

REPAIR CATALOG

R-2131

WHITE MOBI LIFT

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AL. O. 810001 AND FTER

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Supplement "A" to Repair Catalog R2131

This supplement is to be used in conjunction with Repair Catalog R2131 on the MSA 20, 20 II, 25 and 25 II Fork Lift Trucks. This supplement covers changes, corrections and additions to be added to the Repair Catalog.

- Page 9 Change 35P3381 gasket (ref. #76) to 35P1381 (Corr.)
- Page 10 Change 10R1119 Spark Plug (ref. #106) to 10R1191.
- Page 19 Change 35P1450 Prestolite No. to IBB-2042SS1.
- Page 24 Add conversion kit to change 35A7708 pump (Autopulse)
to 35A8639 pump (Bendix).
- 35R75 Kit - conversion, with attaching parts 1
- Page 26 Change D1173 coupling (ref. #15) to 35P517.
- Page 32 Change description on 50A2883 ring (ref. #22) to
Ring - back-up, "O" ring.
- Change 35A4141 countershaft (ref. #30) to 35A9882
(35A4141).
- Page 36 Change 35A1205 valve (ref. #10) to 35A1250.
- Page 38 Change 35A6300 shaft (ref. #3) to 35A9884 (35A6300).
Change 35A6301 shaft (ref. #4) to 35A9883 (35A6301).
- Page 44 Change 35A6907 clamp (ref. #53) to 35A6107 (Corr.).
- Page 48 Change 35A8595 rod (ref. #18) to 35A8592 and length
to 4-3/16".
- Page 52 Change 36A8526 support (ref. #7) to 36A9853 (36A8526).
- Page 56 Add note to 50A4746 nipple (ref. #29). Used on lift
trucks with 90° boss opening in transmission case.
- 29 36A9797 Pipe Assembly - transmission case, 1-1/2" O.D. x 90° 1
Used when transmission case is replaced with flush
opening in case.
- Page 60 Change 35P1286 cover (ref. #18) to 10P3074 (35P1286).
- Page 64 Change 36A9442 bracket (ref. #32) to 36A8888
(36A9442).
Change 10A5914 spring (ref. #34) to 10A25890

Page 66 Add repair kit for tilt cylinder
 35R113 *Repair Kit - cylinder (Includes ref #5, 6, 7, 12, 13, 14, 15 and 18.)

Page 74 Add lift chain to Triplex Tri-Free Lift with BL534 chain.

Chain for Lift - 5/8" Pitch BL534 - 3x4 lacing.

<u>M.F.H.</u>	<u>O.A.H.L.</u>	<u>Chain Length</u>	<u>M.F.H.</u>	<u>O.A.H.L.</u>	<u>Chain Length</u>
133"	70"	156-7/8"	161"	76"	181-7/8"
137"	70"	156-7/8"	165"	76"	181-7/8"
141"	70"	156-7/8"	169"	76"	181-7/8"
145"	70"	156-7/8"	169"	82"	193-1/8"
149"	70"	163-1/8"	173"	82"	199-3/8"
151"	70"	163-1/8"	177"	82"	199-3/8"
149"	76"	175-5/8"	181"	82"	199-3/8"
153"	76"	175-5/8"	185"	82"	205-5/8"
157"	76"	175-5/8"			

Page 76 Change P2048 Repair Kit to 35R70.

Page 92 Change GM147887 clevis (ref. #38) to GM174887 (Corr.).

Page 93 Add note; Parts used on MSA Lift Trucks to No. 28100235 Inc.
 Add the following parts for Auxiliary Valves on MSA Lift Trucks Serial No. 28100236 and after.

40	35A3120	Sleeve - power adapter, 7/16"-14 x 1-3/8"	1	1
41	35A3117	Gasket - sleeve	1	1
42	50A1666	Quad Ring - sleeve	1	1
45	50A4425	Elbow - inlet, 7/8"-14 JIC x 90°	2	2
46	10A16285	"O" Ring, elbow	2	2
47	50A4453	Nipple - close, auxiliary valve, 3/4"	1	-
48	50A4579	Coupling - pipe, 3/4"	1	1
49	50A4825	Connector - hose, 3/4" x 1-1/16" JIC	2	2
50	35A8096	Hose and Tube - return, auxiliary valve to tank, 29-11/16" long	1	1
51	35A8097	Hose and Tube - pressure line, control valve to auxiliary valve	1	1
	35A8112	Angle - clip support	1	1
	35A8113	Clip - tubes	1	1
	50A3653	Bolt - hex., 5/16"-18 x 1/2"	2	2
	50A3658	Bolt - hex., 5/16"-18 x 1-1/2"	1	1
	50A3730	Nut - hex., 5/16"-18	1	1

MSA SERIES LIFT TRUCKS

FOREWORD

This catalog contains a complete list of parts for the MSA 20, 20 II, 25, and 25 II Series Lift Trucks. To assist in determining the part numbers and description, the parts in this catalog are grouped according to their location on the Lift Truck. Reference numbers only are shown in each illustration. These numbers correspond to those in the reference number column in the list of parts which precedes each "exploded view".

TYPICAL PARTS ARE SHOWN, AND MAY NOT ALWAYS BE IDENTICAL WITH CURRENT PARTS. REFER TO THE TEXT.

To further assist in locating repair parts, the part numbers are arranged in numerical sequence and indexed on pages 96 thru 102 Inclusive.

Component parts of assemblies are listed following the assembly itself and are identified as being part of the assembly by this notation following the description:

Consists of the following.....parts:

or

Includes the following.....parts:

Part numbers only make up an assembly. Hardware items are not to be included.

Parts such as standard bolts, nuts, screws, washers, etc., are indented and listed under the respective individual parts with which they are used. The quantity for many of the items listed is shown as A.R. (as required). The correct amount of shims should be determined in order to get the proper clearance.

"Right or Left" is determined by facing the part from the Lift Truck driver's platform.

When in need of repair parts always order the parts from your Mobilift dealer nearest you. All parts orders should plainly specify your name, post office address and whether shipment is to go by parcel post, express or freight.

Before returning repair parts it is necessary to secure written permission from the company authorizing the return of such parts. In the returning of repair parts be sure the package is tagged with your name and address. Prepay transportation charges.

Claims of shortage or breakage should be made to the transportation company on receipt of goods.

It is the policy of White Industrial Division, White Motor Corporation, to improve its products whenever it is possible and practical to do so. We reserve the right to make changes or add improvements in the design or construction at any time without incurring the obligation to install such changes on products previously delivered.



SAFETY FIRST

Most accidents are caused by the failure of some individual to observe simple and fundamental safe rules or precaution. For this reason accidents can be prevented by recognizing the cause of the accidents and doing something about it before the accident occurs.

Regardless of the care used in the design and construction of equipment, there are many points that cannot be completely safeguarded without interfering with accessibility and efficient operation.

A careful operator is the best insurance against an accident.

THE COMPLETE OBSERVANCE OF ONE SIMPLE RULE WOULD PREVENT MANY THOUSAND SERIOUS INJURIES EACH YEAR.

