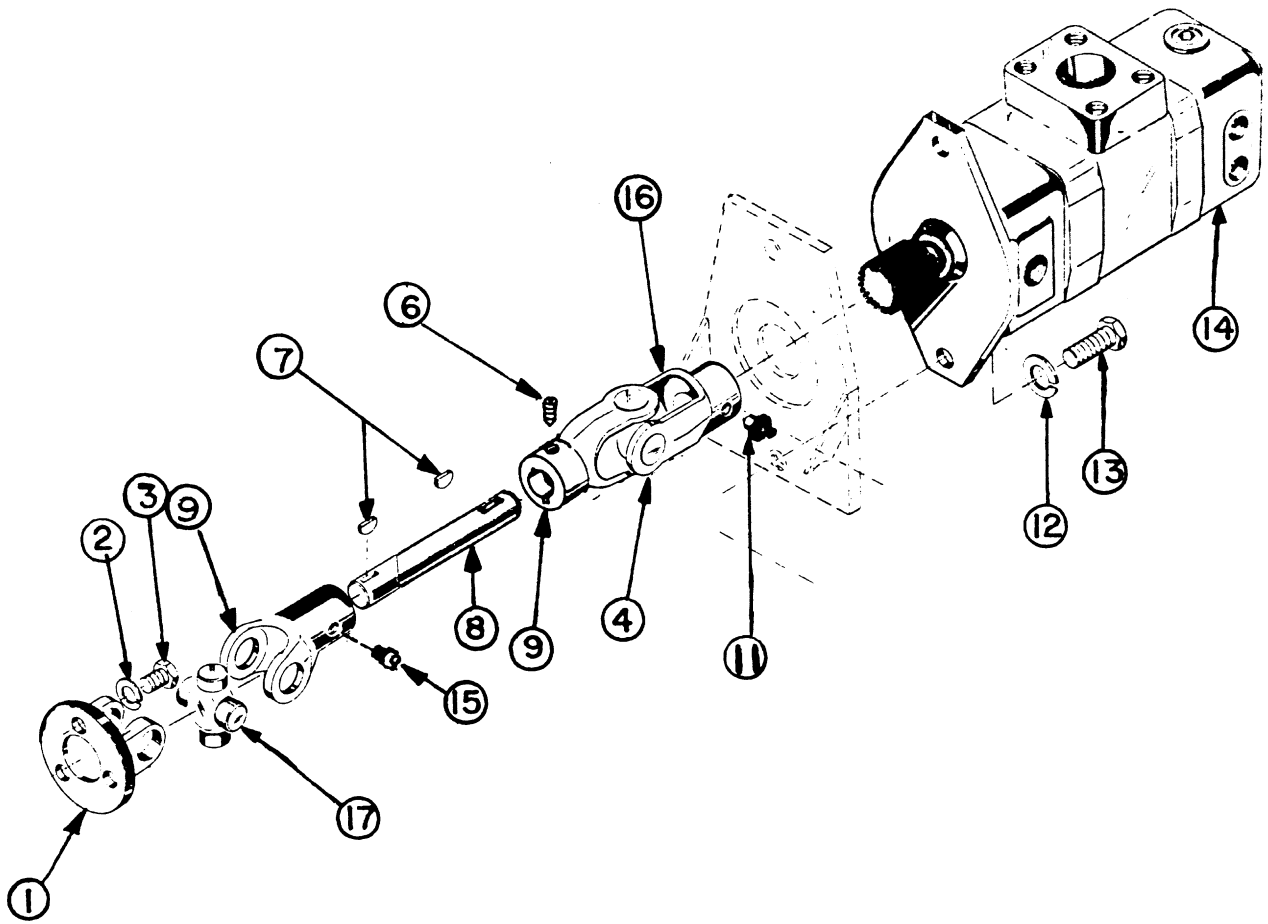
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13535		Adapter, Pump	1
2	P-13699		Cross Kit	2
3	P-10523		End Yoke	1
4	Com'1		Zerk, 1/8 NPT (Straight)	2
5	14723		Shaft	1
6	12140		End Yoke	1
7	14729		End Yoke	1
8	Com'1		Setscrew (3/8-16 NC x 3/8 Cup Pt)	2
9				
10		P-17807	Pump Assembly (page 78)	1
11	Com'1		Washer, Shakeproof 1/2"	2
12	Com'1		Capscrew 1/2-13 x 1 1/4	2
13	P-10517		Key	2



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA . 55121

HYDRAULIC PUMP DRIVE ASSEMBLY (DIESEL)
 NO. 13,403
 S/N 799 to 1613

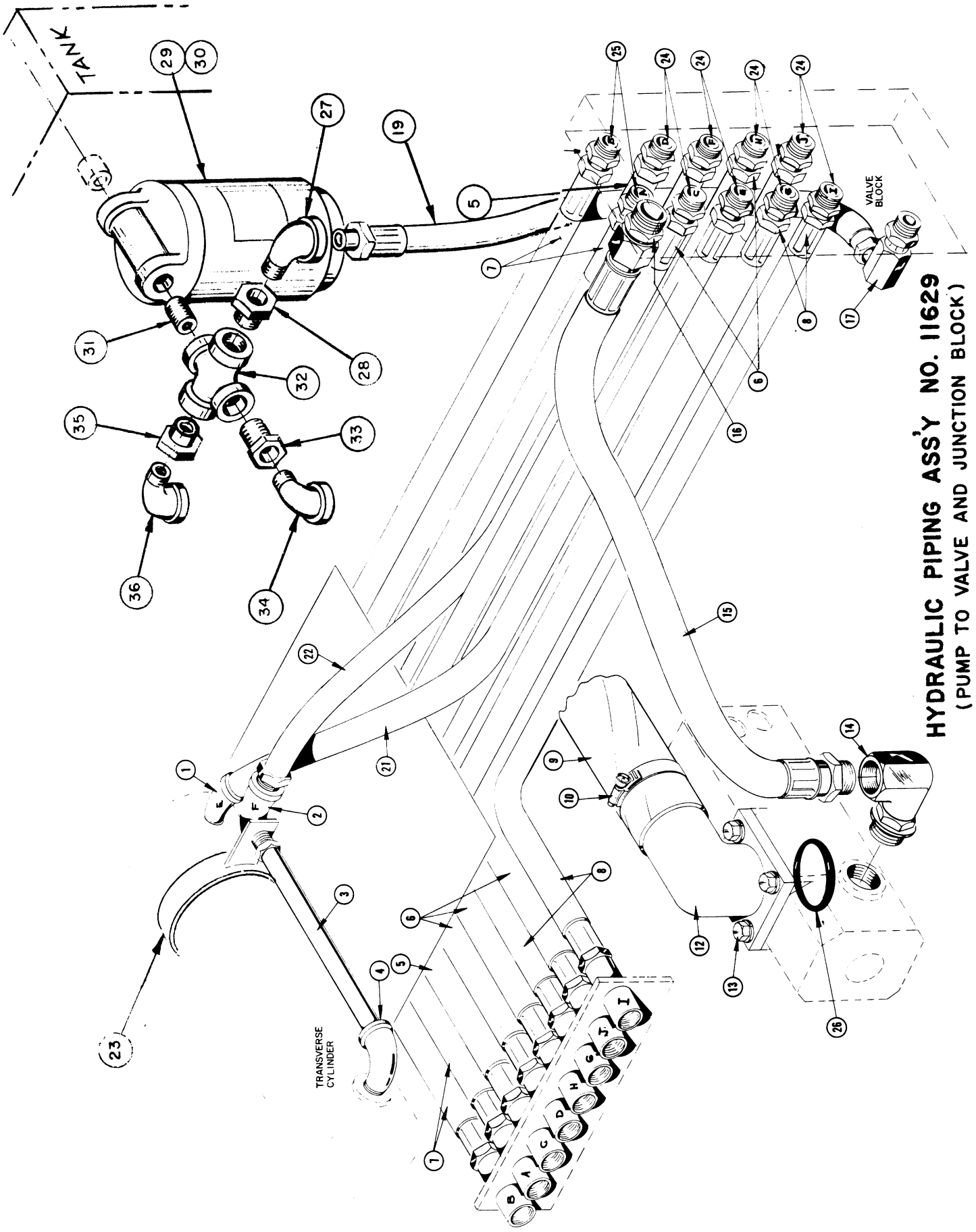
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13,412		Drive Adapter Weldment	1
2	COM'L		Lockwasher, 3/8	4
3	COM'L		Capscrew, 3/8 NC x 2	4
4	P-13458		Center Cross Kit	1
6	COM'L		Setscrew, 3/8 x 3/8-16 NC	2
7	P-10517		Woodruff Key	2
8	13,391		Shaft	1
9	P-13457		Special End Yoke	1
10				
11	COM'L		Key, 1/4 x 1/4 x 1 1/2 Long	1
12	COM'L		Lockwasher, 1/2"	2
13	COM'L		Capscrew, 1/2-13 x 1 NC	2
14		*P-13770	Pump, Hydraulic (Page 78)	1
15	COM'L		Zerk, 1/4-28 NF (Straight)	1
16	12,043		Special End Yoke	1
17	P-13699		Center Cross Kit	1



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
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HYDRAULIC PUMP DRIVE ASS'Y (DIESEL)
 NO. 14724
 S/N 1614 thru

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13412		Drive Adapter Weldment	1
2	Com'1		Lockwasher 3/8	4
3	Com'1		Capscrew, 3/8 NC x 2	4
4	P-13458		Center Cross Kit	1
5				
6	Com'1		Setscrew, 3/8 x 3/8-16 NC	2
7	P-10517		Woodruff Key	2
8	14731		Shaft	1
9	P-13457		Special End Yoke	2
10				
11	Com'1		Zerk, 1/8 NPT (Straight)	1
12	Com'1		Lockwasher, 1/2"	2
13	Com'1		Capscrew, 1/2-13 x 1 NC	2
14		P-17807	Pump, Hydraulic (Page 78)	1
15	P-15272		Zerk, 1/4-28 NF (Straight)	1
16	14729		Special End Yoke	1
17	P-13699		Center Cross Kit	1



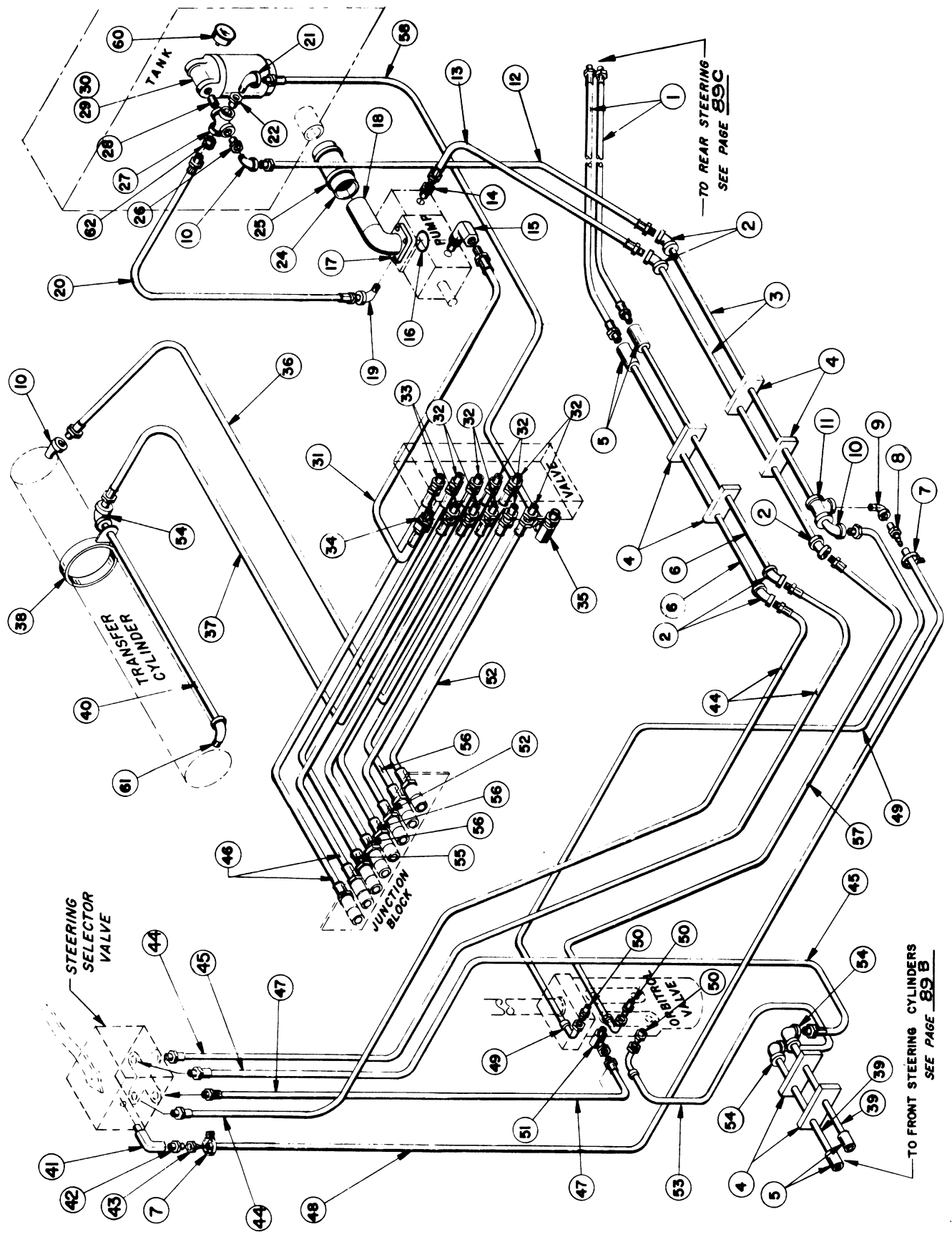
HYDRAULIC PIPING ASSY NO. 11629
 (PUMP TO VALVE AND JUNCTION BLOCK)



REF.	PART NO.	DESCRIPTION	REQ.
		PUMP TO VALVE ASSEMBLY NO. 11,629	
1	P-10119	Street Ell	1
2	P-10225	Elbow	1
3	N-10183	Pipe	1
4	P-10117	Street Ell	1
5	P-10451	Hose	1
6	P-10327	Hose	3
7	P-10274	Hose	2
8	P-10452	Hose	2
9	COM'L	Hose, 2 3/8" I.D. x 9 Radiator	1
10	P-10178	Hose Clamp	2
11			
12	11,598	Adaptor Hose (For Int. D., Use 12,033)	1
13	COM'L	Capscrew, 1/2 x 1 1/4 N.C.	4
14	P-13013	Fitting	1
15	P-13012	Hose	1
16	P-13004	Fitting	1
17	P-12909	Swivel Fitting	1
18	P-10180	Bushing	1
19	P-13003	Hose	1
20	P-10217	Street Ell	1
21	P-10272	Hose	1
22	P-10453	Hose	1
23	612	Cylinder Pipe Clamp	1
24	P-12908	Swivel Fitting	8
25	P-12907	Swivel Fitting	2
26	P-12971	O-Ring	1
27	P-10101	Street L	1
28	P-10059	Bushing	1
29	*P-13586	Element	1
30	*P-13587	Filter	1
31	P-10892	Nipple	1
32	P-13623	Cross	1
33	P-10700	Bushing	1
34	P-10118	Street L	1
35	P-10699	Bushing	1
36	P-10110	Street L	1
		Optional (Spin on Type)	
		Item # 29 Element No. P-13685	
		Item # 30 Filter No. P-13684	

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM DIAGRAM
 PUMP TO VALVE
 NO. 13,069



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

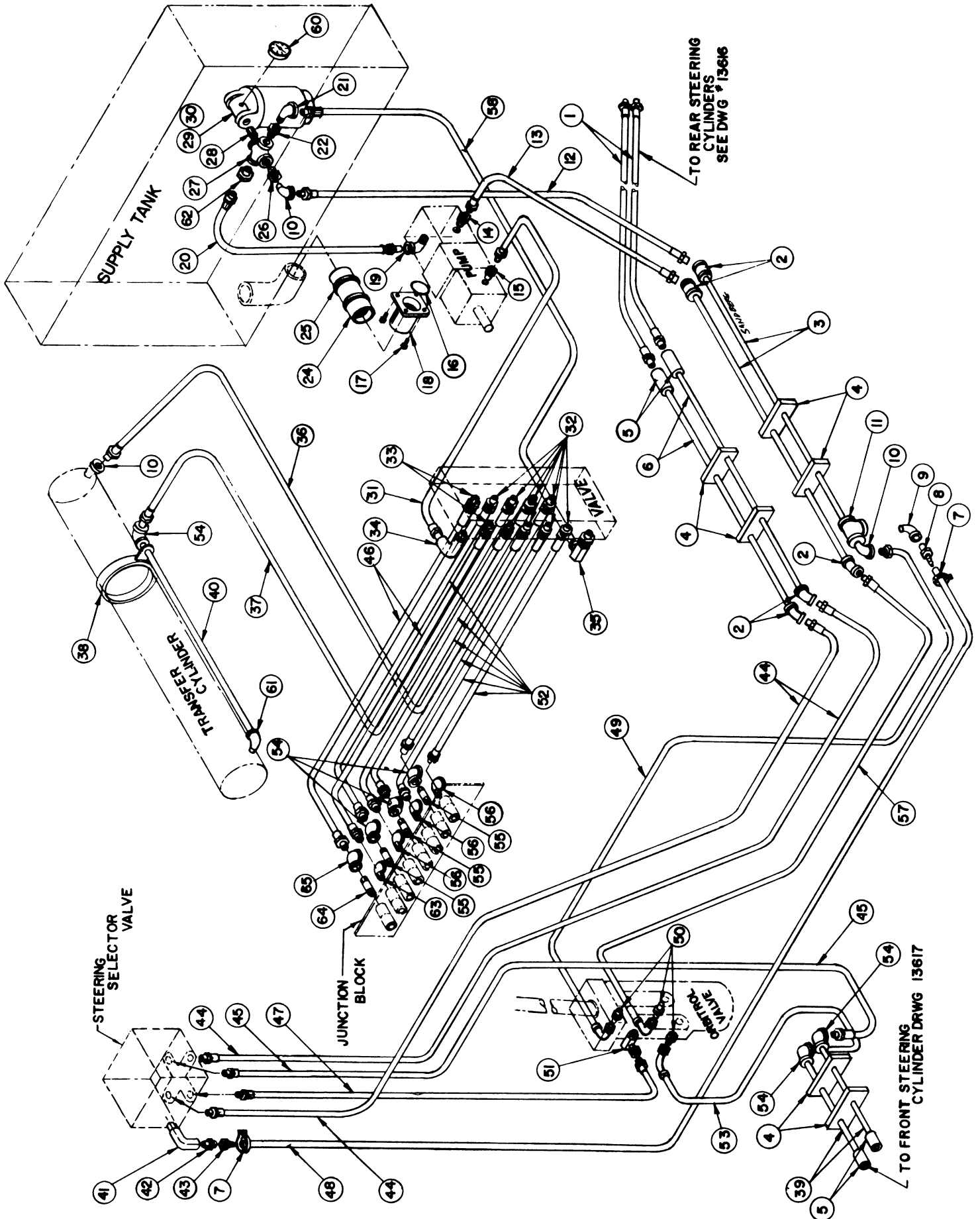
HYDRAULIC SYSTEM DIAGRAM
 PUMP TO VALVE
 NO. 13,069

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-11525		Hose	2
2	P-10206		Elbow	2
3	N-10316		Pipe	2
4	7731		Clamp	6
5	P-10328		Coupling	4
6	N-10315		Pipe	2
7	P-14047		Hose Clamp	2
8	P-13619		Fitting	1
9	P-10216		Street L	1
10	P-10118		Street L	2
11	P-15120		Tee	1
12	P-11525		Hose	1
13	P-13342		Hose	1
14	P-15107		Fitting	1
15	P-15451		Fitting	1
16	P-12971		O-Ring	1
17	COM'L		Capscrew, 1/2 x 1 1/4 N.C.	4
18	11,598		Pump Adapter (For Int. D., Use 12,033)	1
19	P-10191		Street L	1
20	P-10280		Hose	1
21	P-10101		Street L	1
22	P-10059		Bushing	1
23	P-10178		Hose Clamp	2
24	COM'L		Hose	1
25	P-10178		Hose Clamp	2
26	P-10700		Bushing	1
27	P-15121		Cross	1
28	P-10892		Nipple	1
29	*P-13586		Element	1
30	*P-13587		Filter	1
31	P-13012		Hose	1
32	P-11335		Adapter	8
33	P-12907		Adapter	2
34	P-13004		Adapter	1
35	P-12909		Adapter	1
36	P-12945		Hose	1
37	P-10453		Hose	1
38	612		Pipe Clamp	1
39	N-10321		Pipe	2
40	N-10183		Pipe	1
41	P-16430		Street L	1
42	P-13979		Connector	1
43	P-13617		Connector, Hose	1
44	P-13695		Hose	2
45	P-11139		Hose	1
46	P-10274		Hose	2
47	P-10452		Hose	1
48	P-15119		Hose	1
49	P-13441		Hose	1
50	P-12510		Adapter	3

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM DIAGRAM
PUMP TO VALVE
NO. 13,069

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
51	P-12908		Adapter	2
52	P-10452		Hose	2
53	P-13442		Hose	1
54	P-10225		Elbow	3
55	P-10451		Hose	1
56	P-10327		Hose	3
57	P-13440		Hose	1
58	P-13003		Hose	1
59				
60	P-13686		Gauge	1
61	P-10117		Street L	1
62	P-10699		Bushing	1
	*P-13684		Filter, Hydraulic (Spin On)	1
	*P-13685		Element, Filter (Spin On)	1



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

HYDRAULIC ASS'Y. (PUMP TO VALVES)
 400 WAUKESHA DIESEL
 NO. 13,472

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-11525		Hose	2
2	P-10328		Coupling	2
3	N-10316		Pipe	2
4	7731		Clamp	6
5	P-10328		Coupling	4
6	N-10315		Pipe	2
7	P-14047		Hose Clamp	2
8	P-13619		Fitting	1
9	P-10216		Street "L"	1
10	P-10118		Street "L"	2
11	P-15120		Tee	1
12	P-11525		Hose	1
13	P-10390		Hose	1
14	P-15107		Fitting	1
15	P-12970		Adapter	1
16	P-12971		"Ø" Ring	1
17	COM'L		Capscrew (1/2 x 1 1/4 N.C.)	4
18	13,384		Pump Adapter	1
19	P-10191		Street "L"	1
20	P-10280		Hose	1
21	P-10101		Street "L"	1
22	P-10059		Bushing	1
23	P-10178		Hose Clamp	2
24	COM'L		Hose (2 3/8 I.D. x 9" Rad.)	1
25	P-10178		Hose Clamp	2
26	P-10700		Bushing	1
27	P-15121		Cross	1
28	P-10892		Nipple	1
29	P-13586		Element	1
30	P-13587		Filter	1
31			Hose (3/4 x 39" M. To M.)	1
32	P-12908		Adapter	8
33	P-12907		Adapter	2
34	P-17164		Adapter	1
35	P-12909		Adapter	1
36	P-12945		Hose	1
37	P-10453		Hose	1
38	612		Pipe Clamp	1
39	N-10321		Pipe	2
40	N-10183		Pipe	1
41	P-16430		Street "L"	1
42	P-13979		Connector Male	1
43	P-13617		Connector, Hose	1
44	P-13695		Hose	2
45	P-11139		Hose	1
46	P-10302		Hose	2
47	P-10452		Hose	1
48	P-15119		Hose	1
49	P-13441		Hose	1
50	P-12510		Adapter	3
51	P-12908		Adapter	2
52	P-10327		Hose	6
53	P-13442		Hose	1

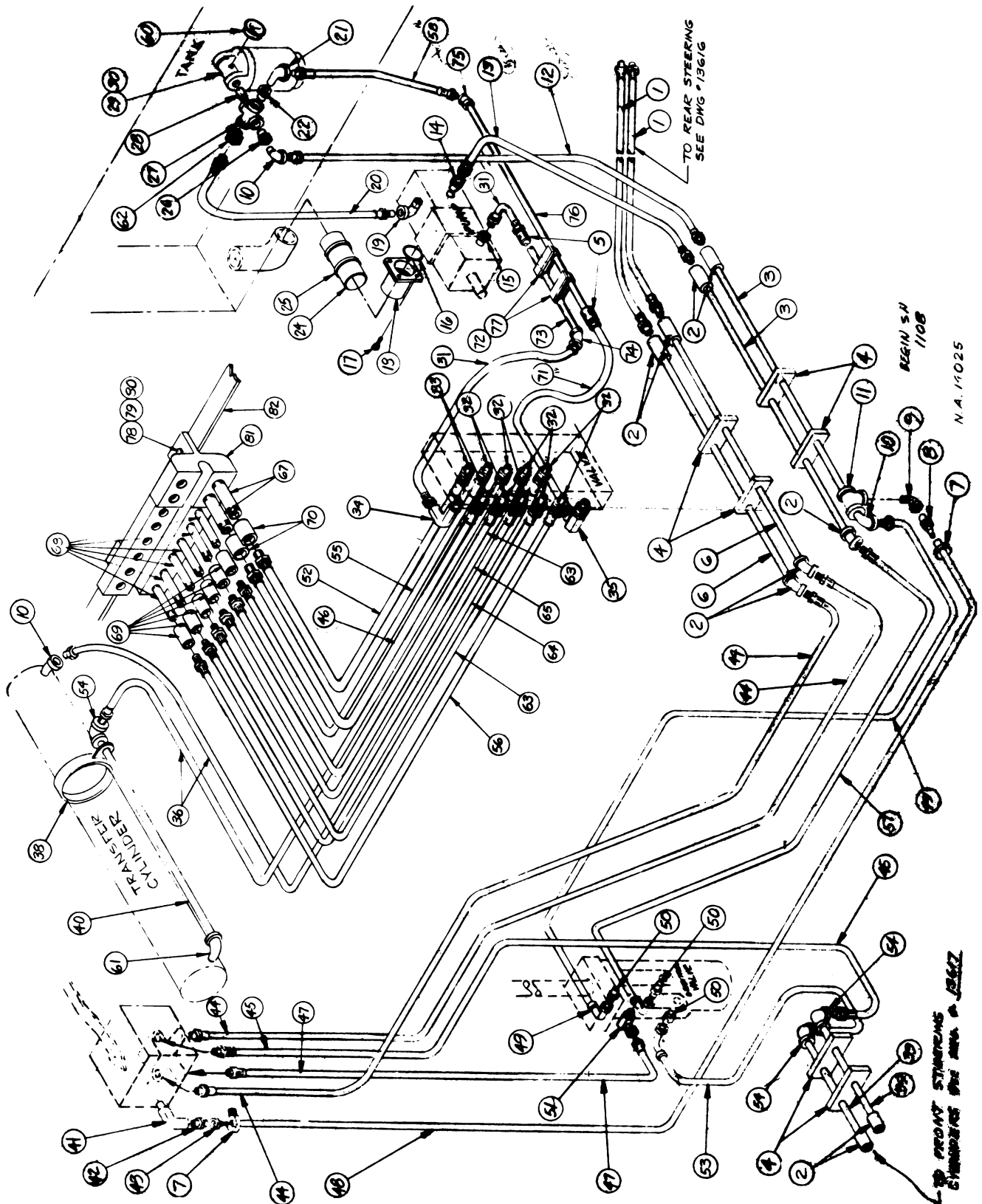
LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

HYDRAULIC ASS'Y. (PUMP TO VALVE)
400 WAUKESHA DIESEL
NO. 13,472

<u>ITEM</u> <u>NO.</u>	<u>PART</u> <u>NO.</u>	<u>ASSEMBLY</u> <u>NO.</u>	<u>DESCRIPTION</u>	<u>NO.</u> <u>REQ.</u>
54	P-10225		Elbow	3
55	P-10189		Nipple	3
56	P-10116		Street "L"	3
57	P-13440		Hose	1
58	P-13003		Hose	1
60	P-13686		Gauge	1
61	P-10117		Street "L"	1
62	P-10699		Bushing	1
63	P-10110		Street "L"	1
64	P-10608		Nipple	1
65	P-10226		Elbow	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
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HYDRAULIC ASSEMBLY
(PUMP TO VALVE) 400 W.D.
NO. 14,029



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC ASSEMBLY
 (PUMP TO VALVE) 400 W.D.
 NO. 14,029

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-11525		Hose	2
2	P-10328		Coupling	9
3	N-10316		Pipe	2
4	7731		Clamp	6
5	P-10674		Coupling	2
6	N-10315		Pipe	2
7	P-14047		Hose Clamp	2
8	P-13619		Fitting	1
9	P-10216		Street "L"	1
10	P-10118		Street "L"	2
11	P-15120		Tee	1
12	P-11525		Hose	1
13	P-10390		Hose	1
14	P-15107		Fitting	1
15	P-12970		Adapter	1
16	P-12971		O-Ring	1
17	COM'L		Capscrew, 1/2 x 1 1/4 N.C. (Gr. 5)	4
18	13,384		Pump Adapter	1
19	P-10191		Street "L"	1
20	P-10280		Hose	1
21	P-10101		Street "L"	1
22	P-10059		Bushing	1
24	COM'L		Hose, 2 3/8 I.D. x 9" Rad.	1
25	P-10178		Hose Clamp	2
26	P-10700		Bushing	1
27	P-15121		Cross	1
28	P-10892		Nipple	1
29	P-13586		Element	1
30	P-13587		Filter	1
31	P-13012		Hose	2
32	P-11335		Adapter	8
33	P-12907		Adapter	2
34	P-17164		Adapter	1
35	P-12909		Adapter	1
36	P-12945		Hose	1
38	612		Pipe Clamp	1
39	N-10321		Pipe	2
40	N-10183		Pipe	1
41	P-16430		Street "L"	1
42	P-13979		Connector, Male	1
43	P-13617		Connector, Hose	1
44	P-13695		Hose	2
45	P-11139		Hose	1
46	P-12943		Hose	1
47	P-10452		Hose	1
48	P-15119		Hose	1
49	P-13441		Hose	1
50	P-12510		Adapter	3
51	P-12908		Adapter	1
52	P-10782		Hose	1
53	P-13442		Hose	1

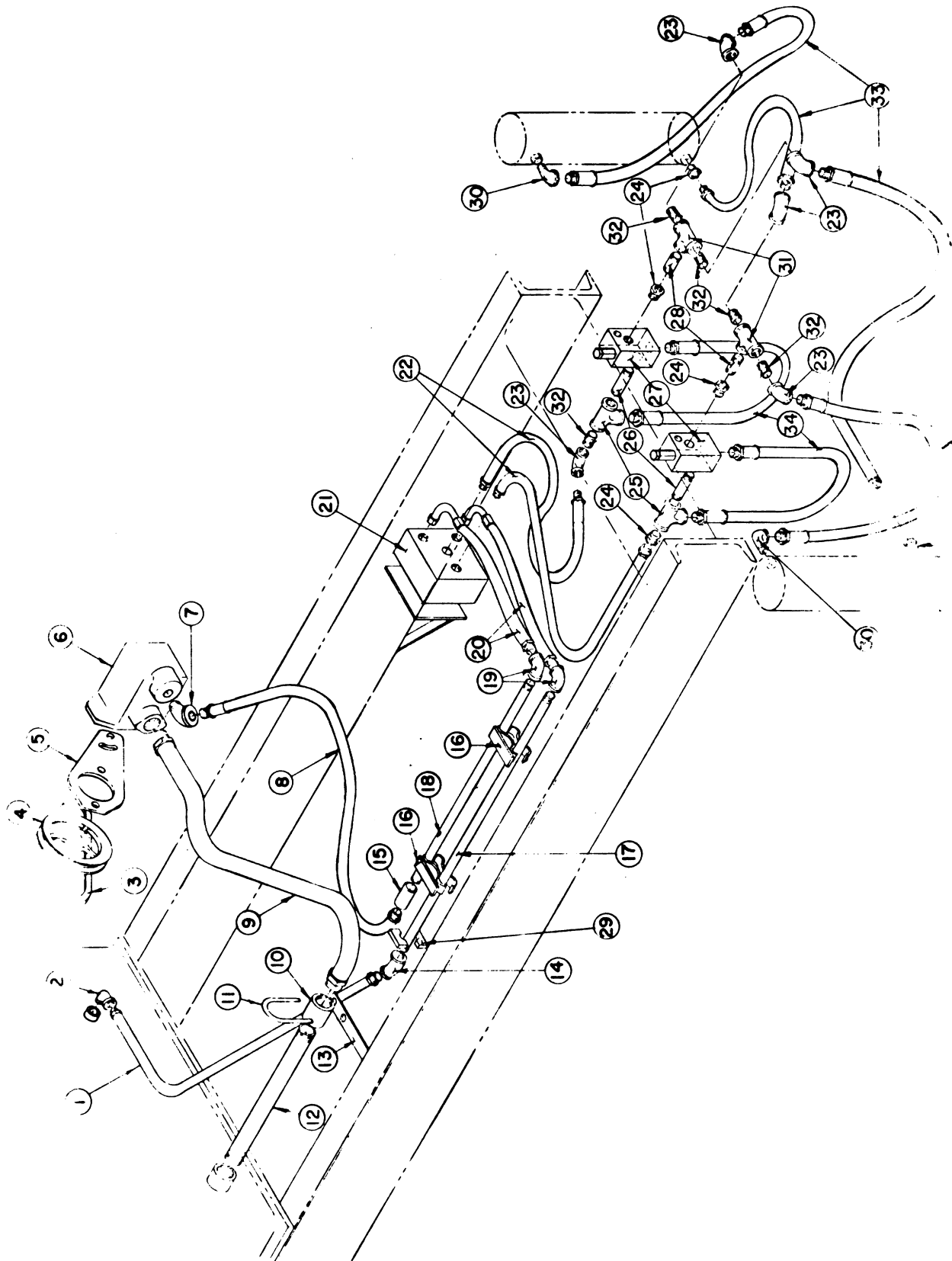
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINN. 55121

HYDRAULIC ASSEMBLY
 (PUMP TO VALVE) 400 W.D.
 NO. 14029

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
54	P-10225		Elbow	3
55	P-13443		Hose	1
56	P-13452		Hose	1
57	P-13440		Hose	1
58	P-17438		Hose	1
60	P-13686		Gauge	1
61	P-10117		Street "L"	1
62	P-10699		Bushing	1
63	P-10272		Hose	3
64	P-11502		Hose	1
65	P-11501		Hose	1
67	P-15540		Pipe	2
68	P-15536		Pipe	6
69	P-15628		Coupling	6
70	P-15542		Coupling	2
71	P-13003		Hose	1
72	6610		Clamp	2
73	N-10159		Pipe	1
74	P-15570		Elbow	1
75	P-10210		Elbow	1
76	P-10514		Pipe	1
77	6611		Clamp	2
78	Com'1		Screw, 3/8 N.C. x 1 1/2	2
79	Com'1		Nut, 3/8 N.C.	2
80	Com'1		Lockwasher, 3/8	2
81	8961		Hose Terminal	1
82	13969		Bar Support	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
MODEL "400"
NO. 13,736



24

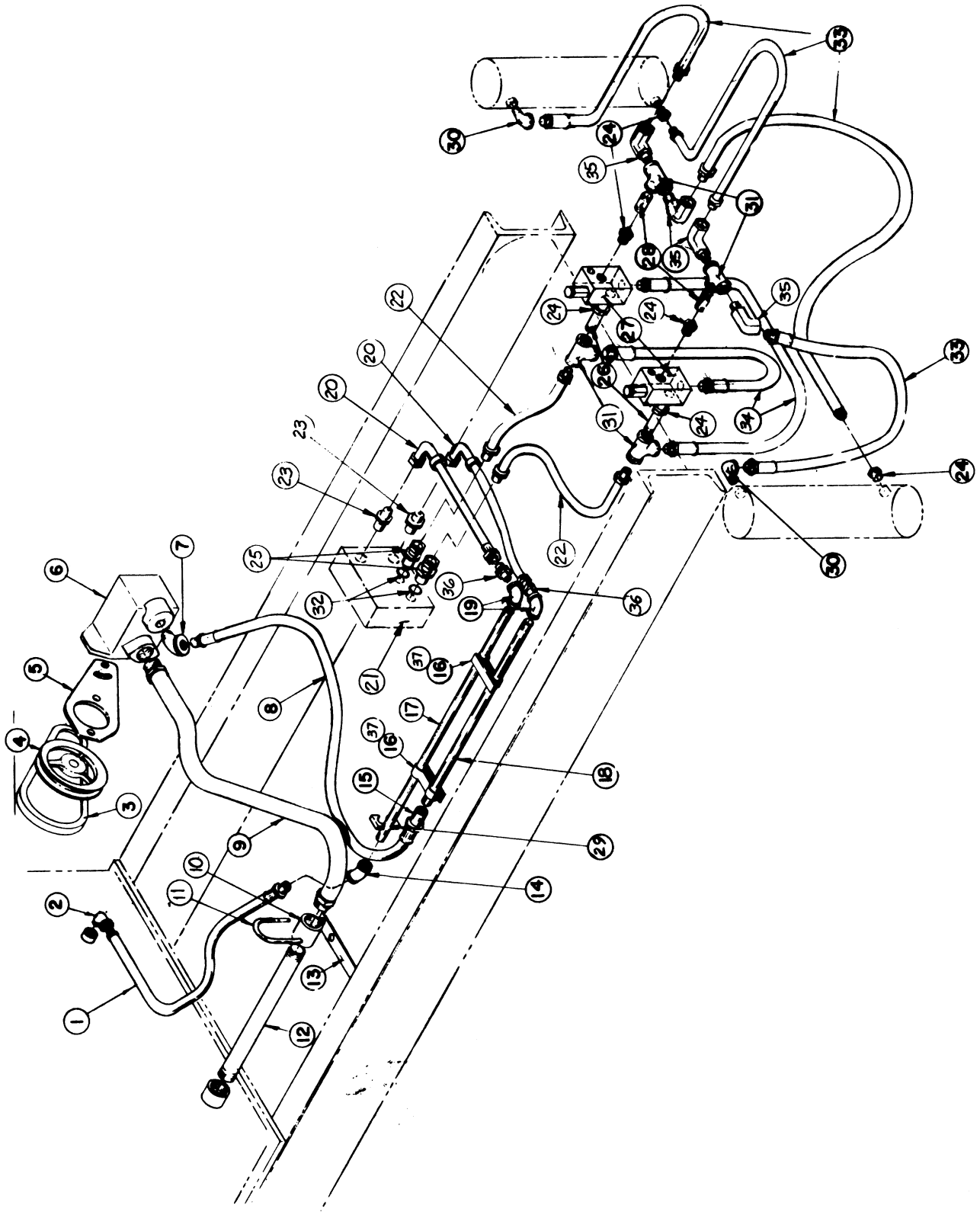
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASS'Y
 MODEL 400-N TF (GAS)
 NO. 13,736

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10267		Hose	1
2	P-15567		St. Ell	1
3	P-17330		Belt	1
4	13,675		Pulley	1
5	13,707		Mtg. Bracket	1
6	P-17329		Pump	1
7	P-15565		St. Ell	1
8	P-11614		Hose	1
9	P-17322		Hose	1
10	P-10126		Coupling	1
11	8924		Clamp	1
12	13,711		Pipe	1
13	13,712		Bracket	1
14	P-15564		Elbow	1
15	P-15542		Coupling	1
16	6611		Bracket, Pipe	2
17	N-10424		Pipe	1
18	N-10423		Pipe	1
19	P-15566		Elbow	2
20	P-15485		Hose	2
21	P-13005		Valve Control	1
22	P-10476		Hose	2
23	P-15558		Elbow	5
24	P-10691		Reducer	5
25	P-15586		Tee	2
26	P-15505		Nipple	2
27	13,760		Valve, Safety	2
28	P-15502		Nipple	2
29	13,757		Clamp, Pipe	1
30	P-15582		St. Ell.	2
31	P-15554		Tee	2
32	P-16965		Close Nipple	5
33	P-14652		Hose	4
34	P-11646		Hose	2

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
(VICKERS PUMP & VALVE)
400 NTF NO. 13736



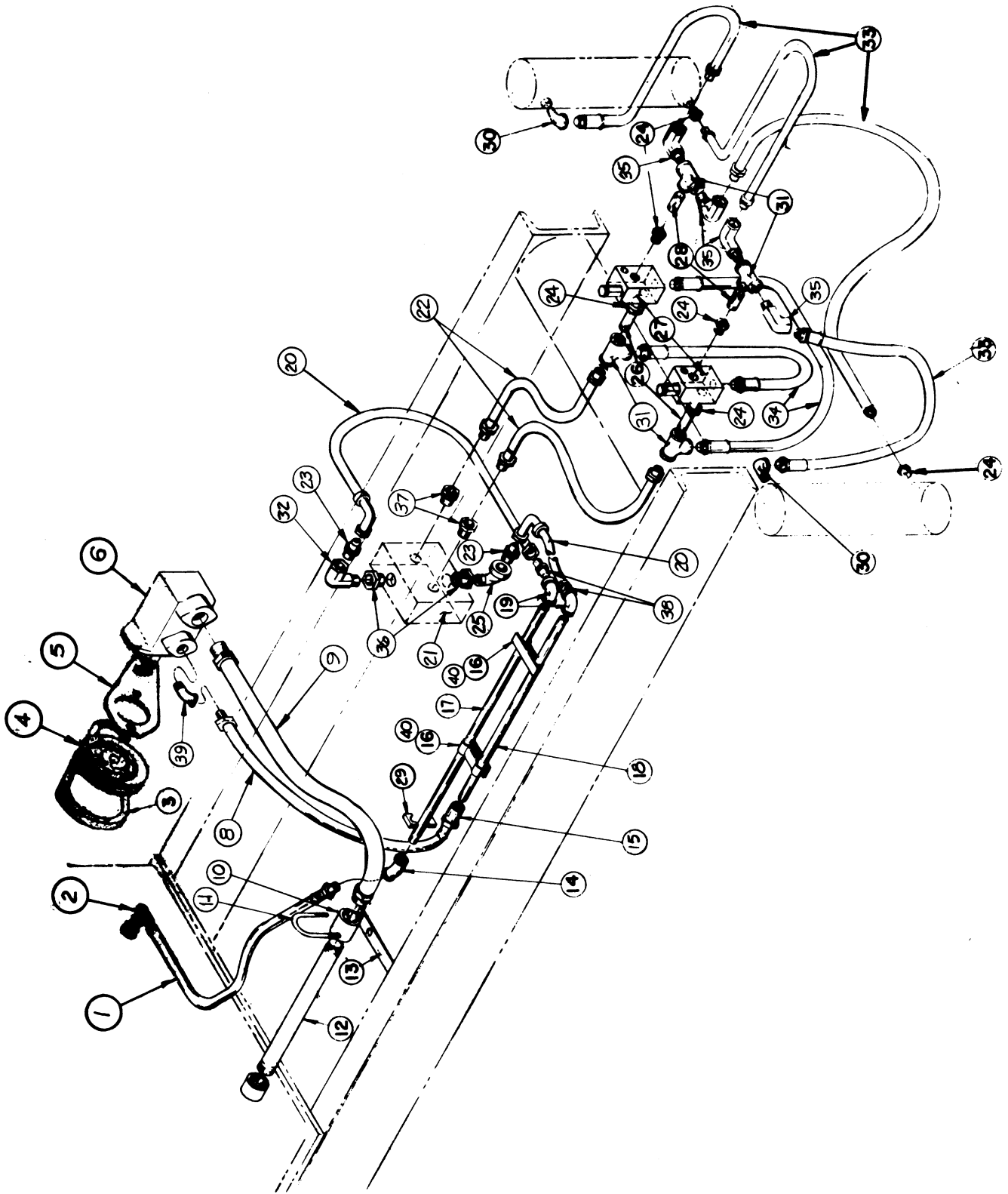
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
 (VICKERS PUMP & VALVE)
 400 NTF NO. 13736

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10267		Hose	1
2	P-15567		St. Ell	1
3	P-17414		Belt	1
4	13674		Pulley	1
5	13707		Mounting Bracket	1
6	P-17329		Pump	1
7	P-15565		St. Ell.	1
8	P-11598		Hose	1
9	P-17322		Hose	1
10	P-10126		Coupling	1
11	8924		Clamp	1
12	13711		Pipe	1
13	13712		Bracket	1
14	P-15564		Elbow	1
15	P-15542		Coupling	1
16	14189		Bracket, Pipe	2
17	N-10424		Pipe	1
18	N-10623		Pipe	1
19	P-15566		Elbow	2
20	P-15485		Hose	2
21	P-13005		Valve Control	Ref.
22	P-10476		Hose	2
23	P-15405		Fitting	2
24	P-10691		Reducer	5
25	P-15464		Fitting	2
26	P-10841		Nipple	2
27	13760		Valve, Safety	2
28	P-15502		Nipple	2
29	13757		Clamp, Pipe	1
30	P-15582		St. Ell	2
31	P-15554		Tee	4
32	P-10271		O-Ring	2
33	P-14652		Hose	4
34	P-11646		Hose	2
35	P-17407		Fitting	4
36	P-12969		Fitting	2
37	11385		Pipe, Clamp, Front	2

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
(GRESEN PUMP & VALVE)
400 NTF NO. 13954