**THAT RULE IS:
"NEVER ATTEMPT TO CLEAN, OIL, OR ADJUST
A MACHINE WHILE IT IS IN MOTION"**

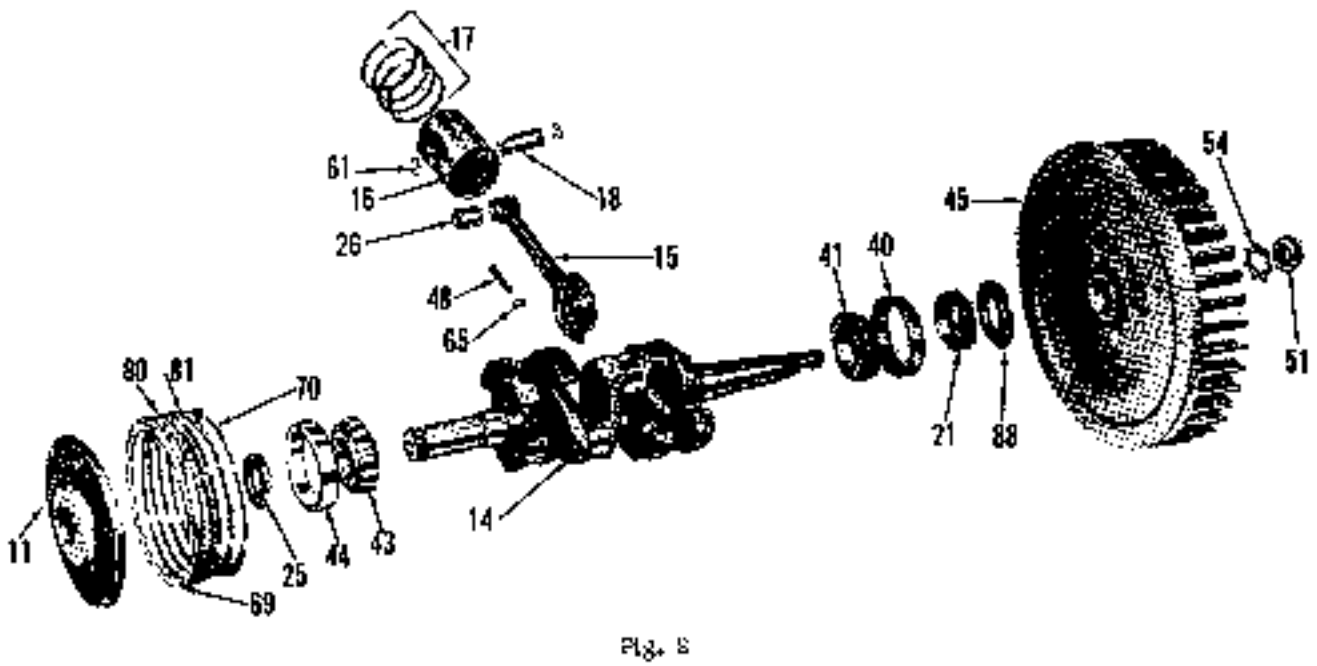
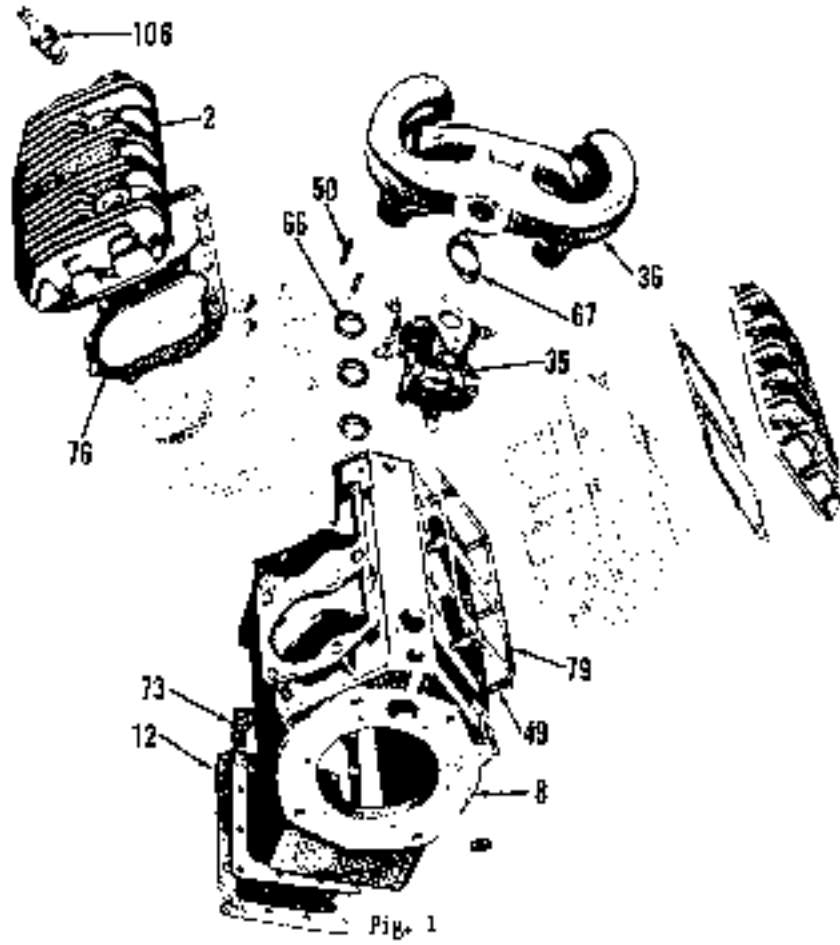
Signed: NATIONAL SAFETY COUNCIL

MSA SERIES LIFT TRUCKS

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MSA SERIES LIFT TRUCKS



MS4 SERIES LIFT TRUCKS

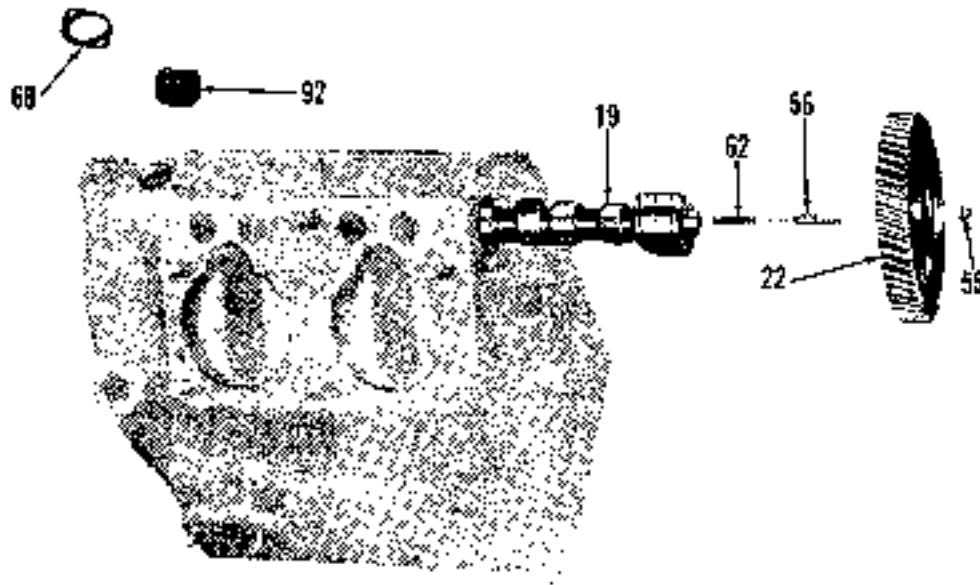


Fig. 3

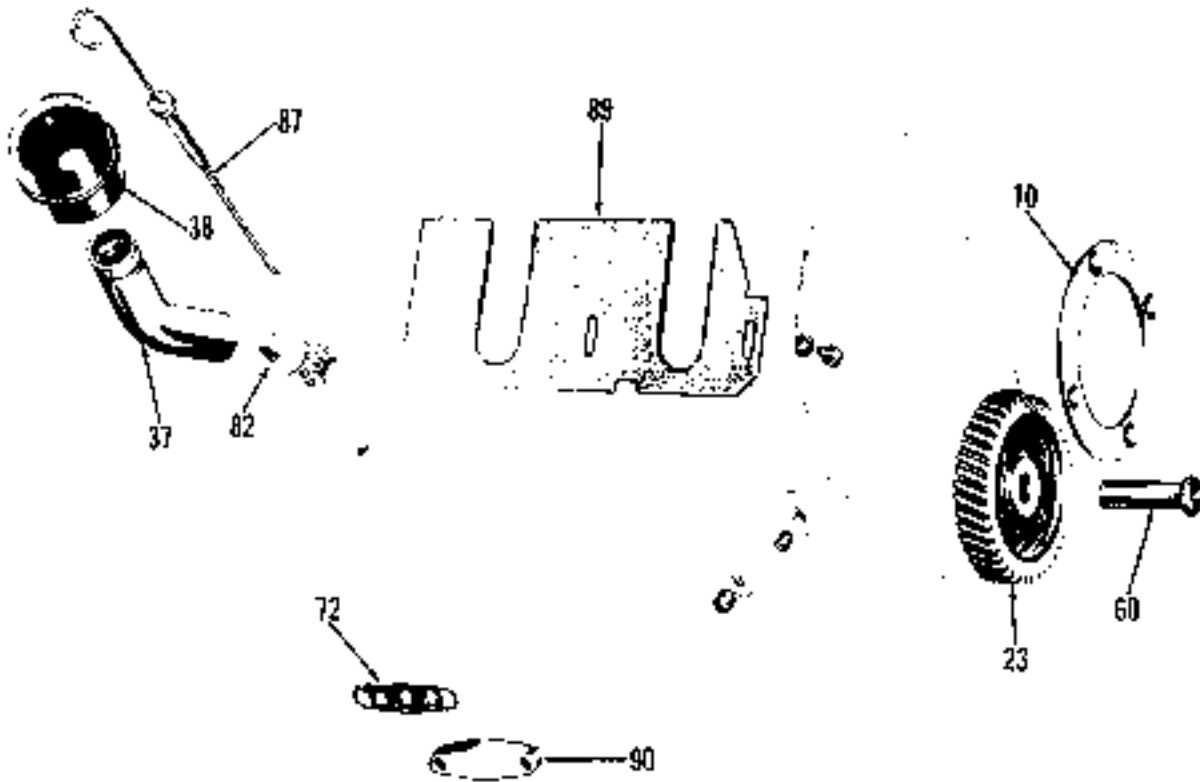


Fig. 4

MSA SERIES LIFT TRUCKS

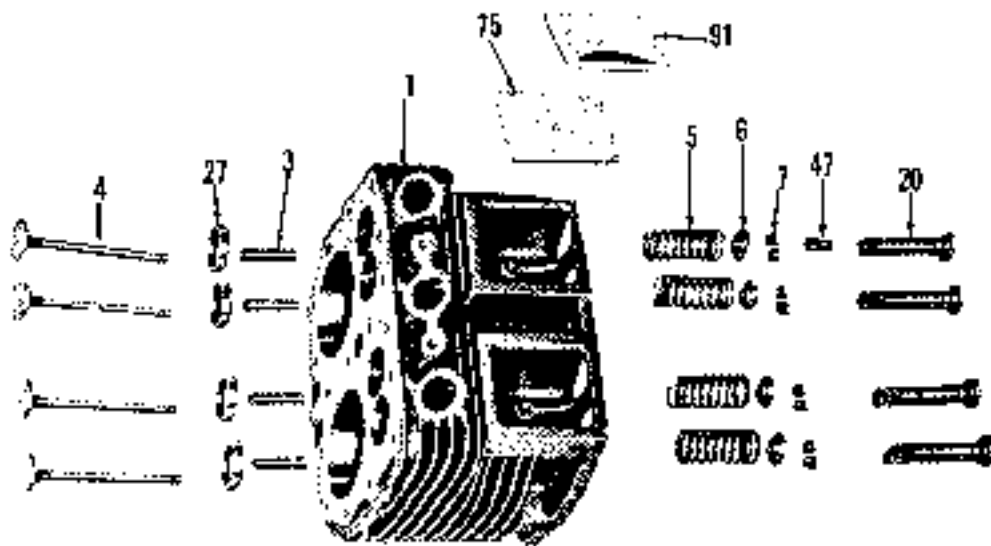


Fig. 5

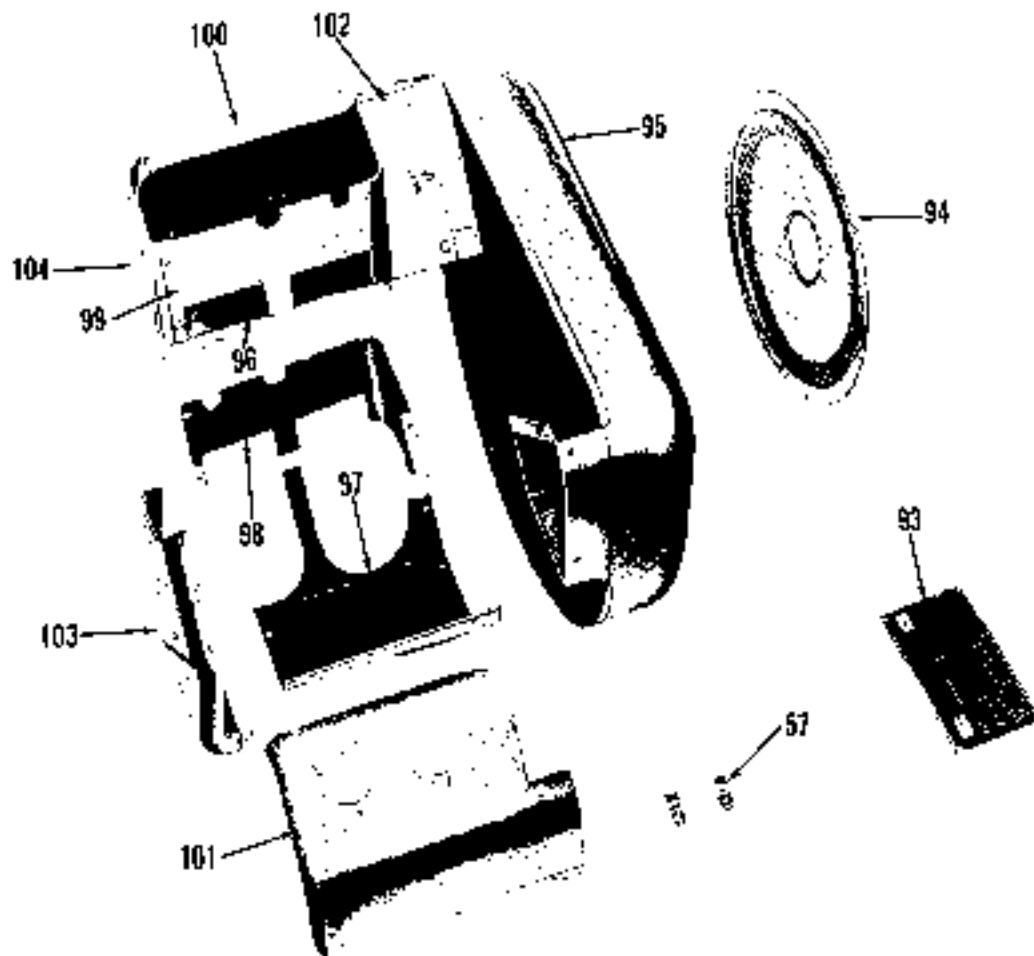


Fig. 6

MSA SERIES LIFT TRUCKS

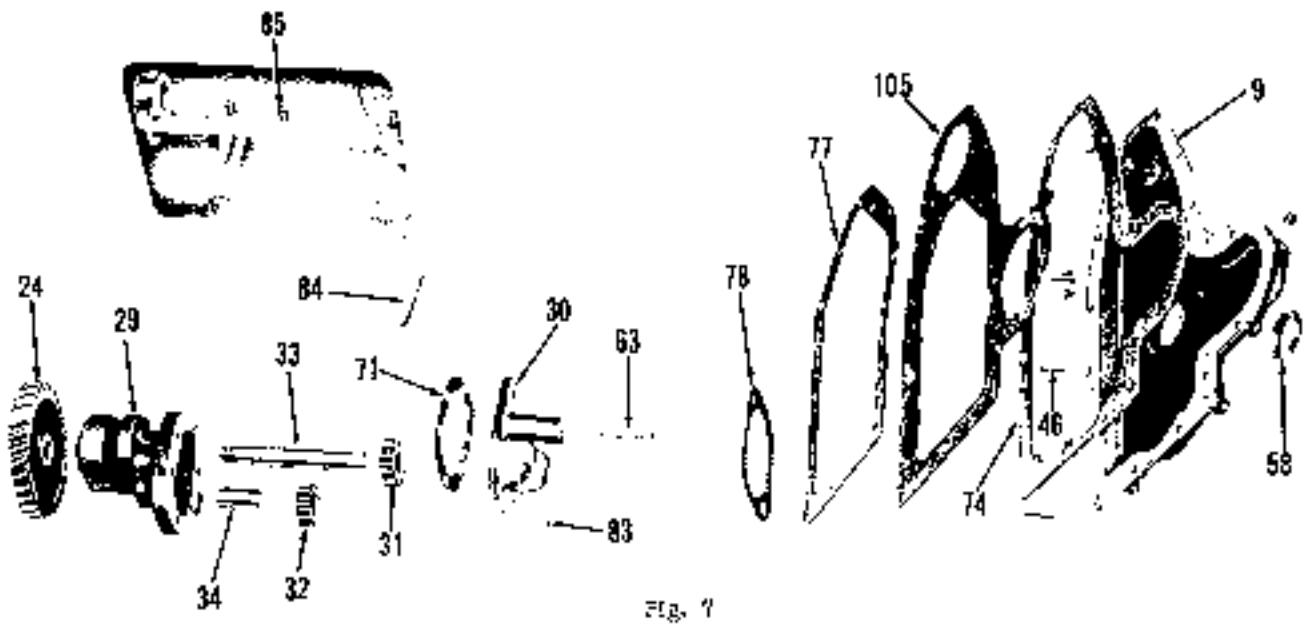
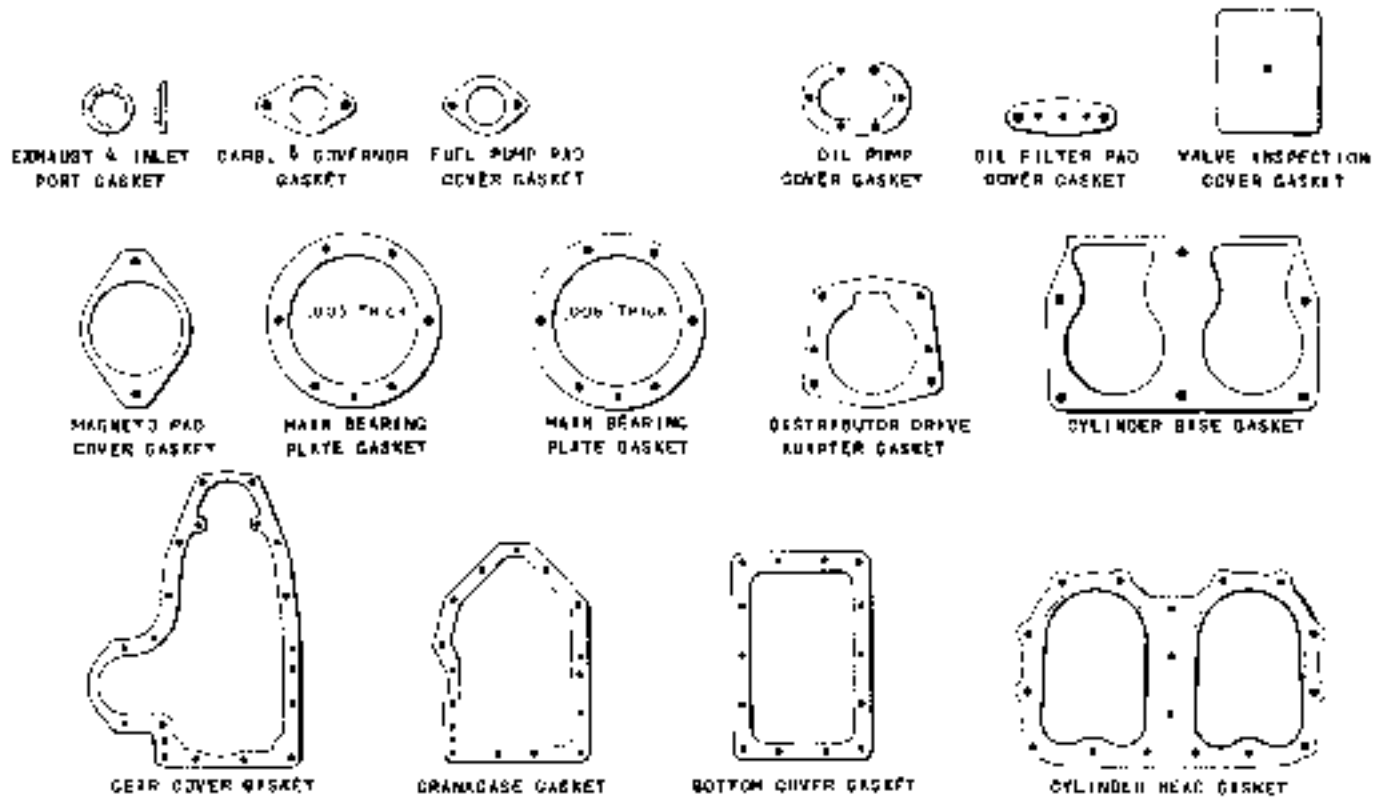


Fig. 7



GASKET SET

Fig. 8

MSA SERIES LIFT TRUCKS

Fig. No.		Part No.	Wisconsin Motor	DESCRIPTION	No. Pcs.
6	1	35P131P	AA-98-S7	Block - cylinder assembly	1
1	2	35P132D	AB10CB	Head - cylinder	2
5	3	15P541	AD-41	Guide - valve stem	8
3	4	9604H	AE70P	Valve - inlet	4
		15P309	AE75D	Valve - exhaust, rocker	4
5	5	9307K	AF49A	Spring - valve, inlet	4
		35P132E	AF51	Spring - valve, exhaust	4
5	6	9307K	AG26	Seat - valve spring, inlet	4
		35P132Z	AG31	Rotator - valve and spring seat, exhaust	4
6	7	9308K	AH9	Lock - valve spring seat	8 Pcs.
1	8	35P132B	BA-45C-S1	+Crankcase - assembly	1
1	8	35P2030	BA-46C-89-S1	++Crankcase - assembly	1
7	9	35P1324	BD-100C-2-S1	Cover - gear, assembly	1
4	10	35P1325	BC209	Plate - bearing retainer	1
2	11	35P1326	BG210-C19-S2	Plate - main bearing	1
1	12	35P1327	GH141A	Plate - crankcase bottom cover	1
		35P1328	BH152	Cover - magnetic pad	1
2	14	35P1329	CA71A-102-S1	Crankshaft	1
2	15	35P1330	DA48-S1	Rod - connecting, assembly	4
2	16	35P1331	ED-190A-1	Piston - standard	4
		35P1332	D3190A-1-85	Piston - .000 oversize	4
		35P1333	D3190A-1-S10	Piston - .010 oversize	4
		35P1334	D3190A-1-S20	Piston - .020 oversize	4
2	17	35P1335	DR31A	Ring Set - piston, standard	1