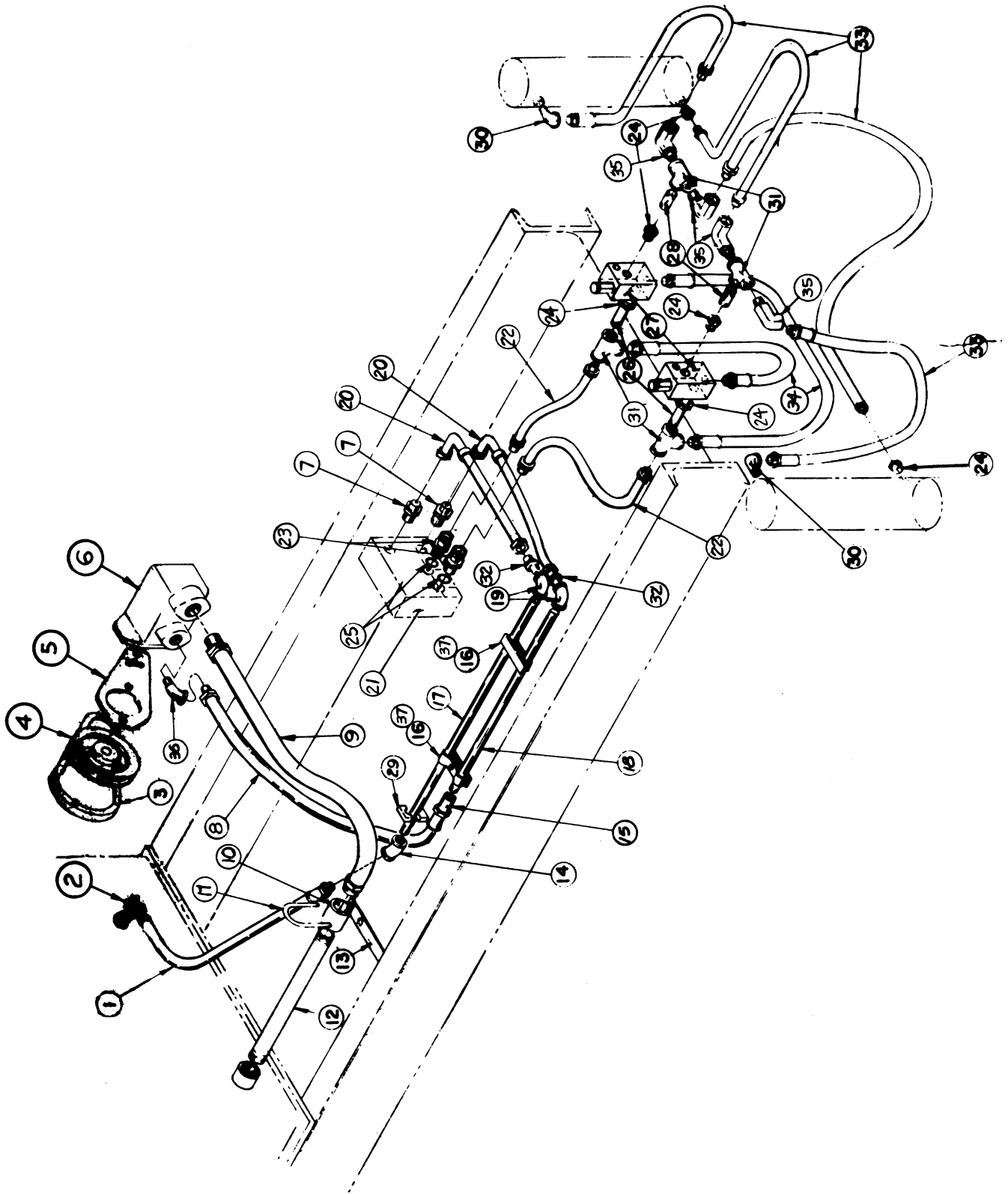
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
 (GRESN PUMP & VALVE)
 400 NTF NO. 13954

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY A NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10267		Hose	1
2	P-15567		St. Ell	1
3	P-17414		Belt	1
4	13674		Pulley	1
5	13707		Mounting Bracket	1
6	P-17415		Pump	1
7	P-15565		St. Ell	1
8	P-11615		Hose	1
9	P-17322		Hose	1
10	P-10126		Coupling,	1
11	8924		Clamp	1
12	13711		Pipe	1
13	13712		Bracket	1
14	P-15564		Elbow	1
15	P-15542		Coupling	1
16	14189		Bracket, Pipe	2
17	N-10424		Pipe	1
18	N-10423		Pipe	1
19	P-15566		Elbow	2
20	P-15485		Hose	2
21	P-17393		Valve, Control	Ref.
22	P-10476		Hose	2
23	P-15102		Fitting	2
24	P-10691		Reducer	5
25	P-10117		Street L	1
26	P-10841		Nipple	2
27	13760		Valve, Safety	2
28	P-15502		Nipple	2
29	13757		Clamp, Pipe	1
30	P-15582		St. Ell	2
31	P-15554		Tee	4
32	P-15467		Street L	1
33	P-14652		Hose	4
34	P-11646		Hose	2
35	P-17407		Fitting	4
36	P-10181		Reducer	2
37	P-10691		Reducer	1
38	P-12969		Fitting	2
39	P-10207		Street Ell	1
40	11385		Pipe Clamp, Front	2

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
(GRESEN PUMP & VICKERS VALVE)
400 NTF NO. 13955



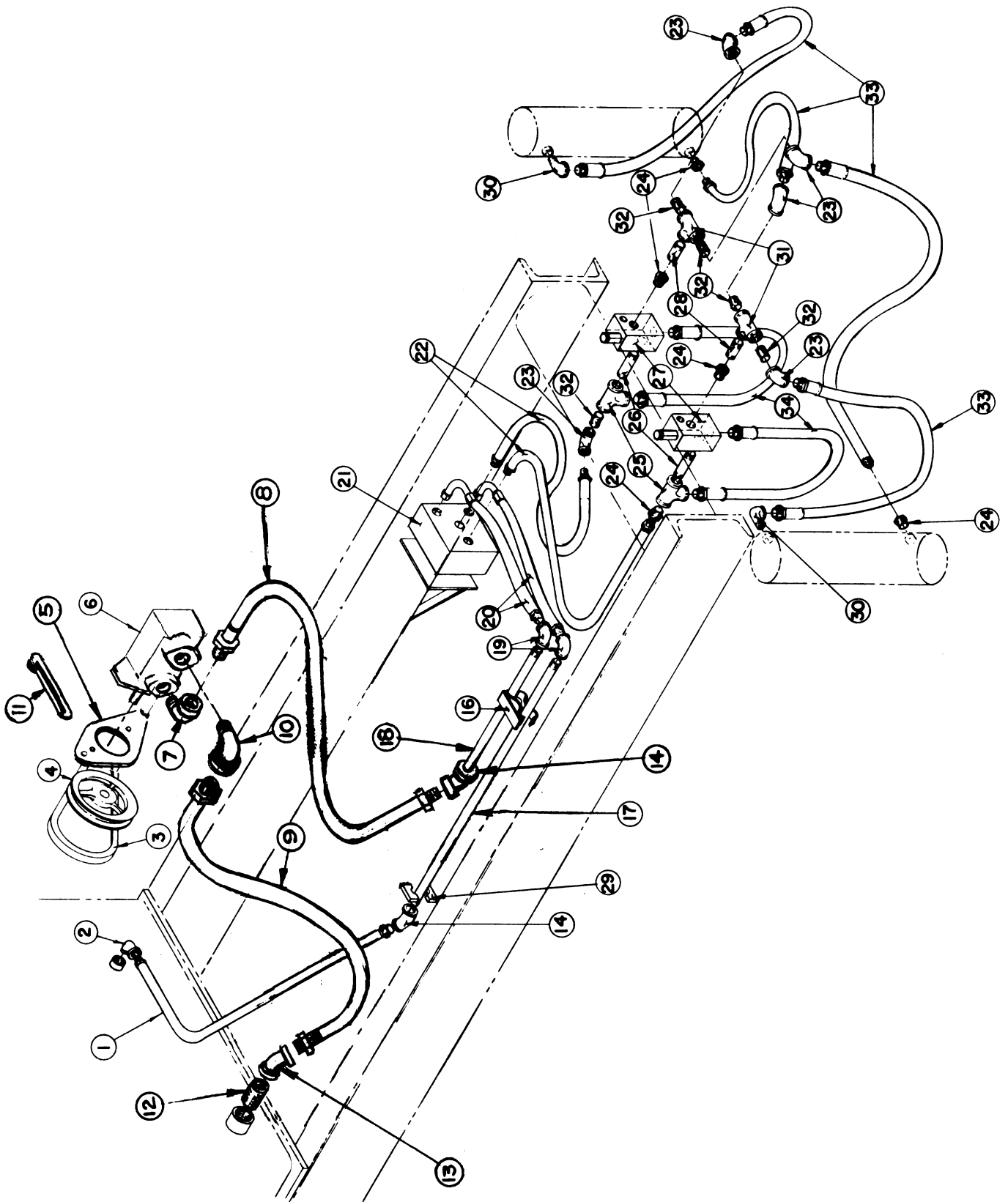
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
 (GRESEN PUMP & VICKERS VALVE)
 400 NTF NO. 13955

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10267		Hose	1
2	P-15567		St. Ell	1
3	P-17414		Belt	1
4	13674		Pulley	1
5	13707		Mounting Bracket	1
6	P-17415		Pump	1
7	P-15405		Fitting	2
8	P-11615		Hose	1
9	P-17322		Hose	1
10	P-10126		Coupling	1
11	8924		Clamp	1
12	13711		Pipe	1
13	13712		Bracket	1
14	P-15564		Elbow	1
15	P-15542		Coupling	1
16	14189		Bracket, Pipe	2
17	N-10424		Pipe	1
18	N-10423		Pipe	1
19	P-15566		Elbow	2
20	P-15485		Hose	2
21	P-13005		Valve, Control	Ref.
22	P-10476		Hose	2
23	P-15464		Fitting	2
24	P-10691		Reducer	6
25	P-10271		O-Ring	2
26	P-10841		Nipple	2
27	13760		Valve, Safety	2
28	P-15502		Nipple	2
29	13757		Clamp, Pipe	1
30	P-15582		St. Ell	2
31	P-15554		Tee	4
32	P-12969		Fitting	2
33	P-14652		Hose	2
34	P-11646		Hose	2
35	P-17407		Fitting	4
36	P-10207		Street Ell	1
37	11385		Pipe, Clamp, Front	2

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
MODEL "400" T.F. (W. DIESEL)
NO. 13,918



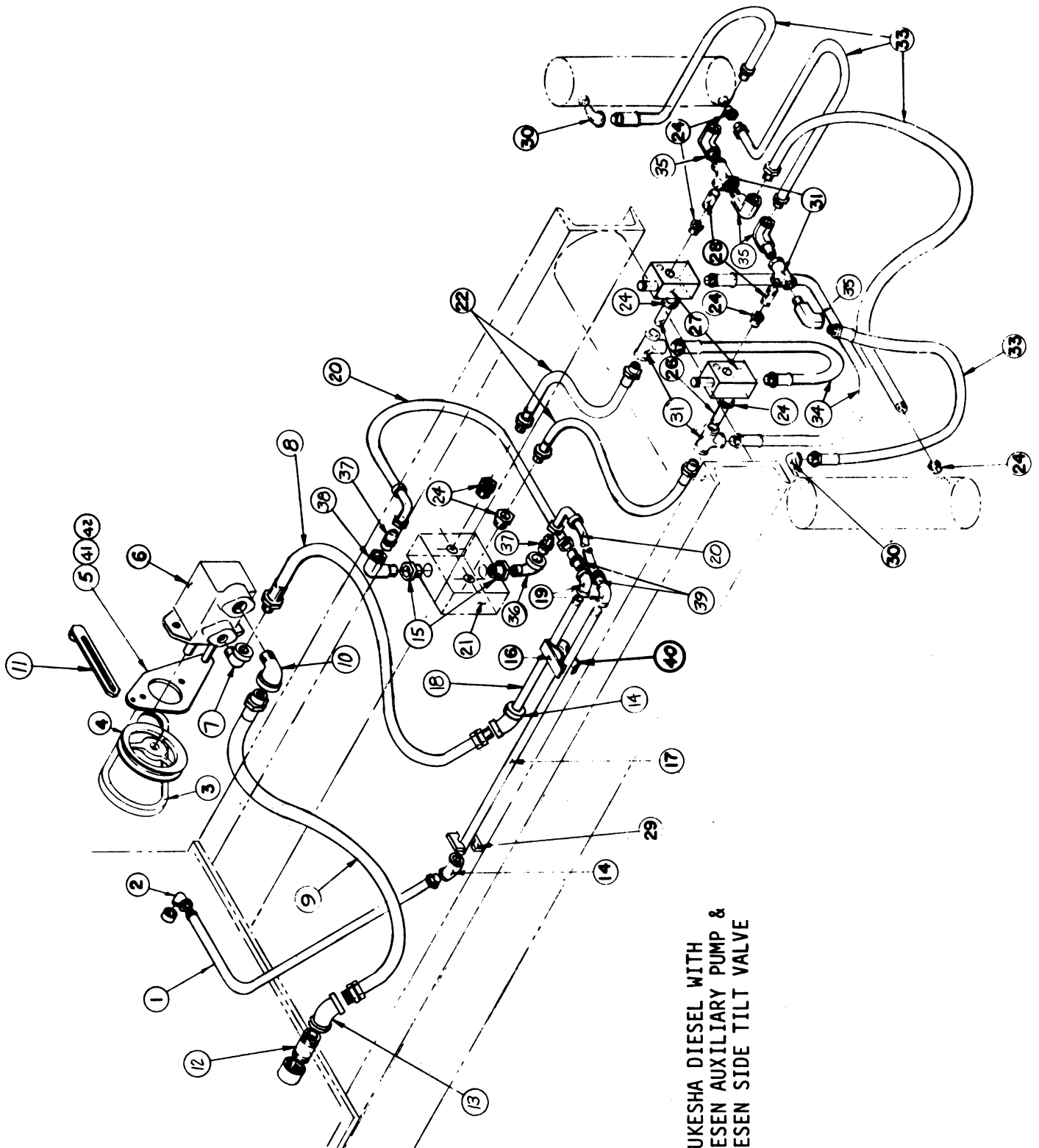
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC ASSEMBLY
 FOR SIDE TILT CYLINDERS
 NO. 13,918

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-11331		Hose	1
2	P-15567		St. Ell	1
3	P-15261		Belt	1
4	13,916		Pulley	1
5	13,509		Mtg. Bracket	1
6	P-17329		Pump	1
7	P-10111		St. Ell	1
8	P-11599		Hose	1
9	P-17322		Hose	1
10	P-10162		Street Ell	1
11	13,881		Adjusting Link	1
12	P-10833		Pipe Nipple	1
13	P-10129		Elbow	1
14	P-15564		Elbow	2
15				
16	6611		Bracket, Pipe	1
17	N-10424		Pipe	1
18	N-10163		Pipe	1
19	P-15566		Elbow	2
20	P-15485		Hose	2
21	P-13005		Valve, Control	1
22	P-10476		Hose	2
23	P-15558		Elbow	5
24	P-10691		Reducer	5
25	P-15586		Tee	2
26	P-15505		Nipple	2
27	13,760		Valve, Safety	2
28	P-15502		Nipple	2
29	13,757		Clamp, Pipe	1
30	P-15582		St. Ell.	2
31	P-15554		Tee	2
32	P-16965		Close Nipple	5

LULL ENGINEERING COMPANY INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
MODEL 400 T.F. WAUKESHA D.
NO. 13,918



WAUKESHA DIESEL WITH
GRESSEN AUXILIARY PUMP &
GRESSEN SIDE TILT VALVE

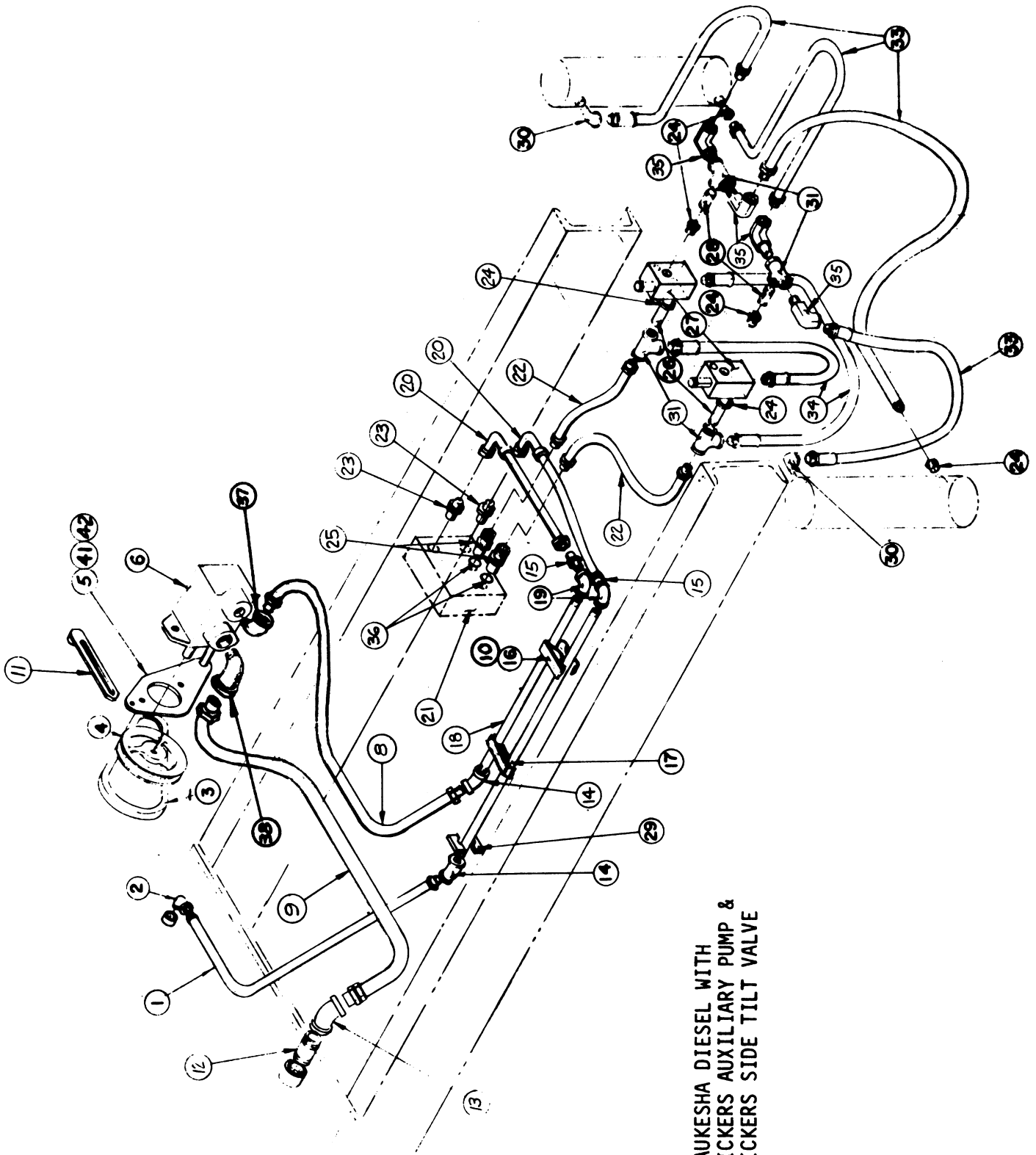
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC ASSEMBLY
 FOR SIDE TILT CYLINDERS
 NO. 13,918

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-11331		Hose	1
2	P-15567		St. Ell	1
3	P-15261		Belt	1
4	13,916		Pulley	1
5	13,545		Mtg. Bracket	1
6	P-17415		Pump	1
7	P-16537		Fitting	1
8	P-11599		Hose	1
9	P-17322		Hose	1
10	P-10162		Street Ell	1
11	13,881		Adjusting Link	1
12	P-10833		Pipe Nipple	1
13	P-10129		Elbow	1
14	P-15564		Elbow	2
15	P-10181		Reducer	2
16	14,189		Bracket, Pipe	1
17	N-10424		Pipe	1
18	N-10163		Pipe	1
19	P-15566		Elbow	2
20	P-15485		Hose	2
21	P-17393		Valve, Control	1
22	P-10476		Hose	2
24	P-10691		Reducer	7
26	P-15505		Nipple	2
27	13,760		Valve, Safety	2
28	P-15502		Nipple	2
29	13,757		Clamp, Pipe	1
30	P-15582		St. Ell.	2
31	P-15554		Tee	2
33	P-14652		Hose	4
34	P-11646		Hose	2
35	P-17407		Fitting	4
36	P-10117		Street Ell	1
37	P-15102		Fitting	2
38	P-15467		Street Ell	1
39	P-12969		Fitting	2
40	11385		Clamp	1
41	3083		Collar	1
42	Com'l		Cotter Key, 1/4" x 2" Long	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
MODEL 400 T.F. WAUKESHA D.
NO. 13,956



WAUKESHA DIESEL WITH
VICKERS AUXILIARY PUMP &
VICKERS SIDE TILT VALVE

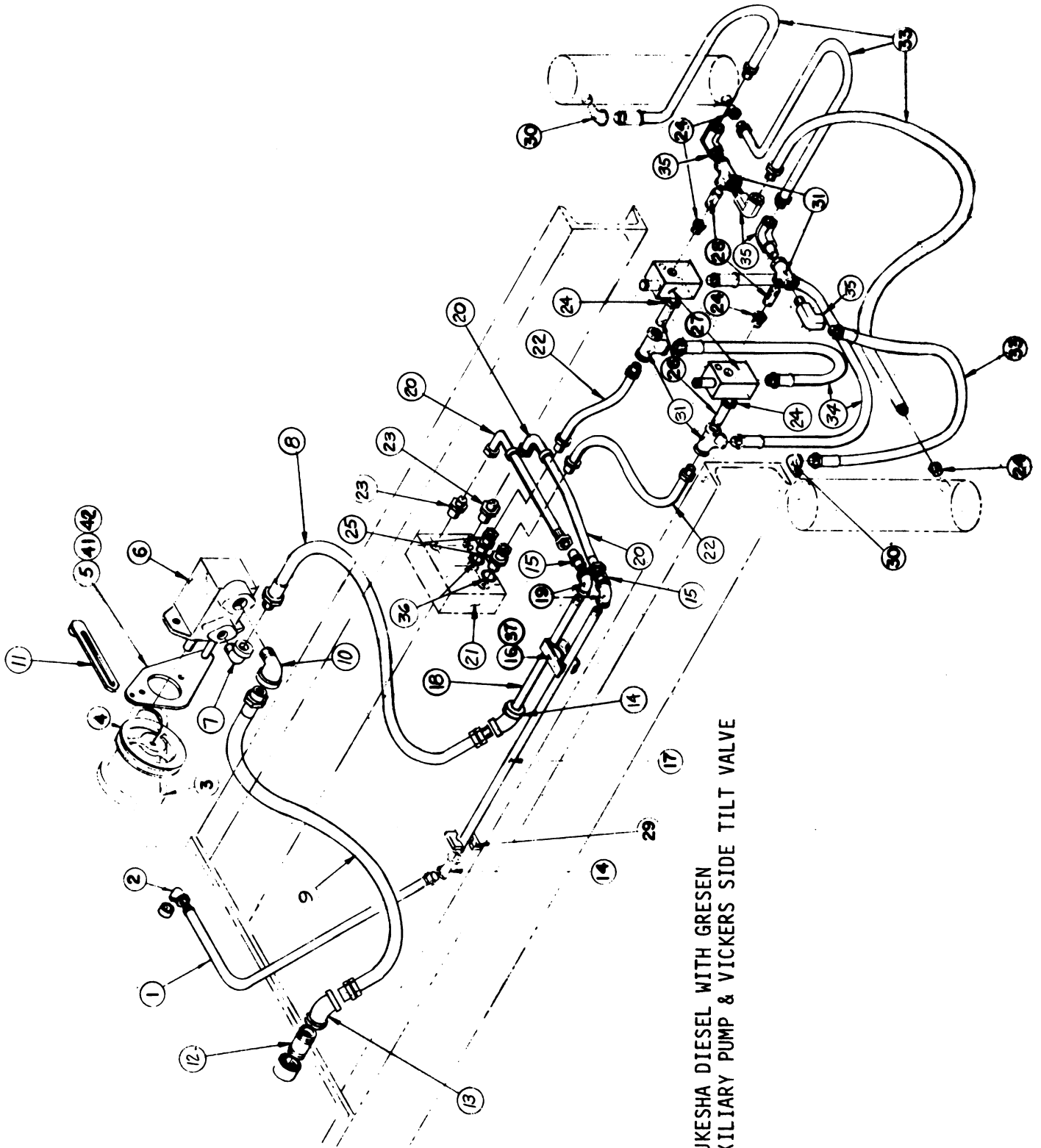
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINN. 55121

HYDRAULIC ASSEMBLY
 FOR SIDE TILT CYLINDERS
 NO. 13,956

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-11331		Hose	1
2	P-15567		St. Ell	1
3	P-15261		Belt	1
4	13916		Pulley	1
5	13545		Mtg. Bracket	1
6	P-17329		Pump	1
8	P-14969		Hose	1
9	P-17322		Hose	1
10	11385		Clamp	2
11	13881		Adjusting Link	1
12	P-10833		Pipe Nipple	1
13	P-10129		Elbow	1
14	P-15564		Elbow	2
15	P-12969		Fitting	2
16	14189		Bracket, Pipe	2
17	N-10424		Pipe	1
18	N-10163		Pipe	1
19	P-15566		Elbow	2
20	P-15485		Hose	2
21	P-13005		Valve, Control	1
22	P-10476		Hose	2
23	P-15405		Fitting	7
24	P-10691		Reducer	2
25	P-15464		Fitting	2
26	P-15505		Nipple	2
27	13760		Valve, Safety	2
28	P-15502		Nipple	2
29	13757		Clamp, Pipe	1
30	P-15582		St. Ell.	2
31	P-15554		Tee	2
33	P-14652		Hose	4
34	P-11646		Hose	2
35	P-17407		Fitting	4
36	P-10271		O-Ring	2
37	P-15567		St. Ell	1
38	P-15646		St. Ell	1
39				
40				
41	3083		Collar	1
42	Com'1		Cotter Key, 1/4" x 2" Long	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASSEMBLY
MODEL 400 T.F. WAUKESHA D.
NO. 13,957

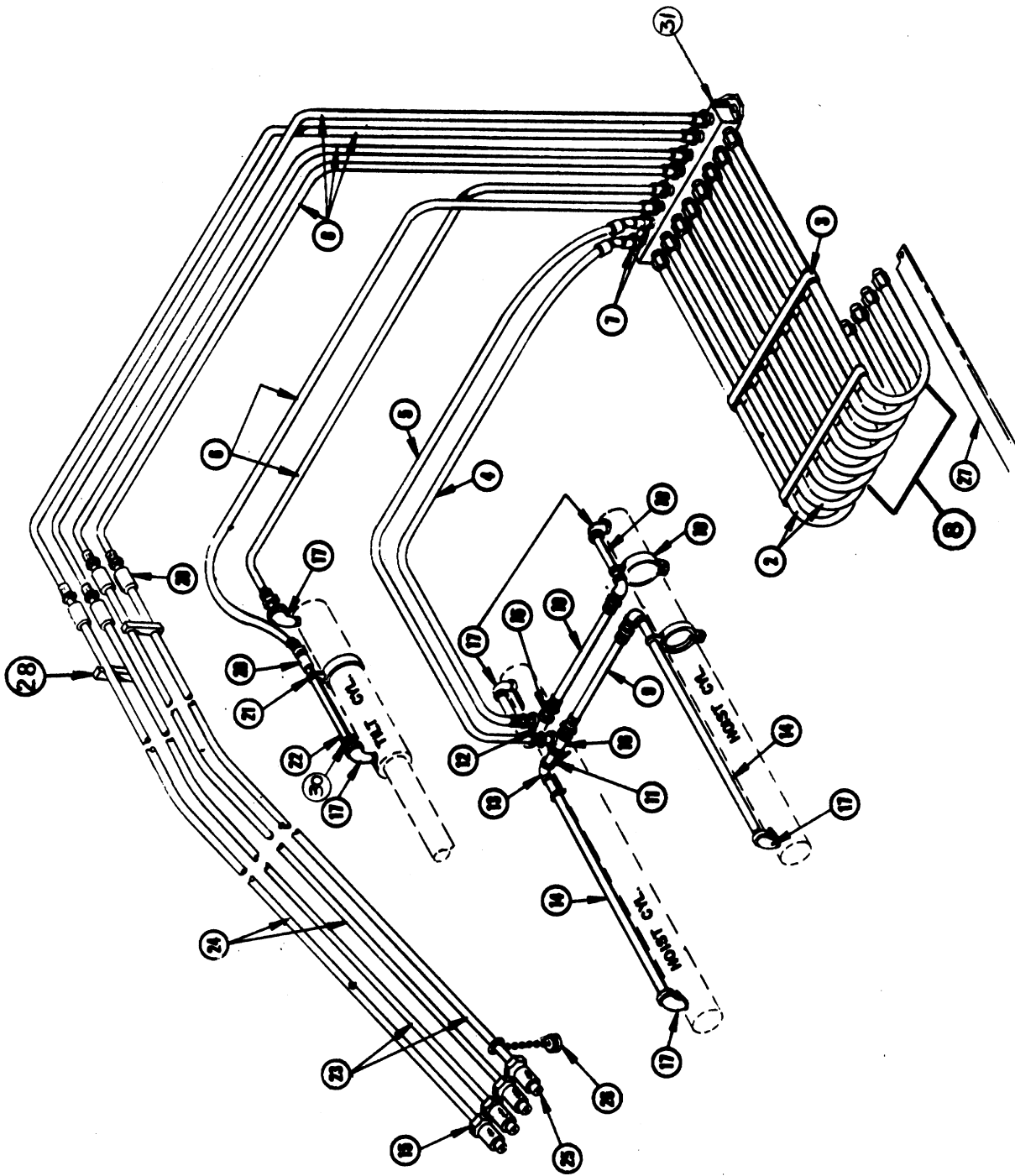


WAUKESHA DIESEL WITH GRIESEN
AUXILIARY PUMP & VICKERS SIDE TILT VALVE

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC ASSEMBLY
 FOR SIDE TILT CYLINDERS
 NO. 13,957

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-11331		Hose	1
2	P-15567		St. Ell	1
3	P-15261		Belt	1
4	13,916		Pulley	1
5	13,545		Mtg. Bracket	1
6	P-17415		Pump	1
7	P-16537		Fitting	1
8	P-11599		Hose	1
9	P-17322		Hose	1
10	P-10162		Street Ell	1
11	13,881		Adjusting Link	1
12	P-10833		Pipe Nipple	1
13	P-10129		Elbow	1
14	P-15564		Elbow	2
15	P-12969		Fitting	2
16	14,189		Bracket, Pipe	1
17	N-10424		Pipe	1
18	N-10163		Pipe	1
19	P-15566		Elbow	2
20	P-15485		Hose	2
21	P-13005		Valve, Control	1
22	P-10476		Hose	2
23	P-15405		Elbow	2
24	P-10691		Reducer	7
25	P-15464		Fitting	2
26	P-15505		Nipple	2
27	13,760		Valve, Safety	2
28	P-15502		Nipple	2
29	13,757		Clamp, Pipe	1
30	P-15582		St. Ell.	2
31	P-15554		Tee	4
33	P-14652		Hose	4
34	P-11646		Hose	2
35	P-17407		Fitting	4
36	P-10271		O-Ring	2
37	11,385		Clamp	1
38				
39				
40				
41	3083		Collar	1
42	Com'1		Cotter Key, 1/4" x 2" Long	1



**HYDRAULIC SYSTEM
(JUNCTION BLOCK TO LIFT ARM)**

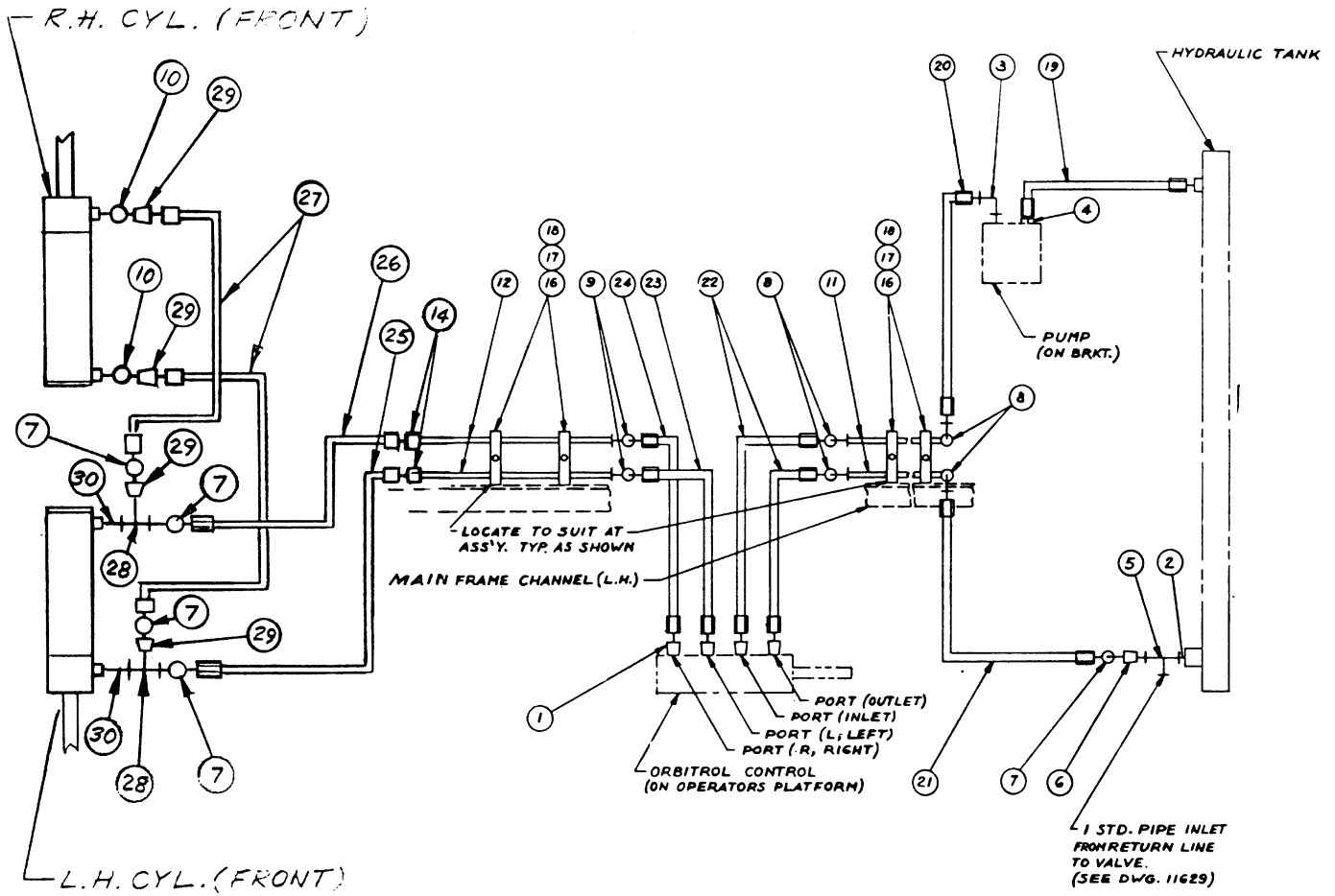
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HYDRAULIC SYSTEM ASS'Y

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1				
2	P-17175		Hose (S/N 101-599, Use P-11299)	2
3	1149		Hose Strap	2
4	P-15070		Hose (S/N 101-599, Use P-12999)	1
5	P-17176		Hose (S/N 101-599, Use P-12998)	1
6	P-11397		Hose (S/N 101-599, Use P-10292)	2
7	P-12969		Fitting	2
8	P-11538		Hose	10
9	P-11541		Hose	1
10	P-11308		Hose	1
11	P-10794		Nipple	1
12	P-10884		Nipple	1
13	P-10225		Elbow	4
14	N-10183		Pipe (S/N 101-599, Use N-10281)	2
15	P-10120		Reducing Bushing	8
16	P-10107		Tee	2
17	P-10117		Street Ell	6
18	P-10888		Pipe	2
19	563		Cylinder Pipe Clamp	4
20	P-10328		Coupling	5
21	563		Cylinder Pipe Clamp	1
22	N-10270		Pipe	1
23	N-10167		Pipe	2
24	N-10168		Pipe	2
25	P-10258		Coupling	4
26	P-10259		Dust Cap	4
27	SEE NOTE		Hose Support	1
28	6611		Clamp	6
29	13,967		Link, Hose Support (Wauk. Models ONLY)	2
30	15109		Restrictor 3/32	1
31	14119		Junction Block Assy	1

NOTE:

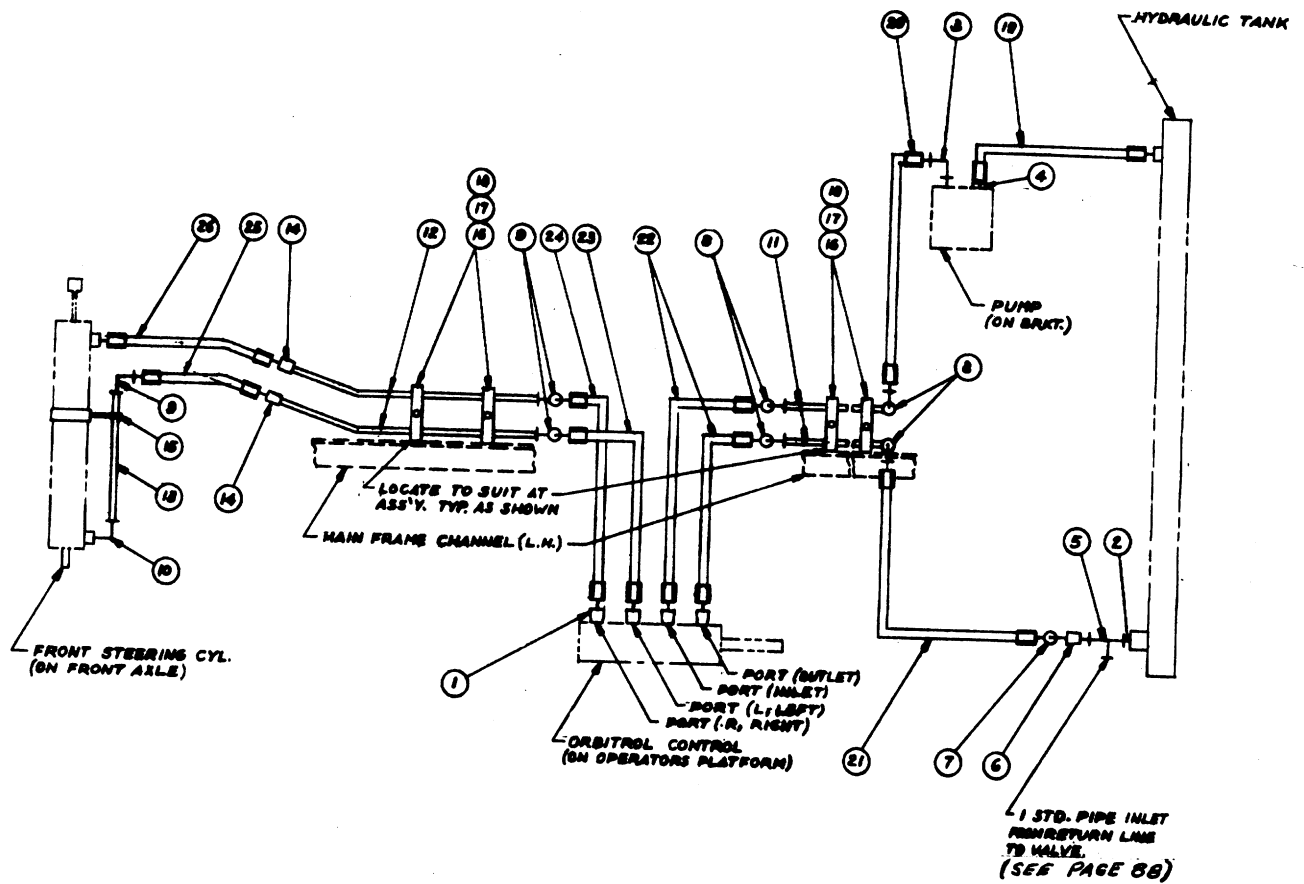
Use 11,521 for 225.
 Use 12,167 for Int. D.
 Use 13,441 for Waukesha, S/N 799-1107.
 Use 8,935 for Waukesha, S/N 1108 Thru.



FRONT ORBITROL STEERING (HYDRAULIC ASSEMBLY)



REF.	PART NO.	DESCRIPTION	REQ.
		FRONT ORBITROL STEERING (HYDRAULIC ASSEMBLY)	
1	P-12984	Adapter	4
2	P-10426	Close Nipple	1
3	P-11497	Swivel Fitting	1
4	P-12908	Swivel Fitting	1
5	P-10173	Tee	1
6	P-10696	Reducing Bushing	1
7	P-10119	Street Ell	5
8	P-10206	Elbow	4
9	P-10225	Elbow	2
10	P-10117	Street Ell	2
11	N-10269	Pipe (3/8 X Str. x 66) Thd. 2 Ends	2
12	11,647	Pipe	2
13			
14	P-10323	Pipe Coupling	2
15			
16	7731	Pipe Clamp	4
17	P-12753	Hex Capscrew	4
18	COM'L	Shakeproof Lockwasher	4
19	P-11589	Hose	1
20	P-13443	Hose	1
21	P-10290	Hose	1
22	P-13442	Hose	2
23	P-13441	Hose	1
24	P-13440	Hose	1
25	P-12985	Hose	1
26	P-11308	Hose	1
27	P-13682	Hose	2
28	P-10195	Tee	2
29	P-10691	Reducing Bushing	4
30	P-10898	Close Nipple	2



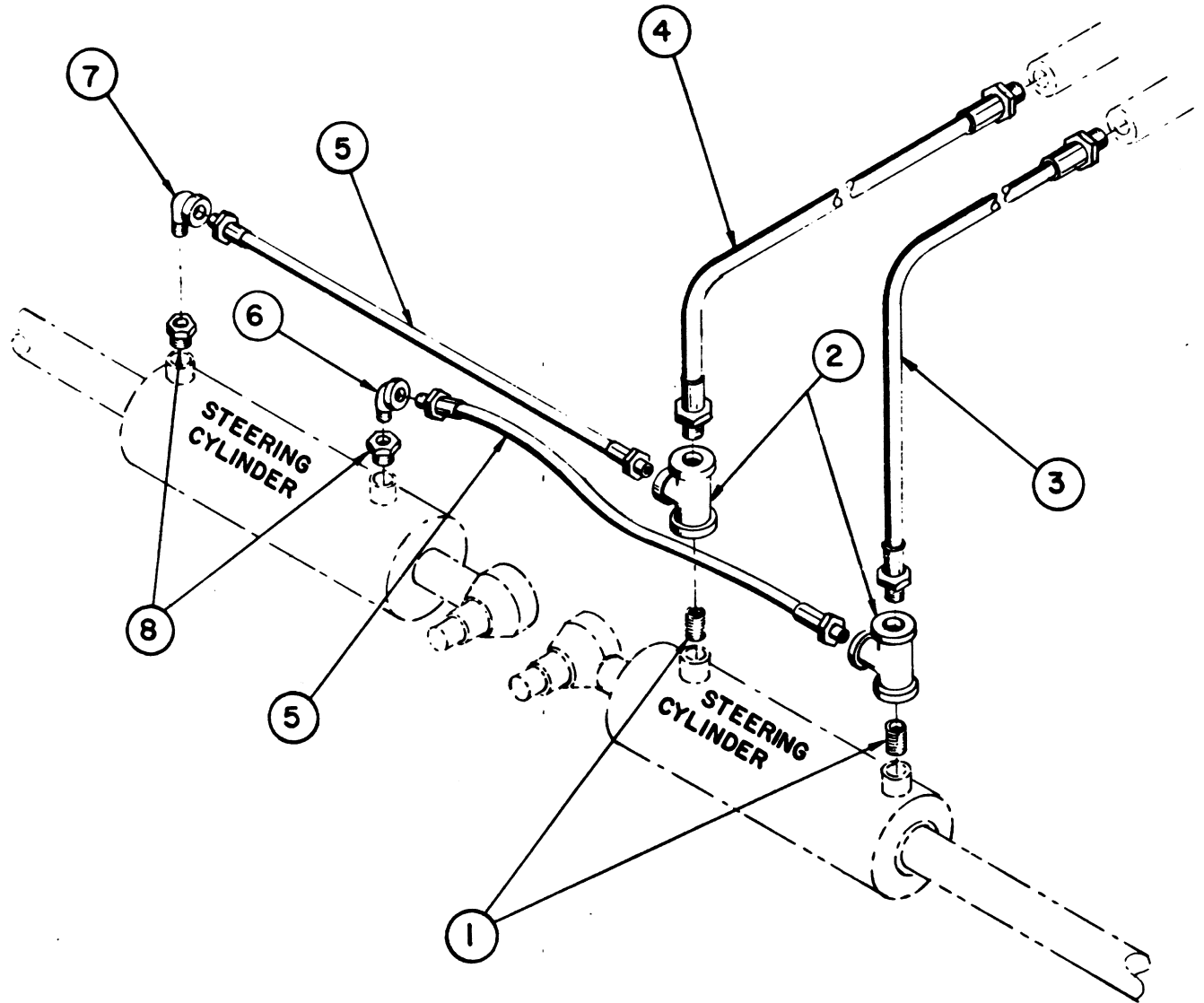
FRONT ORBITROL STEERING (HYDRAULIC ASSEMBLY)



REF.	PART NO.	DESCRIPTION	REQ.
FRONT ORBITROL STEERING (HYDRAULIC ASSEMBLY)			
1	P-12984	Adapter	4
2	P-10426	Close Nipple	1
3	P-11497	Swivel Fitting	1
4	P-12908	Swivel Fitting	1
5	P-10173	Tee	1
6	P-10696	Reducing Bushing	1
7	P-10119	Street Ell	1
8	P-10206	Elbow	4
9	P-10225	Elbow	3
10	P-10117	Street Ell	1
11	N-10269	Pipe, 3/8 X Str. x 66" Thd. 2 Ends	2
12	11,647	Pipe	2
13	N-10079	Pipe, 3/8 X Str. x 9 1/2 Thd. 2 Ends	1
14	P-10323	Pipe Coupling	2
15	612	Cylinder Pipe Clamp	1
16	7731	Pipe Clamp	4
17	P-12753	Hex Capscrew, 5/16-18 NC x 1 1/2	4
18	COM'L	Shakeproof Lockwasher 5/16	4
19	P-11589	Hose	1
20	P-13444	Hose	1
21	P-10290	Hose	1
22	P-13442	Hose	2
23	P-13441	Hose	1
24	P-13440	Hose	1
25	P-12985	Hose	1
26	P-11308	Hose	1

LULL ENGINEERING COMPANY, INC.
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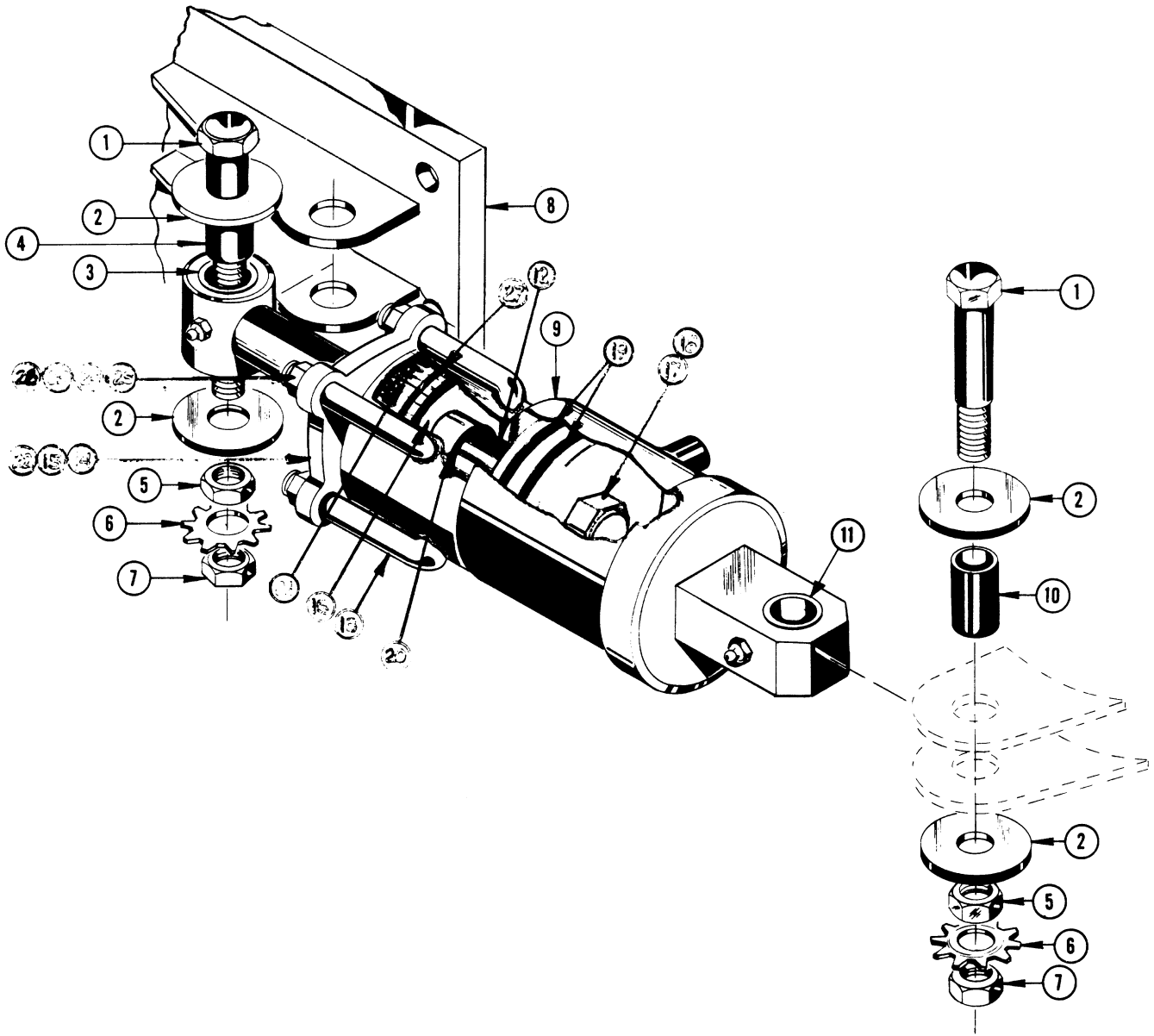
DIAGRAM, FRONT ORBITROL STEERING
NO. 13,617



LULL ENGINEERING COMPANY, INC
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

DIAGRAM, FRONT ORBITROL STEERING
NO. 13,617

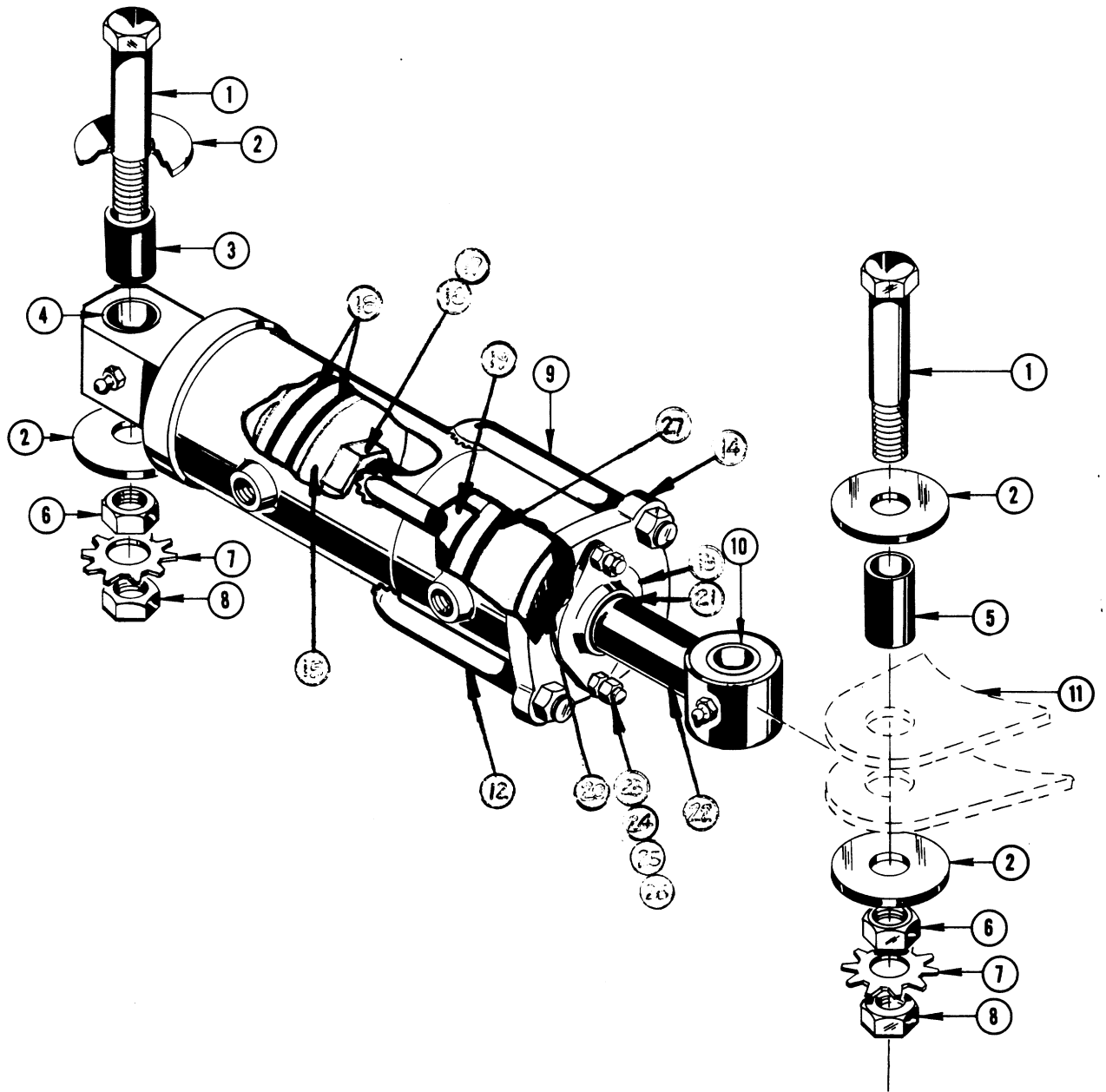
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10898		Close Nipple	2
2	P-15586		Tee	2
3	P-11641		Hose (Tilt Frame Models, Use P-11525)	1
4	P-11141		Hose (Tilt Frame Models, Use P-10147)	1
5	P-14916		Hose	2
6	P-10216		Street Ell	1
7	P-10157		Street Ell	1
8	P-10691		Bushing	2



FRONT STEERING ASS'Y.



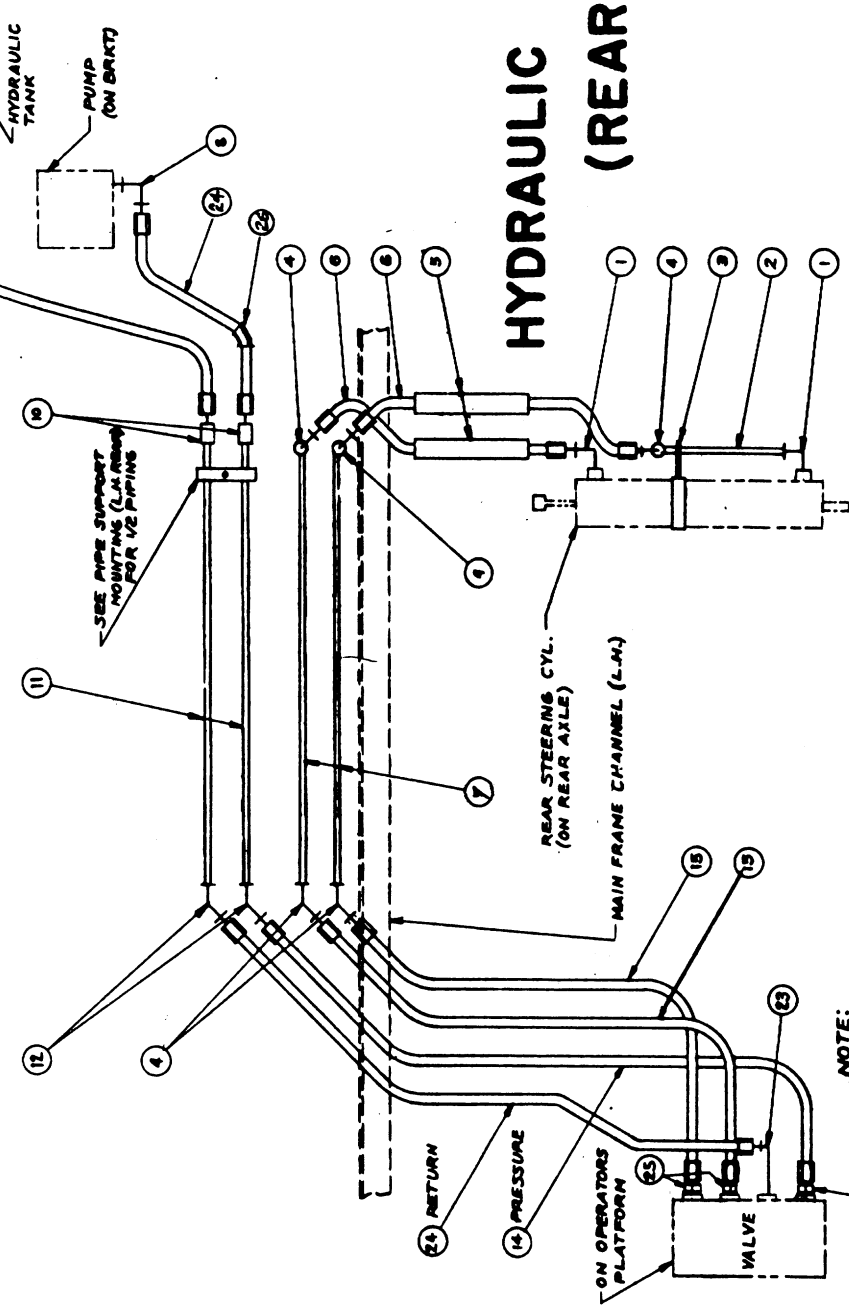
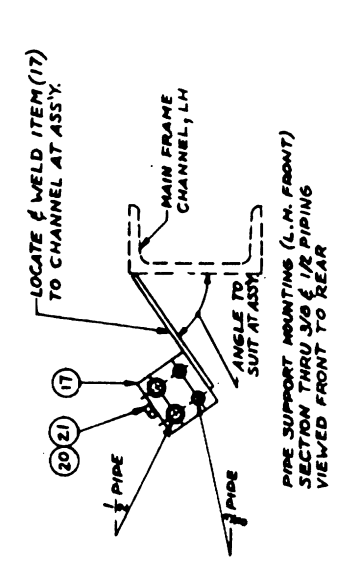
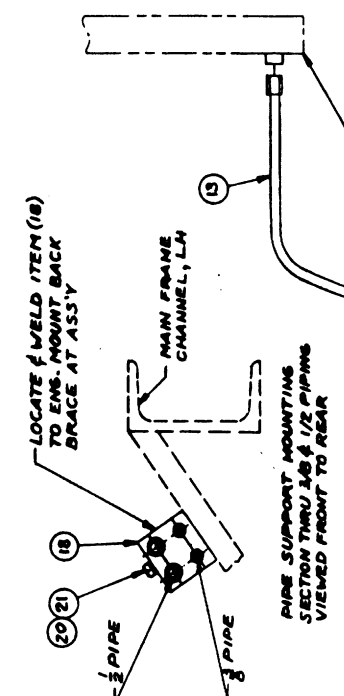
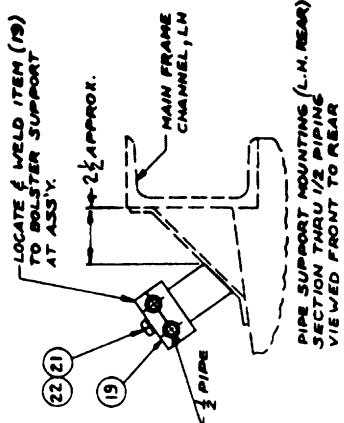
REF.	PART NO.	DESCRIPTION	REQ.
FRONT STEERING ASS'Y NO. 11,538			
1	COM'L	Bolt 1/2 N.C. x 5" Long	2
2	8301	Washer	4
3	11,485	Bushing	1
4	11,489	Pin	1
5	COM'L	Nut, Full Hex 1/2 N.C.	2
6	COM'L	Washer, Shakeproof 1/2	2
7	COM'L	Jam Nut 1/2 N.C.	2
8	11,537	Lug Weldment	1
9	*11,484	Cylinder	1
10	11,488	Pin	1
11	11,486	Bushing	1
12	11,483	Piston Rod Weldment	1
13	11,481	Cyl. Tube Weldment	1
14	1032	Gland	1
15	1028	Head	1
16	551	Piston	1
17	222	Nut	1
18	Com'l	Set Screw 1/4 20 N.C.	1
19	P-11346	Piston Ring	2
20	N-10140	Spacer -1-1/2 Std. Pipe x 2-1/8 Lg	1
21	P-10306	Packing	1
22	P-10308	Wiper	1
23	COM'L	Capscrew 3/8 - 16 NC x 1" LG	2
24	COM'L	Jam Nut 1/2 - 20 N.F.	4
25	COM'L	Shakeproof Washer 3/8	2
26	COM'L	Hex Nut 1/2 - 20 N.F.	4
27	P-10314	O Ring	1
* NOTE: When ordering this cylinder, specify <u>front</u>			



REAR STEERING ASS'Y.



REF.	PART NO.	DESCRIPTION	REQ.
REAR STEERING ASS'Y NO. 11,539			
1	COM'L	Bolt 1/2 N.C. x 5 Long	2
2	8301	Washer	4
3	11,488	Pin	1
4	11,485	Bushing	1
5	11,489	Pin	1
6	COM'L	Full Nut, Hex 1/2 N.C.	2
7	COM'L	Washer, Shakeproof 1/2 N.C.	2
8	COM'L	Jam Nut 1/2 N.C.	2
9	*11,484	Cylinder	1
10	11,486	Bushing	1
11	11,479	Steering Lug	2
12	11,481	Cyl. Tube Weldment	1
13	1032	Gland	1
14	1028	Head	1
15	551	Piston	1
16	222	Nut	1
17	COM'L	Set Screw 1/4- 20 N.C.	1
18	P-11346	Piston Ring	2
19	N-10140	Spacer - 1-1/2 STd. Pipe x 2-1/8 LG	1
20	P-10306	Packing	1
21	P-10308	Wiper	1
22	11483	Piston Rod Weldment	1
23	COM'L	Cap Screw 3/8-16 N.C. x 1" Lg	2
24	COM'L	Jam Nut 1/2 - 20 N.F.	4
25	COM'L	Shakeproof Washer 3/8	2
26	COM'L	Hex Nut 1/2 - 20 N.F.	4
27	P-10314	O Ring	1
*NOTE: When ordering this cylinder, specify <u>rear</u> .			



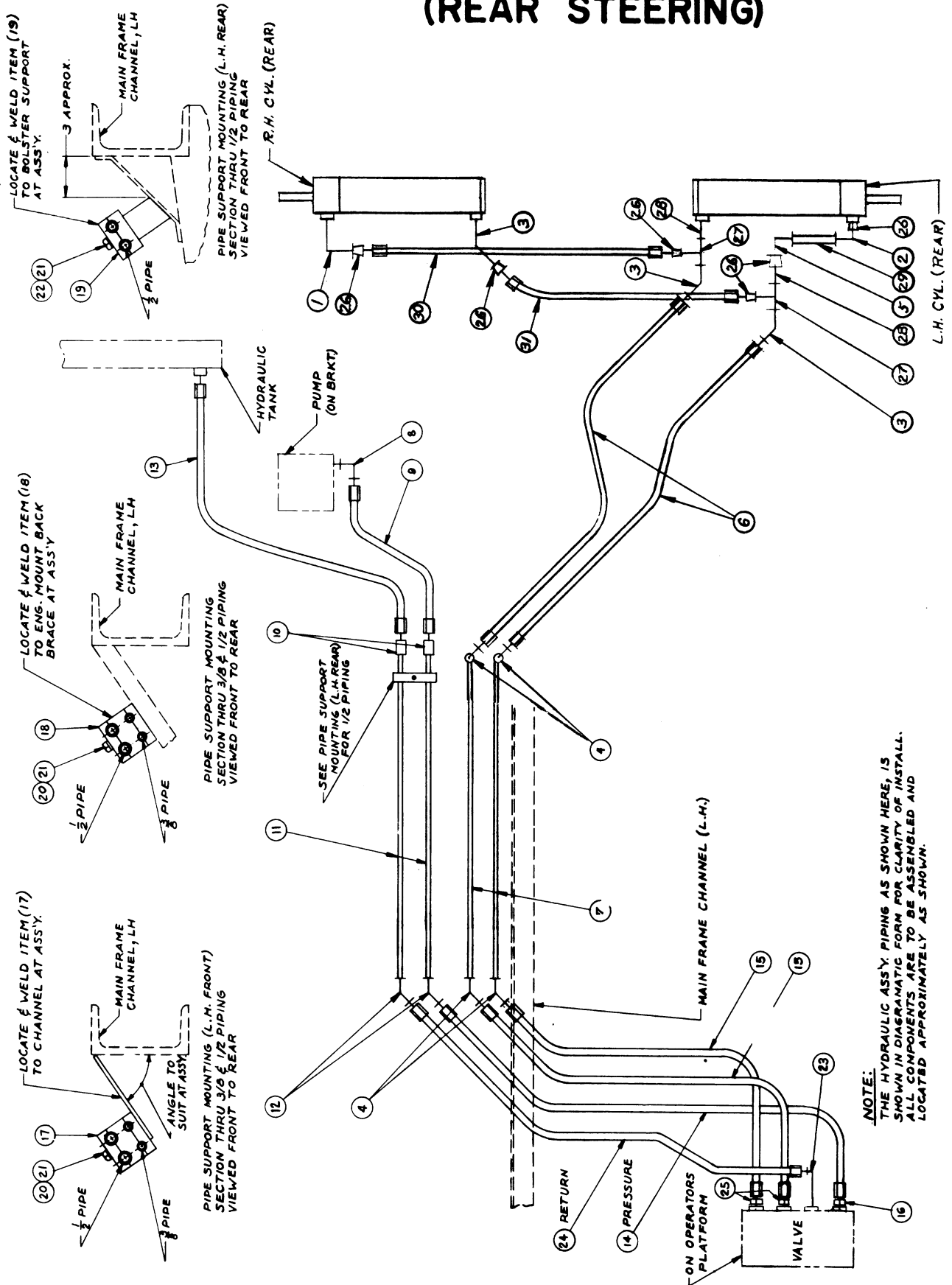
HYDRAULIC ASS'Y. (REAR STEER)

NOTE:
THE HYDRAULIC ASS'Y. PIPING AS SHOWN HERE, IS SHOWN IN DIAGRAMATIC FORM FOR CLARITY OF INSTALL. ALL COMPONENTS ARE TO BE ASSEMBLED AND LOCATED APPROXIMATELY AS SHOWN.



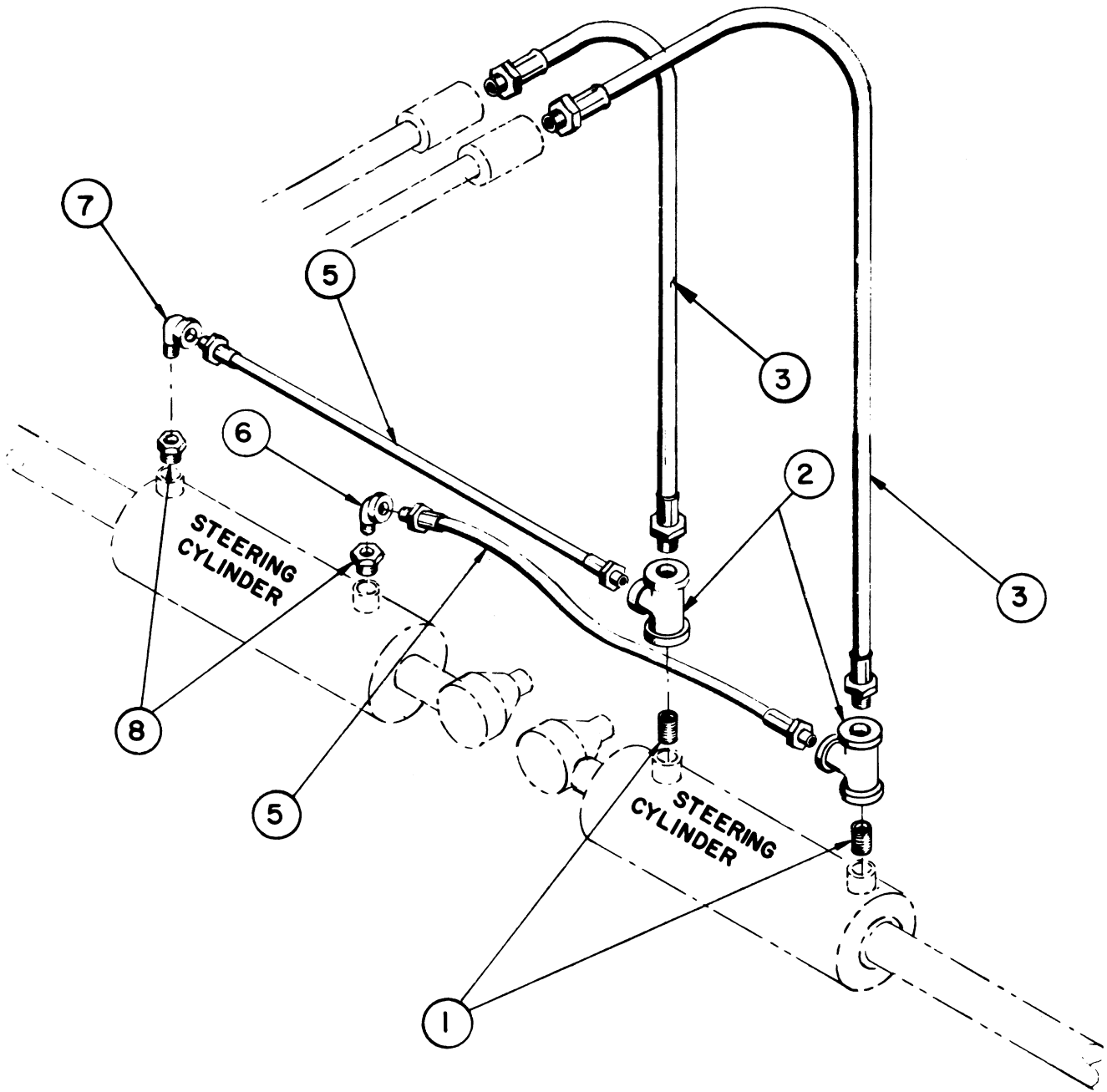
REF.	PART NO.	DESCRIPTION	REQ.
		HYDRAULIC ASSEMBLY (REAR STEERING)	
1	P-10117	Street Ell	2
2	N-10275	Pipe, 3/8 X Str. x 13" Long	1
3	612	Cylinder Pipe Clamp	1
4	P-10206	Elbow	5
5	COM'L	Loom, Neo. Tubing 1" ID x 14" Long	2
6	P-10292	Hose	2
7	N-10267	Pipe, 3/8 X Str. x 40" Long	2
8	P-12989	Swivel Fitting	1
9			
10	P-10260	Pipe Coupling	2
11	N-10285	Pipe, 1/2 X Str. x 61" Long	2
12	P-10208	Elbow	2
13	P-11615	Hose	1
14	P-10302	Hose	1
15	P-10327	Hose	2
16	P-12907	Swivel Fitting	1
17	11,626	Pipe Clamp (Use 12,013 For Int. D.)	1
18	11,623	Pipe Clamp	1
19	11,625	Pipe Clamp (Use 12,041 For Int. D.)	1
20	COM'L	Hex Capscrew, 5/16-18 NC x 2 3/4"	2
21	COM'L	Shakeproof Lockwasher, 5/16	3
22	COM'L	Hex Capscrew, 5/16-18 NC x 1 1/4"	1
23	P-12991	Swivel Fitting	1
24	P-11435	Hose	2
25	P-12908	Swivel Fitting	2
26	COM'L	Loom (Neo. Tubing, 1" ID x 6" Long)	1

HYDRAULIC ASSEMBLY (REAR STEERING)





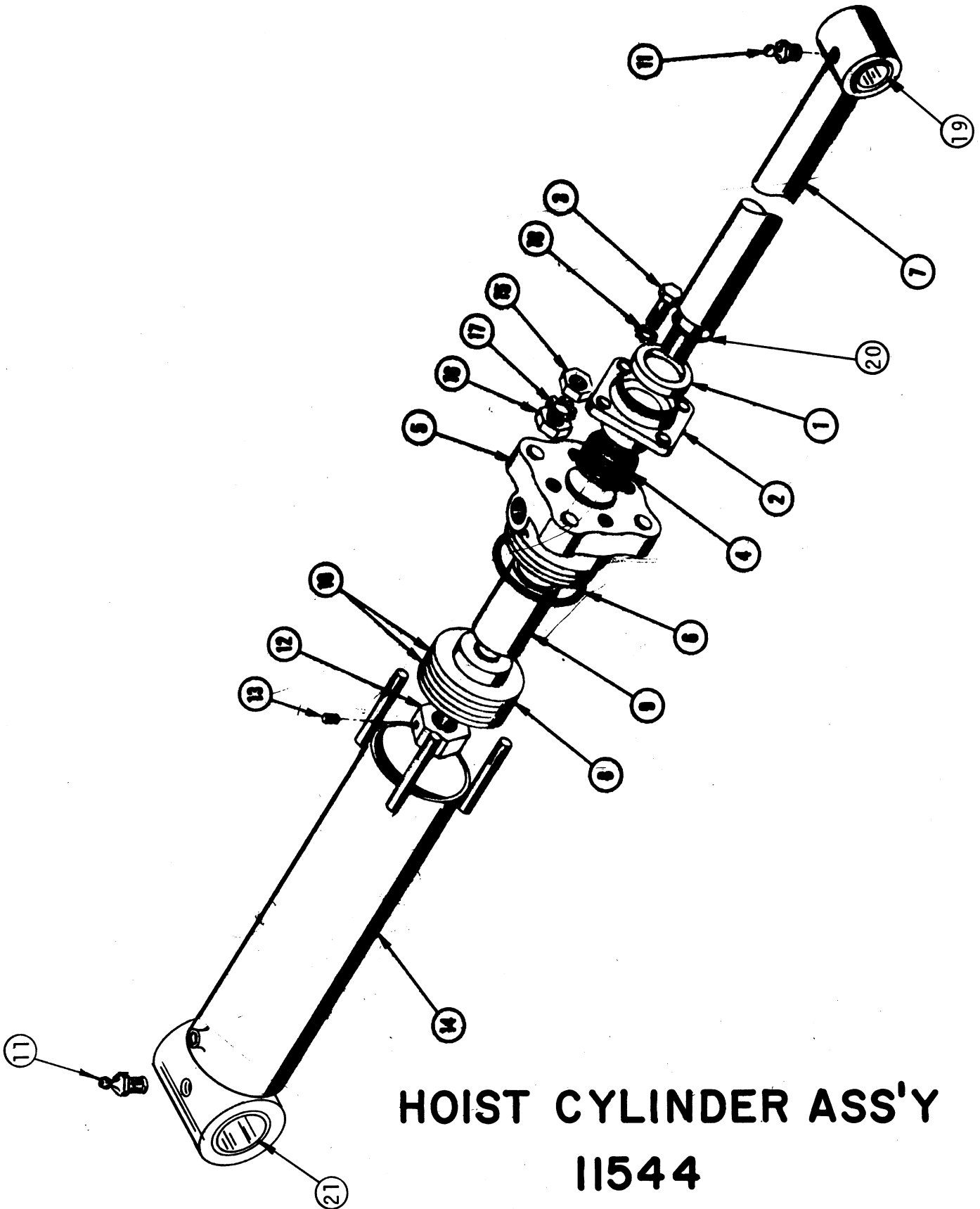
REF.	PART NO.	DESCRIPTION	REQ.
		HYDRAULIC ASSEMBLY (REAR STEERING)	
1	P-10117	Street Ell	2
2	N-10275	Pipe, 3/8 X Str. x 13" Long	1
3	612	Cylinder Pipe Clamp	1
4	P-10206	Elbow	5
5	COM'L	Loom, Neo. Tubing 1" ID x 14" Long	2
6	P-10292	Hose	2
7	N-10267	Pipe, 3/8 X Str. x 40" Long	2
8	P-12989	Swivel Fitting	1
9			
10	P-10260	Pipe Coupling	2
11	N-10285	Pipe, 1/2 X Str. x 61" Long	2
12	P-10208	Elbow	2
13	P-11615	Hose	1
14	P-10302	Hose	1
15	P-10327	Hose	2
16	P-12907	Swivel Fitting	1
17	12,013	Pipe Clamp Weldment	1
18	11,623	Pipe Clamp	1
19	12,041	Pipe Clamp Weldment	1
20	COM'L	Hex Capscrew, 5/16-18 NC x 2 3/4"	2
21	COM'L	Shakeproof Lockwasher, 5/16	3
22	COM'L	Hex Capscrew, 5/16-18 NC x 1 1/4"	1
23	P-12991	Swivel Fitting	1
24	P-11435	Hose	2
25	P-12908	Swivel Fitting	2
26	COM'L	Loom (Neo. Tubing, 1" ID x 6" Long)	1



LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

DIAGRAM, REAR ORBITROL STEERING
NO. 13,616

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-10898		Close Nipple	2
2	P-15586		Tee	2
3	P-11525		Hose	2
4				
5	P-14916		Hose	2
6	P-10216		Street E11	1
7	P-10157		Street E11	1
8	P-10691		Bushing	2



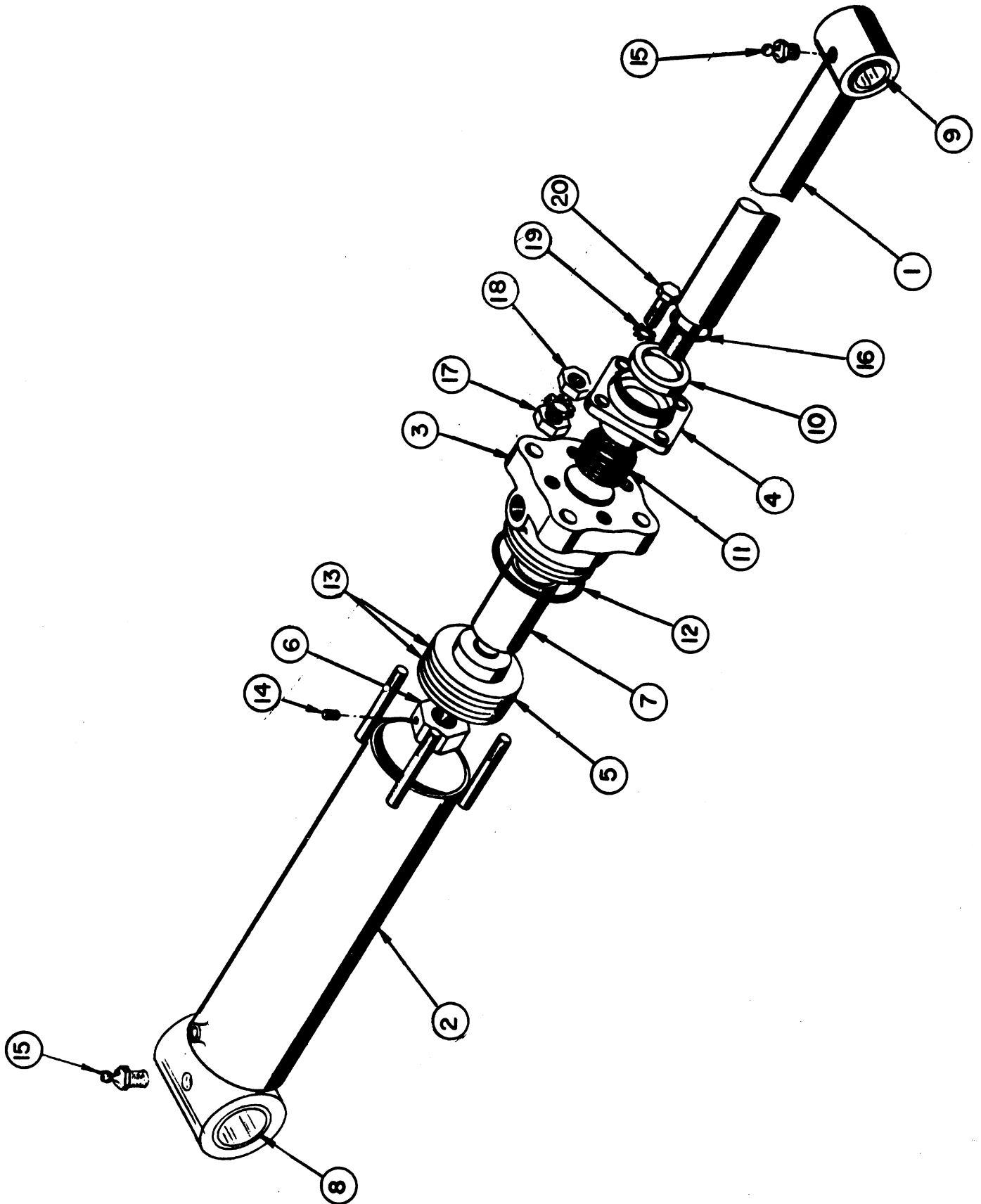
**HOIST CYLINDER ASS'Y
11544**



REF.	PART NO.	DESCRIPTION	REQ.
HOIST CYLINDER ASSEMBLY			
NO. 11,544			
1	P-10307	Klozure	1
2	7196	Gland	1
3	COM'L	Bolt, Hex 5/16-18 NC x 1" Long	4
4	P-10304	V-Packing	1
5	7195	Head	1
6	P-10315	O-Ring	1
7	11,588	Piston Rod	1
8	989	Piston	1
9	COM'L	Spacer 2" Std. Pipe x 5 1/2" Long	1
10	P-11292	Piston Ring Assembly	2
11	COM'L	Zerk Fitting 1/8 N.P.T.	2
12	222	Nut, Special	1
13	COM'L	Setscrew 1/4-20 NC 3/8 Cup Point	1
14	11,578	Cylinder Tube	1
15	COM'L	Nut, Jam 1/2"-20 N.F.	4
16	COM'L	Nut, Hex 1/2-20 N.F.	4
17	COM'L	Washer, Shakeproof 1/2	4
18	COM'L	Washer, Shakeproof 5/16	4
19	3304	Bushing	1
20	P-13191	O-Ring	1
21	4873	Bushing	2

LULL ENGINEERING COMPANY INC.
3045 HIGHWAY 13
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HOIST CYLINDER ASSEMBLY
NO. 13,006



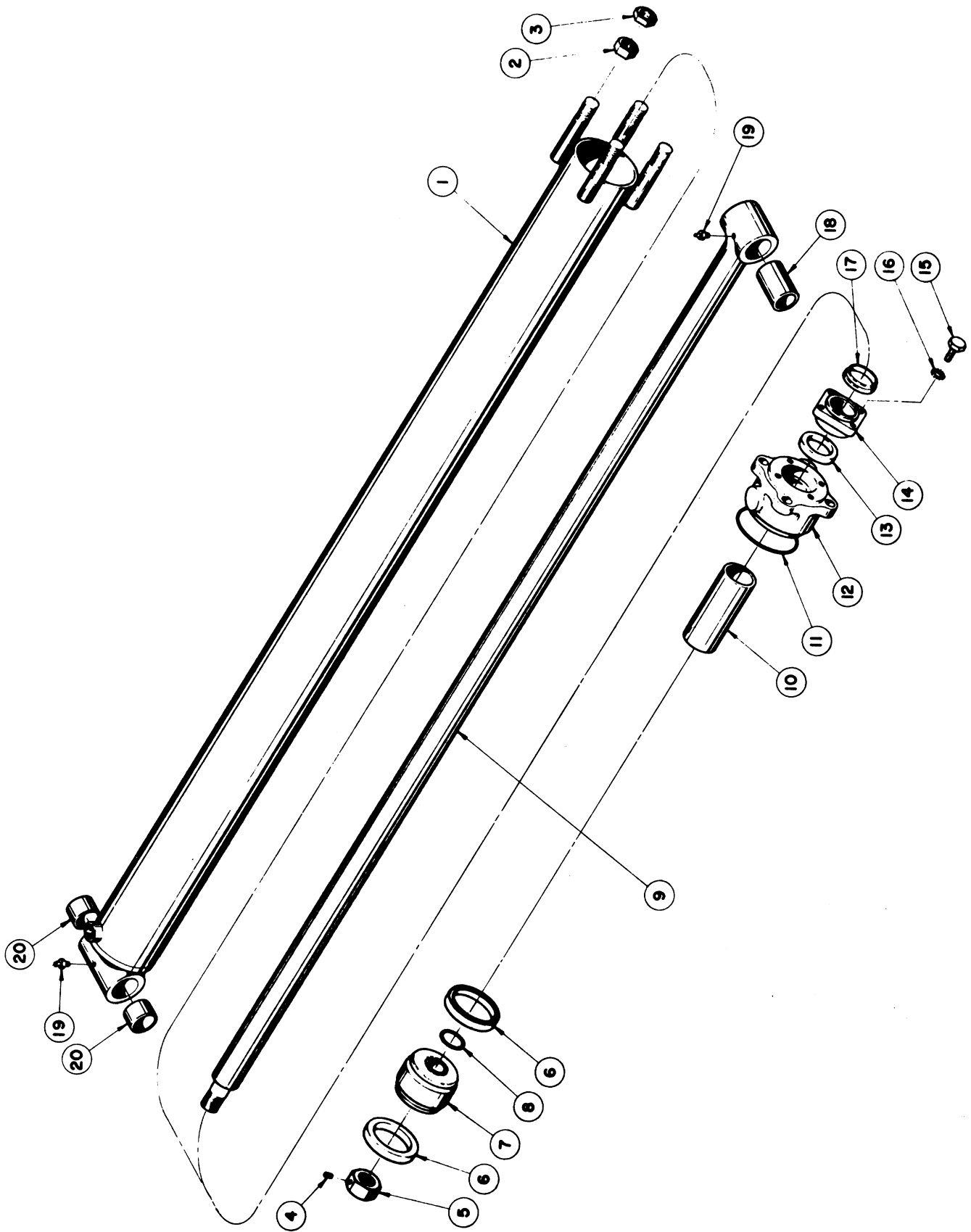
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

HOIST CYLINDER ASSEMBLY
 NO. 13,006

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13,005		Piston Rod	1
2	13,004		Cylinder Tube	1
3	545		Head	1
4	5146		Gland	1
5	9879		Piston	1
6	215		Nut, Special	1
7	N-10299		Spacer, 2 1/2 x 2 1/16 x 5 3/8 long	1
8	4873		Bushing	2
9	3304		Bushing	1
10	P-10307		Klozure	1
11	P-10304		V-Packing	1
12	P-10316		O-Ring	1
13	P-11347		Ring Assembly	2
14	COM'L		Setscrew, 1/4-20 NC x 3/8 C.P.	1
15	COM'L		Zerk Fitting 1/8 NPT	2
16	P-11576		O-Ring	1
17	COM'L		Nut, Hex 1/2 NF	4
18	COM'L		Nut, Jam 1/2 NF	4
19	COM'L		Washer, Shakeproof 5/16"	4
20	COM'L		Capscrew, 5/16 NC x 1 1/2" long	4

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA

HOIST CYLINDER ASS'Y
400 HIGH-LIFT LOADER
NO. 14020



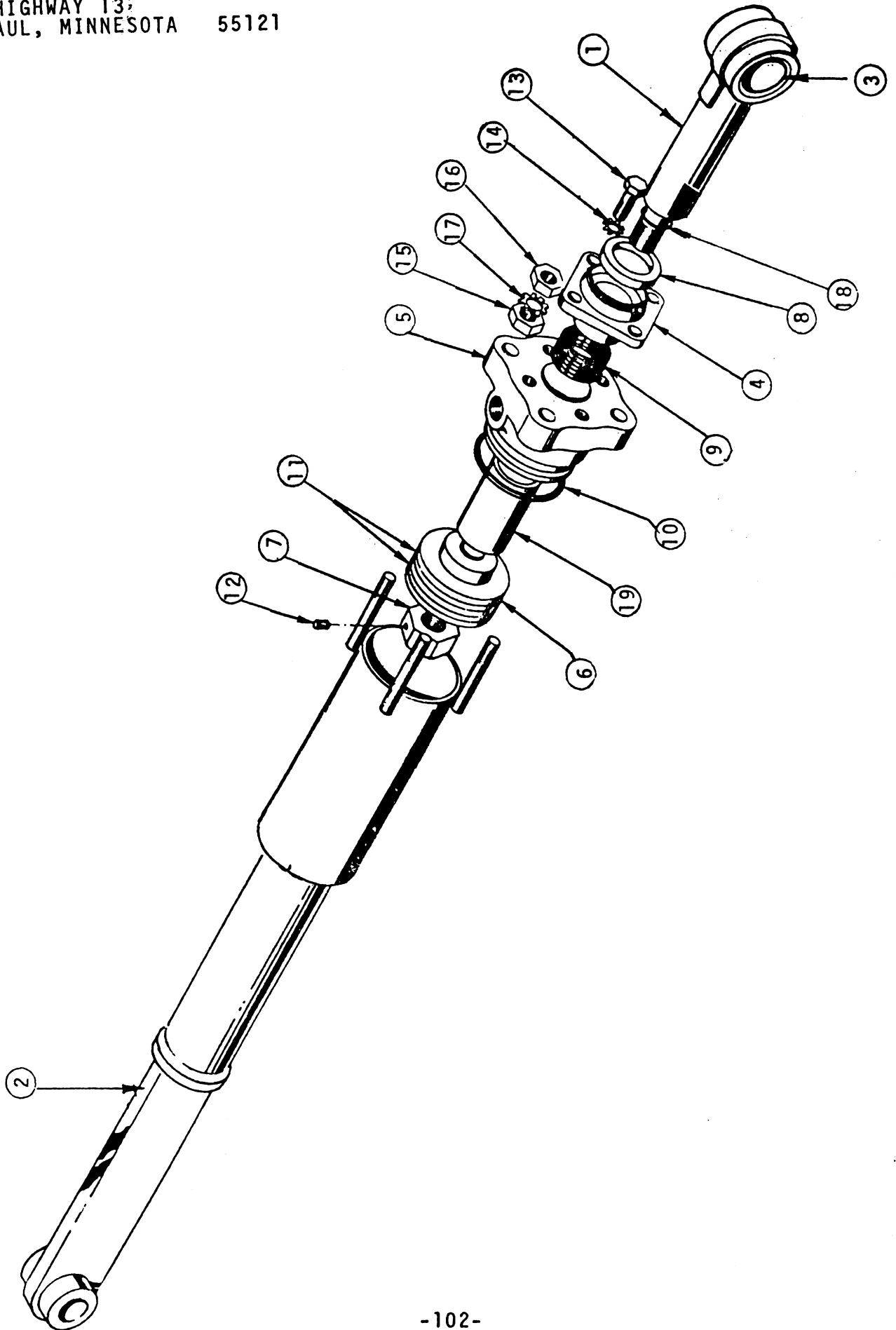
LULL ENGINEERING COMPANY, INC.
 3045 Highway 13,
 ST. PAUL, MINNESOTA 55121

HOIST CYLINDER ASSEMBLY
 400 High-Lift Loader
 NO. 14020

<u>ITEM</u>	<u>PART NO.</u>	<u>DESCRIPTION</u>	<u>QTY.</u>
1	13004	Cylinder Tube	1
2	Com'L	Nut, Hex.	4
3	Com'L	Nut, Jam	4
4	Com'L	Set Screw	1
5	215	Nut Piston	1
6	P17457	Seal, Piston	2
7	14010	Piston	1
8	P11576	O-Ring	1
9	14043	Rod, Piston	1
10	14032	Spacer	1
11	P10316	O-Ring	1
12	545	Head	1
13	P17458	Seal, Rod	1
14	14013	Gland	1
15	Com'L	Capscrew, 5/16-18 NC X 1" Lg.	4
16	Com'L	Washer, Shakeproof	4
17	P17459	Wiper	1
18	3304	Bushing	1
19	P16611	Zerk	2
20	4873	Bushing	2

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

TILT CYLINDER ASSEMBLY



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

TILT CYLINDER ASSEMBLY

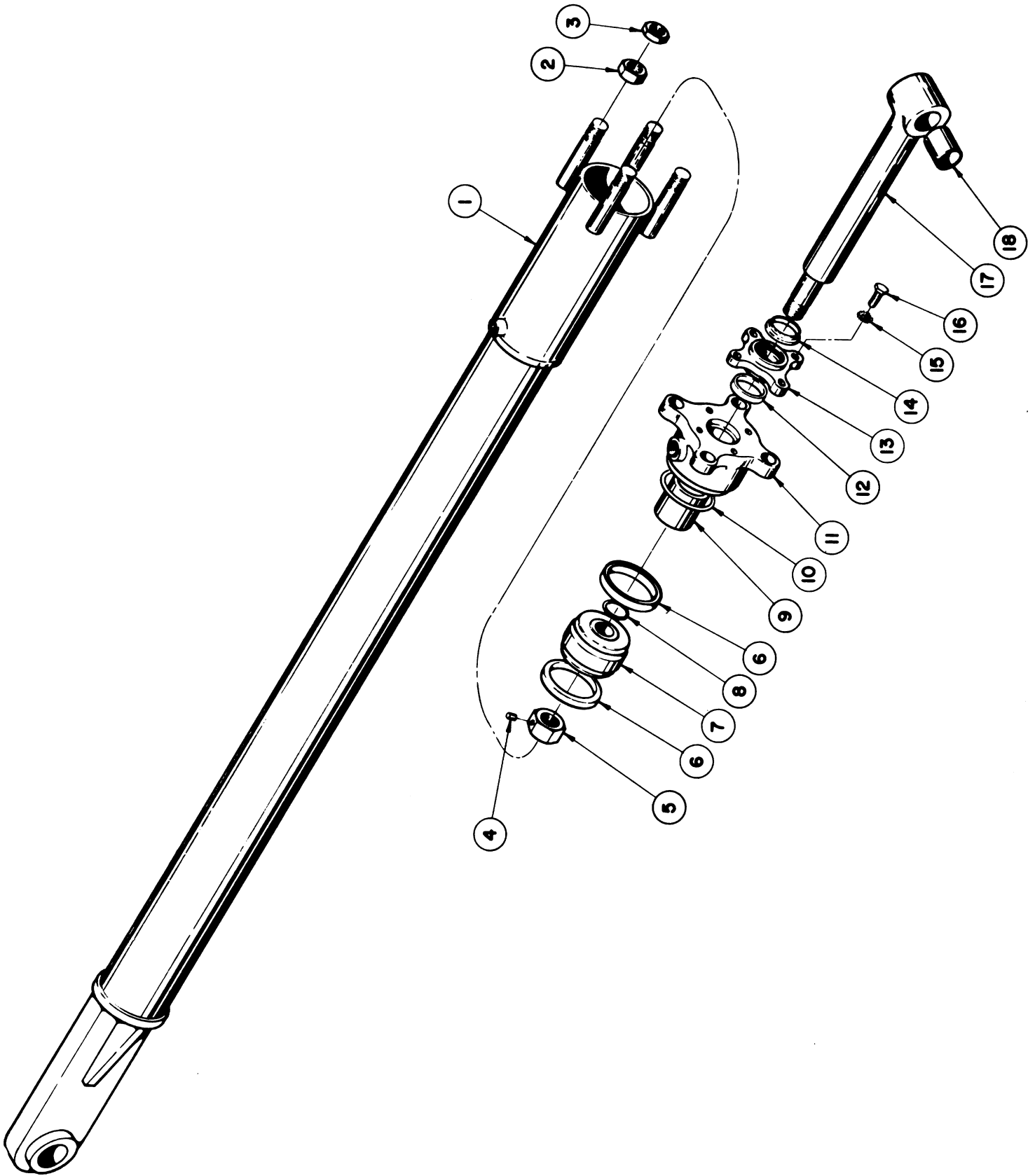
<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13,026 *		Piston Rod	1
2	13,025 **		Cylinder Tube Weldment	1
3	7313		Bushing	1
4	5146		Gland	1
5	545		Head	1
6	9879		Piston	1
7	215		Special Nut	1
8	P-10307		Klozure	1
9	P-10304		V-Packing	1
10	P-10316		O-Ring	1
11	P-11347		Ring Assembly	2
12	COM'L		Setscrew 1/4-20 NC x 3/8 long	1
13	COM'L		Capscrew Hex Hd. 5/16-18 NC x 1 lg.	4
14	COM'L		Washer, Shakeproof 5/16"	4
15	COM'L		Nut, Hex 1/2-20 NF	4
16	COM'L		Nut, Hex Jam 1/2-20 NF	4
17	COM'L		Washer, Shakeproof 1/2"	4
18	P-11576		O-Ring	1
19	N-10300 ***		Spacer 2 1/2 x 2 1/16 x 2 3/4"	1

NOTES:

- * For S/N 101-599, Use 8,774.
- ** For S/N 101-329, Use 11,392.
 For S/N 330-599, Use 12,260.
- *** For S/N 101-329, Use N-10247.
 For S/N 330-599, Use N-10249.