		35P1336	DR31A-85	Ring Set - piston, .000 oversize	1
		35P1337	DR31A-S10	Ring Set - piston, .010 oversize	1
		35P1338	DR31A-S20	Ring Set - piston, .020 oversize	1
2	18	9321R	DE65	Pin - piston, standard	4
		35P1339	DE65-003	Pin - piston, .000 oversize	4
8	19	35P1340	EA11R	Crankshaft	1
5	20	15P110	FE1	Fapper - valve	8
2	21	R324K	GA36A	Gear - crankshaft	1
3	22	35P1341	GB45A	Gear - camshaft	1
4	23	93341	GC27E-1	Gear - idler	1
7	24	35P1342	GD34C	Gear - oil pump	1
2	25	35P1343	PH200B	Seal - oil	1
2	26	35P2020	HG197A	Bushing - piston pin (9333K)	4
5	27	9325K	HG201	Insert - valve seat, inlet	4
		15P913	HG201D	Insert - valve seat, exhaust	4
7	28	35P2007	K95L	+Oil Pump - assembly (933902X)	1
1	29	35P2091	KA61C-81	Body - oil pump (15P314)	1
7	30	35P1345	KB48S2	Cover - oil pump	1
7	31	35P1346	KC86-1	+Gear - oil pump drive	1
7	32	9339K	KC86-2	+Gear - oil pump driven	1
7	31-32	35P2008	KC86A	Gear - oil pump, drive and driven	2
7	33	15P137	KD121-S1	Shaft - drive, oil pump	1
7	34	35P1347	KD122	+Shaft - snub, oil pump	1
7	34	35P2009	KD122A	++Shaft - snub, oil pump	1
1	35	35P1348	L63-S1	Carburetor - Zenith 1209, use 35P1377	1
1	36	35P1377	LZ63-14-S1	Carburetor - Zenith 13105 (35P1348)	1
1	36	35P1349	LD258C	Manifold - inlet and exhaust	1
4	37	35P1350	LP303P	+Tube - oil filler	1
4	37	35A5704	J3306AM	++Tube - oil filler	1
4	38	35P1351	LO63	Cup - oil filter and strainer	1
2	40	TY2022	ME68-1	Cup - main bearing	1
2	41	30-54	ME71-1	Cone - main bearing	1
2	42	35P1353	ME114	Bearing - main, take-off end	1
2	43	9321R	ME114-1	Cone - main bearing, take-off end	1
2	44	9320R	ME114-2	Cup - main bearing, take-off end	1

M5A SERIES LIFT TRUCKS

Fig. No.	Ref. No.	Part No.	Wisconsin Motor	DESCRIPTION	No. Pcs.
				ENGINE (Cont'd)	
2	45	35P2006	NC140G-3-S1	Flywheel - engine, with ring gear (85P1854).....	1
		15P553	GH144	Gear - flywheel ring	1
2	46	35P1355	PA291	Pin - dowel, gear cover	2
5	47	15P322	PA189A	Screw - adjusting, valve tappet	2
5	48	35P135E	PA149-S1	Bolt - connecting rod	8
1	49	38C9H	PC33T	Stud - cylinder block to crankcase	12
1	50	36P1367	PC40C	Stud - manifold to cylinder block	4
2	51	35P1358	FD123	Nut - flywheel mounting	1
2	52	GM147510	FD121	+Nut - for connecting rod bolt	2
		35P2031	FD146	+Nut - lock, 5/16"-24 (replaces hex nut and palnut).....	2
7	53	GM272071	FD185	Nut - for oil pump gear	1
2	54	35P1360	PE65	Lockwasher - for flywheel nut	1
3	55	35P1361	PF52	Butter - camshaft thrust plunger	1
3	56	35P1362	PF107	Plunger - thrust, for camshaft	1
		35P1363	PF120-1	Plug - in gear cover	1
6	57	35P1364	PG314	Clip - holding, spark plug cables	2
		35P2019	PG1183	Bracket - oil filler tube clamp	1
		35P2020	PG1174	Clamp - oil filler tube	1
		35P2021	PG1175	Clamp - tube, oil scribe	1
		50A3648	-----	Belt - hex., 1/4"-20 x 1".....	1
7	58	50A2408	PH299	Seal - oil, crankshaft flywheel end	1
7	59	35P1366	PI133B	Lockscrew - oil pump	1
4	60	36P1367	PJ105	Stud - idler gear	1
2	61	36P1369	PK32	Ring - retainer, piston pin	8
3	62	35P1368	PM105	Spring - camshaft thrust plunger	1
7	63	35P1370	PM111	Spring - oil pump relief valve	1
8	64	35P1371	Q12J	*Gasket Set - (Figure 9) overhaul	1
		35P1372	Q28	*NOTE: Includes parts with a single asterisk (*).	
				**Gasket Set - valve grinding	1
				NOTE: Includes parts with double asterisk ().	
2	65	35P1373	QA114	Shim - connecting rod, .002 thick	8
1	66	9387R	Q975	*Gasket - manifold to block	6
1	67	35P1374	QC71A	*Gasket - for carburetor and governor	4
3	68	35P1375	QD67	*Gasket - fuel pump pad cover	1
2	69	35P1376	QD527C	*Gasket - bearing plate, .036 thick	2
2	70	35P1377	QD527D	*Gasket - bearing plate, .008 thick	1
7	71	35P1378	QD335	Gasket - oil pump cover	1
4	72	35P1379	QD595A	*Gasket - oil filter pad cover	1
1	73	9396R	QDE10A	*Gasket - crankcase bottom cover	1
7	74	35P1380	QD811	*Gasket - gear cover	1
5	75	9395R	QDE12A	*Gasket - valve inspection cover plate	4
1	76	35P1381	QD818C	*Gasket - cylinder head	2
7	77	35P1382	QDE14	*Gasket - gear cover spacer	1
7	78	35P1383	QDE16	*Gasket - magnet pad cover	1
1	79	9404R	QU617	*Gasket - for cylinder base	2
2	80	35P1384	QF33D	Shim - main bearing plate, .006 thick	2
2	81	35P1385	QF33C	Shim - main bearing plate, .018 thick	2
4	82	35P138E	RG91	Screen - oil filler	1
7	83	7409A2	RD112	Screen - oil pump	1
7	84	35P1387	RF1126	Pipe - oil filter outlet	1
7	85	35P1388	RP1143	Nozzle - oil spray	4
		35P2032	RF1472A	Guide - oil scribe	1
1	86	35P1389	PF97	Plug - oil scribe hole	1
4	87	35P1390	RJ159M	+Oil Scribe	1
4	87	36A5756	RJ158N	+Oil Scribe	1
2	88	35P1391	RK170	Oil Sling	1
4	89	35P1392	RK185	Plate - splash	2

MSA SERIES LIFT TRUCKS

Part No.		DESCRIPTION		No. Pcs
Qty. No.	Ref. No.	Wisconsin Motor	ENGINE (Cont'd)	
4	90	35P1393	SA38C	Cover - pad, oil filter
2	91	35P1394	SA38	Plate - cover, valve inspection
3	92	35P1395	SA99	Cover - for fuel pump pad
6	93	35P1396	SD248	Plate - engine instruction
6	94	35P1397	SE207	+Screws - flywheel strand
6	95	35P2014	SE294-C-1-51	+Screws - assembly, rotating
			Includes the following 3 parts:	
		35P2012	PI426	++Governor - screen
		35P2013	PI442	++Washer - screen containing
		35P2015	KA104	++Screw - bolt thread, 1/4"x20 x 3/4"-5
6	95	35P1398	SE74VA	+Strand - flywheel
6	96	35P2010	SE74-VA-22	+5Strand - flywheel
6	96	35P2011	SE753	Strand - lower cylinder, R.H. side (35P1399).....
			+NOTE: Used on Wisconsin Engines to No. 3510395 Inc.	
			+NOTE: Used on Wisconsin Engines to No. 3510395 and after.	
6	97	35P1400	SE752	Strand - lower cylinder, L.H. side
6	98	35P1401	SE77C	Deflector - cylinder head, L.H. side
6	99	35P1402	SE77D	Deflector - cylinder head, R.H. side
6	100	35P1403	SE75C	Strand - cylinder head, R.H. side
6	101	35P1404	SE79C	Strand - cylinder head, L.H. side
6	102	35P1405	SE80	Cover - side, for flywheel strand
6	103	35P1406	SE82C	Cover - rear strand, L.H. side
6	104	35P1407	SE83C	Cover - rear strand, R.H. side
		35P1408	T109	Governor - assembly, (Hoof No. S-110).....
		35P2049	-----	Governor - assembly, (Hoof No. S-110A), (35P1408) ..
7	105	94513	WE182A	Spacer - gear on
1	106	1UR119	YD6-52	Spark Plug - gasoline (AC-C8G)

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
MUFFLER			
1	35A8781	Muffler	1
2	35A8545	Pipe - exhaust (35A7312)	1
		50A1746 - Clamp, exhaust pipe to muffler	1
3		50A2391 - Nipple, tee, 1-1/4" x 2-1/8"	1
4	35A8540	Extension - muffler	1
5		50A763 - Clamp, muffler extension, 2"	1
6	35A8780	Clamp - muffler to support	1
		GM189081 - Bolt, hex., 5/16"-18 x 1-1/4"	2
		GM123976 - Nut, hex., 5/16"-18	2
		GM123394 - Washer, plain, 13/32" I.D., 13/16" O.D.	1
7	35A8729	Support - muffler clamp	1
8	35A8075	*Baffle - muffler	1
9	35A8077	*Clamp - baffle	1
10	15A17821	*Spacer - clamp	2
		*50A2656 - Bolt, hex., 5/16"-18 x 1"	2
		*50A3780 - Nut, hex., 5/16"-18	2
		*NOTE: Used on MSA Lift Trucks to No. 28100255 Inc.	