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

TOGGLE TILT CYLINDER ASS'Y
400 HIGH-LIFT LOADER
NO. 14022



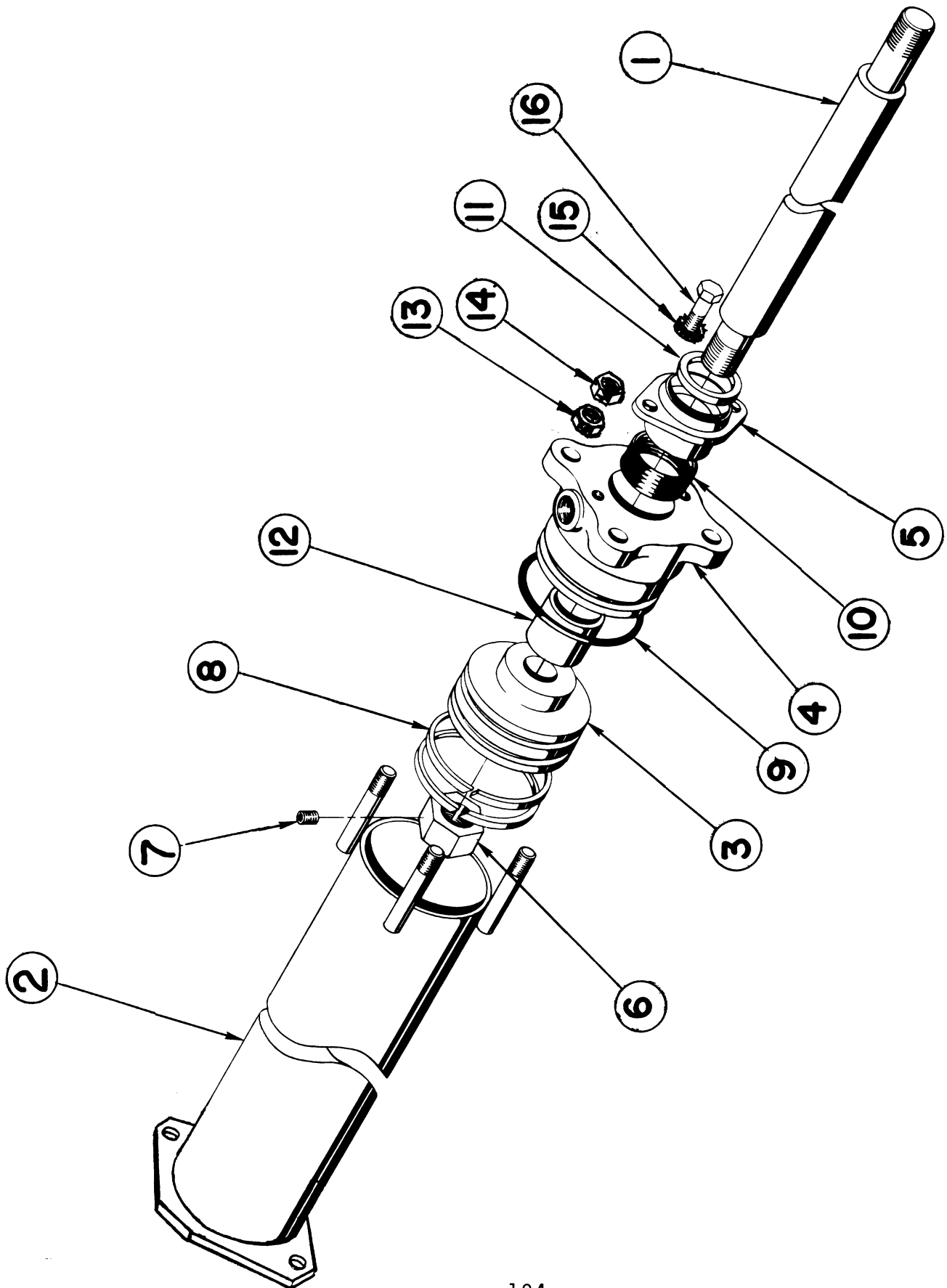
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

TOGGLE TILT CYLINDER ASS'Y
 400 HIGH-LIFT LOADER
 NO. 14022

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	13025		Cylinder Tube	1
2	Com'l		Nut, Hex, 1/2-20 N.F.	4
3	Com'l		Nut, Jam, 1/2-20 N.F.	4
4	Com'l		Set Screw, 1/4-20 NC.,CR.x 3/8 LG.	1
5	215		Nut, Piston	1
6	P-17457		Seal, Piston	2
7	14009		Piston	1
8	P-11576		O-Ring	1
9	N-10300		Spacer	1
10	P-10316		O-Ring	1
11	545		Head	1
12	P-17458		Seal, Rod	1
13	14013		Gland	1
14	P-17459		Wiper, Rod	1
15	Com'l		Washer, Shakeproof-5/16	4
16	Com'l		Cap Screw, HX. HD.,5/16-18 NC. x 1"4	1
17	14056		Rod, Piston	1
18	7313		Bushing	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

TRANSVERSE CYLINDER ASSEMBLY
NO. 11,545

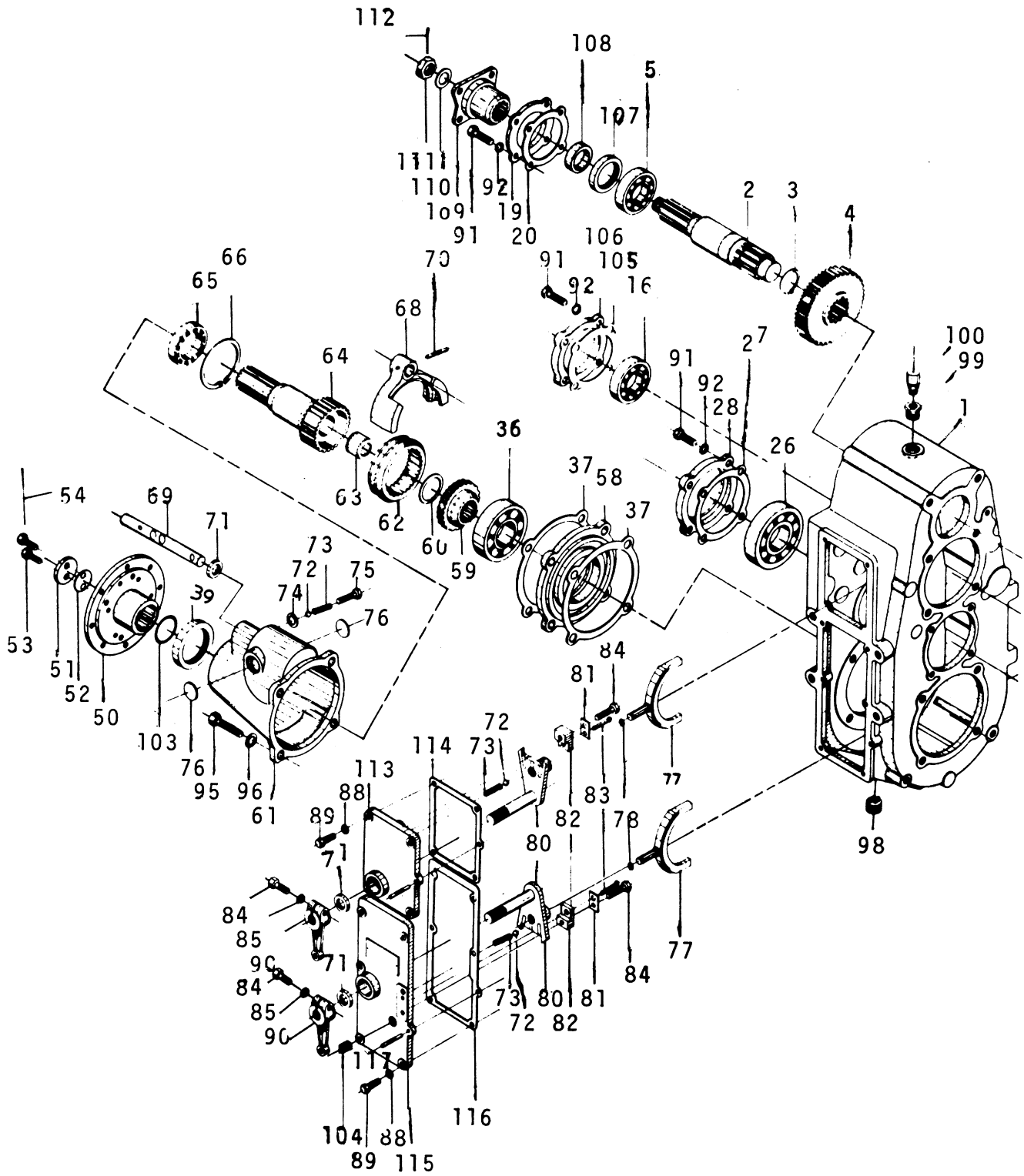


LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
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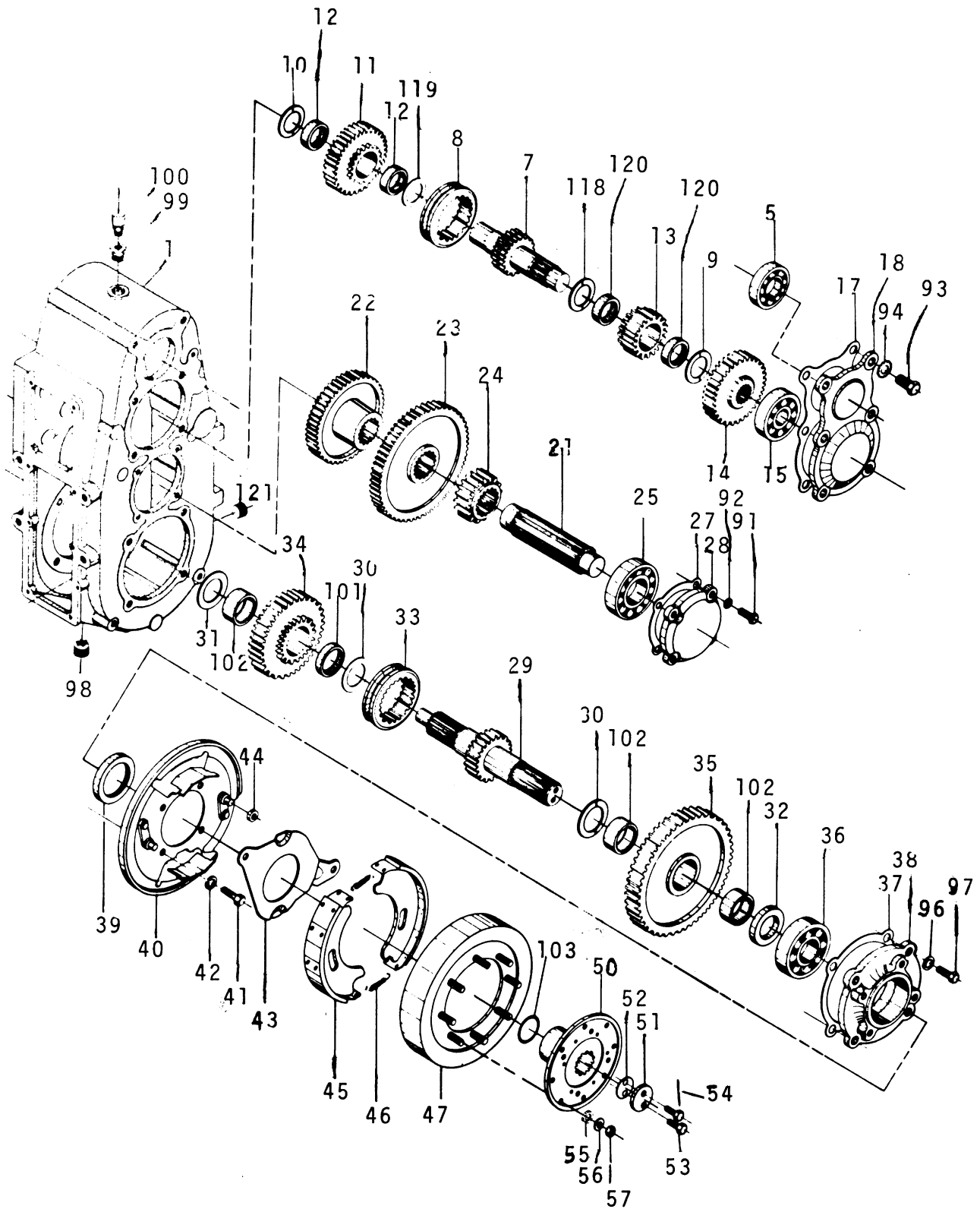
TRANSVERSE CYLINDER ASSEMBLY
 NO. 11,545

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	11,074		Piston Rod	1
2	11,075		Cylinder Tube	1
3	551		Piston	1
4	1028		Head	1
5	1032		Gland	1
6	222		Nut (Special)	1
7	COM'L		Setscrew, 1/4 NC x 3/8 Cup Point	1
8	P-11346		Ring Assembly	2
9	P-10314		O-Ring	1
10	P-10306		V-Packing	1
11	P-10308		Klozure (Wiper)	1
12	N-10229		Spacer, 1 1/2 Std. Pipe x 9 1/2"Lg.	1
13	COM'L		Nut, Hex 1/2-20 NF	4
14	COM'L		Nut, Jam 1/2-20 NF	4
15	COM'L		Washer, Shakeproof 3/8"	2
16	COM'L		Capscrew, 3/8-16 NC x 1" Lg.	2

DROP BOX TRANSMISSION
P-11686



DROP BOX TRANSMISSION
P-11686



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

DROP BOX TRANSMISSION
 P-11686

ITEM NO.	PART NO.	ASSEMBLY NO.	DESCRIPTION	NO. REQ.
1.	P-11909		Case	1
2.	P-11910		Input Shaft	1
3.	P-11911		Snap Ring	1
4.	P-11938		Gear, Input Shaft	1
5.	P-11939		Bearing, Input Stage	2
6.				
7.	P-11940		Shaft, 2nd Stage	1
8.	P-11941		Synchronizer Assembly	1
9.	P-11942		Thrust Washer, 2nd Stage	1
10.	P-11943		Thrust Washer	1
11.	P-11944		Gear, 2nd Stage	1
12.	P-11945		Bearing	2
13.	P-11946		Gear, 2nd Stage	1
14.	P-11947		Gear, 2nd Stage	1
15.	P-11948		Bearing, 2nd Stage	1
16.	P-11949		Bearing, 2nd Stage	1
17.	P-11950		Gasket, Bearing Retainer	1
18.	P-11951		Bearing Retainer	1
19.	P-11952		Bearing Retainer, Input Shaft	1
20.	P-11953		Gasket	1
21.	P-11954		Shaft, 3rd Stage	1
22.	P-11955		Gear, 3rd Stage	1
23.	P-11956		Gear, 3rd Stage	1
24.	P-11957		Gear, 3rd Stage	1
25.	P-11958		Bearing, 3rd Stage	1
26.	P-11959		Bearing, 3rd Stage	1
27.	P-11960		Gasket, Bearing Retainer	2
28.	P-11961		Bearing Retainer	2
29.	P-11962		Output Shaft	1
30.	P-11963		Thrust Washer, Output Shaft	2
31.	P-11964		Thrust Washer, Output Shaft	1
32.	P-11965		Spacer, Output Shaft	1
33.	P-11966		Shifter Collar, Output Shaft	1
34.	P-11967		Gear, Output Shaft	1
35.	P-11968		Gear, Output Shaft	1
36.	P-11969		Bearing, Output Shaft	2
37.	P-11970		Gasket	3
38.	P-11971		Bearing Retainer, Output Shaft	1
39.	P-11972		Oil Seal	2
40.	P-11973		Backing Plate Assembly	1
41.	P-11974		Capscrew	4
42.	P-11975		Lockwasher	4
43.	P-11976		Belcrank	1
44.	P-11977		Washer, Spacer	1
45.	P-11978		Shoe, Brake	2
46.	P-11979		Spring	2
47.	P-11980		Drum Assembly	1
48.	P-11981		Drum	1
49.	P-11982		Bolt	8
50.	P-11983		Flange, Companion	2

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

DROP BOX TRANSMISSION
 P-11686

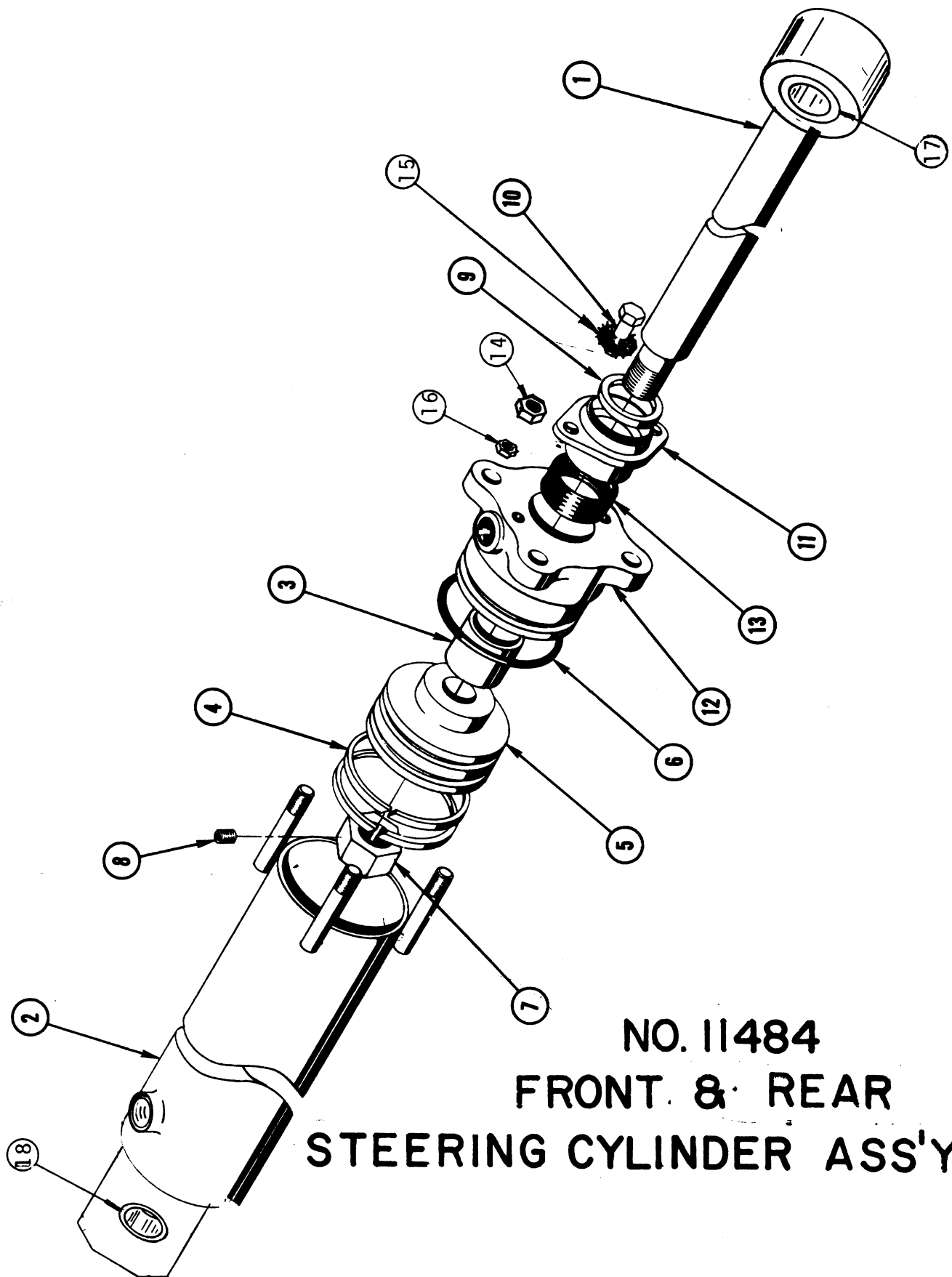
ITEM NO.	PART NO.	ASSEMBLY NO.	DESCRIPTION	NO. REQ.
51.	P-11984		Washer	2
52.	P-11985		Shim	A/R
53.	P-11986		Capscrew, Drilled Head	4
54.	P-11987		Wire Safety	2
55.	P-11988		Washer, Clipped	8
56.	P-11989		Lockwasher	8
57.	P-11990		Nut	8
58.	P-11991		Retainer, Bearing	1
59.	P-11992		Gear	1
60.	P-11993		Snap Ring	1
61.	P-11994		Housing	1
62.	P-11995		Clutch, Sleeve	1
63.	P-11996		Bearing	1
64.	P-11997		Output Shaft, Disconnect	1
65.	P-11998		Bearing	1
66.	P-11999		Snap Ring	1
68.	P-12001		Fork	1
69.	P-12002		Shaft	1
70.	P-12003		Roll Pin	1
71.	P-12004		Oil Seal	3
72.	P-12005		Detent Ball	3
73.	P-12006		Spring	3
74.	P-12007		Dynaseal Washer	1
75.	P-12008		Capscrew	1
76.	P-12009		Expansion Plug	2
77.	P-12010		Fork	2
78.	P-12011		Snap Ring	2
79.				
80.	P-12013		Shifting Bracket Assembly (See Note)	2
81.	P-12017		Lockplate	2
82.	P-12018		Inhibitor Block	2
83.	P-15125		Roll Pin	2
84.	P-15126		Capscrew	5
85.	P-15127		Lockwasher	3
86.				
87.				
88.	P-15128		Starwasher	8
89.	P-15129		Capscrew	8
90.	P-12025		Shifter Lever	2
91.	P-15130		Capscrew	16
92.	P-15131		Starwasher	18
93.	P-15132		Capscrew	6
94.	P-15133		Starwasher	6
95.	P-15134		Capscrew	4
96.	P-12030		Dynaseal Washer	8
97.	P-15135		Capscrew	4
98.	P-15136		Drain Plug	1
99.	P-15137		Reducer Pipe	1
100.	P-12034		Breather	1

LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

DROP BOX TRANSMISSION
 P-11686

ITEM NO.	PART NO.	ASSEMBLY NO.	DESCRIPTION	NO. REQ.
101.	P-12035		Roller Bearing	1
102.	P-12036		Roller Bearing	1
103.	P-12037		O-Ring	2
104.	P-15138		Check Plug, Oil Level	1
105.	P-15139		Gasket	A/R
106.	P-12048		Bearing Retainer, 2nd Stage	1
107.	P-12049		Oil Seal, Input Shaft	1
108.	P-12042		Collar, Input Shaft	1
109.	P-12043		Companion	1
110.	P-12044		Washer, Input Shaft	1
111.	P-15140		Nut, Input Shaft	1
112.	P-15141		Cotter Pin, Input Shaft	1
113.	P-15142		Top Shifter Cap	1
114.	P-15143		Gasket, Top Shifter Cap	1
115.	P-15144		Bottom Shifter Cap	1
116.	P-15145		Gasket, Bottom Shifter Cap	1
117.	P-15146		Dowell Pin	2
118.	P-12039		Spacer	1
119.	P-12040		Spacer	1
120.	P-12041		Roller Bearing	2
121.	P-15147		Oil Level Check Plug	1

NOTE: Shifting Bracket Assembly Includes
 Detent Plate 2
 Shaft 2
 Boss 2



**NO. 11484
FRONT & REAR
STEERING CYLINDER ASS'Y.**



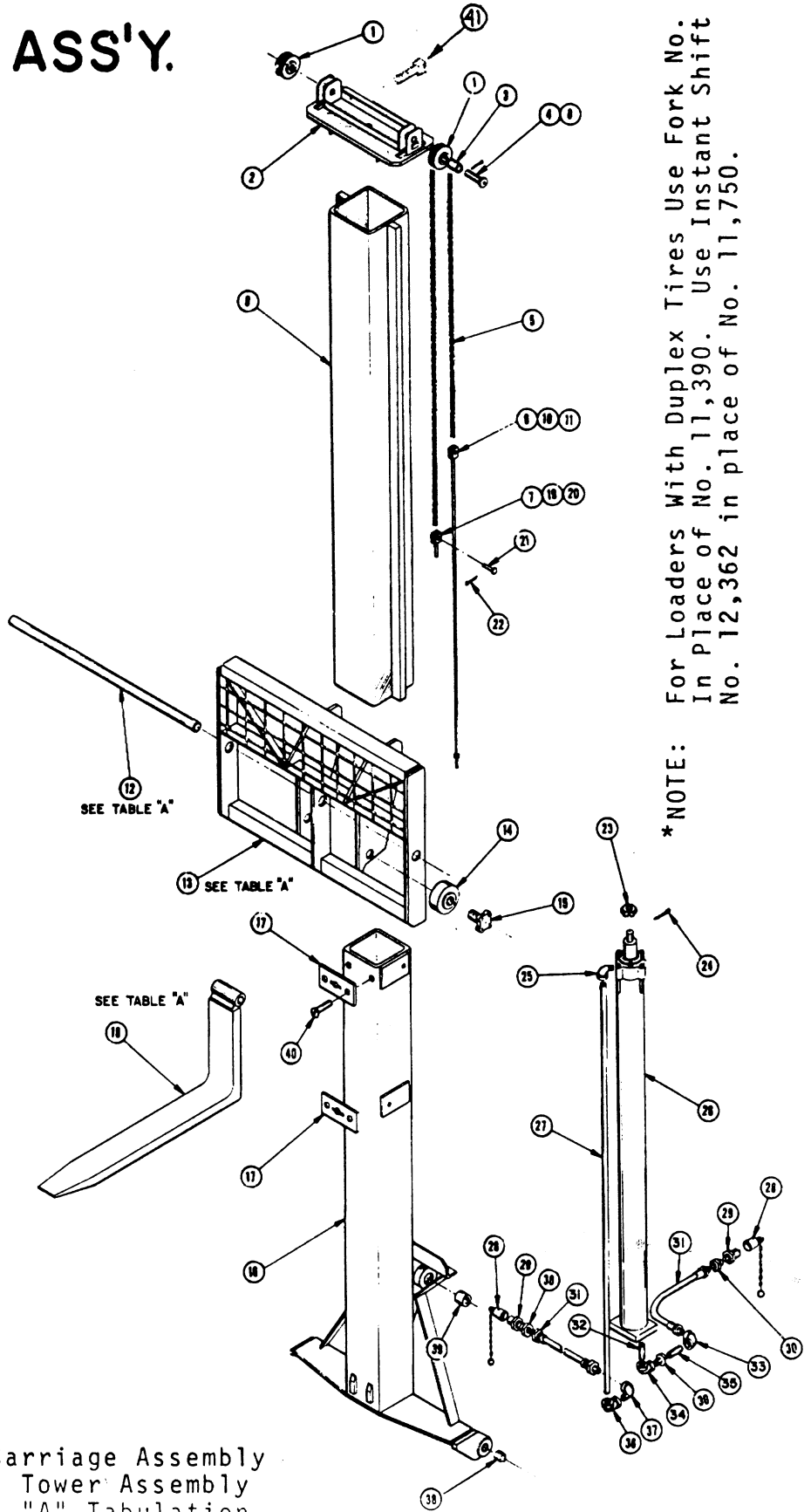
REF.	PART NO.	DESCRIPTION	REQ.
		FRONT & REAR STEERING CYLINDER ASS'Y * NO. 11,484 FRONT * NO. 11,484 REAR	
1	11,483	Piston Rod Weldment	1
2	11,481	Cylinder Tube Weldment	1
3	N-10140	Spacer 1 1/2 Std. Pipe - 2 1/8 long	1
4	P-11346	Ring Assembly	2
5	551	Piston	1
6	P-10314	O-Ring	1
7	222	Special Nut	1
8	COM'L	Setscrew, 1/4 NC x 3/8 Cup Point	1
9	P-10308	Klozure	1
10	COM'L	Capscrew, 3/8-16 NC x 1 Hex Hd.	2
11	1032	Gland	1
12	1028	Head	1
13	P-10306	V-Packing	1
14	COM'L	Jam Nut, 1/2-20 NF	4
15	COM'L	Washer, Shakeproof 3/8"	2
16	COM'L	Nut, Hex 1/2-20 NF	4
17	11,485	Bushing	1
18	11,486	Bushing	1
		*NOTE: Specify <u>Front</u> or <u>Rear</u> when ordering this cylinder.	

TOWER ASS'Y.

TABLE A

ASS'Y. NO.	DESCRIPTION	CARRIAGE NO.	FORK NO.	FORK LENGTH	SHAFT NO.
11610	Side Tilt Carriage Ass'y.	11609	* 11390	42"	11331
11742	5' Wide West Coast C. Ass'y.	11731	* 11390	42"	11365
11751	Instant Shift Fork C. Ass'y.	11747	*11390/11750	42"	11752
11743	Standard Carriage Ass'y.	11744	* 11390	42"	11331
11706	5' W. West C. Side Tilt Ass'y.	11783	* 11390	42"	11776

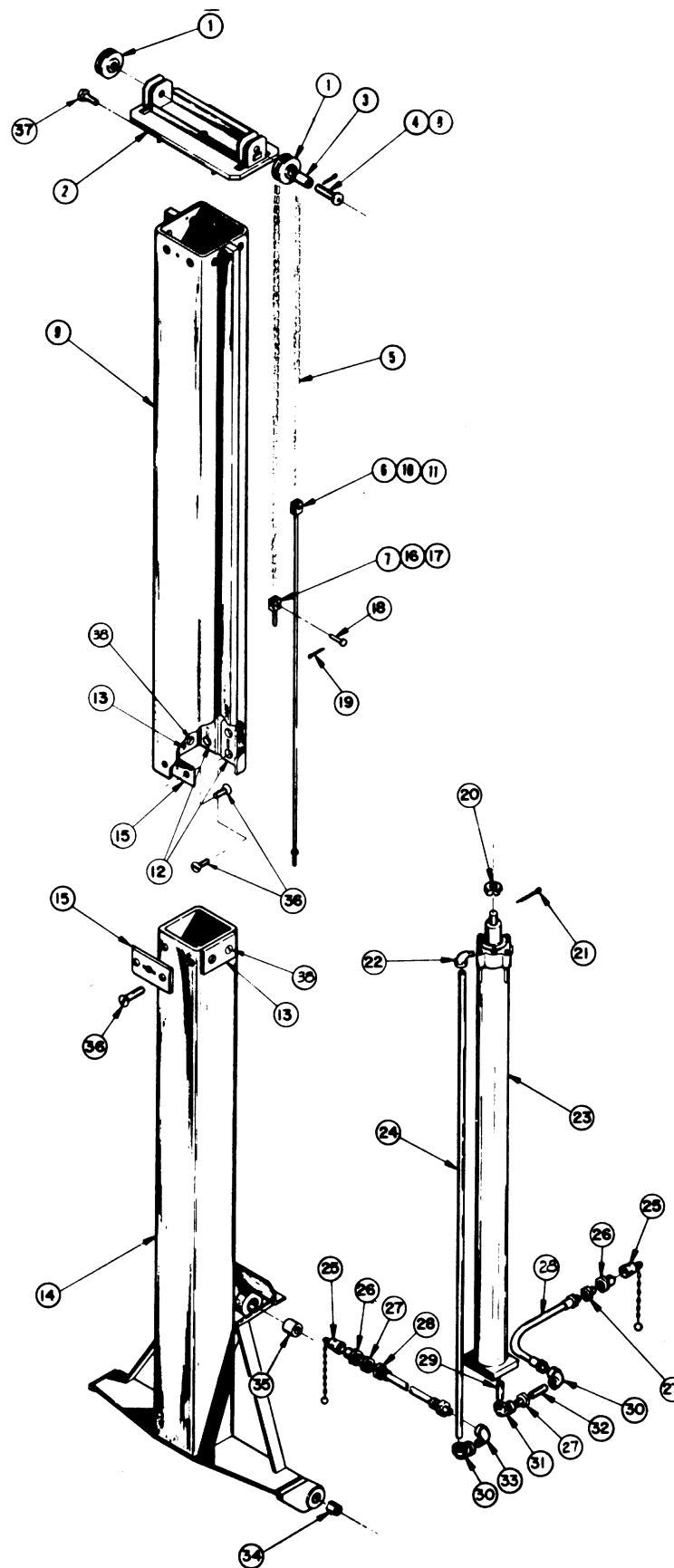
NOTE: For Required Carriage Assembly Used With This Tower Assembly Refer to Table "A" Tabulation.



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

TELESCOPIC TOWER ASS'Y
 NO. 13,034

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7203		Chain Pulley	2
2	6878		Chain Pulley Bracket	1
3	7214		Bushing	2
4	7075		Pin	2
5	P-12983		Chain	2
6	1116		Chain Link	2
7	7207-63		Chain Anchor	2
8	COM'L		Cotter Pin (3/16" Dia. x 1 3/4")	2
9	11,513		Yoke Weldment	1
10	COM'L		Washer, Starlock 1/2"	2
11	COM'L		Hex Nut 1/2 N.F.	4
12	SEE TABLE "A"		Shaft	1
13	SEE TABLE "A"		Carriage	1
14	6860		Roller	4
15	11,272		Spindle	4
16	13,033		Upright Frame (S/N 101-599, Use 11515)	1
17	6911		Bronze Wear Plate	4
18	SEE TABLE "A"		Fork	2
19	COM'L		Hex Nut 5/8 N.F.	4
20	COM'L		Washer, Starlock 5/8"	2
21	7078		Anchor Pin	4
22	COM'L		Cotter Pin, 1/16 Dia. x 3/4"	2
23	COM'L		Finished Hex Castle Nut 1" NF	1
24	COM'L		Cotter Pin 1/8" Dia. x 2"	1
25	P-17361		Street Ell	1
26		11,514	Cylinder Ass'y (Page 115A)	1
27	P-12982		Pipe	1
28	P-10325		Dust Cap	2
29	P-11353		Coupling (Male)	2
30	P-10120		Reducing Bushing	3
31	P-13342		Hose	2
32	P-10937		Nipple	1
33	P-10225		Elbow	1
34	P-10227		Elbow	1
35	P-10885		Nipple	1
36	P-10225		Elbow	1
37	P-10117		Elbow	1
38	7338		Bushing	2
39	6974		Bushing	2
40	COM'L		Capscrew Slotted Flathead 1/2 NC x 1	8
41	P-13517		Capscrew	4



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

TELESCOPIC TOWER ASSEMBLY
 MODEL 400
 NO. 14141

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7203		Chain Pulley	2
2	6878		Chain Pulley Bracket	1
3	7214		Bushing	2
4	7075		Pin	2
5	P-12983		Chain	2
6	1116		Chain Link	2
7	7207-63		Chain Anchor	2
8	Com'1		Cotter Pin (3/16" Dia. x 1 3/4LG)	2
9	14131		Yoke Weldment	1
10	Com'1		Washer, Starlock-1/2"	2
11	Com'1		Hex Nut-1/2-20 N.F.	4
12	14132		Bronze Wear Plate	2
13	14133		Bronze Wear Plate	4
14	14134		Upright Frame	1
15	6911		Bronze Wear Plate	3
16	Com'1		Hex Nut-5/8-18 N.F.	4
17	Com'1		Washer, Starlock-5/8"	2
18	7078		Anchor Pin	4
19	Com'1		Cotter Pin-1/16 Dia. x 3/4"	2
20	Com'1		Finished Hex Cast Nut-1"-12 N.F.	1
21	Com'1		Cotter Pin-1/8" Dia. x 2"	1
22	P-17361		Street Ell-45°	1
23	11514		Cylinder Assembly	1
24	P-12982		Pipe	1
25	P-10325		Dust Cap	2
26	P-11353		Coupling (Male)	2
27	P-10120		Reducing Bushing	3
28	P-13342		Hose	2
29	P-15526		Nipple	1
30	P-15562		Elbow	2
31	P-15566		Elbow	1
32	P-15497		Nipple	1
33	P-15563		Street Elbow	1
34	7338		Bushing	2
35	6974		Bushing	2
36	P-17561		Cap Screw Flt. HD.	10
37	P-13517		Capscrew, Hex HD.	4
38	P-17676		Capscrew, Flt. HD.	8

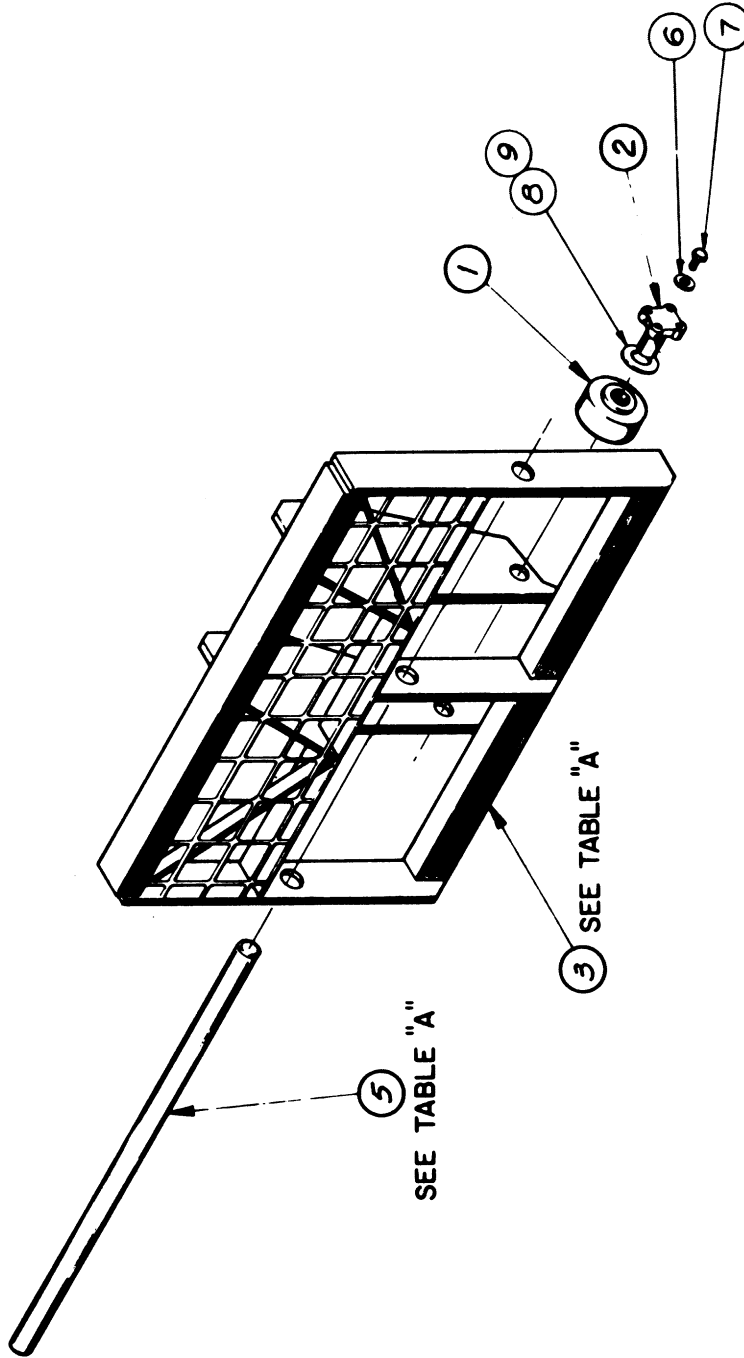
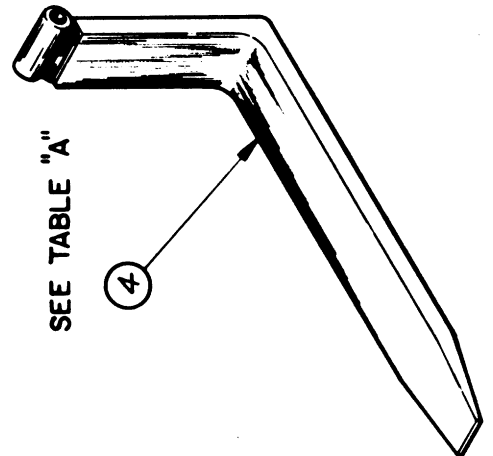


TABLE "A"		ITEM NO.	ITEM NO.	ITEM NO.
ASSY. NO.	DESCRIPTION	3	4	5
		CARRIAGE	FORK LK	FORK LK SHFT LK
11610	SIDE TILT CARRIAGE ASSY.	11609	19279	42"
11742	5' WIDE WEST COAST C. ASSY.	11731	13279	42"
11751	INSTANT SHIFT FORK C. ASSY.	11747	15079	42"
11743	STANDARD CARRIAGE ASSY.	11744	19279	42"
11796	5' W. WEST C. SIDE TILT ASSY.	11783	13279	42"



LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

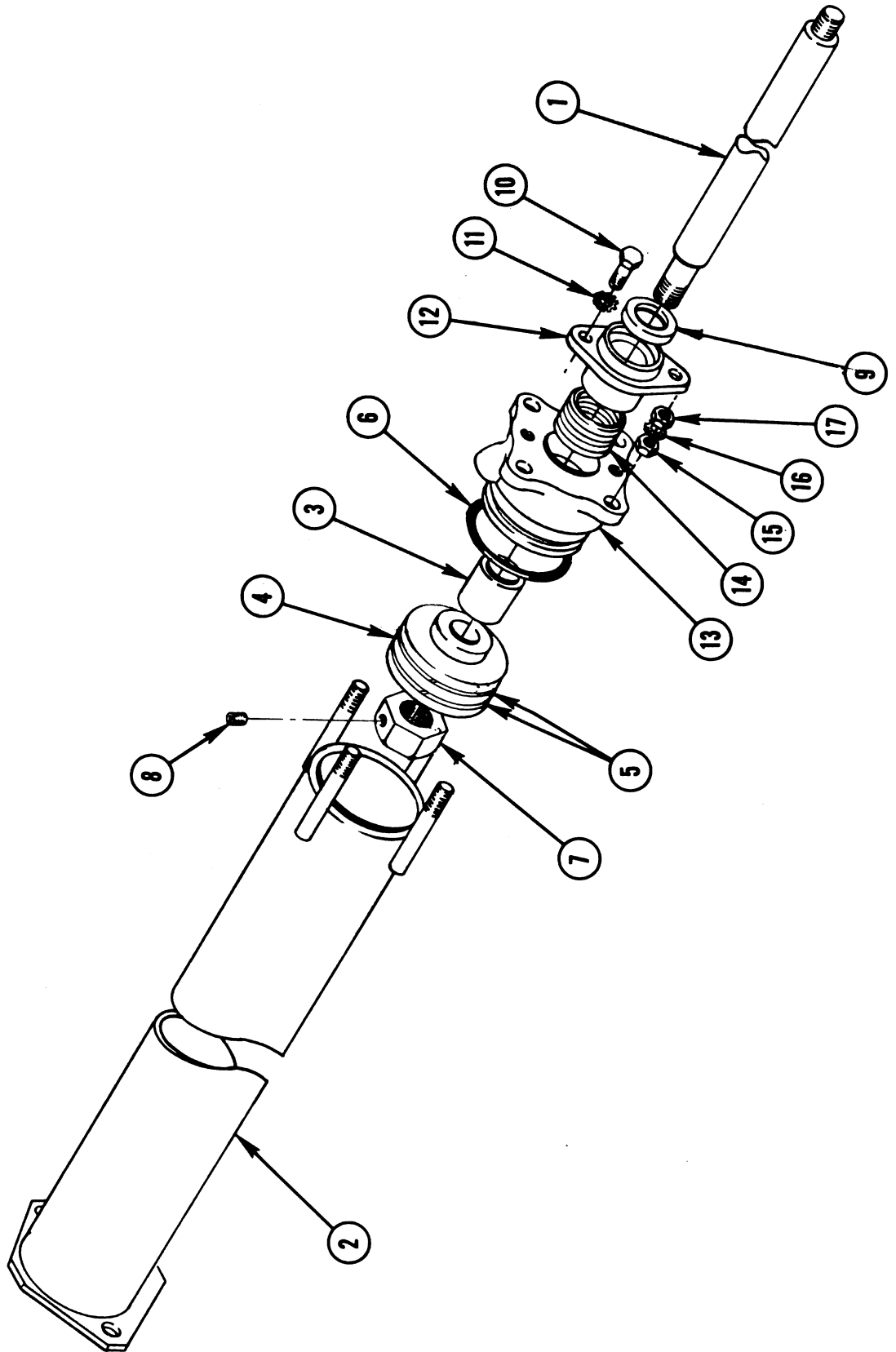
CARRIAGE & FORKS ASSEMBLY
MODEL 400
NO. 14156

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	6860		Roller	4
2	11272		Spindle	2
6	Com'1		Washer,Starlock 7/16	16
7	Com'1		Capscrew,HX.HD.-7/16-14NC x 1 1/4	16
8	P-15223		Shim-1/32" Thick	2
9	P-15238		Shim-1/32" Thick	2

* For Item numbers 3,4, and 5 see Table A.

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

3 1/2" I.D. TOWER CYLINDER ASS'Y
No. 11514
For High-Lift Tower

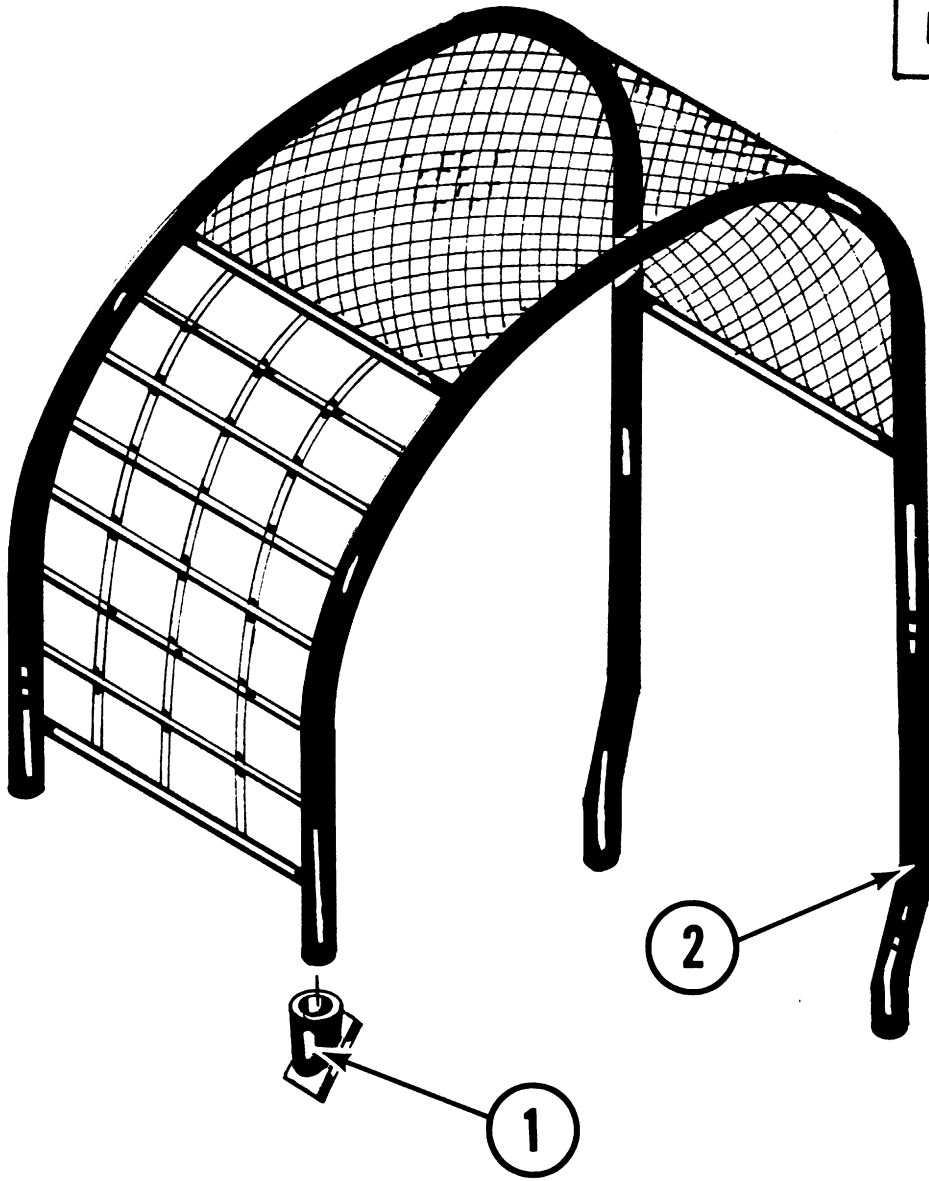


LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

3 1/2" I.D. Tower Cyl. Ass'y.
NO. 11514

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	11507		Piston Rod	1
2	11511		Cylinder Tube	1
3	N-10204		Spacer	1
4	550		Piston	1
5	P-11292		Piston Ring Ass'y.	2
6	P-10315		O'Ring	1
7	222		Special Nut	1
8	COM'L		Setscrew, 1/4 NC x 3/8 Cup Pt.	1
9	P-10303		Klozure	1
10	COM'L		Capscrew, 3/8 NC x 1	2
11	COM'L		Shakeproof Washer, 3/8"	2
12	1023		Gland	1
13	1034		Cylinder Head	1
14	P-10305		V-Packing	1
15	COM'L		Hex-Nut, 7/16 NF	4
16	COM'L		Shakeproof Washer, 7/16"	4
17	COM'L		Jam Nut, 7/16 NF	4

MODEL II B



OVERHEAD GUARD ASS'Y. 8916

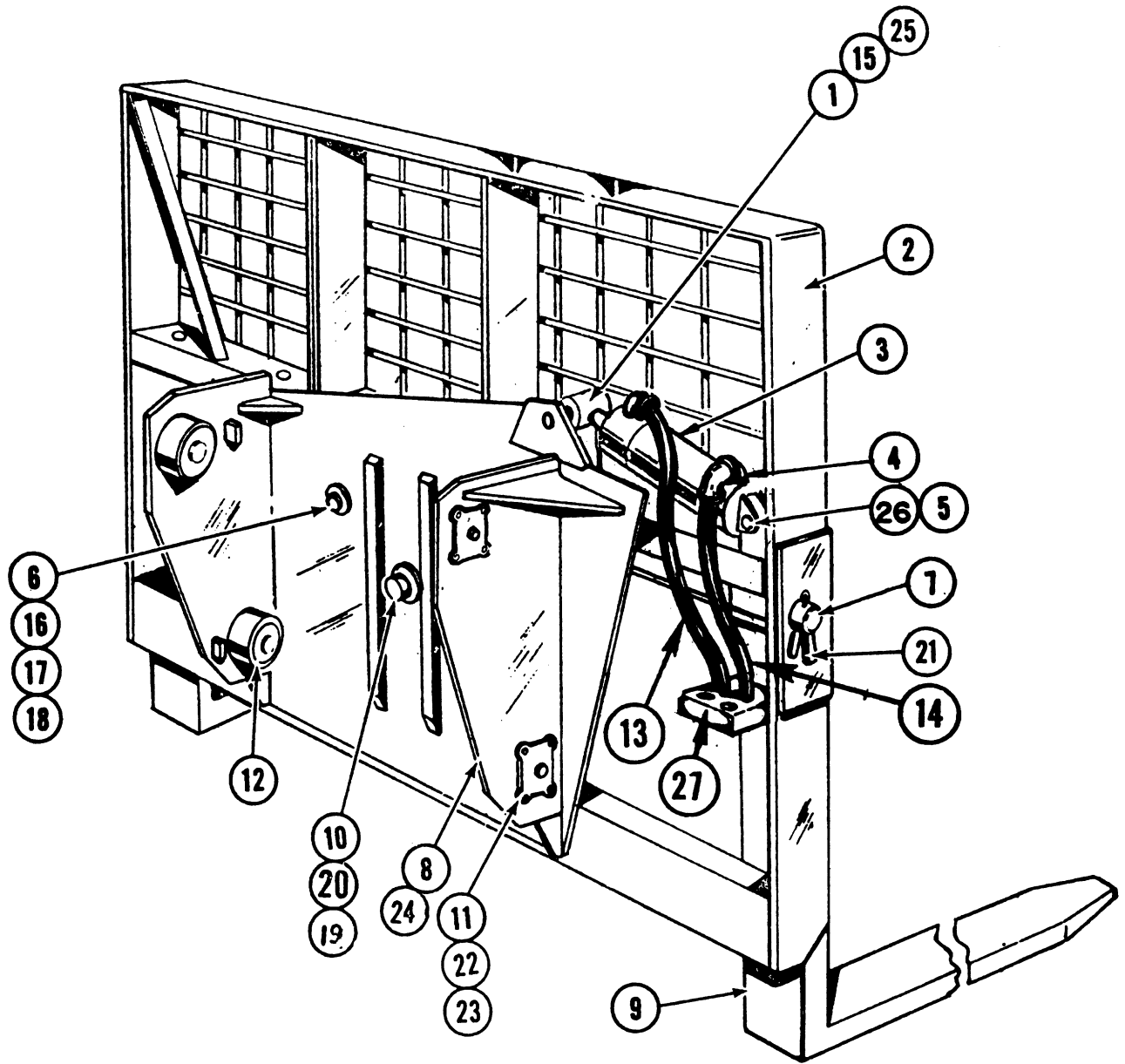
LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

GUARD, OVERHEAD ASSEMBLY
NO. 8916

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	3601		Front Mount	2
2	2193		Guard	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

SIDE TILT CARRIAGE
NO. 11,610

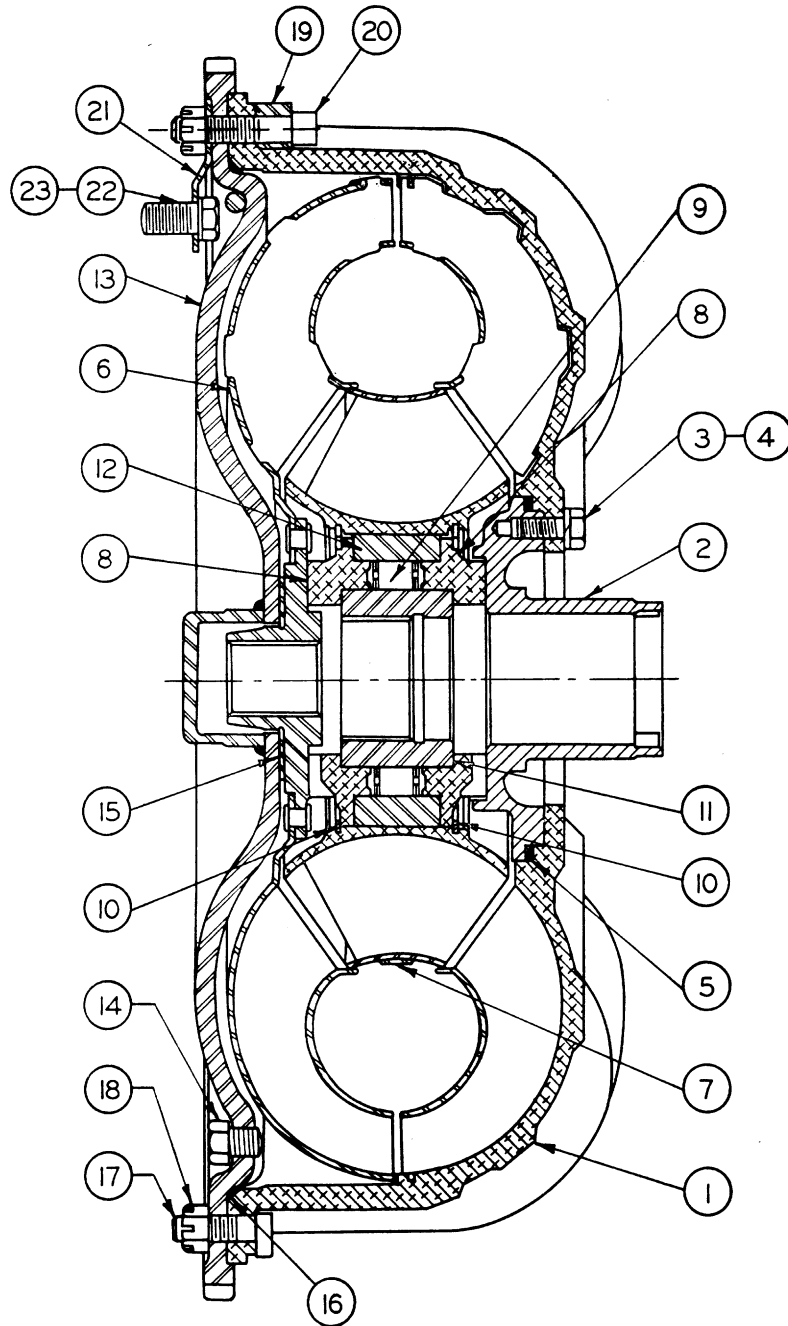


LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13,
 ST. PAUL, MINNESOTA 55121

SIDE TILT CARRIAGE
 NO. 11,610

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	1170		Collar	1
2	11,609		Outer Carriage	1
3	6320		Cylinder Assembly	1
4	P-10156		Street Ell	3
5	6459		Pin	1
6	10,180		Washer	2
7	11,331		Shaft	1
8	11,604		Inner Tower Carriage	1
*9	SEE NOTE		Fork Tine on Tower Ass'y (11516)	2
10	6326		Washer	1
11	11,272		Spindle	4
12	6860		Roller	4
13	P-11646		Hose	1
14	P-11647		Hose	1
15	4273		Pin	1
16	COM'L		Nut, 7/8 - 9 NC	2
17	COM'L		Bolt, 7/8 - 9 NC x 2 1/4 Long	2
18	COM'L		Washer, Shakeproof 7/8"	2
19	222		Special Nut	1
20	COM'L		Setscrew, 1/4 NC x 3/8 Cup Pt.	1
21	COM'L		Cotter Pin, 3/8 Dia. x 2 1/2	2
22	COM'L		Washer, Starlock 7/16 Dia.	16
23	COM'L		Capscrew, 7/16 NC x 1 1/4	16
24	COM'L		Grease Fitting 1/8 NPT x 90°	7
25	COM'L		Cotter Pin 3/16 Dia. x 2	1
26	COM'L		Cotter Pin 3/16 Dia. x 1 1/4	1
27	1157		Hose Junction Block	1
*9	11,390		Fork Tine (Used on S/N 100 thru 329)2	2

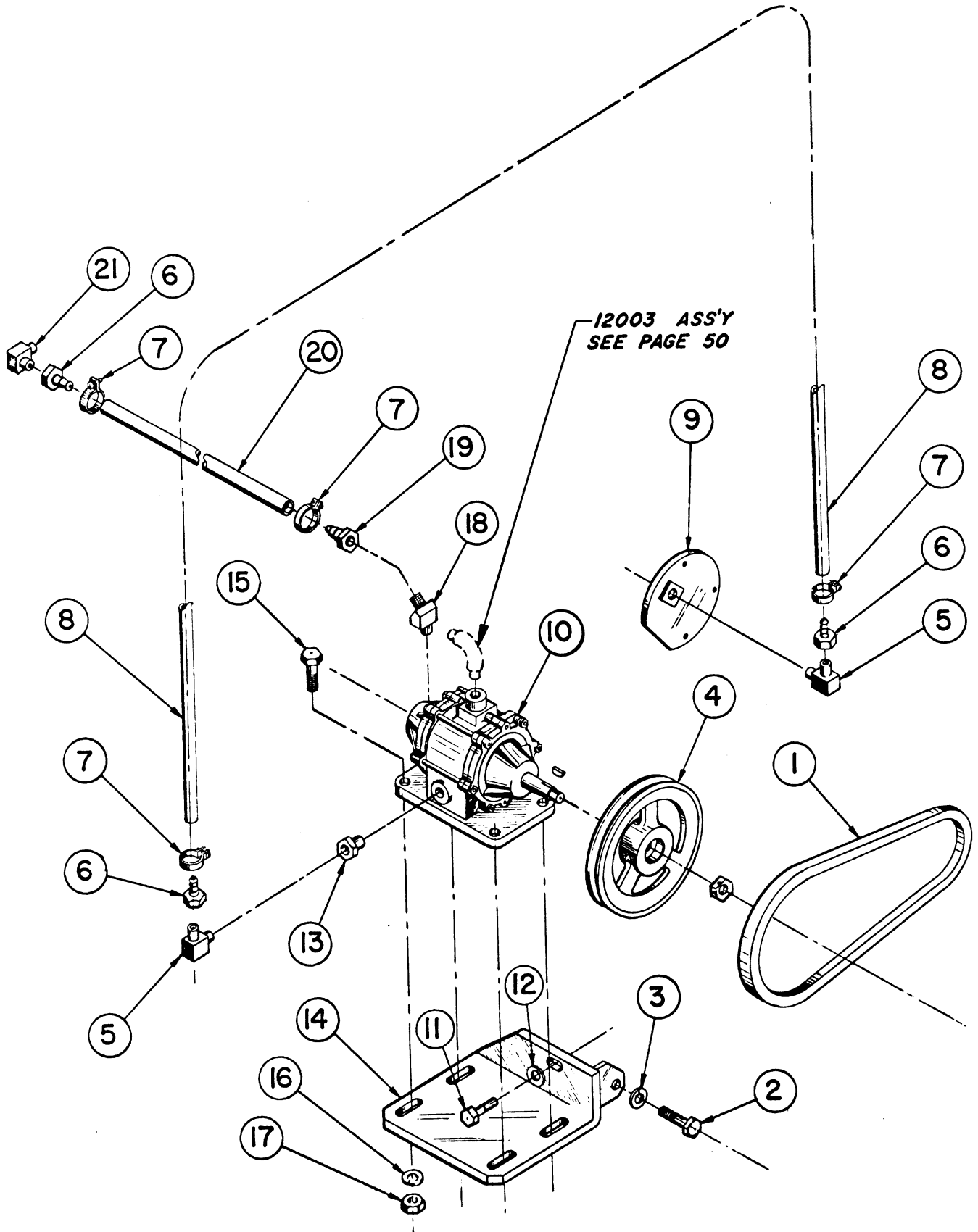
P-13336 TORQUE CONVERTER



LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

TORQUE CONVERTER ASSEMBLY
 NO. P-13336

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	7031		Impeller Assembly	1
2	7032		Impeller Hub	1
3	7032-1		Capscrew	8
4	7032-2		Lockwasher	8
5	7033		Gasket (Hub to Impeller)	1
6	7034		Turbine Assembly	1
7	7035		Stator Assembly	1
8	7036		Stator Thrust Washer	2
9	7037		Sprag	1
10	7039		Snap Ring	2
11	7041		Inner Race	1
12	7042		Outer Race	1
13	7043		Front Cover Assembly	1
14	7043-1		Drain Plug	2
15	7044		Turbine Thrust Washer	1
16	7045		O-Ring Gasket (cover to impeller)	1
17	7046		Bolt, Cover to Impeller	18
18	7047		Lock Nut	18
19	6379		Washer, Halfround	8
20	6380		Bolt, 5/16 x 1 1/2" NF socket Hd.	8
21	6377		Drive Plate, Left Hand, Right Hand	2
22	6377-1		Capscrew, 3/8 x 3/4" NC, Hex	8
23	6377-2		Washer, 3/8 External Star	8

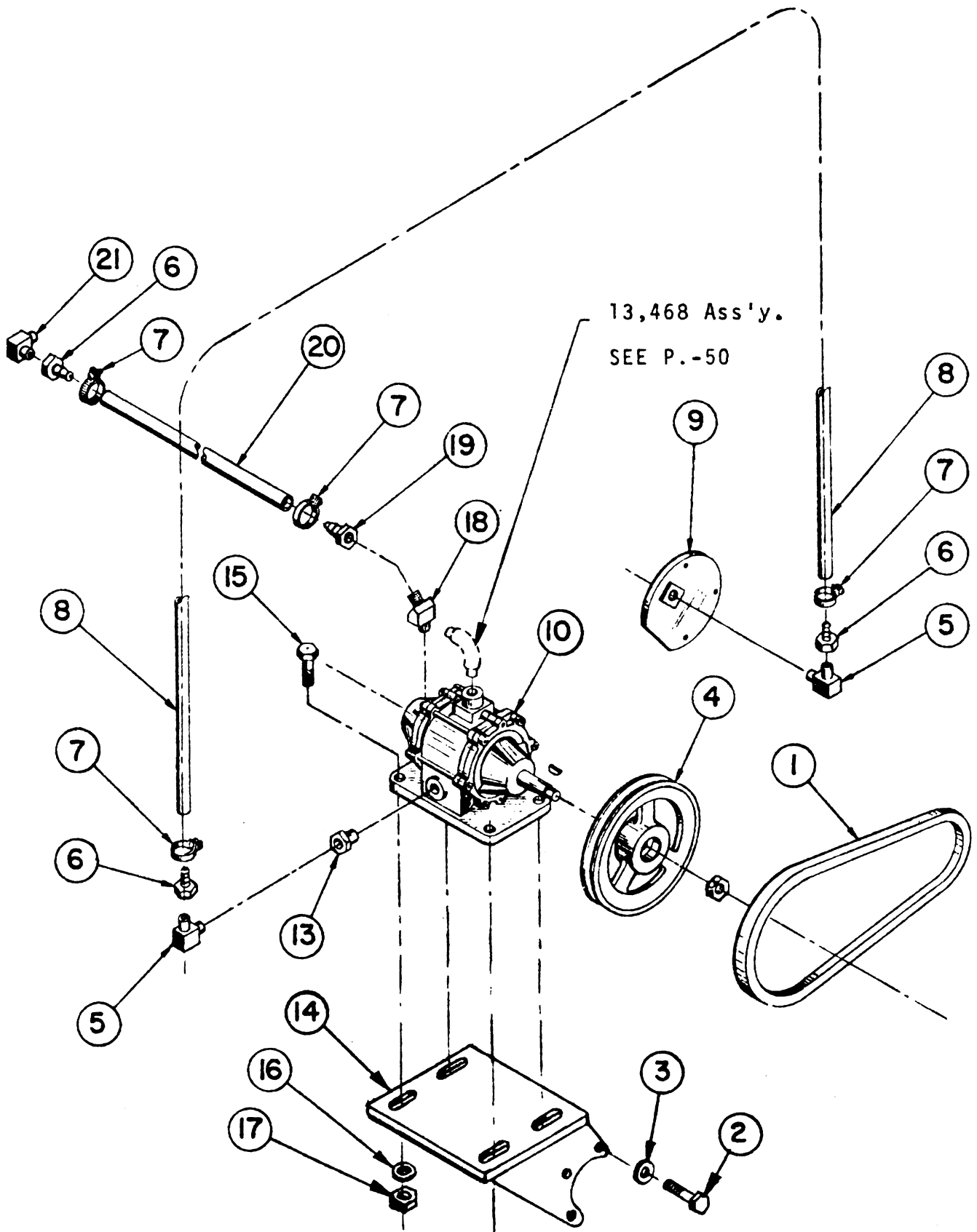




REF.	PART NO.	DESCRIPTION	REQ.
		VACUUM PUMP ASSEMBLY "400" DIESEL NO. 12,470	
1	P-13448	Belt	1
2	COM'L	Capscrew, 5/8 x 1 1/4" Long	1
3	COM'L	Lockwasher, 5/8"	1
4	12,026	Pulley	1
5	P-13616	Fitting	2
6	P-13617	Fitting	3
7	P-13613	Clamp	4
8	COM'L	Hose, 1/4" I.D. x 16 1/2" Long	1
9	12,024	Cover	1
10	P-13341	Vacuum Pump	1
11	COM'L	Capscrew, 1/2" N.C. x 1 1/4"	1
12	COM'L	Lockwasher, 1/2"	1
13	P-10692	Bushing	1
14	12,034	Bracket	1
15	COM'L	Capscrew, 7/16" N.C. x 1 3/4"	4
16	COM'L	Lockwasher, 7/16"	4
17	COM'L	Nut, 7/16" N.C.	4
18	P-13618	Fitting	1
19	P-13619	Fitting	1
20	COM'L	Hose, 1/4" I.D. x 50" Long	1
21	P-12498	Fitting	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

VACUUM PUMP ASSEMBLY
NO. 13,467
WAUKESHA DIESEL



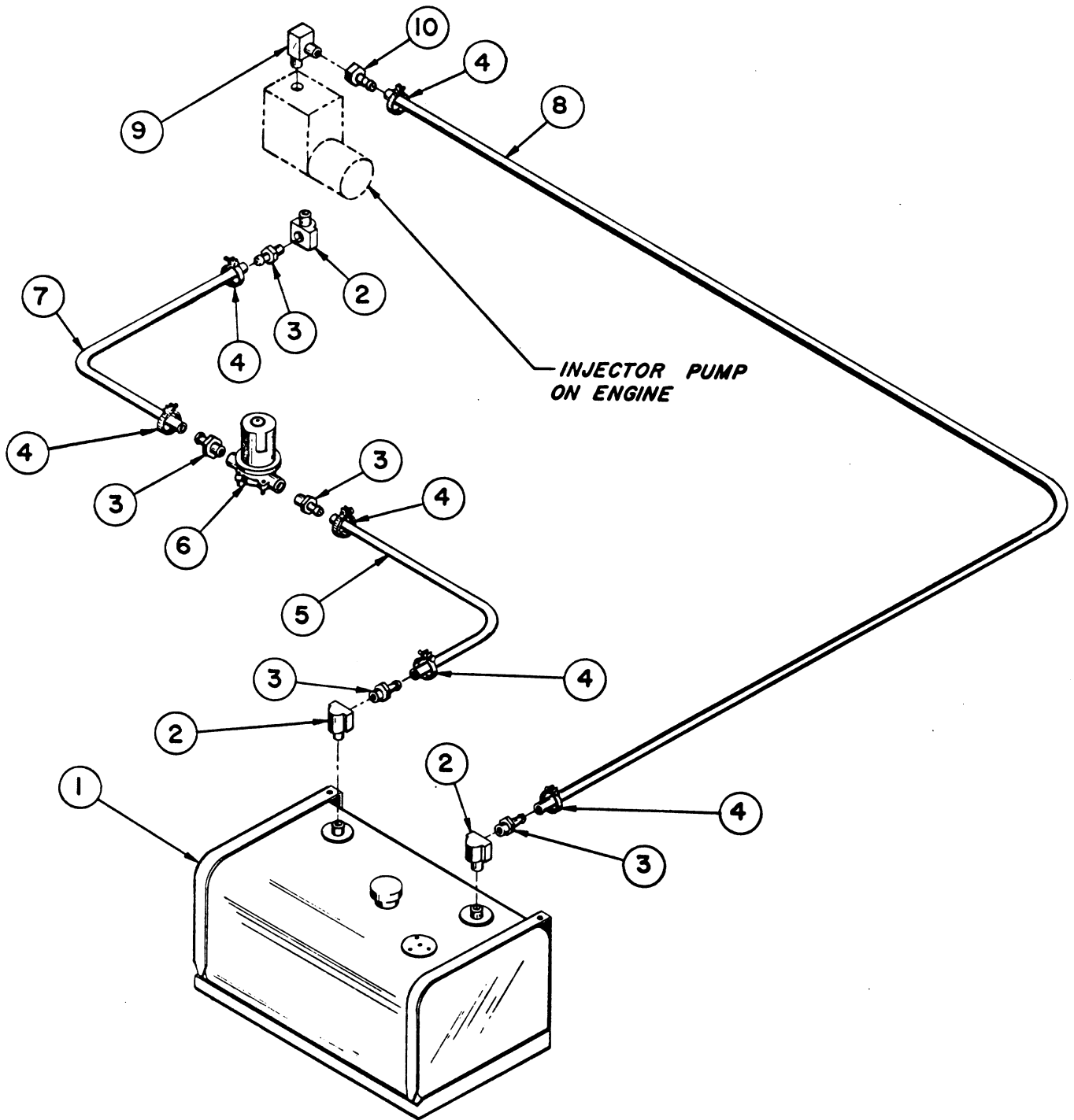
LULL ENGINEERING COMPANY, INC.
 3045 HIGHWAY 13
 ST. PAUL, MINNESOTA 55121

VACUUM PUMP ASSEMBLY
 NO. 13,467
 WAUKESHA DIESEL

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.'</u>
1	P-17153		Belt	1
2	COM'L		Cap Screw, 5/16 x 3/4" Long	6
3	COM'L		Lockwasher, 5/16"	6
4	13,452		Pulley	1
5	P-13616		Fitting	2
6	P-13617		Fitting	3
7	P-13613		Clamp	4
8	COM'L		Hose, 1/4" I.D. x 16 1/2" Long	1
9	12,024		Cover	1
10	P-13341		Vacuum Pump	1
11				
12				
13	P-10692		Bushing	1
14	13,369		Bracket	1
15	COM'L		Capscrew, 7/16 N.C. x 1 3/4	4
16	COM'L		Lockwasher, 7/16"	4
17	COM'L		Nut, 7/16 N.C.	4
18	P-13618		Fitting	1
19	P-13619		Fitting	1
20	COM'L		Hose, 1/4 I.D. x 50" Long	1
21	P-12498		Fitting	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

FUEL LINE PUMP & TANK ASS'Y
NO. 12,643



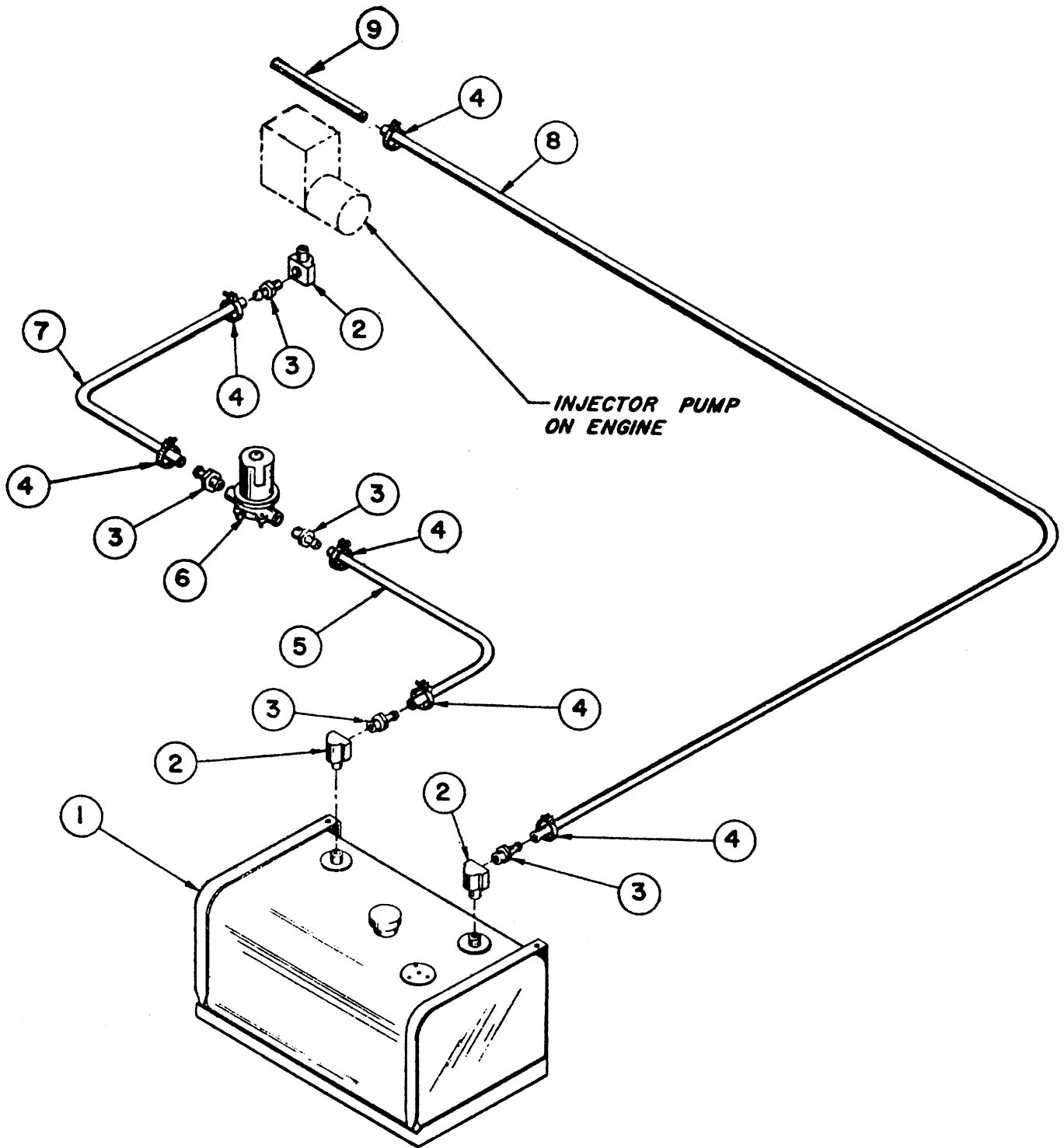
LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

FUEL LINE, PUMP, TANK ASSEMBLY
NO. 12,643

<u>ITEM</u> <u>NO.</u>	<u>PART</u> <u>NO.</u>	<u>ASSEMBLY</u> <u>NO.</u>	<u>DESCRIPTION</u>	<u>NO.</u> <u>REQ.</u>
1		8701	Fuel Tank Assembly (Page 82)	1
2	P-13611		Fitting	3
3	P-13612		Fitting	5
4	P-13613		Clamp	6
5	COM'L		Hose, 5/16 I.D. x 25" Long	1
6	P-13525		Fuel Pump	1
7	COM'L		Hose, 5/16" I.D. x 56" Long	1
8	COM'L		Hose, 5/16" I.D. x 106" Long	1
9	P-13614		Fitting	1
10	P-13615		Fitting	1

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

FUEL LINE PUMP & TANK ASS'Y
NO. 13,469



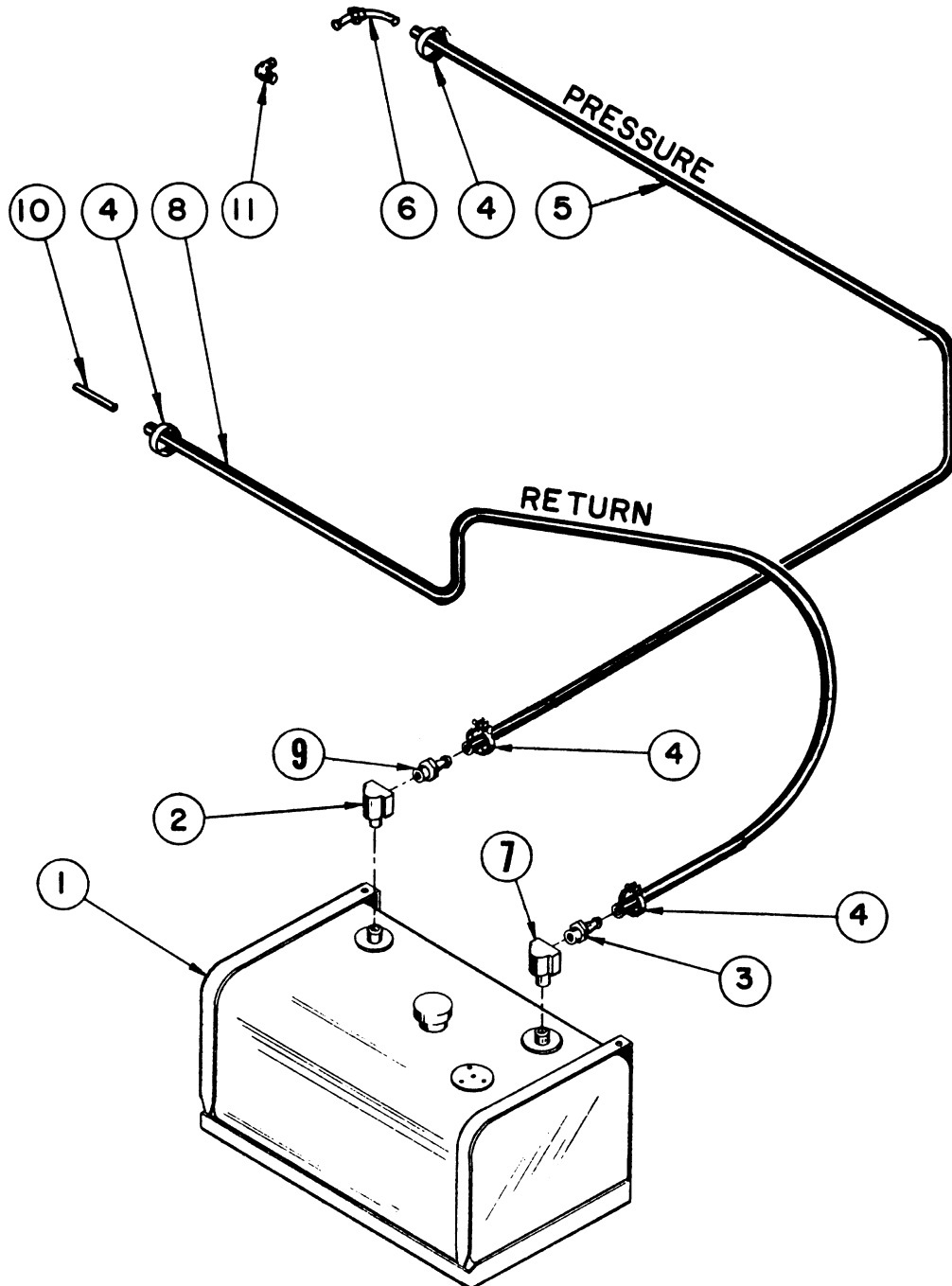
LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MINNESOTA 55121

FUEL LINE, PUMP, TANK ASS'Y.
NO. 13,469

<u>ITEM</u> <u>NO.</u>	<u>PART</u> <u>NO.</u>	<u>ASSEMBLY</u> <u>NO.</u>	<u>DESCRIPTION</u>	<u>NO.</u> <u>REQ.</u>
1		8701	Fuel Tank Ass'y. (P. 82)	1
2	P-13611		Fitting	3
3	P-13619		Fitting	5
4	P-13613		Clamp	6
5	P-13741		Hose	1
6	P-13525		Fuel Pump	1
7	P-13741		Hose	1
8	P-17210		Hose	1
9	P-17212		Tubing	1

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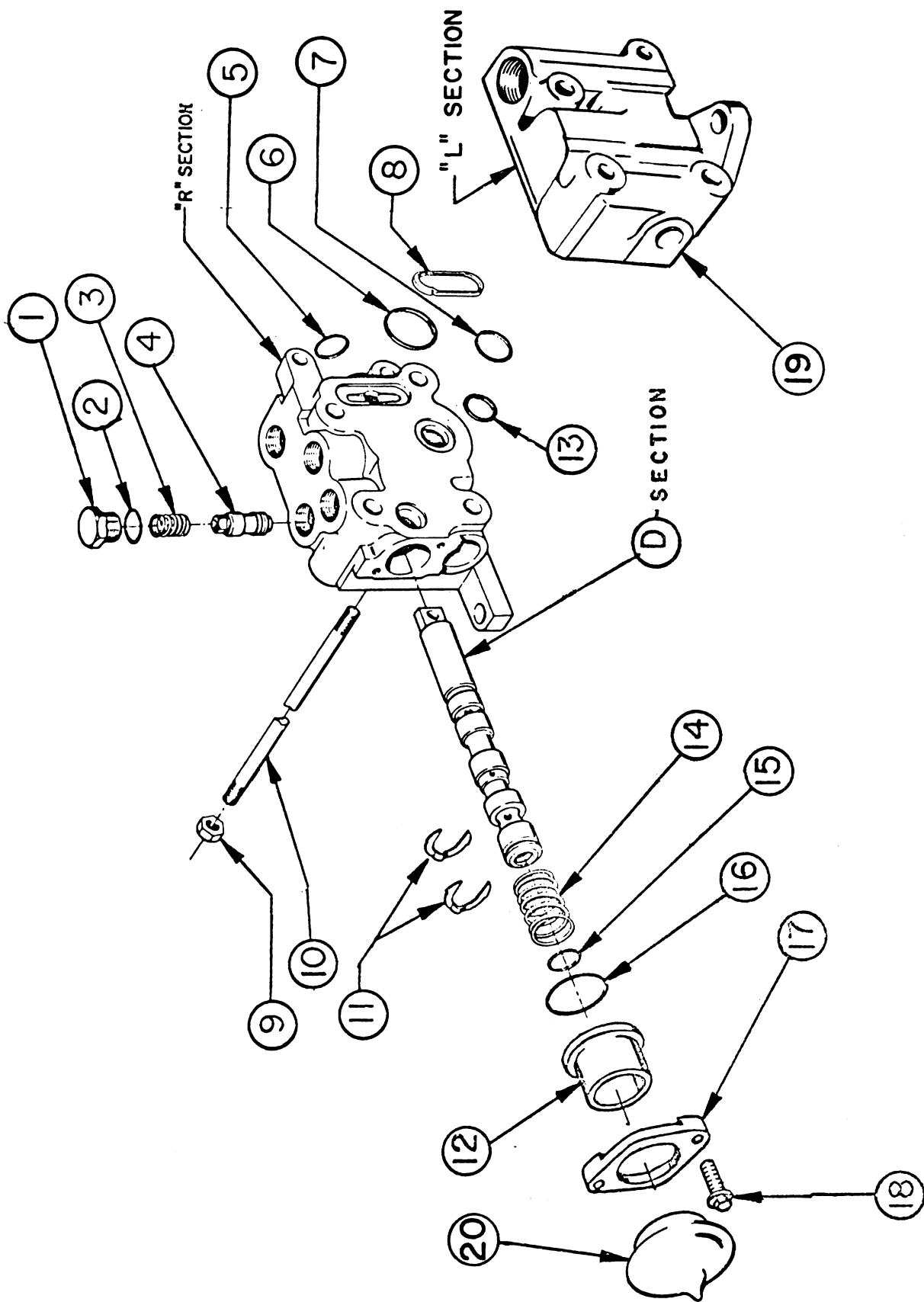
FUEL LINE PUMP & TANK ASSEMBLY
NO. 14,127



LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

FUEL LINE PUMP & TANK ASSEMBLY
NO. 14,127

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1		8701	Fuel Tank Assembly (Page 82)	1
2	P-13611		Fitting	1
3	P-13617		Fitting	1
4	P-14047		Clamp	4
5	P-13741		Hose	1
6	P-14146		Assembly, Fuel Tubing	1
7	P-15315		Fitting	1
8	P-17210		Hose	1
9	P-16464		Fitting	1
10	P-17212		Tubing, Steel	1
11	P-17566		El	1



LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

VALVE ASSEMBLY
NO. P-13005

<u>ITEM NO.</u>	<u>PART NO.</u>	<u>ASSEMBLY NO.</u>	<u>DESCRIPTION</u>	<u>NO. REQ.</u>
1	P-12285		Plug	
2	P-12295		O-Ring	
3	P-12296		Spring	
4	P-12297		Control Valve	
5	P-12298		O-Ring	
6	P-12299		Seal	
7	P-12300		Seal	
8	P-12301		Retainer	
9	P-12307		Nut	
10	P-12308		Stud	
11	P-12309		Washer "C"	
12	P-12310		Sleeve	
13	P-12316		Seal	
14	P-12315		Spring	
15	P-12314		Quad Ring	
16	P-12313		O-Ring	
17	P-12312		Retainer	
18	P-12311		Screw	
19	P-13339		"L" Section	
20	P-13317		Dust Cap	