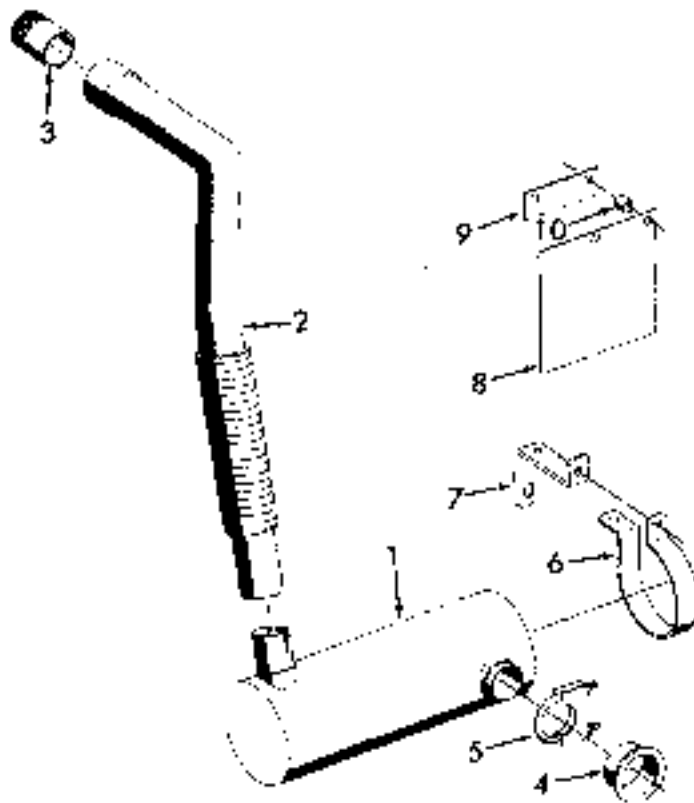


Fig. 9

M5A SERIES LIFT TRUCKS

Kit No	Part No.	DESCRIPTION	No. Per
		Zenith	
		CARBURETOR	
		Carburetor - complete, use 35P1977	1
		Carburetor - complete (35P1846)	1
1	35P1411	* Gasket - flange	1
2	35P1412	Screw - throttle plate	2
3	35P1413	Plate - throttle	1
4	CE717	Spring - idle needle	1
5	35P1414	* Needle - idle adjusting	1
6	10P177	Plug - 1/8", fuel inlet	1
7	35P1415	* Seal - throttle shaft	2
8	35P1416	* Retainer - shaft seal	2
12	35P1417	Screw - throttle stop	1
18	9b-98x	Shaft - throttle, and stop lever, used on Zenith (Carb. 12088)	1
13	35P2810	Shaft - throttle and stop levers, used on Zenith (Carb. 1310x)	1
14	3563R	Jet - idle	1
15	RE7044	* Axle - float	1
16	35P1418	Assembly - float and linkage	1
17	35P2317	* Washer - fibre, fuel valve seat	1
18	U366R	* Valve and Seat - fuel	1
19	35P1420	* Gasket - bowl to body	1
20	35P1421	Bowl - fuel	1
21	35P1422	Plug - main jet passage	1
22	RE7054	* Washer - fibre, passage plug	1
23	35P1423	Jet - main	1
24	RE7055	* Washer - fibre, main jet	1
25	35P1424	Screw - bowl to body	4
26	10P177	Plug - bowl drain	1
27	35P1425	* Retainer - choke shaft packing	1
28	35P1426	Bracket - choke	1
30	35P1427	Screw - choke bracket	2
31	35P1428	Shaft - choke	1
32	35P1429	Screw - choke lever swivel	1
33	35P1430	Spring - choke lever return	1
34	35P1431	Screw - bracket clip	1
35	35P1432	Clip - bracket tube	1
36	GM218552	Nut - clamping screw	1
37	CE7184	* Washer - choke shaft packing	1
38	35P1434	Plate - choke	1
40	35P1435	Screw - choke plate	2
41	35P1436	* Plug - choke shaft hole	1
42	8JF1437	* Washer - fibre, discharge jet	1
43	35P1438	Jet - discharge	1
44	8JF1439	Jet - well vent	1
45	35P1440	Venturi	1
46	35P1441	Tube - idle filler, used on Zenith Carb. 12088	1
47	35P1442	Pushing - throttle shaft	2
48	10P189	Lever - choke	1
49	GM456315	Nut - choke shaft	1
51	GM101488	Lock-washer - choke shaft nut	1
	35P1443	Kit - gasket (** parts in gasket set)	1
	35P1446	Kit - repair parts (* parts in repair kit)	1

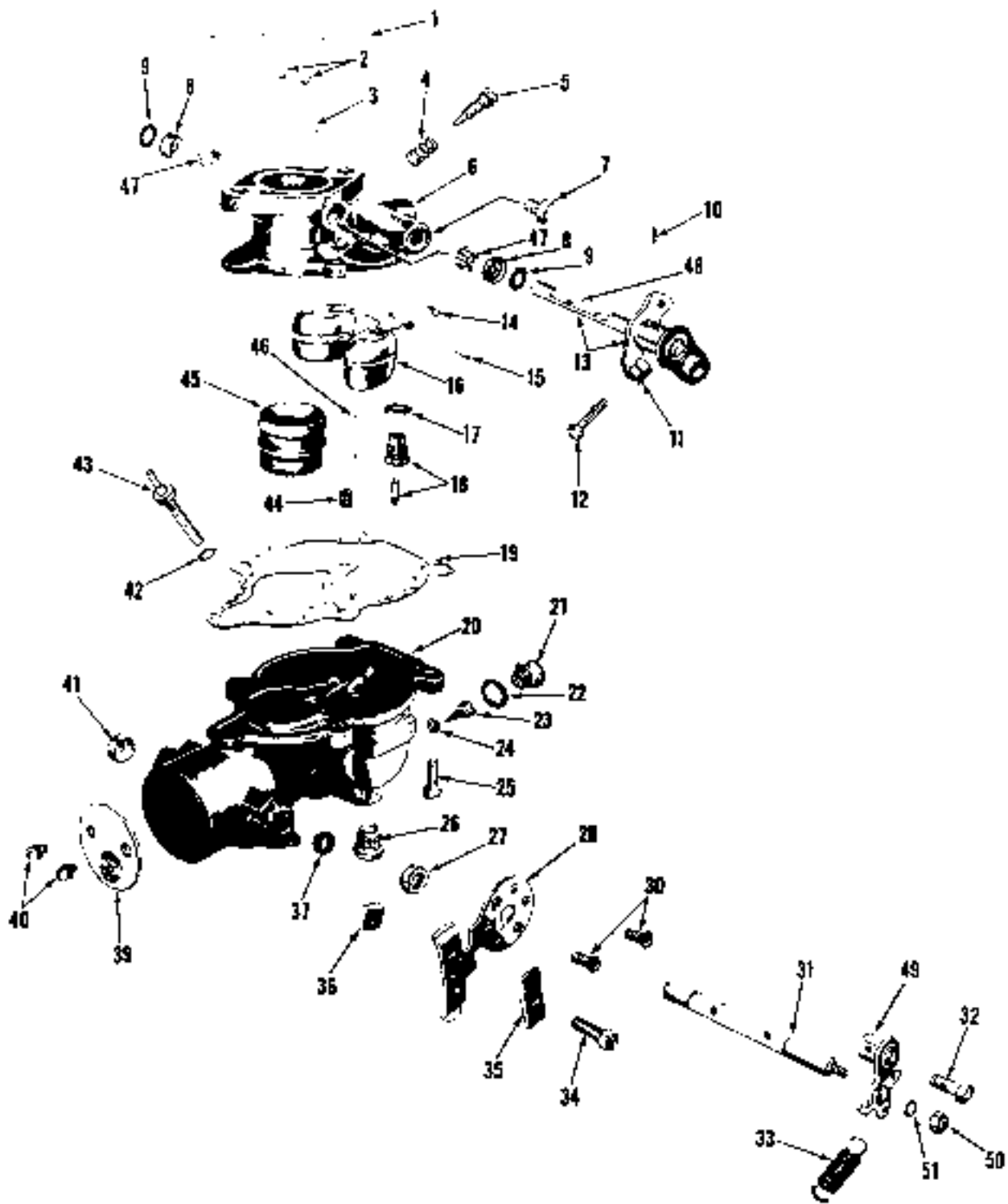


Fig. 10

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	Quantity	DESCRIPTION	No. Pcs.
		Wisconsin	ENGINE OIL FILTER	
1	35A 7551	RV400	Oil Filter - assembly, complete with body Includes the following 2 parts:	1
2	35P1411	RV-40	Cartridge - filter	1
3	35P1451	QD-685	Gasket - filter	1
4	35A 7542	-----	*Bracket - filter	1
4	35A 8721	-----	**Bracket - filter	1
			*GM120380 - Bolt, hex., 5/16"-18 x 1-1/2"	2
			*GM120876 - Nut, hex., 5/16"-18	2
			** 35A 3061 - Bolt, hex., 3/8"-10 x 3/4"	2
5	35A 7562		Plate - filter adapter	1
6	35A 7550		Gasket - bracket and plate	2
7	35A 4796		*Hose - filter to engine, inlet, 16" long	1
7	35A 8723		**Hose - filter to engine, inlet, 34" long	1
8	35A 7797		*Hose - filter to engine, outlet, 24" long	1
8	35A 8748		**Hose - filter to engine, inlet, 40" long	1
			GM137494 - Connector, hose, 1/2" x 3/8"-24	1
			GM125673 - Bushing, reducer, outlet, 3/8" to 1/8"	1
			GM094171 - Flare, inverted flare, outer, 1/8"	1
			*NOTE: Used on MSA 20 and 25 Lift Trucks to No. 28103487 &c.	
			**NOTE: Used on MSA 20 II and 25 II Lift Trucks No. 28103438 and alter.	

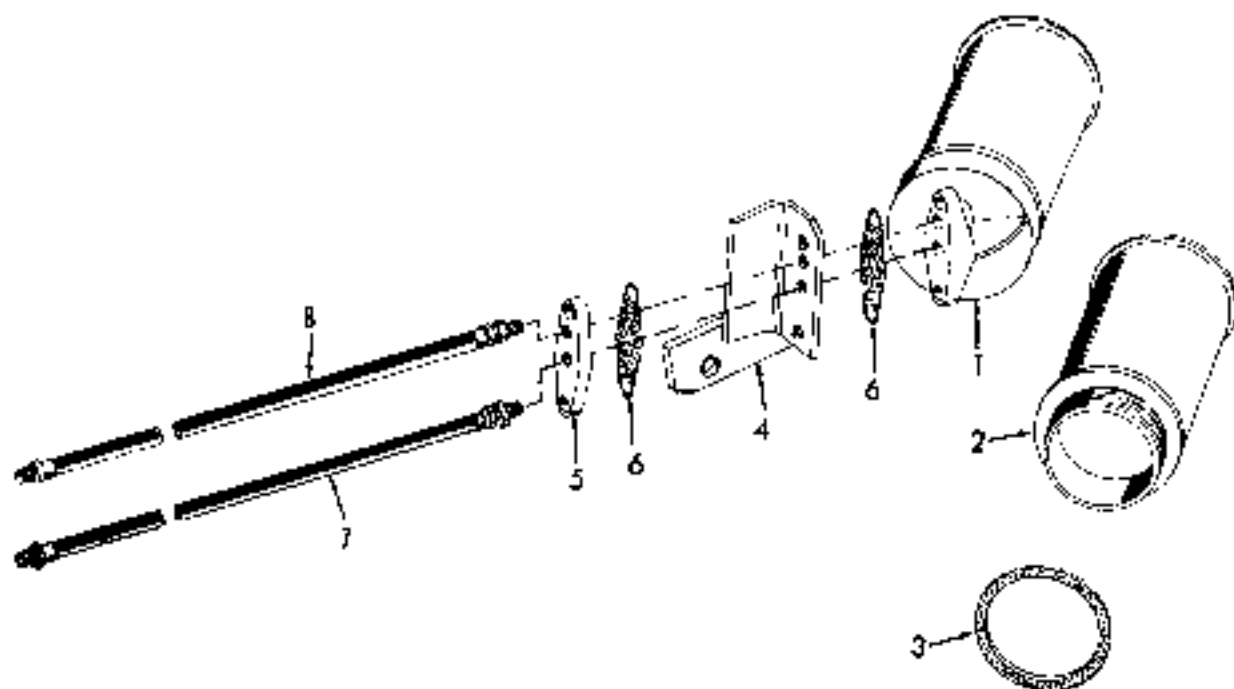


Fig. 11

MSA SERIES LIFT TRUCKS

Ref. No	Part No	DESCRIPTION	No. Pcs
		AIR CLEANER Group 1 Used on MSA 23 and 25 Lift Trucks to No. 28100437 (inc.)	
1	19A1E904	Air Cleaner - assembly (Frank Corporation PA 70-1PL)..... Includes the following 3 parts:	1
2	10P1372	Base - assembly.....	1
3	10P1373	Filter - air cleaner.....	1
4	10P1374	Cover - filter.....	1
		GM120240 - Nut, wing, No. 10-32 N.F.	1
5	33A72E6	Bracket - air cleaner.....	1
		GM100122 - Bolt, hex., 3/8"-16 x 1".....	2
		GM120377 - Nut, hex., 3/8"-16.....	2
6	33A72E5	Hose - air cleaner to carburetor.....	1
		GM105479 - Clamp, hose, carburetor, 1-7/8".....	1
		GM105481 - Clamp, hose, air cleaner end, 2-1/8".....	1
7	33A7267	Clamp - air cleaner tube.....	1
8	33A7375	Baffle - assembly.....	1

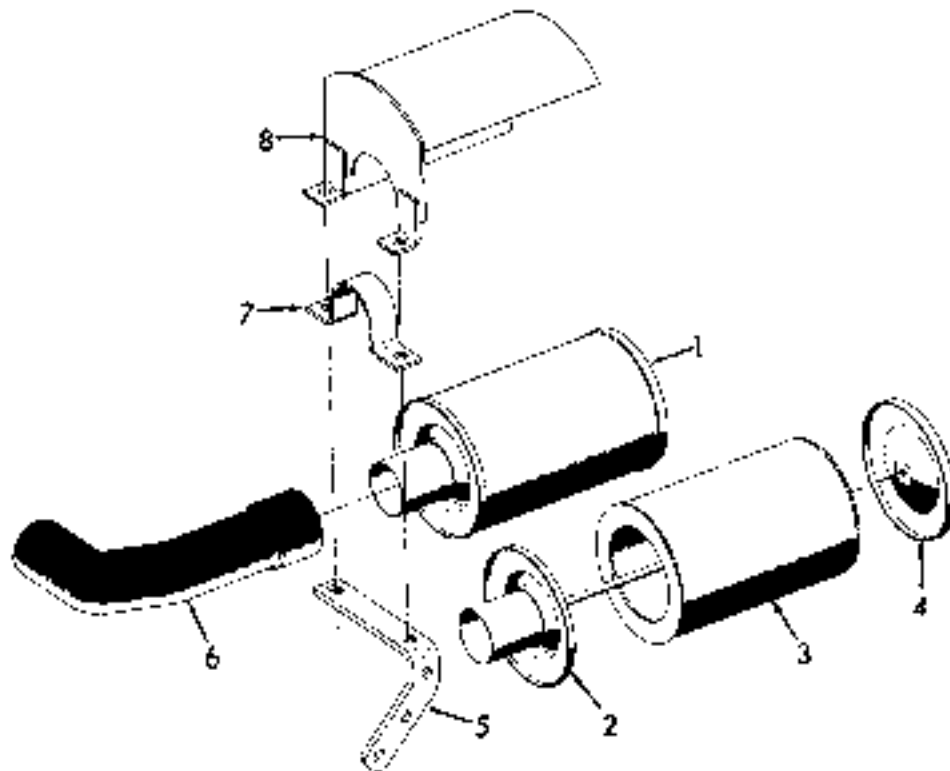


Fig. 15

MSA SERIES LIFT TRUCKS

Qty. No.	Part No.	DESCRIPTION	No. Pcs.
AIR CLEANER Group II Used on MSA 20 II and 25 II Lift Trucks No. 28106-438 and after.			
1	36A8738	Air Cleaner - assembly, with mounting bracket	1
		50A4197 - Washer, plain, 9/16" I.D., 1-3/8" O.D.	2
		Includes the following 2 parts:	
2	13P1873	Filter - air cleaner	1
3	13P1874	Cover - filter	1
4		GM120240 - Nut, wing, No. 10-32 N.F.	1
5	35A7265	Hose - air cleaner to carburetor	1
		GM106879 - Clamp, hose, carburetor end, 1-7/8"	1
		GM135681 - Clamp, hose, air cleaner end, 2-1/8"	1
6	35A3723	Cover - air cleaner	1
7	35A6717	Retainer - air filter	1
8	2914587	Snap Ring - retainer	1
	35A6740	Insulation - air cleaner back, 1/2" thick x 9-3/4" long	1
	35A6741	Insulation - air cleaner, 1/2" thick, 7-1/4" wide x 14-1/2" long	1
	35A6742	Insulation - battery strand, 1/2" thick x 18" square	1
9	35A6752	Duct - intake, battery end	1
	35A6749	Insulation - duct, 1/2" thick x 5' x 8-1/2"	1