**SERVICE PARTS
PS-1200 PLANETARY STEERING AXLE ASSEMBLY**

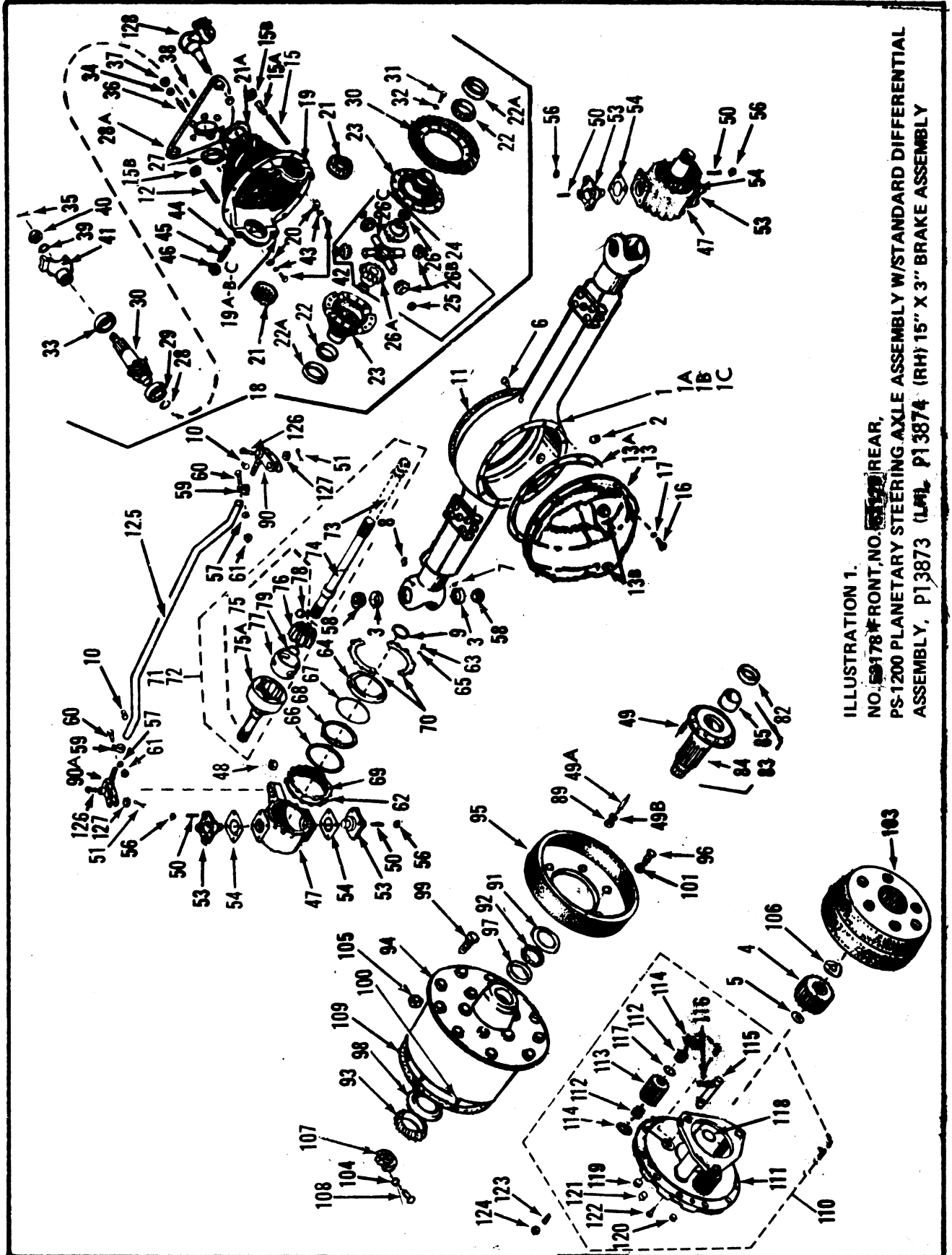


ILLUSTRATION 1.
NO. 59178 FRONT, NO. 59179 REAR,
PS-1200 PLANETARY STEERING AXLE ASSEMBLY W/STANDARD DIFFERENTIAL
ASSEMBLY, P13873 (LHM), P13874 (RH) 15" X 3" BRAKE ASSEMBLY

SERVICE PARTS
AXLE ASSEMBLY

A	NO. 46748 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)	G	
B	NO. 46749 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)	H	
C	NO. 53178 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)	I	
D	NO. 53179 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)	J	
E		K	
F		L	

ITEM NO.	DESCRIPTION	QUANTITY												PART NO.	
		A	B	C	D	E	F	G	H	I	J	K	L		
	COMPLETE PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT) NO.46748	1													P-18009
	REPLACE WITH P-18009														
	COMPLETE PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR) NO.46749	1													P-18010
	REPLACE WITH P-18010														
	COMPLETE PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT) WITH HEAVY DUTY 22° BALL ENDS NO.53178			1											P-18009
	COMPLETE PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR) WITH HEAVY DUTY 22° BALL ENDS NO.53179				1										P-18010
•1	Axle Housing Weldment (Front)	1													P-18032
⊙1A	Axle Housing Weldment (Rear)		1												P-18035
1B	Axle Housing Weldment (Front)			1											P-19296
1C	Axle Housing Weldment (Rear)				1										P-19297
2	Plug – Magnetic Drain, 1/2" - 14	1	1	1	1										P-13780
3	Cup – Bearing	4	4												P-13781
3	Cup – Bearing			4	4										P-19298
4	Gear – Sun	2	2	2	2										P-13782
5	Ring – Retaining	2	2	2	2										P-13783
6	Vent – Axle Air	1	1	1	1										P-13784
7	Plug – Ball End Grease, 3/8" NPT	2	2	2	2										P-13785
8	Fitting – Lubrication, 1/8" NPT Straight	2	2	2	2										P-13786
9	Seal – Oil, Axle Shaft	2	2	2	2										P-13787
10	Fitting – Grease, 1/4"-28 (Tie Rod)	2	2	2	2										P-13788

SERVICE PARTS
AXLE ASSEMBLY

ITEM NO.	DESCRIPTION	QUANTITY												PART NO.				
		A	B	C	D	E	F	G	H	I	J	K	L					
A	NO. 46748 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)																G	
B	NO. 46749 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)																H	
C	NO. 53178 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)																I	
D	NO. 53179 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)																J	
E																	K	
F																	L	
**11	Gasket – Differential Carrier	1	1	1	1													P-13789
12	Stud – Carrier Mounting, 7/16" - 14 X 7/16" - 20 X 1.88"	6	6	6	6													P-17535
13	Cover – Differential Assembly	1	1	1	1													P-13791
**13A	Gasket – Differential Cover	1	1	1	1													P-19299
13B	Plug – Square Socket, 3/4" - 14	2	2	2	2													P-19300
*13C	Washer – Flat, 5/8"	2	2	2	2													P-19306
15	Stud – Carrier Mounting, 7/16"-14 X 7/16" - 20 X 2.25"	4	4	4	4													P-13795
15A	Dowel – Tapered, Carrier Mounting	4	4	4	4													P-19307
15B	Locknut – Carrier Mounting, 7/16"-14 (Grade 8)	10	10	10	10													P-17537
16	Bolt – Differential Cover Mounting, 7/16"-20 X 1.00" Hex, (Grade 5PH)	10	10	10	10													P-19308
17	Lockwasher – Differential Cover Mounting, 7/16", P, Regular Spring	10	10	10	10													P-13797
18	Complete Carrier Assembly (6.17:1 Ratio) Consists of Indented Items 19 thru 46	1	1	1	1													P-13798
19	Carrier Housing & Cap Assembly	1	1	1	1													P-13799
19A	Bolt, Hex, 5/8" - 11 X 3.25" (Grade 8PH)	4	4	4	4													P-19309
19B	Dowel	4	4	4	4													P-13803
19C	Lockwasher, 5/8", P, Heavy Spring	4	4	4	4													P-13804
20	Lock – Differential Bearing Adjusting Nut	2	2	2	2													P-13805
21	Locknut – Differential Side Bearing	2	2	2	2													P-13806
21A	Gasket – Pinion Oil Seal Bearing Retainer	1	1	1	1													P-13794
22	Cone – Differential Side	2	2	2	2													P-17185
22A	Cup – Differential Side	2	2	2	2													P-17186
23	Differential Case & Cover Assembly	1	1	1	1													P-13808
24	Complete Differential Assembly	1	1	1	1													P-17142

**SERVICE PARTS
AXLE ASSEMBLY**

A	NO. 46748 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)	G	
B	NO. 46749 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)	H	
C	NO. 53178 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)	I	
D	NO. 53179 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)	J	
E		K	
F		L	

ITEM NO.	DESCRIPTION	QUANTITY												PART NO.
		A	B	C	D	E	F	G	H	I	J	K	L	
44	Pad - Thrust	1	1	1	1									P-13827
45	Screw - Thrust Pad	1	1	1	1									P-13828
46	Nut - Thrust Pad Screw, 7/8"-14 Jam	1	1	1	1									P-13829
47	Housing - Steering Knuckle (LH & RH)	2	2											P-13830
47	Housing - Steering Knuckle (LH & RH)			2	2									P-19314
48	Bushing - Housing, Steering Knuckle	2	2											P-13831
48	Bushing - Housing, Steering Knuckle			2	2									P-19315
49	Stud - Spindle to Knuckle, 7/16" Dia. X 2 1/2"													
	Grade 8	16	16	16	16									P-13832
49A	Stud - Spindle to Knuckle, 7/16"-14 & 7/16"-													
	20 X 2.00"	8	8	8	8									P-13833
49B	Washer - Flat, 7/16"	8	8	8	8									P-19316
50	Stud - Trunnion to Knuckle, 1/2" - 13 & 1/2"													
	- 20 X 2.00"	16	16	16	16									P-13834
51	Cotter Pin, 1/8" X 1.25" Long (Tie Rod Bolt)	2	2	2	2									P-13835
53	Trunnion	4	4											P-13837
53	Trunnion			4	4									P-19317
54	Shim - Knuckle Bearing (.005" Thick)	AR	AR	AR	AR									P-13839
54	Shim - Knuckle Bearing (.010" Thick)	AR	AR	AR	AR									P-13840
56	Locknut, 1/2" - 20 (Grade 8)	16	16	16	16									P-13842
57	Lockwasher, 5/8", P, Regular Spring													
	(Tie Rod Clamp)	2	2	2	2									P-13843
58	Cone - Bearing	4	4											P-13844
58	Cone - Bearing			4	4									P-19318
59	Clamp - Tie Rod	2	2	2	2									P-13845
60	Belt, Hex Head 5/8"-11 X 2.75" Long (Grade 5PH)													
	(Tie Rod Clamp Mtg.)	2	2	2	2									P-19319

SERVICE PARTS
AXLE ASSEMBLY

A	NO. 46748 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)	G	
B	NO. 46749 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)	H	
C	NO. 53178 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)	I	
D	NO. 53179 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)	J	
E		K	
F		L	

ITEM NO.	DESCRIPTION	QUANTITY												PART NO.				
		A	B	C	D	E	F	G	H	I	J	K	L					
61	Nut, Hex, 5/8"-11 (Grade 2P) (Tie Rod Clamp Bolt)																	
		2	2	2	2													P-13847
62	Gasket - Knuckle	2	2	2	2													P-13848
63	Bolt - Retainer, 5/16"-18 X 0.62" (Grade 2PH)	24	24	24	24													P-19321
64	Ring - Split Retainer	2	2															P-13850
64	Ring - Split Retainer			2	2													P-19322
65	Lockwasher - Retainer, 5/16", Z, Heavy Spring	24	24	24	24													P-13851
66	Seal - Felt, Steering Ball	2	2															P-13852
66	Seal - Felt, Steering Ball			2	2													P-19323
67	Spring - Ball Seal	2	2															P-13853
67	Spring - Ball Seal			2	2													P-19324
68	Seal - Oil, Ball End	2	2															P-13854
68	Seal - Oil, Ball End			2	2													P-19325
69	Flange	2	2															P-13855
69	Flange			2	2													P-19326
70	Ring - Retainer Half	4	4															P-13856
70	Ring - Retainer Half			4	4													P-19327
71	Complete Shaft & U-Joint Assembly (LH) -																	
	Consists of Indented Items 73 & 75	1	1	1	1													P-13858
72	Complete Shaft & U-Joint Assembly (RH) -																	
	Consists of Indented Items 74 & 75)	1	1	1	1													P-13859
73	Shaft - Long (37.06")	1	1	1	1													P-13860
74	Shaft - Short (30.68")	1	1	1	1													P-13861
75	Complete U-Joint Assembly - Consists of																	
	Indented Items 75A thru 79	2	2	2	2													P-13857
75A	Ball - Outer Race	2	2	2	2													P-13862
76	Race - Inner	2	2	2	2													P-13863
77	Cage, U-Joint	2	2	2	2													P-13864

SERVICE PARTS
AXLE ASSEMBLY

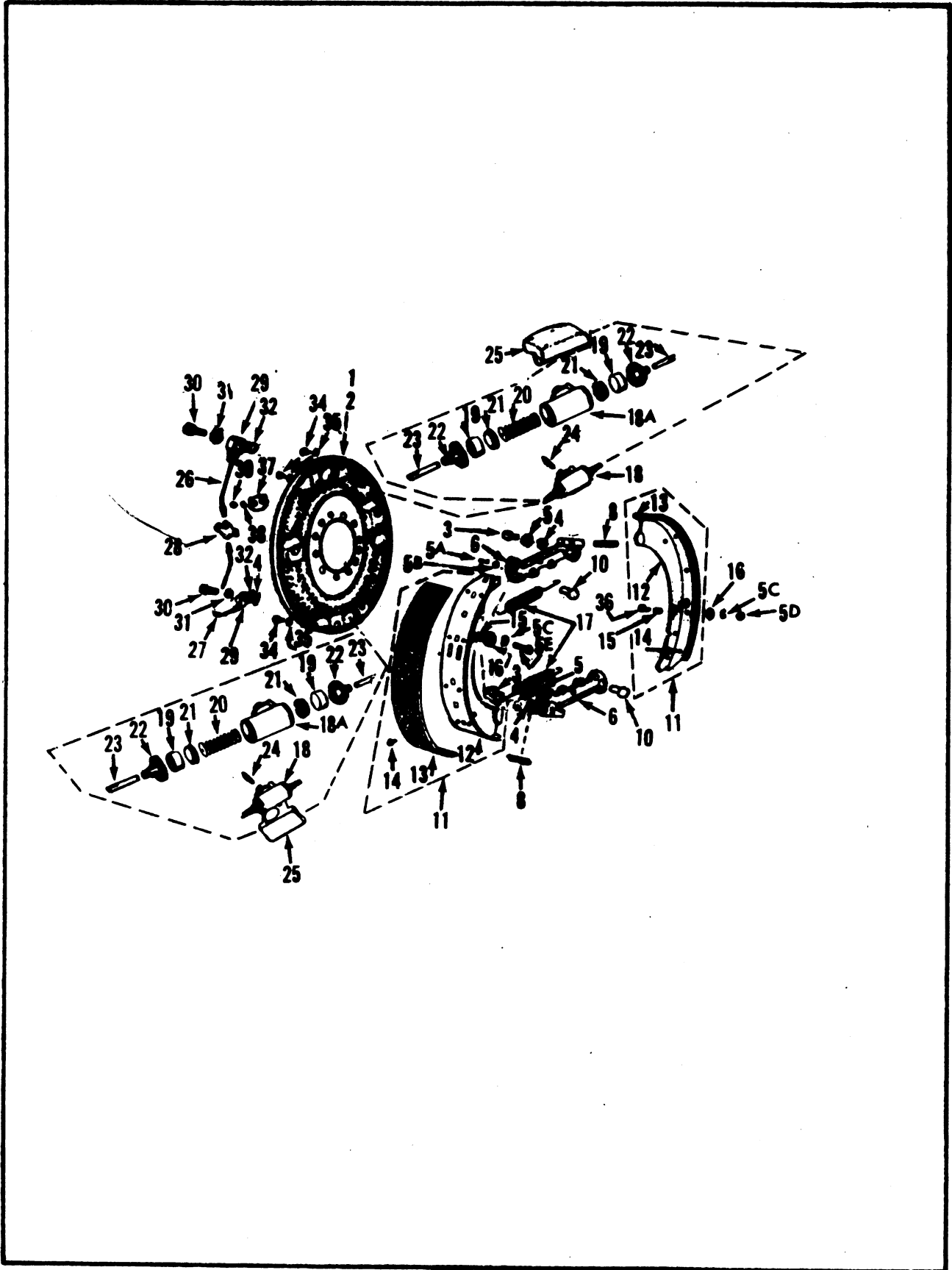
ITEM NO.	DESCRIPTION	QUANTITY												PART NO.		
		A	B	C	D	E	F	G	H	I	J	K	L			
A	NO. 46748 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)														G	
B	NO. 46749 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)														H	
C	NO. 53178 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)														I	
D	NO. 53179 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)														J	
E															K	
F															L	
78	Ball, U-Joint	12	12	12	12											P-13865
79	Ring - Snap	2	2	2	2											P-13866
82	Seal - Oil, Axle Shaft	2	2	2	2											P-13869
83	Complete Spindle Assembly (LH & RH) - Consists of Indented Items, 84, 85	2	2	2	2											P-13870
84	Spindle (LH & RH)	2	2	2	2											P-13871
85	Bushing - Spindle (LH & RH)	2	2	2	2											P-13872
*86	Complete Brake Assembly (LH) - For Illustration & Service Parts see pages 38 thru 40	1	1	1	1											P-13873
*87	Complete Brake Assembly (RH) - For Illustration & Service Parts see pages 38 thru 40	1	1	1	1											P-13874
89	Locknut - Spindle to Flange, 7/16"-20 (Grade 8)	24	24	24	24											P-13876
90	Clevis (LH) - Tie Rod End	1	1	1	1											P-13877
90A	Clevis (RH) - Tie Rod End	1	1	1	1											P-13878
91	Seal - Oil	2	2	2	2											P-13879
92	Cone - Bearing (Inner)	2	2	2	2											P-13880
93	Cone - Bearing (Outer)	2	2	2	2											P-13881
*	Complete Hub Assembly (LH & RH) - Consists of Indented Items 94 thru 101	2	2	2	2											P-13882
94	Hub Only	2	2	2	2											P-13883
95	Drum - Brake	2	2	2	2											P-13884
96	Bolt, Hex, 5/8"-11 X 1.75" (Grade 8PH)	12	12	12	12											P-19328
97	Cup - Bearing (Inner)	2	2	2	2											P-13886
98	Cup - Bearing (Outer)	2	2	2	2											P-13887

SERVICE PARTS
AXLE ASSEMBLY

A	NO. 46748 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)	G	
B	NO. 46749 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)	H	
C	NO. 53178 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (FRONT)	I	
D	NO. 53179 PS-1200 PLANETARY STEERING AXLE ASSEMBLY (REAR)	J	
E		K	
F		L	

ITEM NO.	DESCRIPTION	QUANTITY												PART NO.	
		A	B	C	D	E	F	G	H	I	J	K	L		
99	Stud - Wheel	20	20	20	20										P-13888
100	Stud - Hub to Drive Flange, 7/16"-14 X 7/16" - 20 X 1.75"	24	24	24	24										P-13889
101	Lockwasher, 5/8" Regular Spring	12	12	12	12										P-13843
*102	Washer - Flat, 5/8"	2	2												P-19329
103	Ring Gear	2	2	2	2										P-19330
104	Lockwasher, 5/16", Z, Heavy Spring	2	2	2	2										P-13851
105	Nut - Wheel, 3/4" - 16	20	20	20	20										P-13894
106	Spacer - Ring	2	2	2	2										P-13895
107	Locknut - Bearing, 2 1/2" - 16	2	2	2	2										P-13896
108	Bolt, 5/16"-24 X 2.25", Hex, (Grade 8PH)	2	2	2	2										P-19331
*109	Gasket (Drive Flange)	2	2	2	2										P-13898
110	Complete Drive Flange & Planetary Gear Assembly - Consists of Indented Items														
	111 thru *122B	2	2	2	2										P-19332
111	Drive Flange Only	2	2	2	2										P-19333
112	Needle Bearing (50 Quantity per Gear)	300	300	300	300										P-13901
113	Planet Gear	6	6	6	6										P-13902
114	Washer - Spacer	12	12	12	12										P-13903
115	Pin - Planet Gear	6	6	6	6										P-19334
116	Pin - Spring, 3/16" X 1.50"	6	6	6	6										P-19335
117	Spacer - Planet Gear	6	6	6	6										P-13906
118	Thrust Washer	2	2	2	2										P-19336
119	Plug - Hex, Soc., Pipe, 1/2"-16C	2	2	2	2										P-19337
120	Plug, Pipe, 1/8" NPT	2	2	2	2										P-13867
121	Plug - Magnetic Drain, 1/2"-14	2	2	2	2										P-13780
122	Fitting - Relief	2	2	2	2										P-13868

SERVICE PARTS
P13874 (RH), P13873 (LH)
15" X 3" BRAKE ASSEMBLY

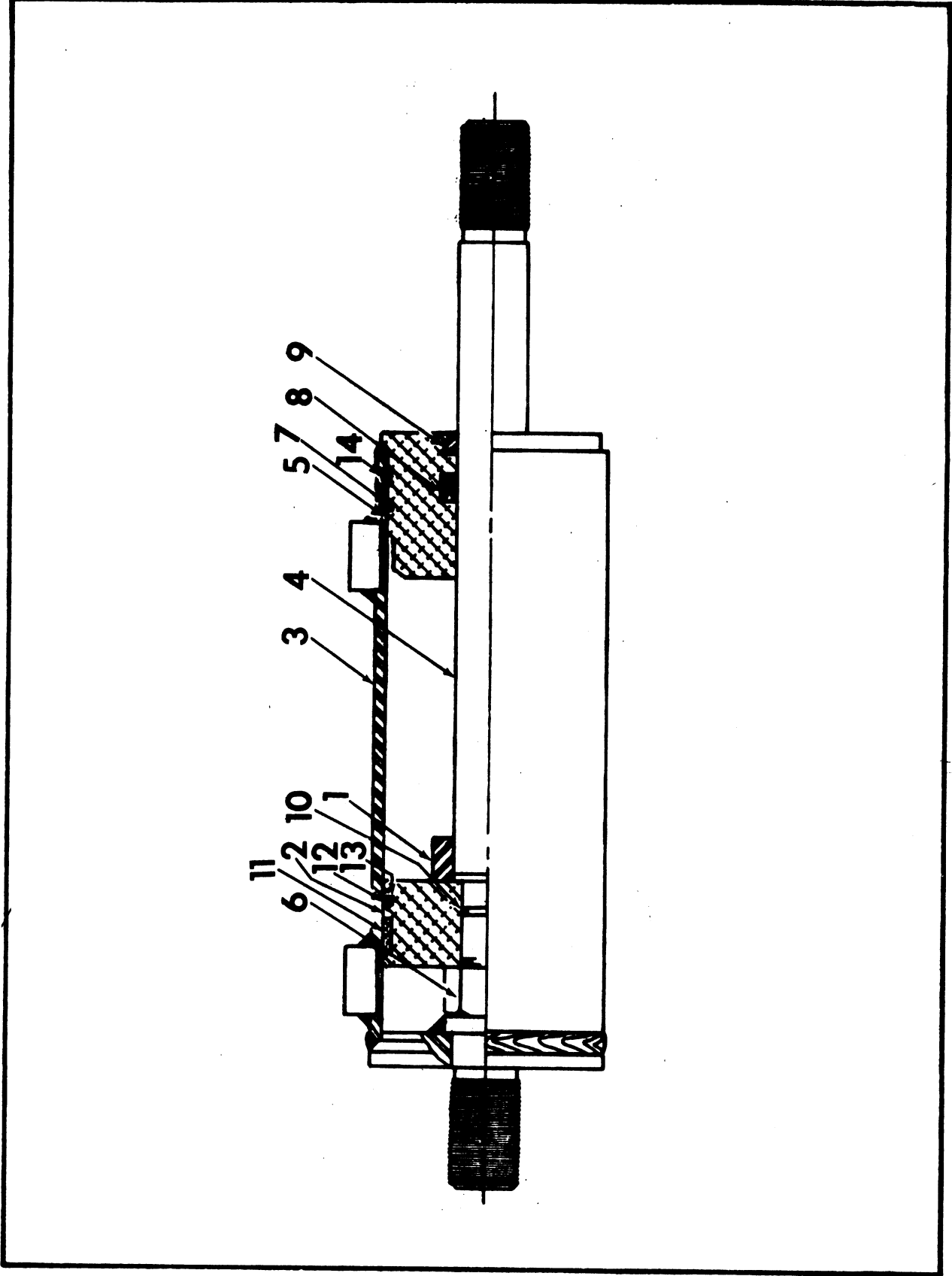


**P13874 BRAKE ASSEMBLY
(RH) - 15" X 3"**

**P13873 BRAKE ASSEMBLY
(LH) - 15" X 3"**

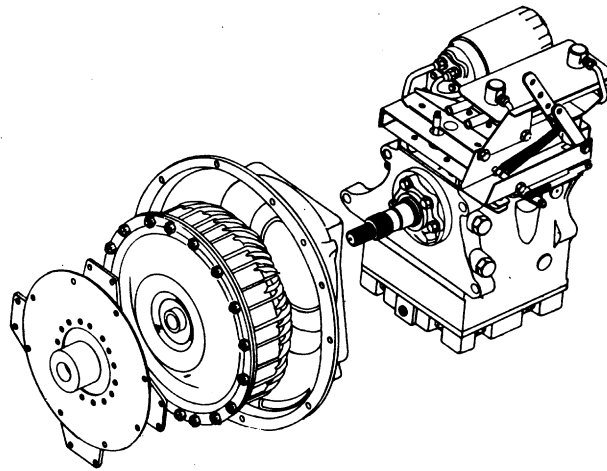
ITEM	DESCRIPTION	QUANTITY				PART NO.
		A	B	C	D	
	COMPLETE BRAKE ASSEMBLY (LH) 15" X 3"	1				P-13873
	COMPLETE BRAKE ASSEMBLY (RH) 15" X 3"		1			P-13874
1	Backing Plate (LH)	1				P-13920
2	Backing Plate (RH)		1			P-13921
3	Stud & Spring Washer Assembly	2	2			P-13930
4	Gear - Adjusting	2	2			P-13933
5	Washer - Stud	4	4			P-13932
5A	Bolt - Hex Head, 3/8"-24 X 0.62" (Grade 5Z)	4	4			P-13935
5B	Lockwasher, 3/8" C External Tooth	4	4			P-13934
5C	Lockwasher, 1/4" C Internal Tooth	2	2			P-19385
5D	Nut, Hex, 1/4"-28 (Grade 5Z)	1	1			P-19386
5E	Bolt, Hex, 1/4"-28 X 1" Long (Grade 5Z)	1	1			P-13978
6	Anchor Support & Adjusting Assembly (LH) -					
	Consists of Indented Item: 8	2				P-13953
6	Anchor Support & Adjusting Assembly (RH) -					
	Consists of Indented Item: 8		2			P-13954
8	Screw - Adjusting (LH)	2				P-13957
8	Screw - Adjusting (RH)		2			P-13958
10	Pin - Anchor	2	2			P-13952
11	Shoe & Lining Assembly (LH & RH)					
	Consists of Indented Items 12, 13, 14	2	2			P-13924
12	Shoe Only	2	2			P-13926
13	Lining Only	2	2			P-19387
14	Rivet	28	28			P-13928
15	Sleeve - Shoe Guide	2	2			P-13949
16	Washer - Shoe Guide Bolt	2	2			P-13948
17	Spring - Brake Shoe Retracting	2	2			P-13961
18	Complete Wheel Cylinder Assembly (LH & RH)					
	Consists of Indented Items 19 thru 23	2	2			P-13965
18A	Cylinder Only	2	2			
19	Piston Assembly	4	4			P-13966 / P-13967
20	Spring	2	2			P-13968
21	Cup - Piston	4	4			P-13969
22	Boot	4	4			P-13970
23	Push Rod	4	4			P-13971

SERVICE PARTS
P19383 & P19366
HYDRAULIC STEERING CYLINDER (LANTEX)



LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13,
ST. PAUL, MINNESOTA 55121

FUNK REVERSER



revers  **matic**

**MAINTENANCE
& SERVICE PARTS**

Table of Contents

FUNK REVERSER P17236

<u>DESCRIPTION</u>	<u>PAGE</u>
OPERATION PROCEDURE -----	2
SERVICE PROCEDURE -----	3
TORQUE CONVERTER INSTALLATION DATA -----	4,5
PERFORMANCE CHECK -----	5
DRIVE PLATE ASSEMBLY -----	6
CONVERTER HOUSING -----	6
CONVERTER ASSEMBLY -----	7,8
SHUTTLE ASSEMBLY -----	9,10
CONTROL ASSEMBLY -----	11,12
OIL FILTER -----	13,14
HEAT EXCHANGER -----	13,14
CONTROL VALVE ASSEMBLIES -----	15
OIL LINE GROUP -----	16
CLUTCH STACK ASSEMBLY -----	17,18

OPERATION

FUNK REVERSER P17236

Like all mechanical equipment, the Revers-O-Matic and attached transmission will need attention and servicing. Routine checks will help prevent down-time. The operator can aid in preventive maintenance by keeping a watchful eye, reporting weak or borderline malfunctioning.

Because the unit operates "in" oil and "by" oil, most of the maintenance is concerned with oil replenishment and oil cleanliness.

RULES OF OPERATION

1. Check oil level daily, stopping engine before check. Make sure area around oil fill is clean before removing dip stick.
2. Always shift the Revers-O-Matic to neutral before starting the engine, or when the vehicle is parked and the engine is running.
To move the vehicle, select the speed range desired by shifting the transmission behind the shuttle box and then engage the directional clutch (forward or reverse) in the Revers-O-Matic.
3. Engage forward and reverse clutches at idle speed only. The clutches are not power absorbing members and must not be subjected to slippage under pressure.
4. Use brakes to slow motion or stop before applying the opposite clutch.
5. If the oil temperature gauge which is the converter oil "Out" temperature rises above 250°F. or the warning light comes on, stop the vehicle immediately. Shift Revers-O-Matic to neutral and run the engine at 1000-1200 R.P.M. The temperature should drop rapidly to the engine water temperature (within minutes). If the temperature does not drop, trouble is indicated. The cause of trouble should be determined before further operation of the vehicle; refer to "TROUBLE SHOOTING" instructions to be found elsewhere in this manual. Generally when overheating does occur, it is due to rapid reversals in the higher gear ratios. Shifting to a lower gear will help eliminate overheating due to this cause.
6. Do not shut off the engine when the unit is overheated.
7. The drive shaft should be disconnected if the vehicle is to be towed.

SERVICE

THE FUNK MFG. COMPANY recommends the use of type "A" automatic transmission fluid or equivalent in the Revers-O-Matic Drive, Torque Converter and Attached Transmissions.

The type of service and the operating conditions will determine the maintenance interval. However as stated above, it is recommended that the oil level be checked daily; at the same time checking for oil leaks.

Because the hydraulic system is the heart of the transmission, it is especially important that the oil be kept clean.

All models of the unit have a common oil fill. This means the entire unit may be filled with lubricating oil from one oil fill location, positioned on the side of the Revers-O-Matic (shuttle) transmission.

When draining for an oil change, the Revers-O-Matic and ALL variable speed transmissions must be drained separately.

NOTE: ANY REFERENCE AS TO THE LEFT OR RIGHT HAND SIDE OF THE MODEL 50000 WITH ATTACHED IS MADE FROM THE REAR OF THE UNIT LOOKING FORWARD TOWARD THE ENGINE.

When servicing your unit for the first time, fill the Revers-O-Matic Drive to the overflow level with the recommended lubricant. This will take approximately 9 quarts. Start engine and run at idle speed for one minute. Stop engine and add 4 more quarts of fluid; some of the original fluid being required to fill the converter. Check the oil level with the dipstick, adding oil if necessary to bring the level up to the low mark when unit is cold, or the full mark when unit is warm. Run the engine for at least five minutes and recheck the oil level.

SERVICE PROCEDURE AND RECOMMENDATIONS

1. Stop engine before checking or adding oil.
2. Always check the oil level of the Revers-O-Matic Drive immediately after stopping the engine.
3. Clean around oil fill before checking or adding oil.
4. It is recommended that all lubricating oil and oil filter be changed after the first 20 hours of operation and/or after overhaul.
5. Thereafter and under normal operating conditions, it is recommended that all lubricating oil and oil filters be changed after every 500 hours of operation. The oil in the system must be changed whenever the oil shows traces of dirt or the effects of high operating temperature evidenced by discoloration or strong odor. If the oil in the system has become contaminated with metal particles, ALL the components of the hydraulic system (oil tubes, oil pump, oil filter, control valve, converter, clutches, heat exchanger, sump) must be thoroughly cleaned. Generally this means a tear-down of the units. Metal particles in the oil is evidence of failure of some part.
6. Drain dirty oil while unit is still warm, examining for contamination as described above.
7. Clean all magnetic drain plugs before replacing.
8. Replace oil filter element. Use AC TYPE PF-2 which is generally available at most gas stations.
9. Always use clean oil and clean containers.
10. Do not overfill.
11. Keep all joints in the shuttle box and transmission controls properly lubricated with heavy grease.
12. If radiator on the vehicle is drained during winter storage, the heat exchanger on the transmission must also be drained.

TROUBLE SHOOTING

The diagnosis of trouble in the transmission always should start by making certain preliminary checks before it is assumed that the transmission is at fault, or before carrying out any other trouble shooting procedures.

1. Check the coolant level in the engine radiator.
2. Check the oil level in the transmission. A low oil level can effect the operation of the transmission, and may indicate fluid leaks that could cause transmission damage. A high oil level can cause foaming of the oil which in turn may result in clutch slippage or leakage at the breather or filler tube.
3. Check the adjustment of the control and governor linkages. Make sure that the engine starts to rev up immediately after the pedal or lever leaves the neutral zone, and that the governor is being held wide open with pedal or lever in the full throttle position. All interferences that limit top R.P.M. should be remedied.

JERKING STARTS

If unit starts with a jerk, check the engine idle speed which is recommended at 450 to 550 R.P.M. If idle speed is lower than this, unit will die too easily in rapid reversals; and if higher than this, the converter will transmit too much torque for smooth starts. Maladjustment of the control system caused by excessive friction or external interference may cause the clutches to engage after the engine has started to accelerate. The control valve should be completely open before the engine starts to rev up. This is mandatory for smooth starts.

SLUGGISHNESS

Check engine for proper operating performance (refer to the performance check on Page 7). Adjust the rod from the control system to the governor so that the engine starts to rev up immediately after the control valve is opened.

All interferences that limit top R.P.M. should be remedied.

CLUTCH SLIPPAGE

Inspect the control valve and linkage for possible malfunction. Check the regulator valve for proper operating pressures as instructed under the performance check on Page 7. If the readings are other than normal, check for broken pressure regulator springs; make certain the valves are clean. Internally, inspect the clutch affected for possible damage. Check the oil pump for damage and improper performance.

CLUTCH FAILING TO RELEASE

First check for high oil level. Internally, inspect the clutch affected for burned, damaged or worn parts and replace as necessary. Check the alignment of the missing teeth on the separator plates with the oil drain holes in the clutch cylinder, making sure the drain holes are not clogged. If the output shaft exerts a turning force of 30 inch pounds of torque or more with the unit in neutral, corrective measures should be taken and this would require disassembly of the unit and inspection of all parts.

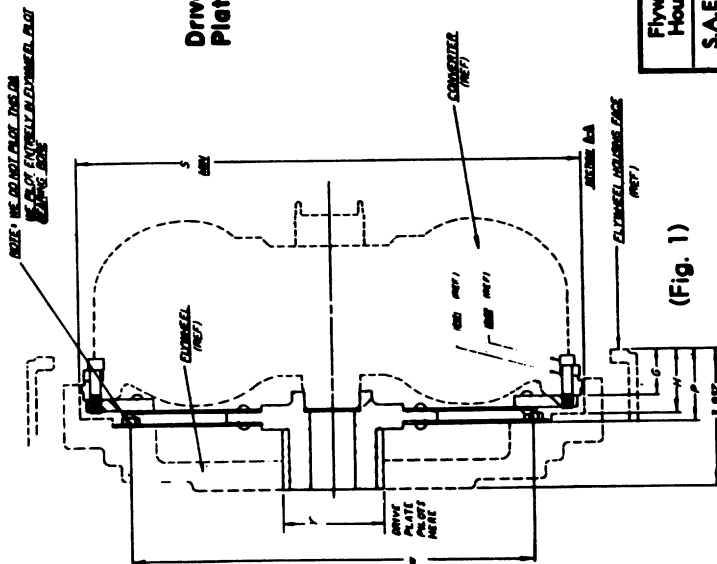
OVERHEATING

First, check for high oil level. Shifting to a lower gear will help eliminate the tendency to overheat. Inspect the heat exchanger and oil filter lines for obstructions and clean or replace as necessary. The possibility of insufficient oil flow to the heat exchanger caused by a worn or damaged oil pump should be checked. Inspect the oil filter for clogging.

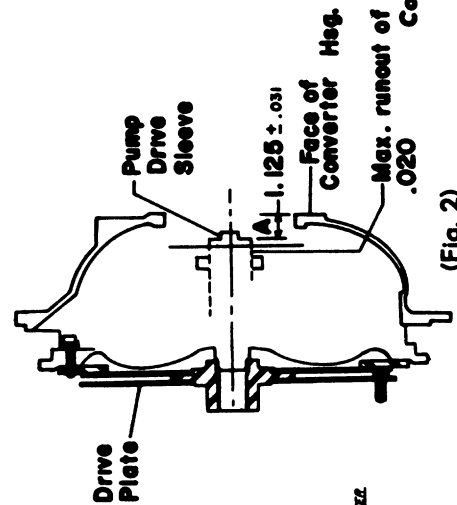
NOISY CONVERTER

First, check for low oil level. Inspect the converter for worn or damaged parts, check for damaged oil pump and replace if necessary.

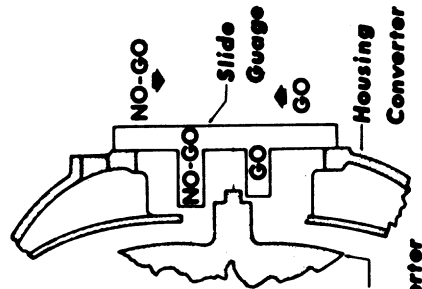
TORQUE CONVERTER INSTALLATION DATA



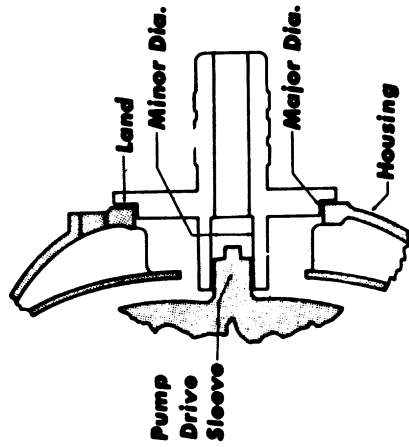
(Fig. 1)



(Fig. 2)



(Fig. 3)



(Fig. 4)

The 2 Drive Plate Assemblies Listed Below are Standards

Flywheel Housing	Flywheel	Converter	Y	D-ive Plate Ass'y. No.	W	S	H	P	G	P-G
S.A.E. No. 2, 3, 4	S.A.E. 10"	12"	2.440 or 2.835 With Sleeve	12101	11.625	14 1/2	1 15/16	2 1/2	1 1/2	3/4
S.A.E. No. 2, 3, 4	S.A.E. 10"	11 3/4"	2.440 or 2.835 With Sleeve	12101-K	11.625	14 5/16	1 15/16	2 1/2	1 1/2	3/4

- Preliminary checks should be made for the dimensions shown in Fig. No. 1, also the following must be within SAE tolerances before starting converter installation.
 - Engine flywheel face runout.
 - Engine flywheel housing pilot bore runout, and parallelism of mounting face in relation to flywheel.
- Attach the converter drive plate assembly to the engine flywheel with the #F10030-12 capscrew (3/8 x 3/4) and the #F16202 lockwasher supplied with the assembly. If the drive hub sleeve is required, it should be installed at this time.
- Attach the torque converter to the converter drive plate with the #F11004-20NY socket head capscrew (5/16 x 1 1/4) and the #4012121 half round washer supplied with the assembly. Be sure the converter is positioned so that the drain plugs #45015 on the front side of the converter do not interfere with the drive plate.
- Remove the converter housing from the Revers-O-Matic and attach this to the engine flywheel housing. The capscrews and lockwashers for this are not ordinarily supplied.
- The location of the pump drive end of the torque converter (shown as dimension "A" Fig. #2) must be checked on all installations. Due to the flexibility of the drive plate allowing the converter to tilt slightly, it will be necessary to hold the converter hub in the center position.
- The dimension "A" is to be 1 1/8" plus or minus 1/32" and may be checked with a depth mike, a closely graduated scale rule and a straight edge, or the #CDG-1 "Go" and "No-Go" gauge (see Fig. #3) is available for this check. The dimension "A" is to be checked at the end of the pump drive sleeve and not at the ends of the two driving lugs. (see Fig. #2).

7. If dimension "A" is less than $1\frac{1}{8}$ " minus $1/32$ " or if the "Go" side of the #CDG-1 gauge will not slide by the end of the pump drive sleeve, it will be necessary to remove the converter housing and check for interference of the torque converter, converter drive plate, and engine flywheel for possible damaged or deformed drive plate. If no interference is found, the thickness of the flywheel must be reduced, or metal shims may be installed between the converter housing and the Revers-O-Matic drive.

8. If dimension "A" is more than $1\frac{1}{8}$ " plus $1/32$ ", or the "No-Go" side of the #CDG-1 gauge will slide by the pump drive sleeve, shims may be installed between the engine flywheel and the converter drive plate. Plain washers not more than $1/16$ " thick may be used for this purpose.

9. The runout of the pump drive sleeve, which is not to exceed .020" max., is checked by using the #CRG-1 gauge (Fig. #4), which also checks for converter housing misalignment. The use of this gauge depends on a sense of feel. The #CRG-1 gauge slips over the pump drive sleeve and into the converter housing bore, this may require a slight lifting because the flexibility of the converter drive plate may allow the torque converter to tilt slightly. The gauge is then turned as the engine is turned over slowly. If the gauge turns freely through a full turn of the crankshaft, the converter and converter housing are in satisfactory alignment. If the gauge will not enter the converter

housing bore, or the gauge does not turn freely as the engine is turned over, it will be necessary to recheck the tolerances noted in paragraph #1, as this would indicate the runout is in excess of the .020" limit.

10. Attach the Revers-O-Matic Drive to the converter housing with the #F10040-32 cap screws ($7/16 \times 2'$) and #F16203 lockwashers, checking first that the oil pump drive lugs are set at right angles to the drive lugs on the converter pump drive sleeve. The full weight of the Revers-O-Matic must be suspended during installation to prevent damage to the oil seal at the front of the oil pump. The Revers-O-Matic should be rotated a few degrees each way during installation to mesh the spline connections inside the converter.

NOTE: The Revers-O-Matic must be filled with oil per service instructions on page 4 before engine is started.

11. Installation with reference to the standard 40RC7824 control assembly is shown on page 17. Connect the throttle rod between the throttle lever (point "E", page 5) and the governor spring. Throttle rod length is adjusted so that the engine begins to rev up when the lever has left stop "A" by not more than $1/16$ ". The rod from the operator's control is connected to the bell crank (point "D'"), being sure that the operator can articulate the bellcrank thru 45° each way, or until stop "C" closes.

PERFORMANCE CHECK

Attach a tachometer to the engine with the transmission in neutral. Holding the forward pedal or lever wide open, the engine should turn up to the top governor R.P.M. as shown on the specification sheet. If the R.P.M. is less than this, check the control and governor linkage to make sure that the governor is being held wide open, or tune up the engine. Check the R.P.M. with the reverse pedal or lever fully depressed. The engine speed should be the same as above.

Next, place the transmission in high gear and lock the brakes. Holding the forward pedal or lever wide open, the engine should turn up to the minimum static R.P.M. as shown on the specification sheet. If the R.P.M. is less than this, tune up the engine. If the engine speed is over the maximum static R.P.M. as shown on the specification sheet, the torque converter or the hydraulic clutches in the Revers-O-Matic are slipping. Repeat the same test, using the reverse pedal or lever.

If a check indicates that the converter or the Revers-O-Matic are at fault, first check the oil level of the unit as described under "Service" on Page 4. Next, check the control oil pressures. Install a 200# pressure gauge in the pipe fitting located on top of the control valve and at the front end of the Revers-O-Matic Drive. With the engine turning approximately 1500 R.P.M. the pressure should read 150 P.S.I. minimum. If less than this, remove and clean the pressure regulator valves as follows:

1. Remove the upper regulator cap on the left hand side of the unit near the front end of the case. Remove the spring, valve, and guide pin. Thoroughly clean the valve port as well as the various parts of the valve. Set the parts of the upper regulator valve aside so that they will not be mixed up with other parts later on.
2. Install all the upper regulator cap only in the upper regulator valve port.

3. Remove the lower regulator cap, spring, valve and guide pin. Thoroughly clean the valve port as well as the various parts of the valve.
4. Reassemble the lower regulator valve complete, being sure that the valve slides freely in the valve port.
5. A pressure reading can now be taken on the lower regulator valve, using the gage previously installed. The lower regulator should be set at 75 to 80 P.S.I.
6. The pressure of the regulators can be adjusted by adding or removing washers under the springs in the regulator caps.
7. Remove the upper regulator cap and reassemble the upper regulator valve complete, being sure that the valve slides freely in the valve port.

8. The upper regulator valve should now be set so as to read 160 to 170 P.S.I. at 1800 R.P.M. in neutral. However, the pressure will drop momentarily below 100 P.S.I. when the clutches are engaged. With the engine idling, the regulator should read approximately 100 P.S.I.

9. With new oil in the unit, the pressure regulator valves may buzz. This is due to a foaming of the oil. Do not read the pressure gage when the regulator valves are buzzing. Idle the engine for several minutes, then rev up and read the pressure gage.

10. The 10# pressure regulator valve located on the right hand side of the unit is rarely a source of service problems. However, if the valve should require cleaning, follow the steps described above for the other two regulator valves.

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FUNK REVERSER P17236
 CONVERTER HOUSING
 DRIVE PLATE ASSEMBLY

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
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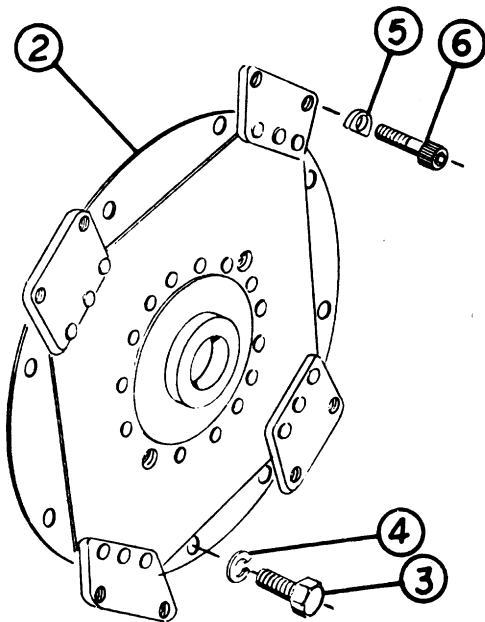
CONVERTER HOUSING

1	P17253	Converter Housing	1
2	Com'1	Lockwasher - 7/16"	4
3	Com'1	Cap Screws - 7/16" x 2" NC	4

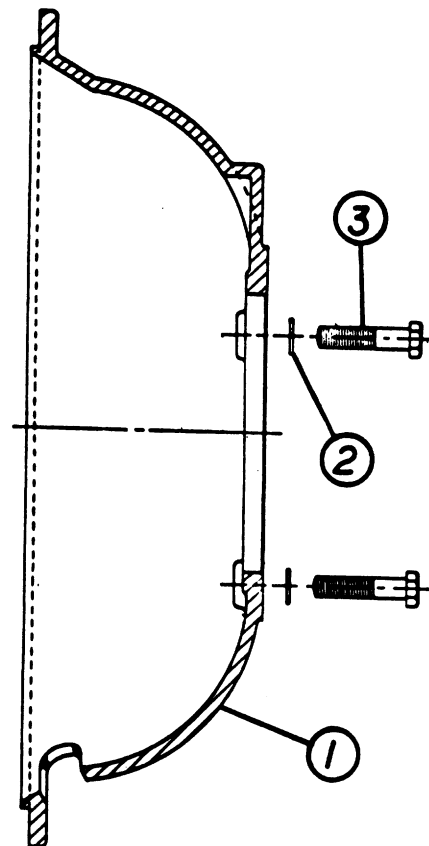
DRIVE PLATE ASSEMBLY

2	P17722	Drive Plate Assembly, Converter (For 11-3/4 Converter)	1
3	P17049	Cap Screw 3/8-NC x 3/4 Hex Head (HT)	8
4	P16908	Washer 3/8 Medium Spring Lock	8
5	P14645	Washer Half Round 11/16 Dia. x 1/4 thick	8
6	P17453	Cap Screw 5/16 NF x 1-1/4 socket head (HT)	8

DRIVE PLATE ASSEMBLY

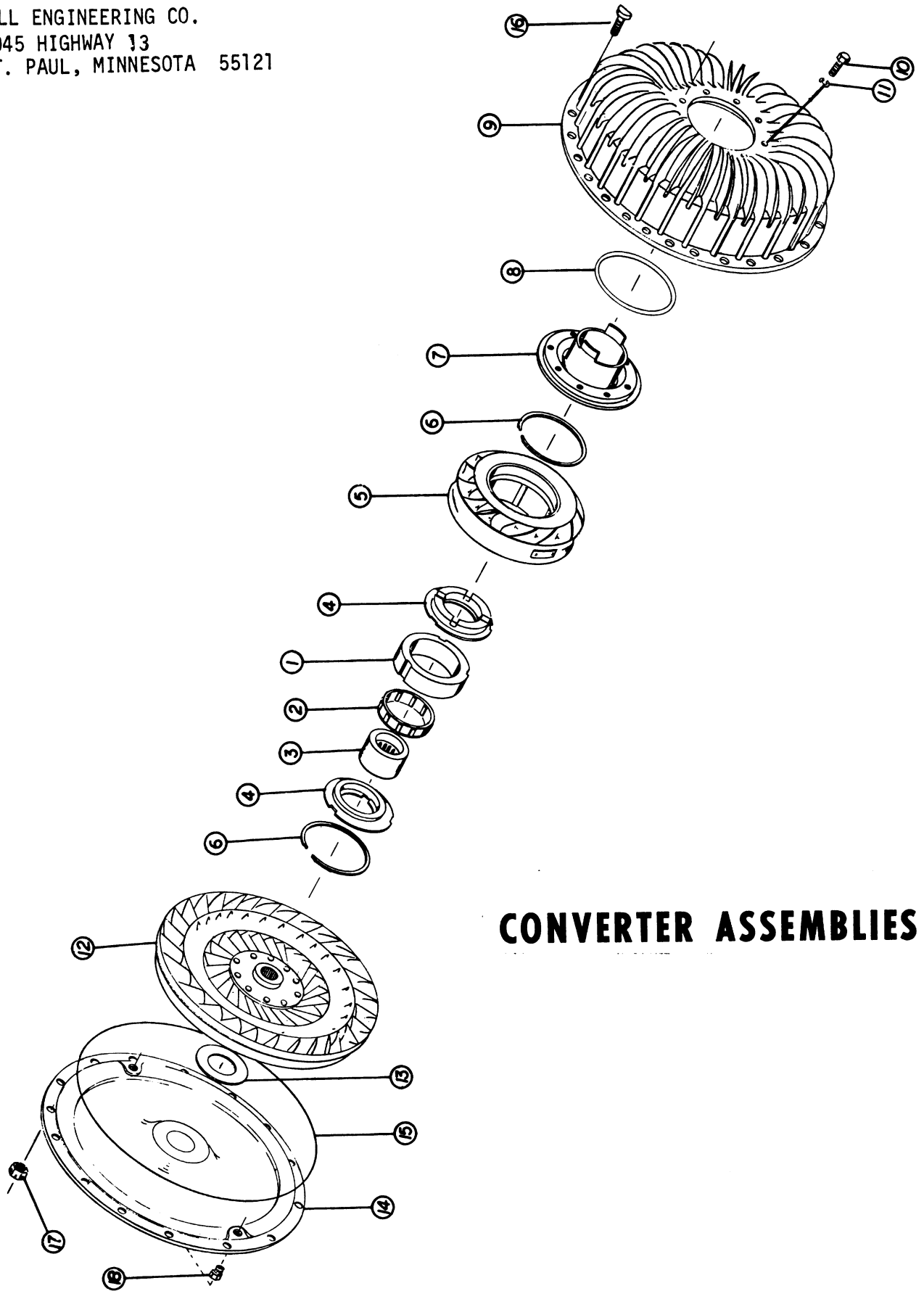


CONVERTER HOUSING



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FUNK REVERSER P17236
CONVERTER ASSY. NO. P17723



CONVERTER ASSEMBLIES

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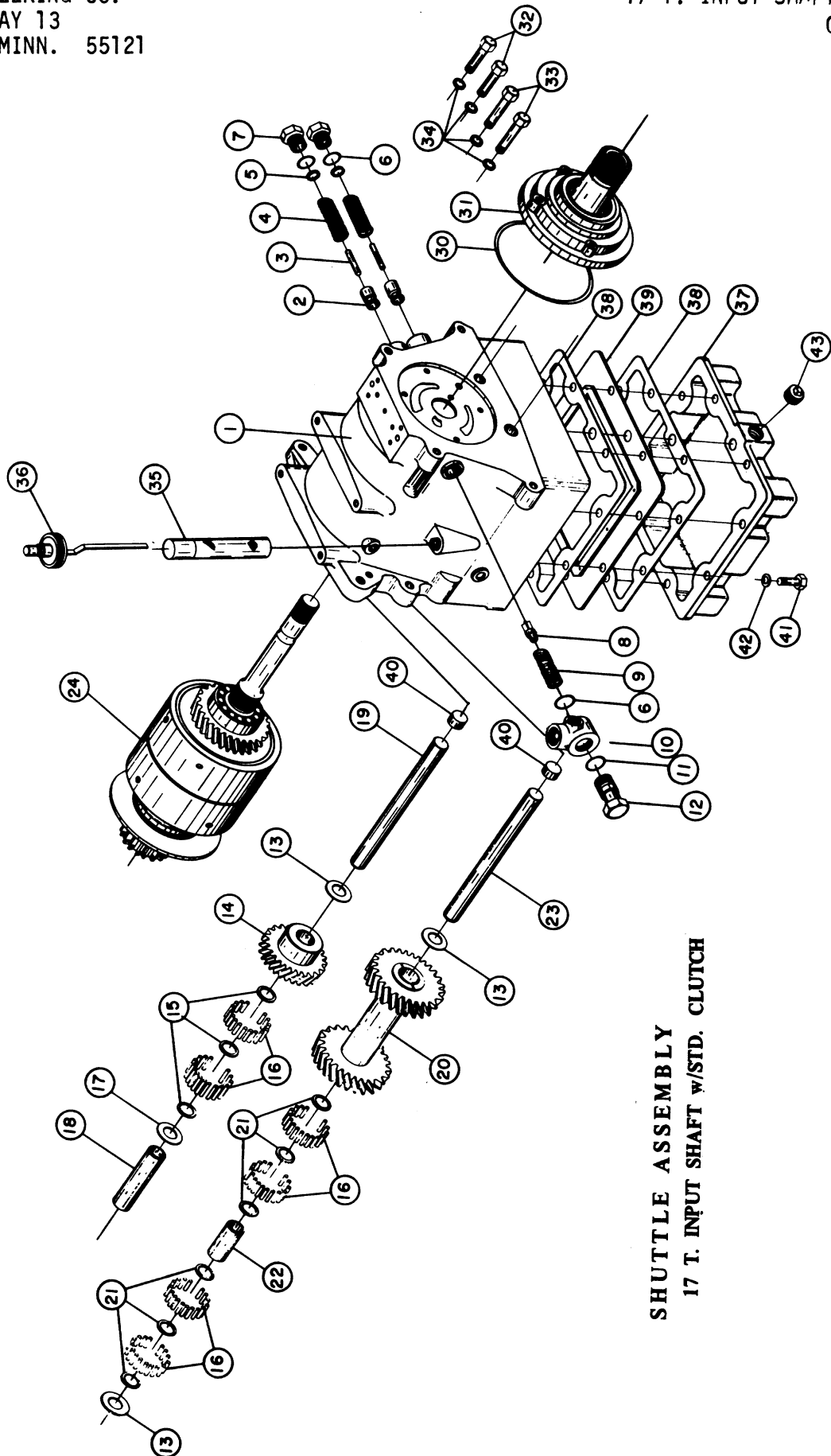
FUNK REVERSER P17236
CONVERTER ASSY. NO. P17723

(11-3/4) Converter Without Drive Ring

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
1	P15109	Race - Outer	1
2	P17524	Sprag - One Way Clutch	1
3	P15110	Race - Inner	1
4	P17732	Washer - Stator Thrust	2
5	P18147	Stator Assembly	1
6	P15108	Snap Ring	2
7	P14696	Hub - Impeller	1
8	P16416	Gasket - Hub to Impeller	1
9	P18148	Impeller Assembly	1
10	P17049	Cap Screw	8
11	P14645	Lock Washer	8
12	P18149	Turbine Assembly	1
13	P17402	Washer - Turbine Assembly	1
14	P18150	Cover Assembly - Front	1
15	P14630	"O" Ring Gasket	1
16	P14647	Bolt - Cover to Impeller	10
17	P18136	Lock Nut	10
18	P18137	Drain Plug	2

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FUNK REVERSER P17236
SHUTTLE ASSEMBLY
17 T. INPUT SHAFT W/STD.
CLUTCH

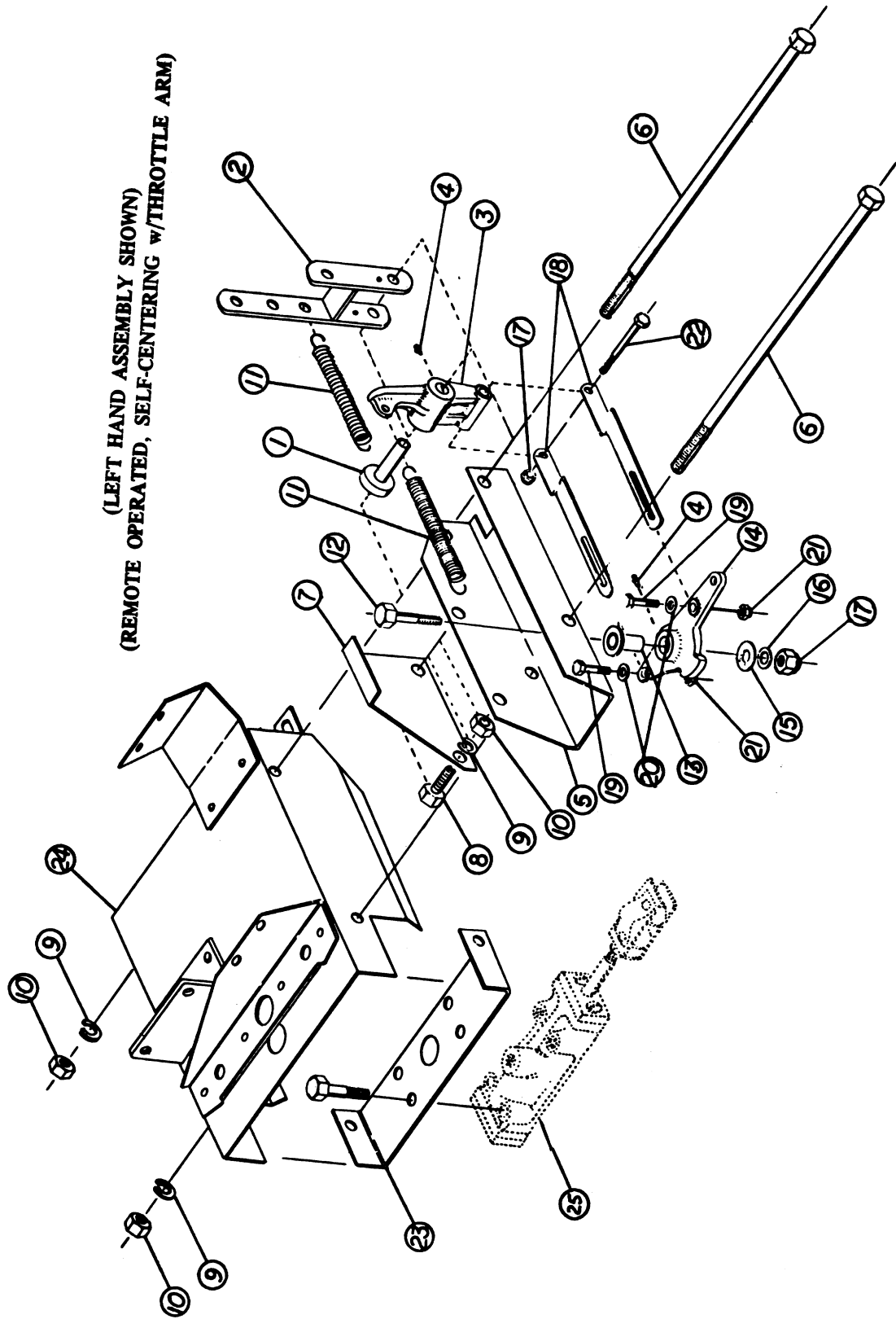


SHUTTLE ASSEMBLY
17 T. INPUT SHAFT W/STD. CLUTCH

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FUNK REVERSER P17236
 SHUTTLE ASSEMBLY
 17 T. INPUT SHAFT W/STD. CLUTCH

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
1	P17877	Case Assembly (L.H.)	1 of 2
2	P12772	Valve Regulator	2
3	P12773	Pin - Reg. Guide	2
4	P12774	Spring - Regulator	2
5	P12775	Washer	As Req.
6	P12776	"O" Ring	3
7	P12777	Cap - Valve Regulator	2
8	P12767	Valve, Regulator	1
9	P18151	Spring, Regulator Valve	1
10	P13352	Black Reg. Valve	1
11	P12771	"O" Ring - Outer	1
12	P12770	Cap Regulator	1
13	P12787	Washer, Gear Thrust	3
14	P12778	Gear Idler	1
15	P12779	Washer, Idler Gear Bearing	3
16	P12784	Roller, Counter Shaft & Idler Gear Bearing	100
17	P12781	Washer, Idler Gear	1
18	P12780	Tube Spacer, Idler Gear	1
19	P18152	Shaft, Idler Gear	1
20	P12783	Gear, Counter Shaft	1
21	P12785	Washer	6
22	P12786	Spacer, Counter Shaft Bearing	1
23	P18153	Shaft, Counter Shaft Gear	1
24	P18154	Clutch Stack Asm. (for model 4050229)	1 of 4
30	P12792	Gaskets	1
31	P13354	Assm. Oil Pump (for models 4050229)	1 of 2
32	P12820	Capscrew	2
33	P12821	Capscrew	2
34	P12822	Washer - Dynaseal	4
35	P18025	Screen (40RC7904)	1
36	P18026	Assembly - Cap (40RC7892)	1
37	P17835	Sump, Oil (4050289)	1
38	P17460	Gasket	2
39	P17854	Assembly - Screen	1
40	P12789	Cork	2
41	P15129	Capscrew	8
42	P16908	Washer - Lock	8
43	P17839	Plug	1
44	P17838	Drain Plug (not shown)	1



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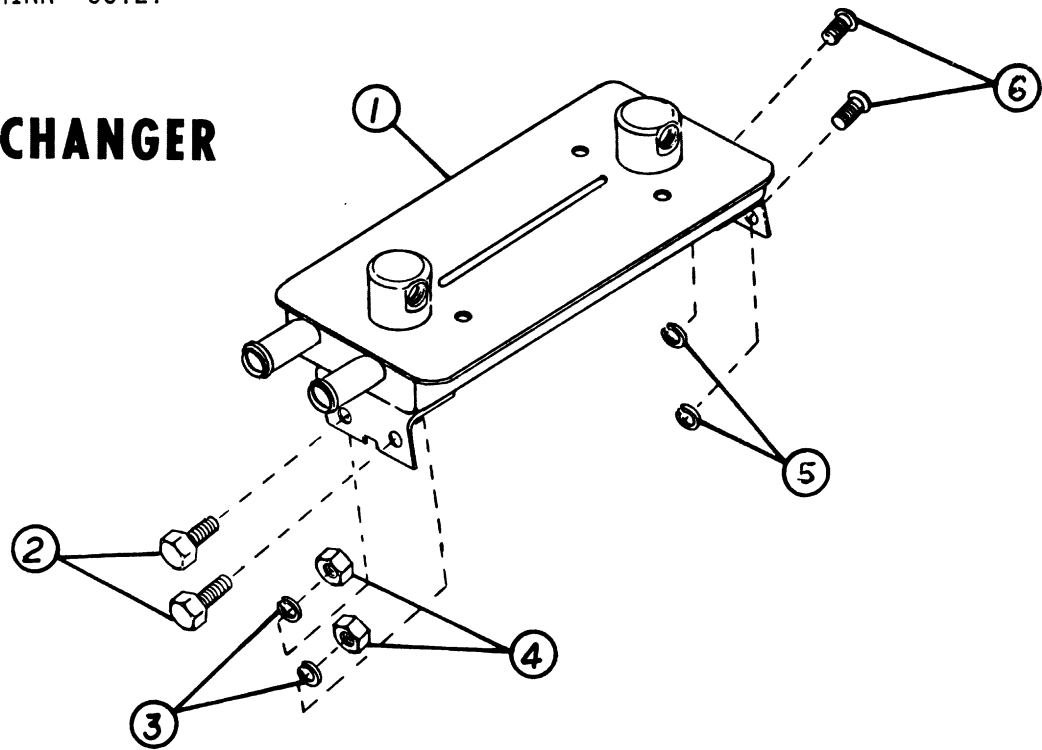
FUNK REVERSER P17236
 CONTROL ASSEMBLY

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
1	P12745	Bushing, Lever to Rocker	1
2	P12744	Lever, Throttle	1
3	P12743	Rocker, Throttle	1
4	P12747	Grease Fitting	2
5	P12737	Bracket, Control	1
6	Com'l	Tie Bolt	2
7	P12738	Stop, Control	1
8	Com'l	3/8"x1" N.C. Hex	2
9	Com'l	Washer 3/8" Lock	4
10	Com'l	Nut 3/8" N.C. Hex	4
11	P12746	Spring, Throttle Lever	2
12	Com'l	1/4" x 1-3/4" N.F. Hex	1
13	P12740	Bushing, Bellcrank	1
14	P12739	Bellcrank	1
15	Com'l	Washer 1/4" STD. FLAT	1
16	Com'l	Washer 3/16" Std. Flat	1
17	P12752	Nut	2
18	P12742	Link Bellcrank to Rocker	2
19	P12732	Bolt	2
20	P12748	Washer	2
21	P12733	Nut	2
22	P12750	Bolt	1
23	P12735	Base	1
24	P12736	Air Scoop	1
25	P12741	CONTROL VALVE ASSEMBLY	1

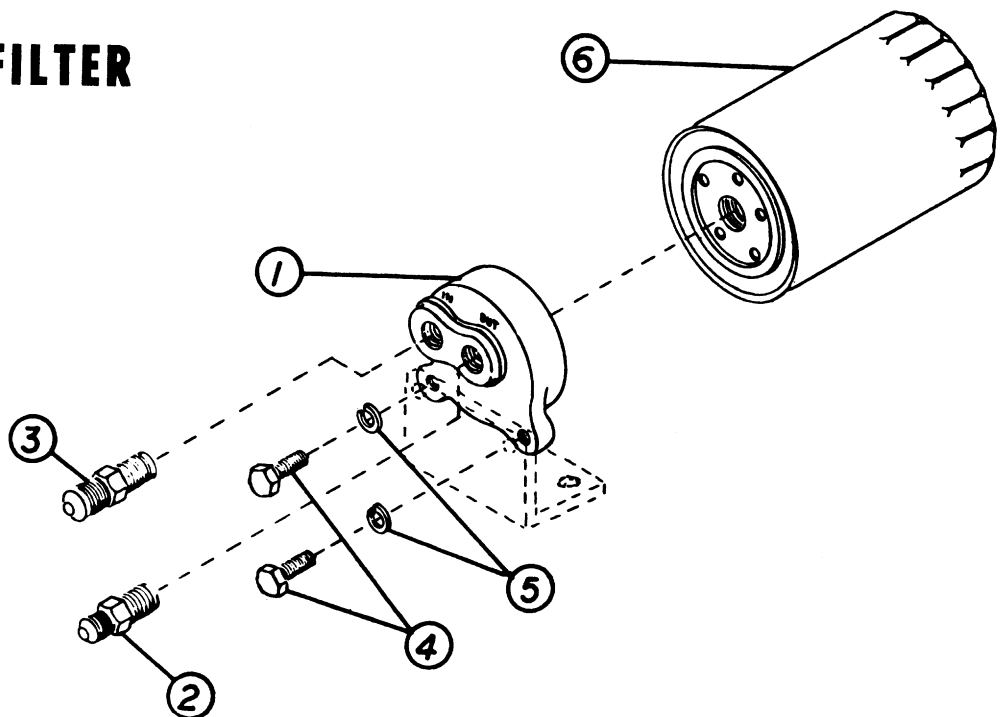
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FUNK REVERSER P17236
HEAT EXCHANGER
OIL FILTER

HEAT EXCHANGER



OIL FILTER



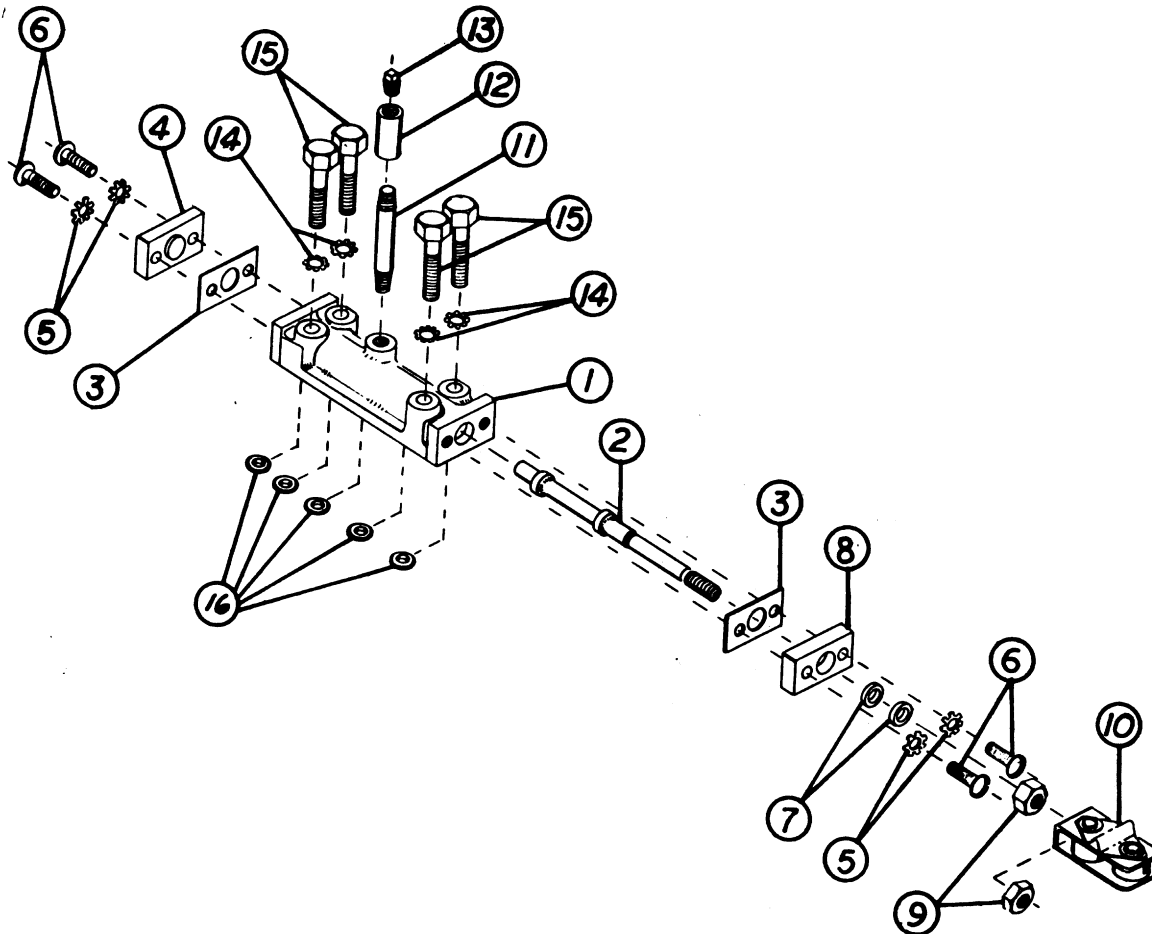
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FUNK REVERSER P17236
 HEAT EXCHANGER
 OIL FILTER

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
<u>HEAT EXCHANGER</u>			
1	P12698	Heat Exchanger (Oil Cooler)	1
2	Com'l	Bolt - 5/16 x 3/4 N.C. Hex Head	2
3	Com'l	Washer 5/16 Lock	2
4	Com'l	Nut 5/16 N.C. Hex Head	2
5	Com'l	Washer 1/4 Ext. Star	2
6	Com'l	Screw, Self Tapping 1/4 x 3/8 Hex Head	2
<u>OIL FILTER</u>			
1	P14640	Filter, Cap Assy.	1
2	Com'l	Fitting 5/16 x 1/4 Per Spec.	1
3	Com'l	Fitting 3/8 x 1/4 Per Spec	1
4	Com'l	Cap Screw 5/16 x 3/4 N.C.	2
5	Com'l	Washer 5/16 Lock	2
6	P12711	Oil Filter AC type PF-2 Cartridge	1

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
1	P12741	Body Valve	1
2	P12741	Valve, Control	1
3	P12722	Gasket, Valve Caps	2
4	P12719	Cap, Valve Closed	1
5	Com'l	Washer, 1/4" Ext. Star	4
6	Com'l	Capscrew, 1/4" x 3/4" N.C.	4
7	P12721	Seal, Oil	2
8	P12720	Cap, Valve, Open (Takes Oil Seal)	1
9	Com'l	Nut, 5/16" N.F. Hex Jam	2
10	P12730	Roller Cage Assy	1
10 A	P12729	(Not Illustrated) Roller	2
11	Com'l	Nipple, Pipe 1/8" x 2"	1
12	Com'l	Coupling 1/8" Pipe	1
13	Com'l	Plug 1/8" Pipe SA HD	1
14	Com'l	Washer 5/16 Ext. Star	4
15	Com'l	Capscrew 5/16 x 1-1/2 N.C. Hex	4
16	P12728	"O" Ring	5

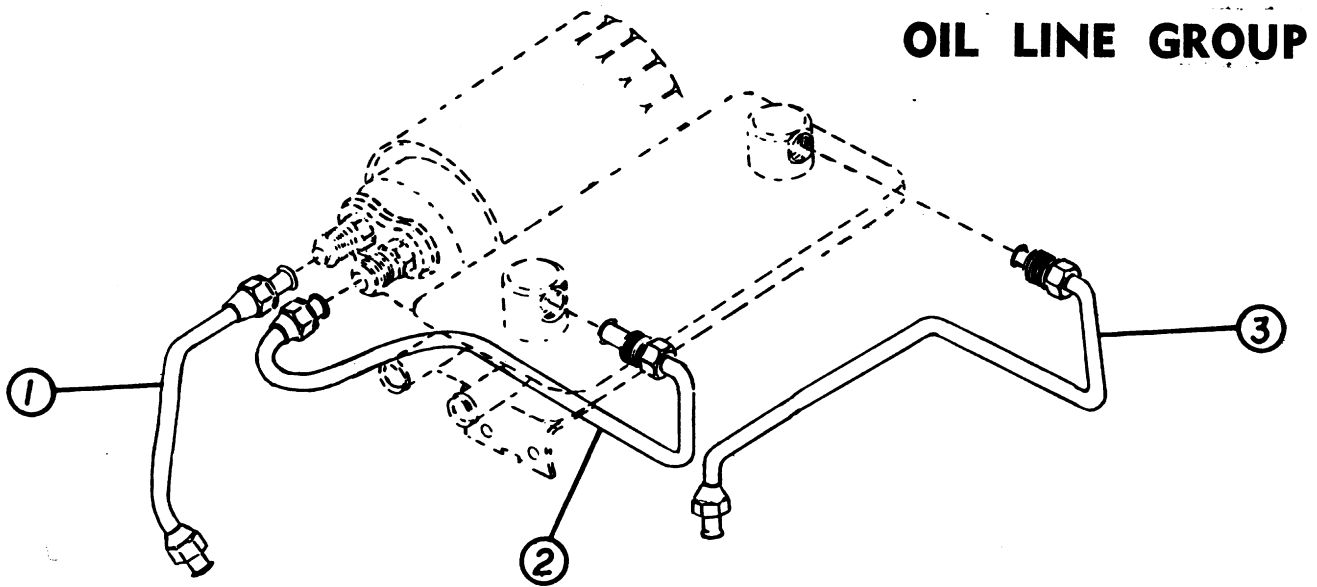
CONTROL VALVE ASSEMBLIES



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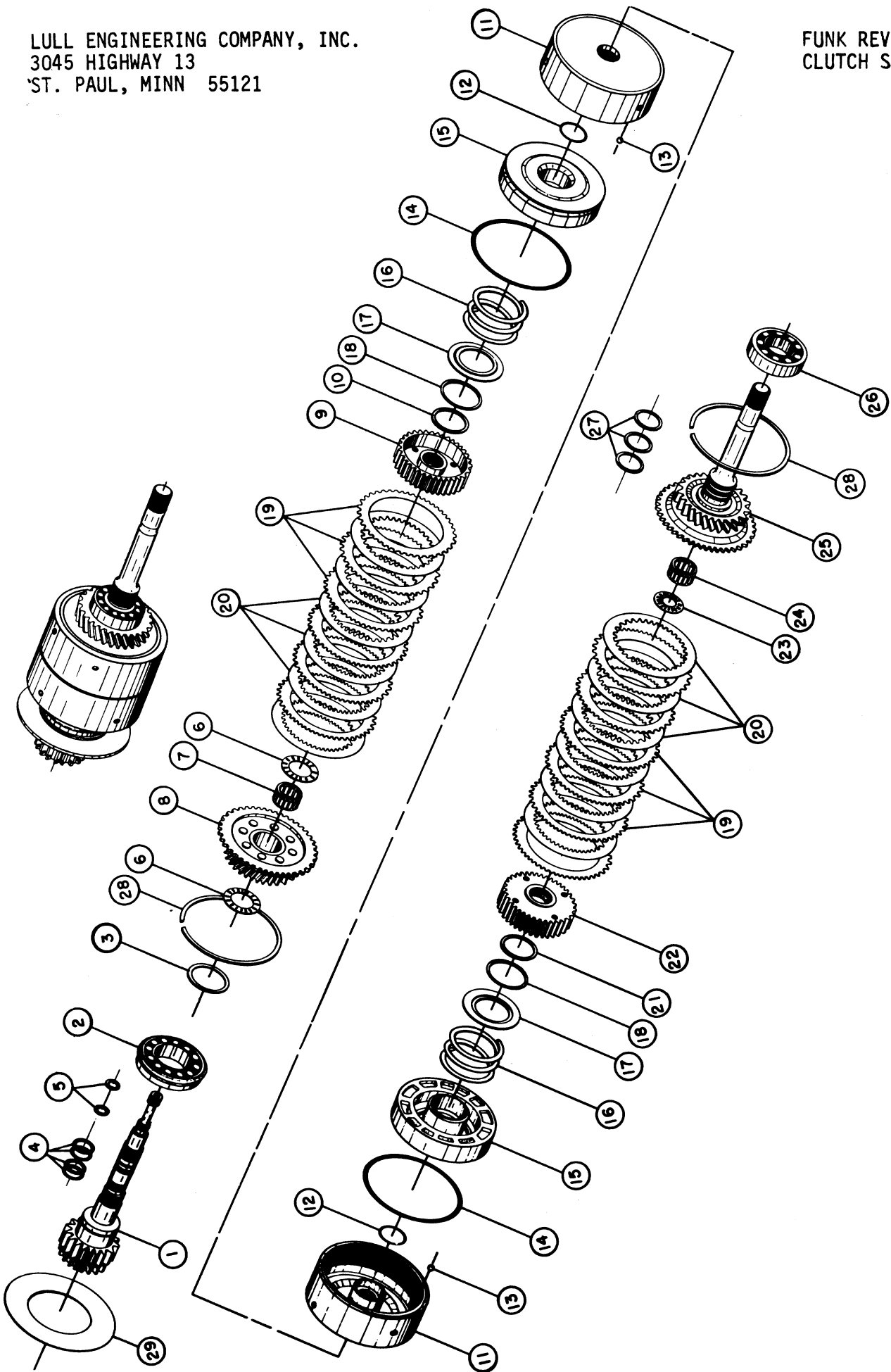
FUNK REVERSER P17236
OIL LINE GROUP

REF. NO.	PART.NO.	DESCRIPTION	QTY. REQ.
1	P17753	Tube, Filter to Regulator	1
2	P18022	Tube, Filter to Heat Exchanger	1
3	P18138	Tube, Heat Exchanger to Case	1



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FUNK REVERSER P17236
CLUTCH STACK ASSEMBLY



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FUNK REVERSER P17236
 CLUTCH STACK ASSEMBLY

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
1	P18155	Asm. Shaft Output	1
2	P18156	Bearing, Ball	1
3	P18157	Snap Ring	1
4	P12799	Seal Ring	4
5	P12797	Seal Ring	2
6	P18158	Bearing, Thrust	2
7	P18159	Bearing	1
8	P18160	Asm. Gear Output	1
9	P18161	Hub, Rear Clutch	1
10	P12803	Snap Ring	1
11	P12811	Asy. Cyl. Clutch for 4050166 and Stacks	2 of 1
12	P12807	O Ring	2
13	P12808	Ball	2
14	P12813	Seal	2
15	P12811	Piston-Clutch (for 4050166 Stack)(for 4050027)	2 of 1
16	P12814	Spring	2
17	P12815	Retainer	2
18	P11993	Snap Ring	2
19	P12810	Plate-Separator	12
20	P18162	Plate-Clutch	12
21	P12805	Snap Ring	1
22	P18163	Hub, Front Clutch	1
23	P18164	Bearing-Thrust	1
24	P18165	Bearing-Pilot	1
25	P18166	Asm. Shaft Input (for 4050166)	1 of 2
26	P13345	Bearing-Ball	1
27	P12794	Ring-Seal	3
28	P12816	Ring-Retaining	2
29	P18167	Ring-Centering	1

Table of Contents

FUNK REVERSER P11687

<u>DESCRIPTION</u>	<u>PAGE</u>
Operation Procedure -----	2
Service and Trouble Shooting -----	3
Hydraulic Flow Diagram -----	4
Control Adjustments -----	4
Torque Converter Installation Data -----	5,6
Performance Check -----	6
Converter Assembly -----	7,8
Drive Plate Assembly -----	9
Converter Housing -----	9
Revers-O-Matic Drive -----	10,11,12
Clutch Stack Assembly -----	13,14
Control Assembly -----	15,16
Control Valve Assembly -----	17
Heat Exchange Assembly -----	18,19
Oil Filter Assembly -----	18,19
Oil Line Group -----	19

DESCRIPTION

The Revers-O-Matic Drive consists of a pair of hydraulically actuated multiple disc clutches. When the front clutch is engaged, the output shaft turns engine-wise and in most applications this produces forward motion. The rear clutch is driven by a simple gear train and its rotation is opposite to the front clutch. Therefore, when the rear clutch is engaged, the output shaft turns anti-engine-wise and in most applications this produces rearward motion.

The power is transmitted from the engine to the Revers-O-Matic Drive through a torque converter. The use of a torque converter has two distinct advantages. First, the converter is essentially a fluid drive, there being no direct mechanical connection through it. This feature creates a very smooth and shock-free drive with the elimination of engine stalling and lugging. Secondly, the converter multiplies torque, but only during heavy pull-down loads. When loads are light, the converter transmits the engine power directly at almost engine speed and there is no torque multiplication. The net result is an action like a transmission, with infinitely variable and automatic speed ratios. The need for shifting gears, although present, is greatly reduced.

The Revers-O-Matic Drive is equipped with a very unique control system; this being a device that sorts out motions from a single hand lever or double foot accelerator pedals that first engages one of the clutches and then accelerates the engine as the lever or pedal is moved further. Therefore, it is a unified control that regulates both the direction of travel and the speed of travel. Movement of the lever from a neutral position in one direction produces forward motion, and opposite movement of the lever produces rearward motion. The action of the foot pedals is essentially the same, except that one pedal produces forward motion and the other rearward motion.

CAUTION:

The clutches are not power absorbing members and must not be subjected to slippage under power.

The clutch must be engaged prior to accelerating the engine when the vehicle is to be moved or direction changed.

The clutches are hydraulically applied and spring released. Each clutch has six friction plates which have sintered bronze facings and six reaction plates of polished steel. Because the clutches are hydraulically controlled, there is automatic compensation for normal wear - no adjustment is necessary.

OPERATION

Like all mechanical equipment, the Revers-O-Matic will need attention and servicing. Routine checks will help prevent down-time. The operator can aid in preventive maintenance by keeping a watchful eye; reporting weak or borderline malfunctioning.

Because the unit operates "in" oil and "by" oil, most of the maintenance is concerned with oil replenishment and oil cleanliness.

RULES OF OPERATION

1. Check oil level daily, stopping engine before check. Make sure area around oil fill is clean before removing dip stick.
2. Always shift the Revers-O-Matic to neutral before starting the engine, or when the vehicle is parked and the engine is running.
3. Engage forward and reverse clutches at idle speed only. The clutches are not power absorbing members and must not be subjected to slippage under pressure.
4. Use brakes to slow or stop motion before applying the opposite clutch.
5. If the oil temperature gauge which is the converter oil "Out" temperature rises above 250°F. or the warning light comes on, stop the vehicle immediately. Shift Revers-O-Matic to neutral and run the engine at 1000-1200 R.P.M. The temperature should drop rapidly to the engine water temperature (within minutes). If the temperature does not drop, trouble is indicated. The cause of trouble should be determined before further operation of the vehicle; refer to "TROUBLE SHOOTING" instructions to be found elsewhere in this manual. Generally when overheating does occur, it is due to rapid reversals in the higher gear ratios. Shifting to a lower gear will help eliminate overheating due to this cause.
6. Do not shut off the engine when the unit is overheated.

SERVICE

THE FUNK MFG. COMPANY recommends the use of the following types of lubrication oils.

Revers-O-Matic Drive and Torque Converter Oil . . . Use type "A" automatic transmission fluid or equivalent.

NOTE! - The Revers-O-Matic and converter have a common fill located on the side of the Revers-O-Matic case.

When servicing your unit for the first time, fill the Revers-O-Matic Drive to the overflow level with the recommended lubricant. This will take approximately 6 quarts. Start engine and run at idle speed for one minute. Stop engine and add 4 more quarts of fluid; most of the original fluid being required to fill the converter. Check the oil level with the dipstick, adding oil if necessary to bring the level up to the low mark when unit is cold, or the full mark when unit is warm. Run the engine for at least five minutes and recheck the oil level.

1. Always use clean oil and clean containers.
2. Do not overfill. Clean around oil fill hole before checking level or adding oil.
3. Change all lubricating oils and oil filter after the first 20 hours of operation.
4. Thereafter and under normal operating conditions it is recommended that all lubricating oils and oil filter be changed after every 500 hours of operation or sooner if visual inspection of oil shows contamination. The oil filter is an AC Type PF-2 and is readily available throughout the United States.
5. Always clean the magnetic drain plugs before replacing.
6. Always check the oil level of the Revers-O-Matic Drive immediately after stopping the engine.
7. Keep all joints in the control system properly lubricated with heavy grease.
8. If radiator on the vehicle is drained during winter storage, the heat exchanger on the transmission must also be drained.

TROUBLE SHOOTING

The diagnosis of trouble in the transmission should always start by making certain preliminary checks before it is assumed that the transmission is at fault, or before carrying out any other trouble shooting procedures.

1. Check the coolant level in the engine radiator.
2. Check the oil level in the transmission. A low oil level can effect the operation of the transmission, and may indicate fluid leaks that could cause transmission damage. A high oil level can cause foaming of the oil which in turn may result in clutch slippage or leakage at the breather or filler tube.
3. Check the adjustment of the control and governor linkages. Make sure that the engine starts to rev up immediately after the pedal or lever leaves the neutral zone, and that the governor is being held wide open with pedal or lever in the full throttle position. All interferences that limit top R.P.M. should be remedied.

JERKING STARTS

If unit starts with a jerk, check the engine idle speed which is recommended at 450 to 550 R.P.M. If idle speed is lower than this, unit will die too easily in rapid reversals, and if higher, the converter will transmit too much torque for smooth starts. Maladjustment of the control system caused by excessive friction or external interference may cause the clutches to engage after the engine has started to accelerate. The control valve should be completely open before the engine starts to rev up. This is mandatory for smooth starts.

SLUGGISHNESS

Check engine for proper operating performance (refer to the performance check on Page 9). Adjust the rod from the control system to the governor so that the engine starts to rev up immediately after the control valve is opened.

All interferences that limit top R.P.M. should be remedied.

CLUTCH SLIPPAGE

Inspect the control valve and linkage for possible malfunction. Check the regulator valve for proper operating pressures as instructed under the performance check on Page 9. If the readings are other than normal, check for broken pressure regulator springs, make certain the valves are clean. Internally, inspect the clutch effected for possible damage. Check the oil pump for damage and improper performance.

CLUTCH FAILING TO RELEASE

First check for high oil level. Internally, inspect the clutch effected for burned, damaged or worn parts and replace as necessary. Check the alignment of the missing teeth on the separator plates with the oil drain holes in the clutch cylinder, making sure the drain holes are not clogged. If the output shaft exerts a turning force of 30 inch pounds of torque or more with the unit in neutral, corrective measures should be taken. This would require disassembly of the unit and inspection of all parts.

OVERHEATING

First, check for high oil level. Shifting to a lower gear will help eliminate the tendency to overheat. Inspect the heat exchanger and oil filter lines for obstructions and clean or replace as necessary. The possibility of insufficient oil flow to the heat exchanger caused by a worn or damaged oil pump should be checked. Inspect the oil filter for clogging.

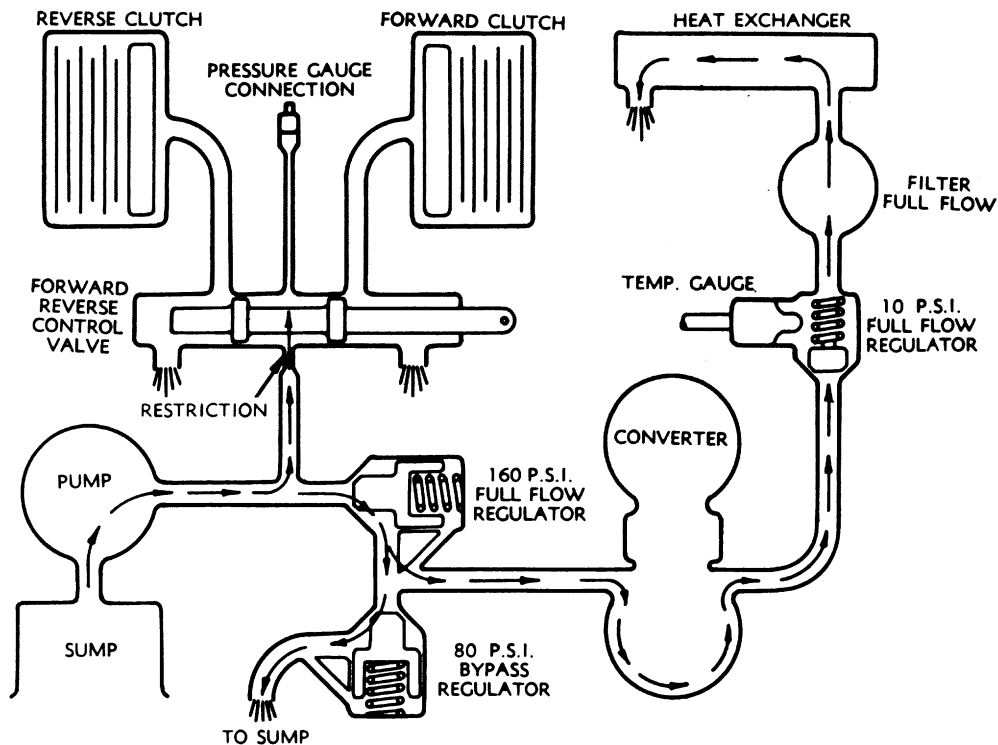
NOISY CONVERTER

First, check for low oil level. Inspect the converter for worn or damaged parts. Check for damaged oil pump and replace if necessary.

HYDRAULIC FLOW DIAGRAM

FUNK REVERSER
P-11687

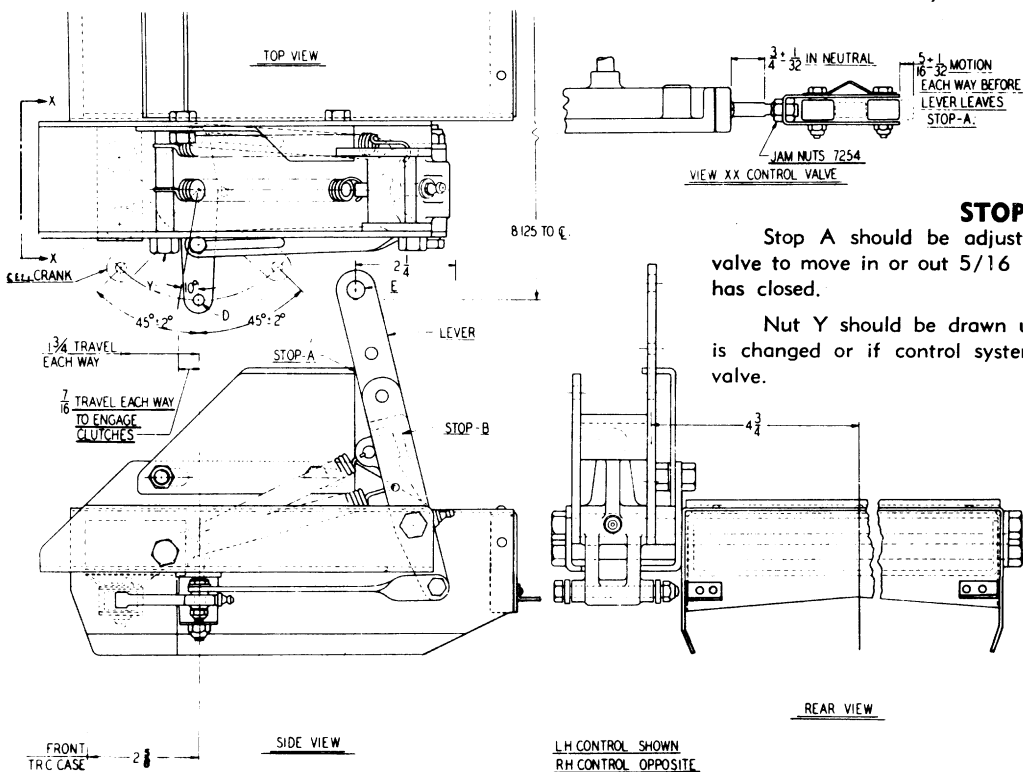
MODEL RC REVERS-O-MATIC (NEUTRAL)



CONTROL ADJUSTMENTS

ADJUSTMENTS

Centering control valve, adjust Jam Nuts to hold $\frac{3}{4} + \frac{1}{32}$ dim. Shown when control system is in neutral.

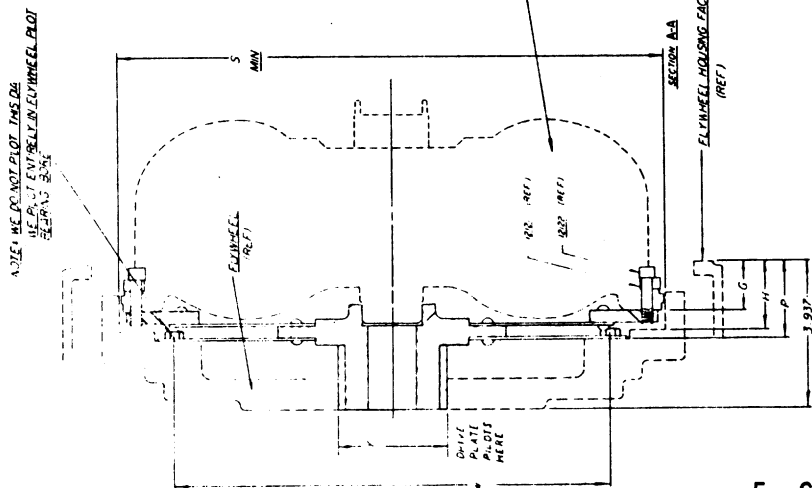


STOP ADJUSTMENTS

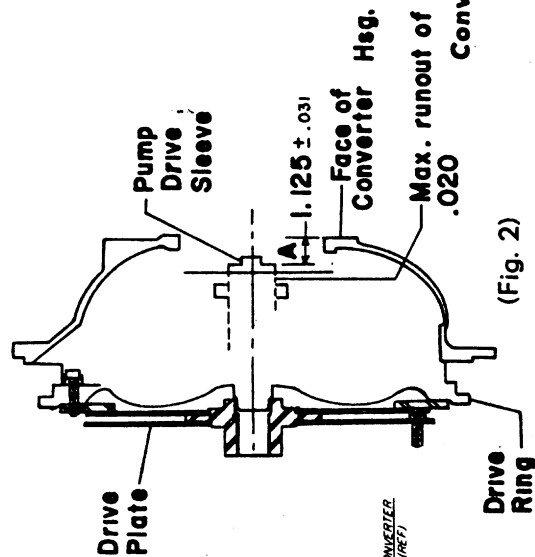
Stop A should be adjusted fore or aft to a position that will allow valve to move in or out $\frac{5}{16} + \frac{1}{32}$ before lever leaves stop A and stop B has closed.

Nut Y should be drawn up snug but not tight—if tension on this nut is changed or if control system is replaced. Recheck centering of control valve.

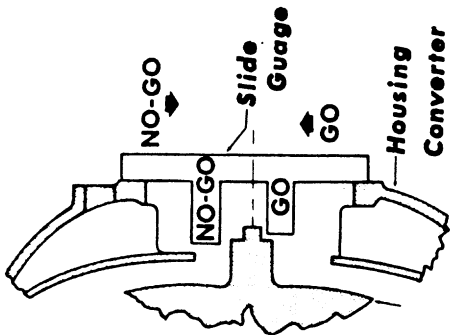
TORQUE CONVERTER INSTALLATION DATA



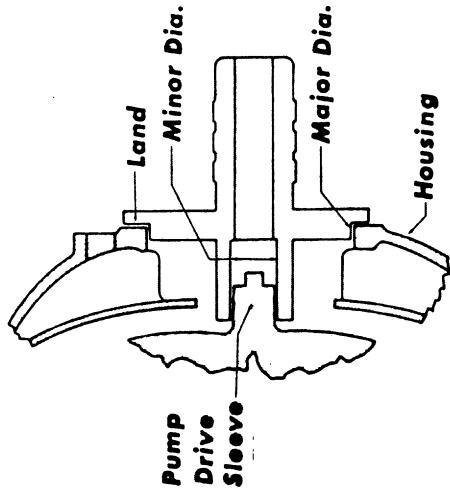
(Fig. 1)



(Fig. 2)



(Fig. 3)



(Fig. 4)

1. Preliminary checks should be made for the dimensions shown in Fig. No. 1, also the following must be within SAE tolerances before starting converter installation.
 - A. Engine flywheel face runout.
 - B. Engine flywheel housing pilot bore runout, and parallelism of mounting face in relation to flywheel.
2. Attach the converter drive plate assembly to the engine flywheel with the #F10030-12 capscrew (3/8 x 3/4) and the #F16202 lockwasher supplied with the assembly. If the drive hub sleeve is required, it should be installed at this time.
3. Attach the torque converter to the converter drive plate with the #F11004-20NY socket head capscrew (5/16 x 1 1/4) and the #4012121 half round washer supplied with the assembly. Be sure the converter is positioned so that the drain plugs #45015 on the front side of the converter do not interfere with the drive plate.

4. Remove the converter housing from the Revers-O-Matic, and attach this to the engine flywheel housing. The capscrews and lockwashers for this are not ordinarily supplied.
5. The location of the pump drive end of the torque converter (shown as dimension "A" Fig. #2) must be checked on all installations. It will be necessary to hold the converter hub in the center position, due to the flexibility of the drive plate allowing the converter to tilt slightly.
6. The dimension "A" is to be 1.125 plus or minus .031 and may be checked with a depth mike, a closely graduated scale rule and a straight edge, or the #CDG-1 "Go" and "No-Go" gauge (see Fig. #3) is available for this check. The dimension "A" is to be checked at the end of the pump drive sleeve, and not at the ends of the two driving lugs. (See Fig. #2).

7. If dimension "A" is less than 1/8" minus 1/32" or if the "Go" side of the #CDG-1 gauge will not slide by the end of the pump drive sleeve, it will be necessary to remove the converter housing and check for interference of the torque converter, converter drive plate, and engine flywheel for possible damaged or deformed drive plate. If no interference is found, the thickness of the flywheel must be reduced, or metal shims may be installed between the converter housing and the Revers-O-Matic drive.
8. If dimension "A" is more than 1/8" plus 1/32", or the "No-Go" side of the #CDG-1 gauge will slide by the pump drive sleeve, shims may be installed between the engine flywheel and the converter drive plate. Plain washers not more than 1/16" thick may be used for this purpose.

9. The runout of the pump drive sleeve, which is not to exceed .020" max., is checked by using the #CRG-1 gauge (Fig. #4), which also checks for converter housing misalignment. The use of this gauge depends on a sense of feel. The #CRG-1 gauge slips over the pump drive sleeve and into the converter housing bore, this may require a slight lifting because the flexibility of the converter drive plate may allow the torque converter to tilt slightly. The gauge is then turned as the engine is turned over slowly. If the gauge turns freely through a full turn of the crankshaft, the converter and converter housing are in satisfactory alignment. If the gauge will not enter the converter

PERFORMANCE CHECK

Attach a tachometer to the engine with the transmission in neutral. Holding the forward pedal or lever wide open, the engine should turn up to the top governor R.P.M. as shown on the specification sheet. If the R.P.M. is less than this, check the control and governor linkage to make sure that the governor is being held wide open, or tune up the engine. Check the R.P.M. with the reverse pedal or lever fully depressed. The engine speed should be the same as above.

Next, place the transmission in high gear and lock the brakes. Holding the forward pedal or lever wide open, the engine should turn up to the minimum static R.P.M. as shown on the specification sheet. If the R.P.M. is less than this, tune up the engine. If the engine speed is over the maximum static R.P.M. as shown on the specification sheet, the torque converter or the hydraulic clutches in the Revers-O-Matic are slipping. Repeat the same test, using the reverse pedal or lever.

If a check indicates that the converter or the Revers-O-Matic are at fault, first check the oil level of the unit as described under "Service" on Page 4. Next, check the control oil pressures. Install a 200# pressure gauge in the pipe fitting located on top of the control valve and at the front end of the Revers-O-Matic Drive. With the engine turning approximately 1500 R.P.M. the pressure should read 150 P.S.I. minimum. If less than this, remove and clean the pressure regulator valves as follows:

1. Remove the upper regulator cap on the left hand side of the unit near the front end of the case. Remove the spring, valve, and guide pin. Thoroughly clean the valve port as well as the various parts of the valve. Set the parts of the upper regulator valve aside so that they will not be mixed up with other parts later on.
2. Install the upper regulator cap **only** in the upper regulator valve port.

housing bore, or the gauge does not turn freely as the engine is turned over, it will be necessary to recheck the tolerances noted in paragraph #1, as this would indicate the runout is in excess of the .020" limit.

10. Check that the oil pump drive lugs are set at right angles to the drive lugs on the converter pump drive sleeve. The full weight of the Revers-O-Matic must be suspended during installation to prevent damage to the oil seal at the front of the oil pump. The Revers-O-Matic should be rotated a few degrees each way during installation to mesh the spline connections inside the converter.

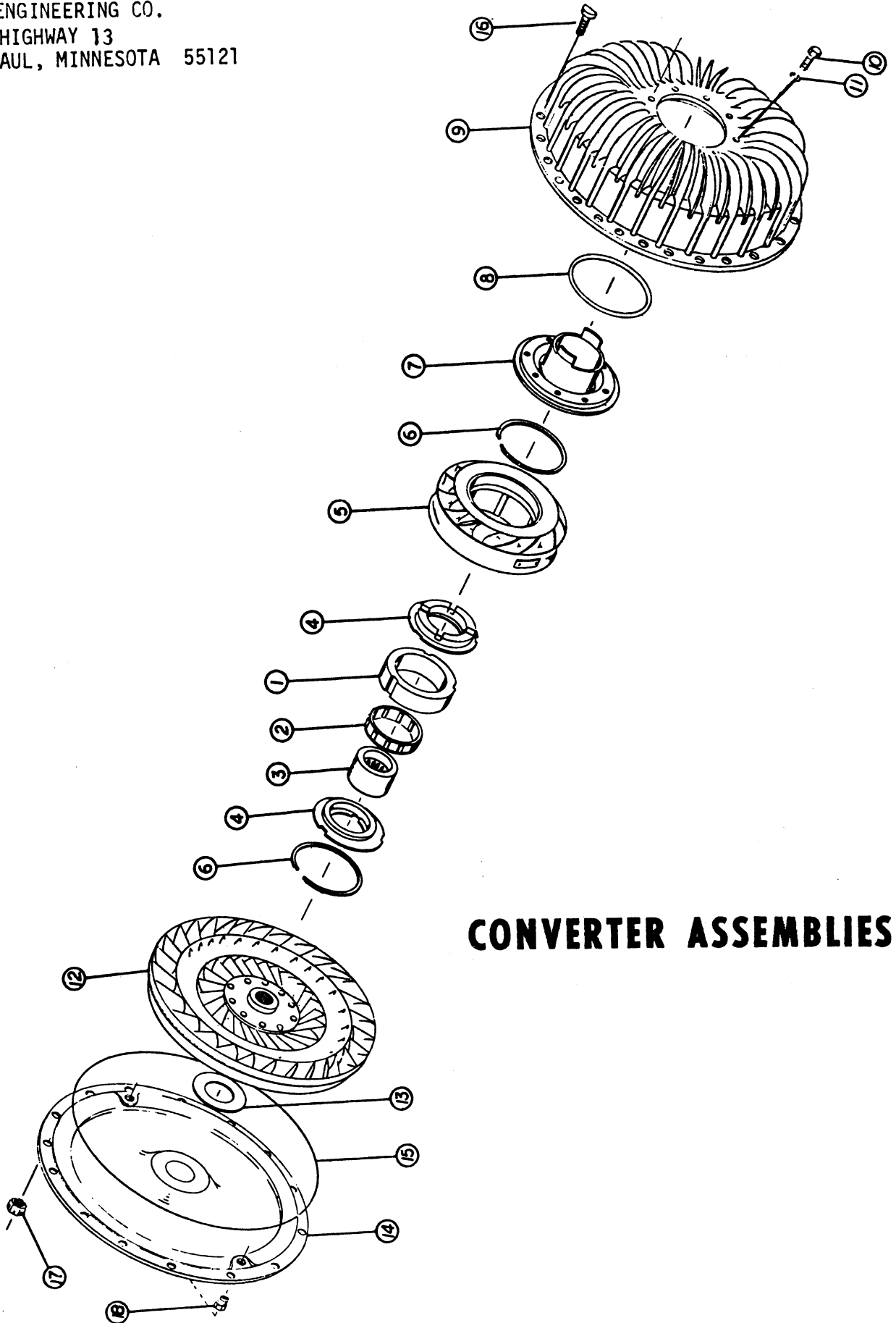
NOTE: The Revers-O-Matic must be filled with oil per service instructions on page 4 before engine is started.

11. Attach the Revers-O-Matic Drive to the converter housing with the 4 #F10040-32 capscrows (7/16 x 2") and #F16203 lockwashers.
12. This installation refers to the standard 7250 control assembly shown on page 12. Connect the throttle rod between the throttle lever (point "E", page 7) and the governor spring. Throttle rod length is adjusted so the engine begins to rev up when the lever has left stop "A" by not more than 1/16". The rod from the operator's control is connected to the bellcrank (point "D"), being sure that the operator can articulate the bellcrank thru 45° each way, or until stop "C" closes.

3. Remove the lower regulator cap, spring, valve and guide pin. Thoroughly clean the valve port as well as the various parts of the valve.
4. Reassemble the lower regulator valve complete, being sure that the valve slides freely in the valve port.
5. A pressure reading can now be taken on the lower regulator valve, using the gage previously installed. The lower regulator should be set at 75 to 80 P.S.I.
6. The pressure of the regulators can be adjusted by adding or removing washers under the springs in the regulator caps.
7. Remove the upper regulator cap and reassemble the upper regulator valve complete, being sure that the valve slides freely in the valve port.
8. The upper regulator valve should now be set so as to read 160 to 170 P.S.I. at 1800 R.P.M. in neutral. However, the pressure will drop momentarily below 100 P.S.I. when the clutches are engaged. With the engine idling, the regulator should read approximately 100 P.S.I.
9. With new oil in the unit, the pressure regulator valves may buzz. This is due to a foaming of the oil. Do not read the pressure gage when the regulator valves are buzzing. Idle the engine for several minutes, then rev up and read the pressure gage.
10. The 10# pressure regulator valve located on the right hand side of the unit is rarely a source of service problems. However, if the valve should require cleaning, follow the steps described above for the other two regulator valves.

LULL ENGINEERING CO.
3045 HIGHWAY 13
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FUNK REVERSER P-11687
CONVERTER ASSY. NO. P-12178



CONVERTER ASSEMBLIES

LULL ENGINEERING COMPANY, INC.
3045 HIGHWAY 13
ST. PAUL, MN 55121

FUNK REVERSER P-11687
CONVERTER ASSEMBLY
P12178

CONVERTER ASSEMBLY

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
1	P15109	Race (Outer)	1
2	P17524	Sprag (One Way Clutch)	1
3	P15110	Race (Inner)	1
4	P17732	Washer - Stator Thrust	2
5	P16417	Stator Assembly	1
6	P15108	Snap Ring	2
7	P14696	Hub Impeller	1
8	P16416	Gasket - Hub to Impeller	1
9	P17925	Impeller Assembly	1
10	P17049	Cap Screw	8
11	P14645	Lock Washer	8
12	P16416	Turbine Assembly	1
13	P17402	Washer - Turbine Thrust	1
14	P18135	Cover Assembly - Front	1
15	P14630	"O" Ring Gasket	1
16	P14647	Bolt - Cover to Impeller	10
17	P18136	Lock Nut	10
18	P18137	Drain Plug	2

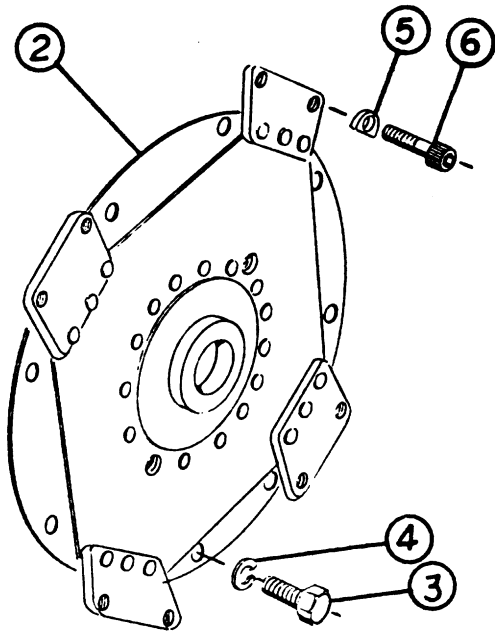
CONVERTER HOUSING

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
1	P17253	Convertor Housing	1
2	COMM.	Lockwasher, 7/16"	4
3	COMM.	Capscrew, 7/16" x 2" N.C.	4

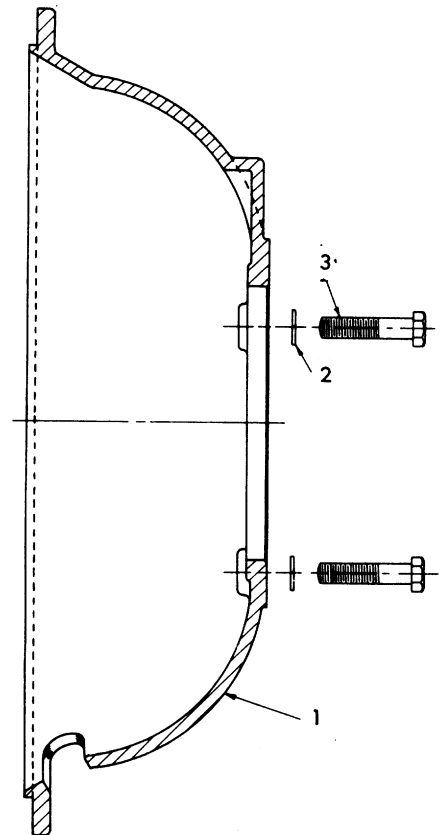
DRIVE PLATE ASSEMBLY

1	-	Not used this assembly	-
2	P15493	Drive Plate Assembly, Convertor (For 12" Convertor)	1
3	P17049	Cap Screw, 3/8" NC x 3/4" Hex Hd. (HT)	8
4	P16908	Washer, 3/8" Medium Spring Lock	8
5	P14645	Washer	8
6	P17453	Cap Screw	8

DRIVE PLATE ASSEMBLIES

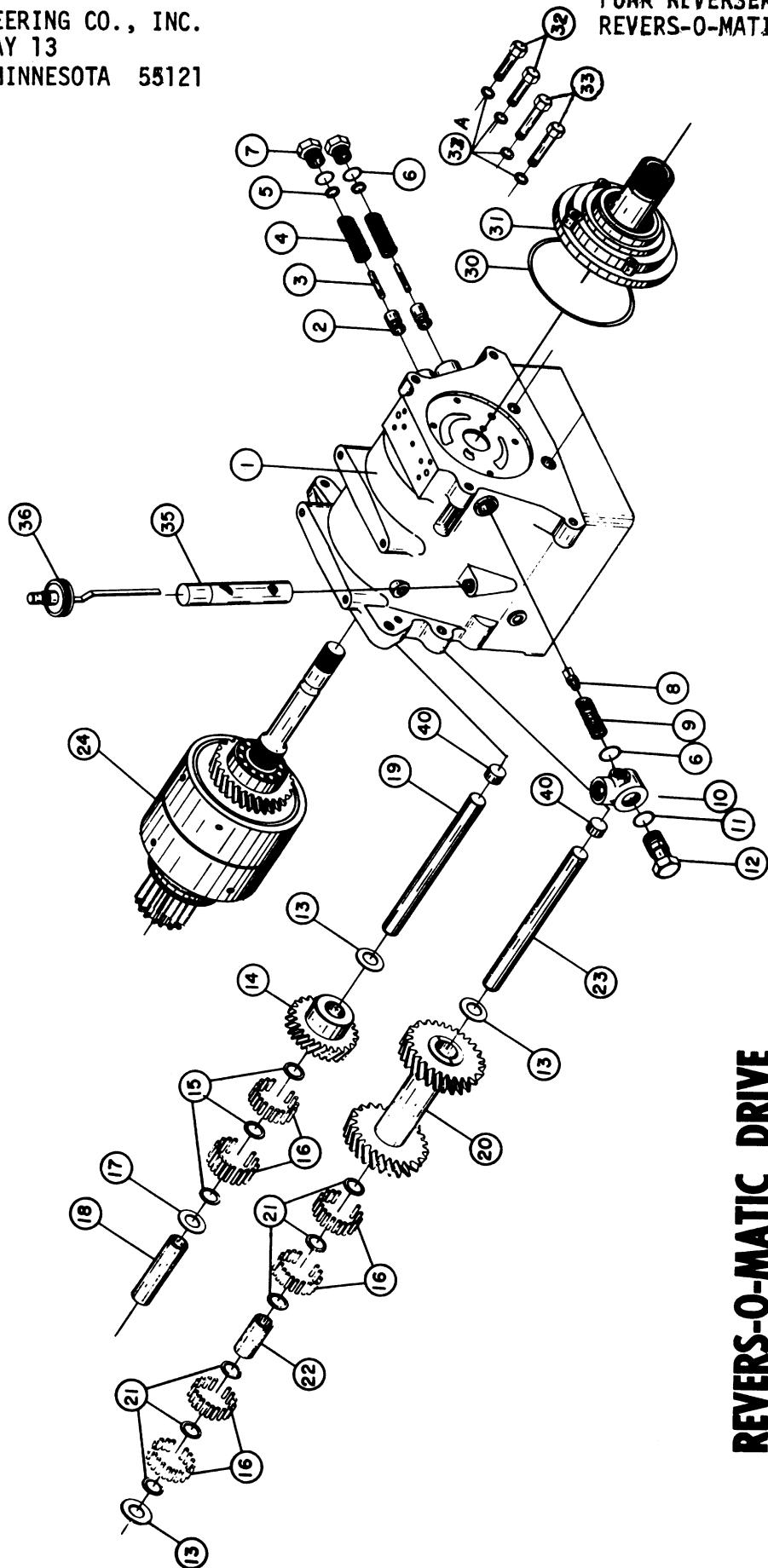


CONVERTER HOUSING



LULL ENGINEERING CO., INC.
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FUNK REVERSER P11687
REVERS-O-MATIC DRIVE



REVERS-O-MATIC DRIVE

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
1	P12763	Case Assembly (left hand)	1
2	P12772	Valve Regulator, 80/160#	2
3	P12773	Pin, Regulator Guide	2
4	P12774	Spring, Regulator 80/160# 2-1/4	2
5	P12775	Washer, Pressure Adjusting	As Req.
6	P12776	O Ring	3
7	P12777	Cap Reg. Valve	2
8	P12767	Valve, Regulator, 10#	1
9	P12768	Spring, Regulator Valve 10# (1-3/4 Long)	1
10	P13352	Block, Reg. Valve	1
11	P12771	O Ring - Outer	1
12	P12770	Cap Regulator	1
13	P12787	Washer, Gear Thrust	3
14	P12778	Gear Idler (24 Teeth)	1
15	P12779	Washer, Idler Gear Bearing	3
16	P12784	Roller, Countershaft & Idler Gear Bearing	100
17	P12781	Washer, Idler Gear	1
18	P12780	Tube Spacer, Idler Gear	1
19	P12782	Shaft, Idler Gear	1
20	P12783	Gear, Counter Shaft (25 and 27 teeth)	1
21	P12785	Washer	6
22	P12786	Spacer, Counter Shaft Gear Bearing	1
23	P12788	Shaft, Counter Shaft Gear	1
24	P14635	Clutch Stack Assembly (for model RC or RCA)	1
25	P13348	Gasket, Rear Cover	As Req.
26	P13347	Seal Rear Cover	1
27	P13346	Cover, Rear	1
28	P13350	Washer (3/8 Sealing)	3
	P13351	Washer (3/8 External Star)	3
29	Comm.	Cap Screw (3/8 x 1) N.C. Hex	6
30	P12792	Gasket, Oil Pump	1
31	P13354	Pump Assembly Oil	1
	P12791	Oil Seal (Ref. #31- A Serviceable Part of Pump) Not Shown	
32	P12820	Cap Screw (5/16 x 1-3/4 N.C. Hex)	2
33	P12821	Cap Screw (5/16 x 2 N.C. Hex)	2
33-A	P12822	Washer (5/6 Sealing)	4
34	P12789	Cork (3/4") Not Shown	2
35	P18025	Screen, Oil Strainer	1
36	P18026	Filler Cap & Oil Level Gauge Assembly	1
37	P12764	Drain Plug - Not Shown	1

NOT ILLUSTRATED

	P14697	U-Joint Flange	1
*	P14692	Gasket and Seal Kit - 4000586 & 4000648	1
*	P14692	Includes the Following Parts on next page (12)	

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FUNK REVERSER P11687
 REVERS-O-MATIC DRIVE (Continued)

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
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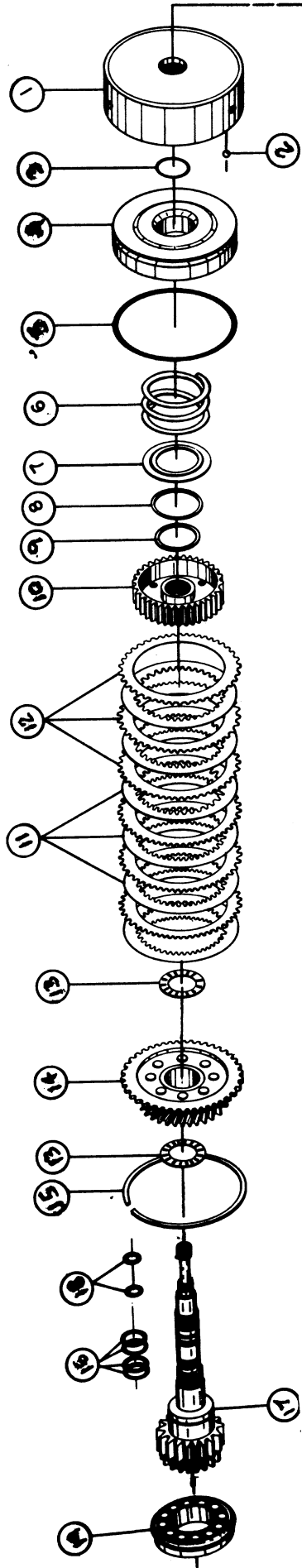
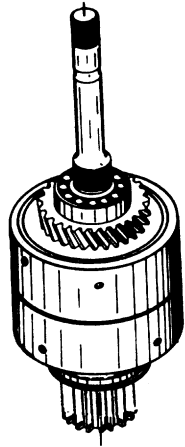
NOT ILLUSTRATED: CONTINUED

		4000586	
P12792		Gasket Pump	1
P13348		Gasket, rear cover	3
P12776		O Ring	3
P12771		O Ring	1
P12728		O Ring	5
P12789		Cork	2
P12822		Washer	4
P13350		Washer	3

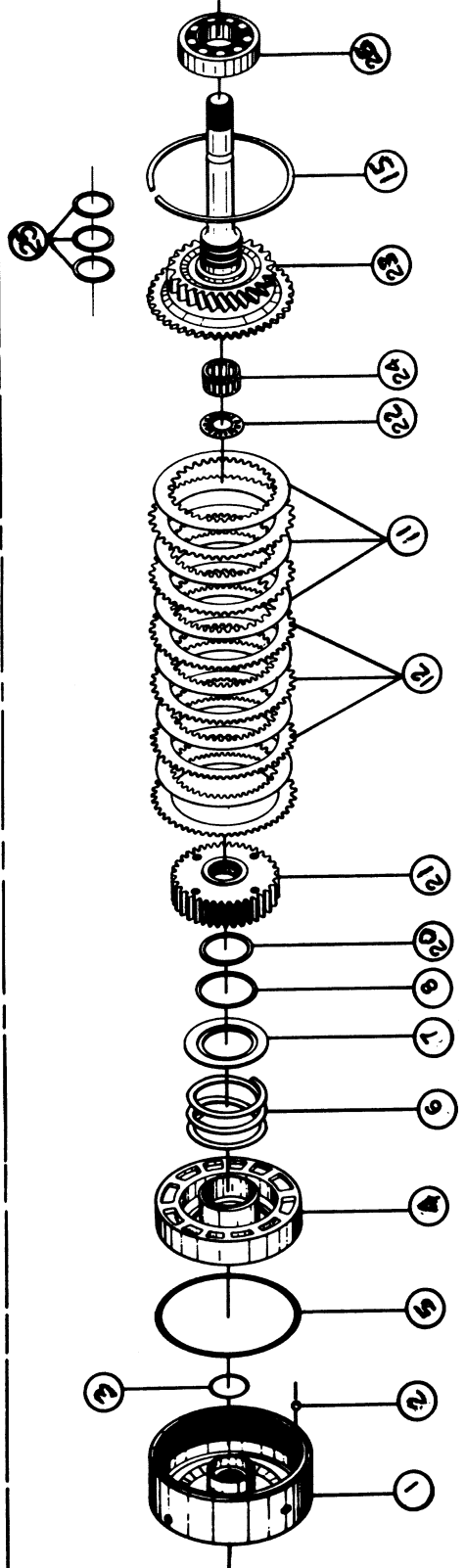
		4000648	
P12722		Gasket, Valve Cap	2
P12721		Seal, Oil	2
P12807		O Ring-Piston, Inner	2
P13347		Seal, Rear Cover	1
P12791		Oil Seal	1
P12813		Seal, Piston, Outer	2
P12797		Seal Ring	2
P12794		Seal Ring	3
P12799		Seal Ring	4

LULL ENGINEERING CO., INC.
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ST. PAUL, MINNESOTA

CLUTCH STACK ASSEMBLY



FUNK REVERSER P-11687
CLUTCH STACK ASSEMBLY



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 ST. PAUL, MN 55121

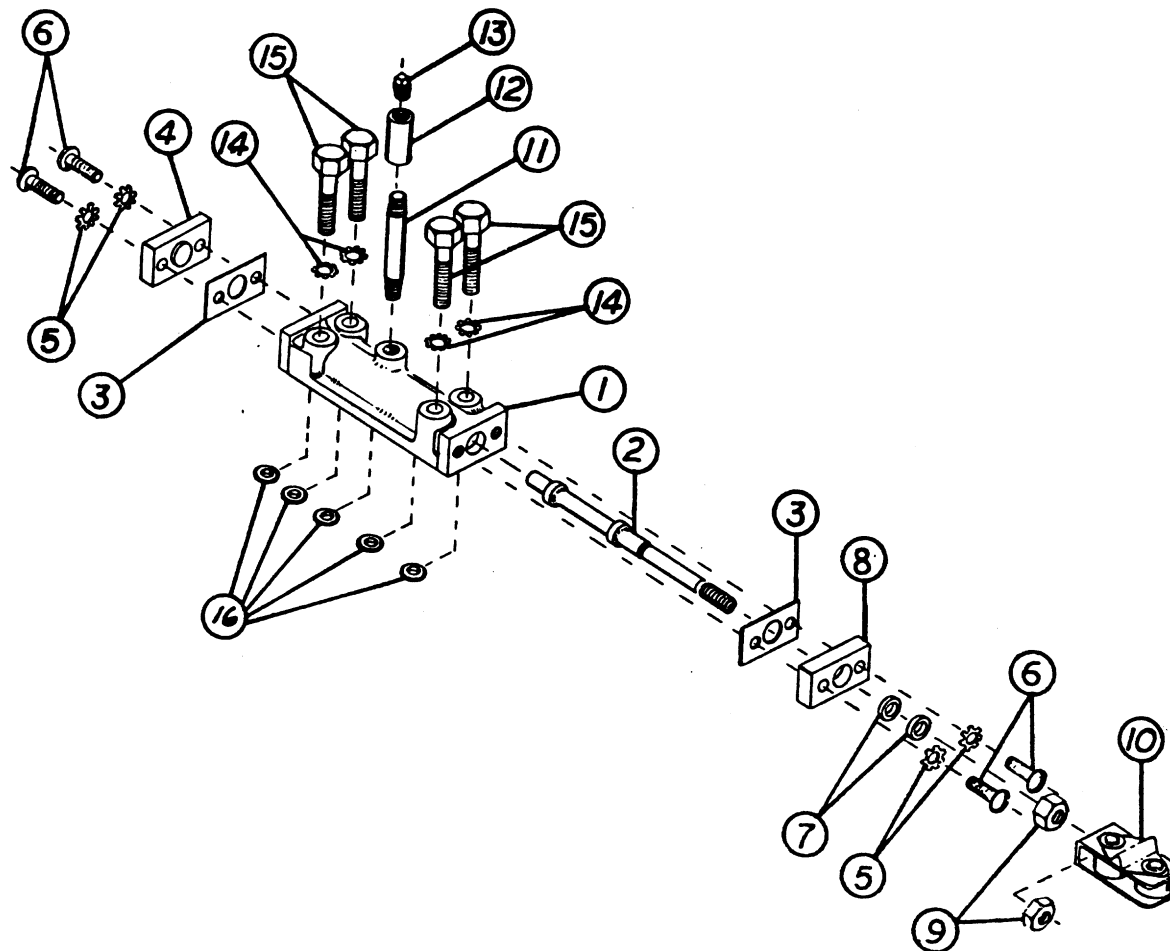
FUNK REVERSER P11687
 CLUTCH STACK ASSEMBLIES

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
1	P12806	Cylinder Assembly Clutch	2
2	P12808	Ball - 1/4	2
3	P12807	"O" Ring, Piston, Inner	2
4	P12811	Piston, Clutch	2
5	P12813	Seal, Piston, Outer	2
6	P12814	Spring, Clutch	2
7	P12815	Retainer, Clutch Spring	2
8	P12812	Ring, Snap	2
9	P12803	Ring, Snap Rear Clutch Hub	1
10	P12802	Hub, Clutch Rear	1
11	P12809	Plate, Clutch Int. Spline	12
12	P12810	Flate Separator, Ext. Spline	12
13	P12801	Washer, Thrust, Output Gear	2
14	P12800	Gear Ass'y, Power Output	1
15	P12816	Ring, Snap (Clutch Stack Retainer)	2
16	P12799	Ring, Seal	4
17	P13344	Shaft Ass'y. Power Output (for Model RC or RCS)	1
18	P12797	Ring Seal	2
19	P13345	Bearing, Ball, Output Shaft	1
20	P12805	Ring, Snap, Front Clutch Hub	1
21	P12804	Hub, Clutch Front	1
22	P12787	Washer, Gear Thrust	1
23	P12793	Shaft Assy. Power Input (Model RC & RCO)	1
24	P17695	Bearing-Pilot	1
25	P12794	Ring, Seal	3
26	P13345	Bearing, Ball, Input Shaft	1

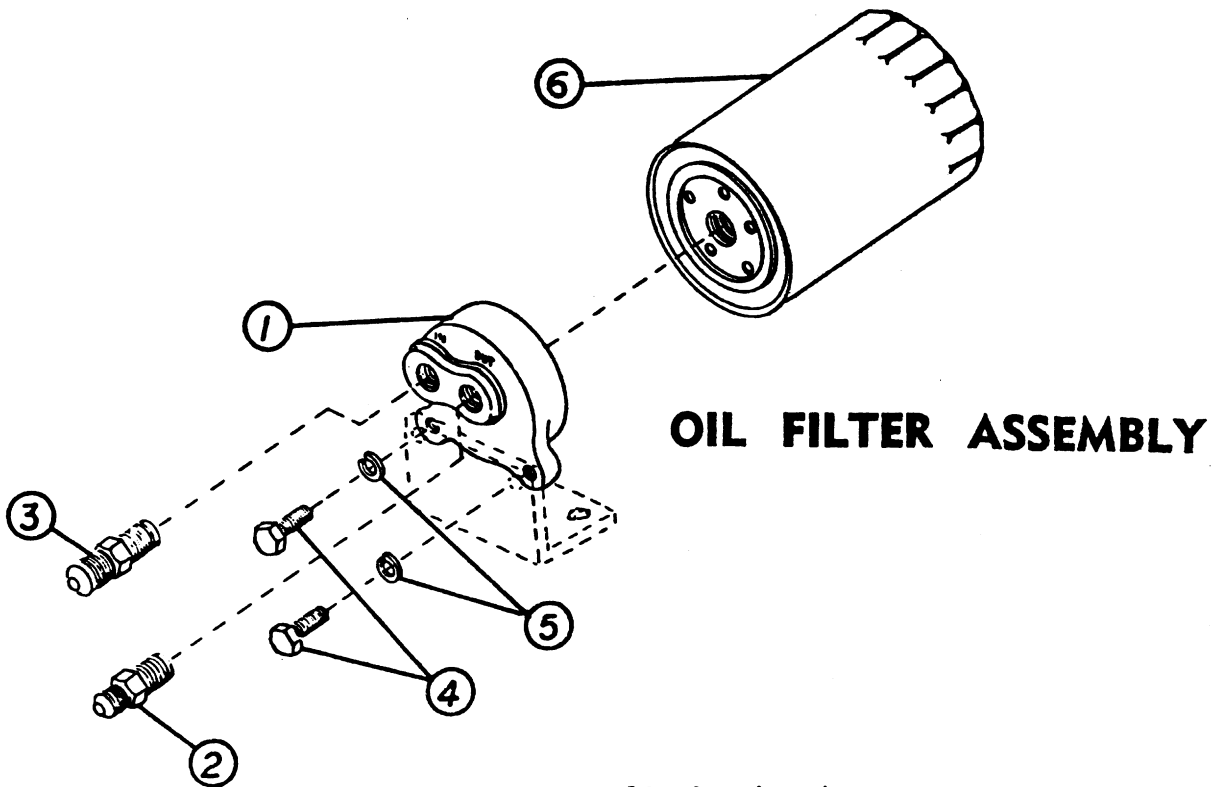
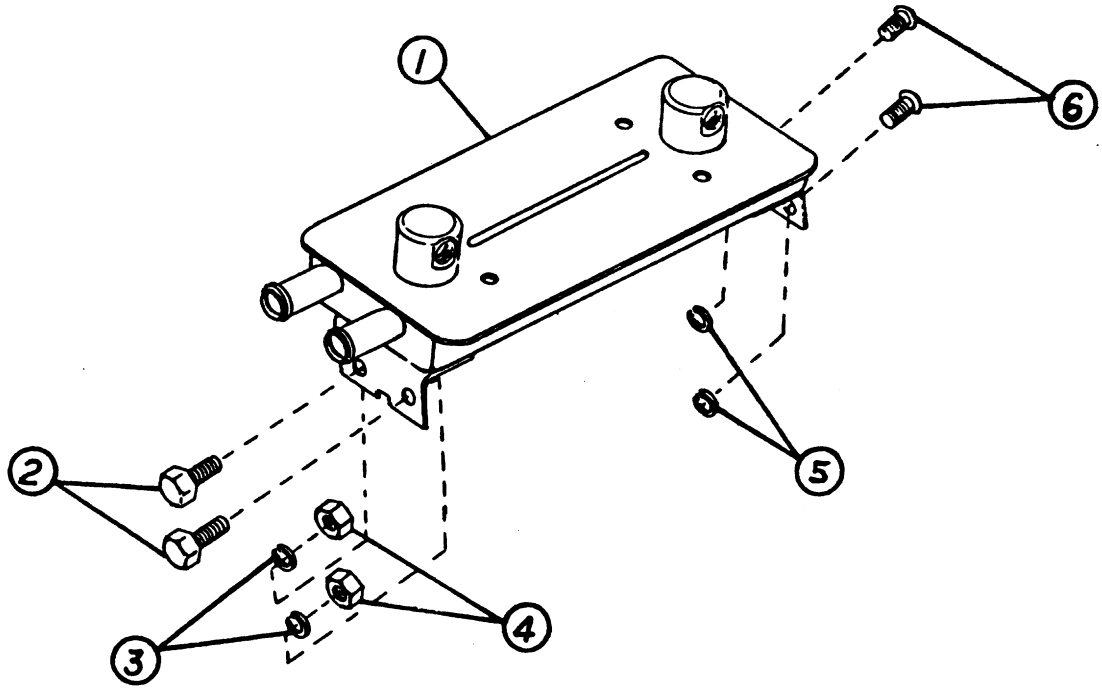
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REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
1	P12741	Body Valve	1
2	P12741	Valve, Control	1
3	P12722	Gasket, Valve Caps	2
4	P12719	Cap, Valve Closed	1
5	Com'l	Washer, 1/4" Ext. Star	4
6	Com'l	Capscrew, 1/4" x 3/4" N.C.	4
7	P12721	Seal, Oil	2
8	P12720	Cap, Valve, Open (Takes Oil Seal)	1
9	Com'l	Nut, 5/16" N.F. Hex Jam	2
10	P12730	Roller Cage Assy	1
10 A	P12729	(Not Illustrated) Roller	2
11	Com'l	Nipple, Pipe 1/8" x 2"	1
12	Com'l	Coupling 1/8" Pipe	1
13	Com'l	Plug 1/8" Pipe SA HD	1
14	Com'l	Washer 5/16 Ext. Star	4
15	Com'l	Capscrew 5/16 x 1-1/2 N.C. Hex	4
16	P12728	"O" Ring	5

CONTROL VALVE ASSEMBLIES



HEAT EXCHANGER ASSEMBLY



OIL FILTER ASSEMBLY

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FUNK REVERSER
 HEAT EXCHANGER
 OIL FILTER
 OIL LINE GROUP

REF. NO.	PART NO.	DESCRIPTION	QTY. REQ.
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HEAT EXCHANGER

1	P12698	Heat Exchanger (Oil Cooler)	1
2	Com'1	Bolt - 5/16 x 3/4 N.C. Hex Head	2
3	Com'1	Washer 5/16 Lock	2
4	Com'1	Nut 5/16 N.C. Hex Head	2
5	Com'1	Washer 1/4 Ext. Star	2
6	Com'1	Screw, Self Tapping 1/4 x 3/8 Hex Head	2

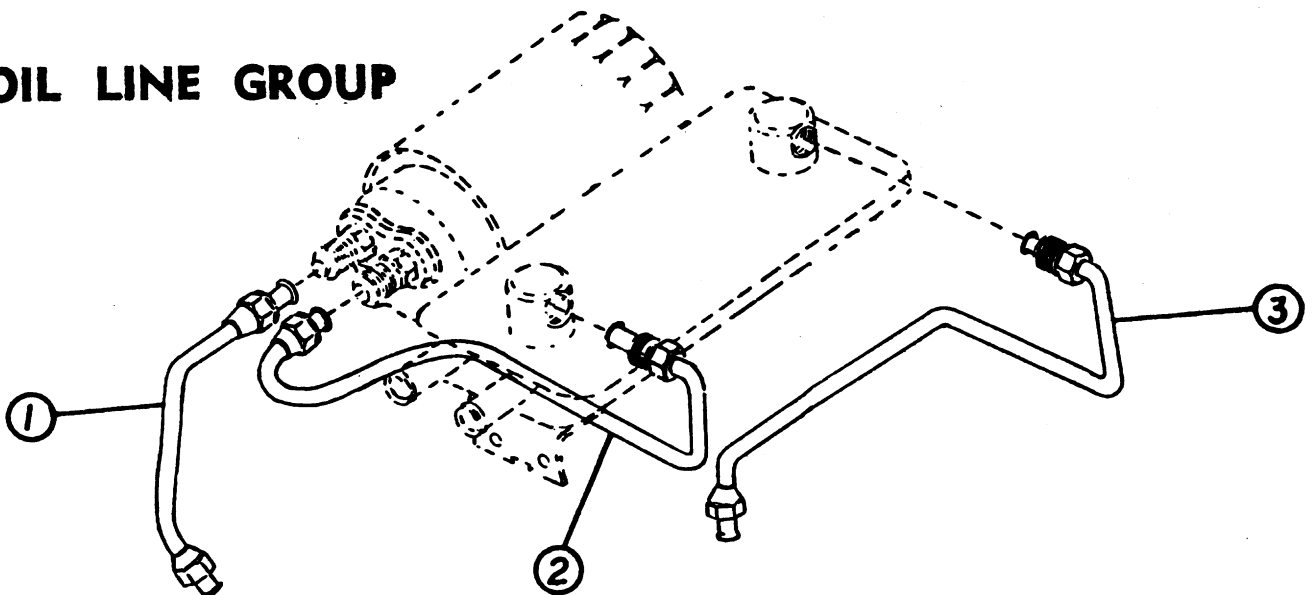
OIL FILTER

1	P14640	Filter, Cap Assy.	1
2	Com'1	Fitting 5/16 x 1/4 Per Spec.	1
3	Com'1	Fitting 3/8 x 1/4 Per Spec	1
4	Com'1	Cap Screw 5/16 x 3/4 N.C.	2
5	Com'1	Washer 5/16 Lock	2
6	P12711	Oil Filter AC type PF-2 Cartridge	1

OIL LINE GROUP

1	P17753	Tube, Filter to Regulator	1
2	P18022	Tube, Filter to Heat Exchanger	1
3	P18138	Tube, Heat Exchanger to Case	1

OIL LINE GROUP



The parts information in this publication is based on data available at the time it was printed. Because of continual improvement and advancing product design, your vehicle may not be identical to the parts information shown. Whenever there is a question, obtain the latest parts information available from your local dealer. JLG Industries, Inc. continually updates these publications electronically within our *OnLine Services*.



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- Enter orders using part numbers, or order by selecting from graphical parts manuals.
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- Review invoices and credits.
- Review shipping information.
- Submit warranty claims

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