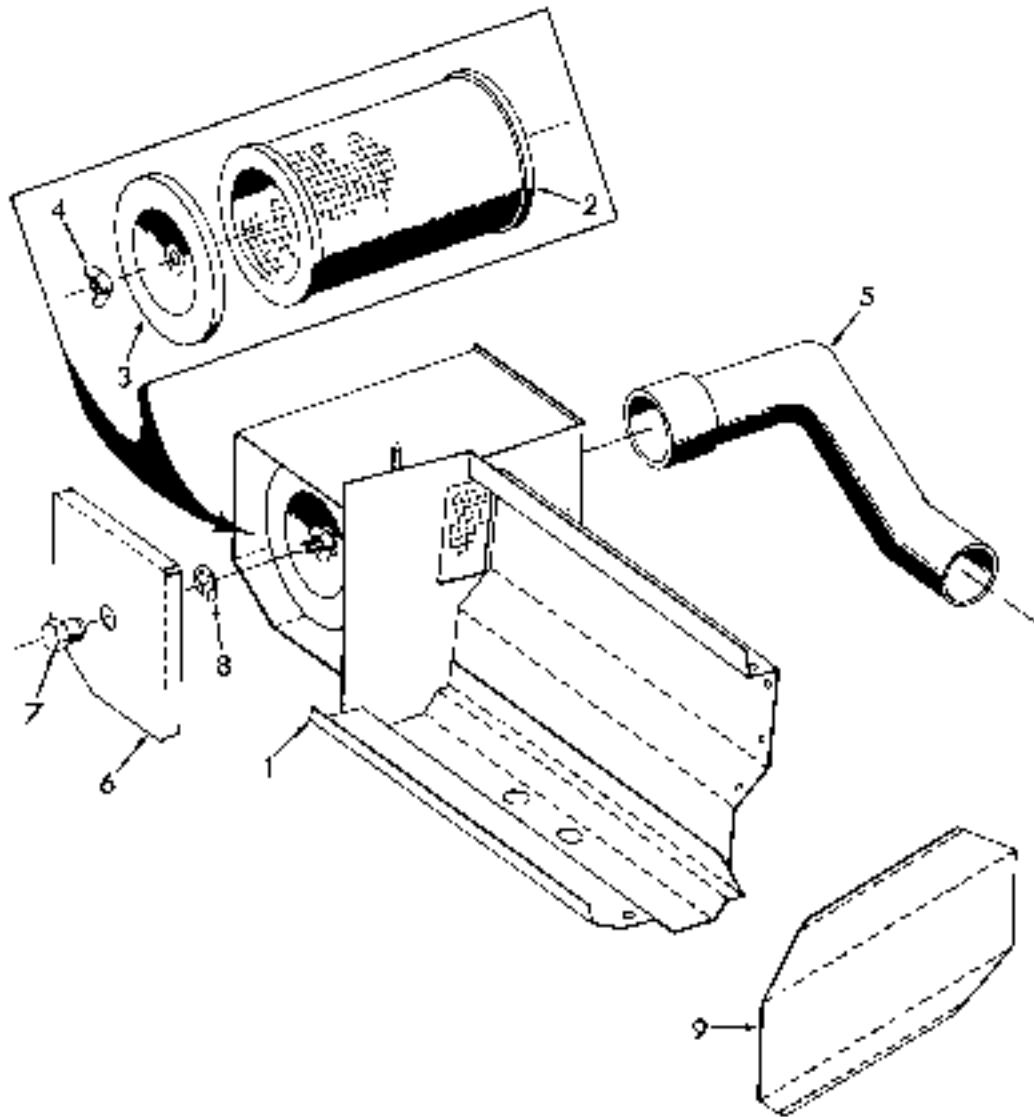


Fig. 13

MSA SERIES LIFT TRUCKS

Ref No	Part No	DESCRIPTION	No Pcs	
		GENERATOR, REGULATOR, BATTERY AND ELECTRICAL SYSTEM Group 1 Used on MSA 20-25 Lift Trucks re No. 28180435 Int.		
1	10A21399	*Generator - with pulley, (Delco-Remy No. 1103426) (10A17645)	1	
		*NOTE: Order service parts for generator direct from Delco-Remy Division or United Motor Service.		
		GM188077 - Bolt, hex., 3/16"-16 x 3/4"	1	
		GM183081 - Bolt, hex., 3/16"-16 x 1-1/4"	2	
2	10A17847	Pulley - generator, 2-13/16" O.D.	1	
		GM124856 - Key, Woodruff, No. 8, 1/8" x 5/8"	1	
	10A17846	Fan - generator	1	
3	25A7263	Belt - generator drive, 49" O.C.	1	
4	25A7270	Pulley - generator drive, 4-7/10" dia.	1	
		25A158 - Nut, hex., (Nylon), 1/2"-13	1	
		GM163846 - Key, Woodruff, No. 1/8" x 3/4"	1	
5	25A7266	Bracket - generator	1	
6	25A7267	Support - bracket	1	
		GM188120 - Bolt, hex., 3/8"-16 x 1-1/2"	4	
7	25A7265	Arm - generator adjusting	1	
8	25A5137	Regulator	1	
		GM118030 - Bolt, hex., 1/4"-20 x 3/4"	3	
	10P2325	Battery - 12 volt, type 25M, 46A, 36 month	1	
	10P2334	Battery - 12 volt, type 25M, 46A, 48 month	1	
	10P2365	Electrolyte - 5 gallon	-	
	10P2393	Hose - electrolyte dispenser, for gal. container	-	
9	25A7213	Box - battery	1	
10	25A7217	Strap - battery hold down	1	
		25A8742 - Nut, hex. jam, 5/8"-16	2	
11	25A7219	Hold-Down - battery	1	
		GM186032 - Nut, wing, 5/8"-11	2	
12	25A7279	Baffle - battery	1	
		25A2755 - Screw, socket head, 3/8"-16 x 1-1/4"	2	
13	25A8583	Cable - battery ground	1	
14	25A8532	Cable - battery to starter	1	
	25A4771	Harness - wiring, upper	1	
	25A4770	Harness - wiring, lower	1	
	25A7507	Harness - wiring, generator to regulator	1	
		25A4602 - Clip, battery cables and harness	4	
	10A9146	Wire - ignition switch to fuel pump	1	
	27663	Clip - harness	1	
		25A4607 - Clip, battery cables	4	
15	25A7702	Horn	1	
	25A7701	N Nut - hex., Gripco, 1/4"-20	1	
16	25A408	Relay - horn (25A316 later.)	1	
	25A7764	Wire - relay to horn	1	
17	25A8305	Button - horn	1	
	25A7176	Wire - button to harness	1	
	25A7175	Wire - button to ground	1	
18		25A8261 - Bushing, generator, horn wire	1	
19	25A7763	Bracket - horn	1	
	Machine No.	Accessories No.		
20	25P1469	IF430	Coil - distributor	1
21	25P1470	YPER	Coil - ignition (Prestolite No. 200687)	1
	10P22-	PC234	Strap - starter bracket	2
	15P042	25713A	Bracket - starter support	1
	25P1471	25013A	Arm - actance	1
22	25P1472	PG32E-3	Clamp - holding coil	1
23	25P1473	YA16-3	Starter - 12 volt (Prestolite No. MBK-1100)	1
24	25P1474	YD298	Conductor - terminal, for ground strap	1

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.	
		GENERATOR, REGULATOR, BATTERY AND ELECTRICAL SYSTEM Group I		
	Moline No., Wisconsin No.			
25	85P1475	YC-77-S1	Solenoid - starting switch	1
	35P1478	YL-356-7	Wire - assembly, solenoid to starter	1
26	85P1477	YD20	Cap - terminal, for ignition wires	2
27	35P1478	YD20A	Cap - terminal, coil wire	1
28	85P1479	YF10-A-S1	Distributor - (Auto Lite No. LAD3004-27)	1
		Includes the following 4 parts:		
	85P1481	-----	Point - set, distributor (Prestolite No. IGS-2224L)	1
	85P1480	-----	Condenser - distributor (Prestolite No. IGS-2042S11) (35P1482)	1
	35P1761	-----	Rotor - distributor (Prestolite No. IG1657R)	1
	35P2009	-----	Cap - distributor (Prestolite No. IG1224D)	1
	35P1480	YL352-8	Wire - ignition coil to distributor	1
	35P1483	YL286M	Cable Set - distributor ignition	1
29	35P1481	PI189	Grommet - cable	1
	35P1480	YL352-10	Cable - to ignition coil	1
30	35P1483	GD10.-1	Gear - distributor drive	1
31	35P1484	GF68	Pinion - distributor drive	1
32	35P1485	TA123-2	Shaft - distributor drive	1
33	35P1486	TD117B-S1	Adapter - distributor drive	1
34	35P1487	ISG182	Bushings - distributor drive shaft	2
35	35P1488	QDG.5A	Gasket - for distributor adapter	1
36	35P1489	TB112	Housing - distributor drive	1
	-----	2E14	Older - distributor drive	1
	GM187294	RF170A	Coupling - older to pipe, 1/8"	1
	50A4463	RF904	Pipe - older, 1/8" pipe x 4"	1
	-----	RF990	Elbow - pipe to drive housing, 1/8"-90°	1
	85P2016	X3-106	Bolt - str. hex., No. 10-32 x 1"	2
	GM103088	PD-110	Nut - hex., No. 10-32	1

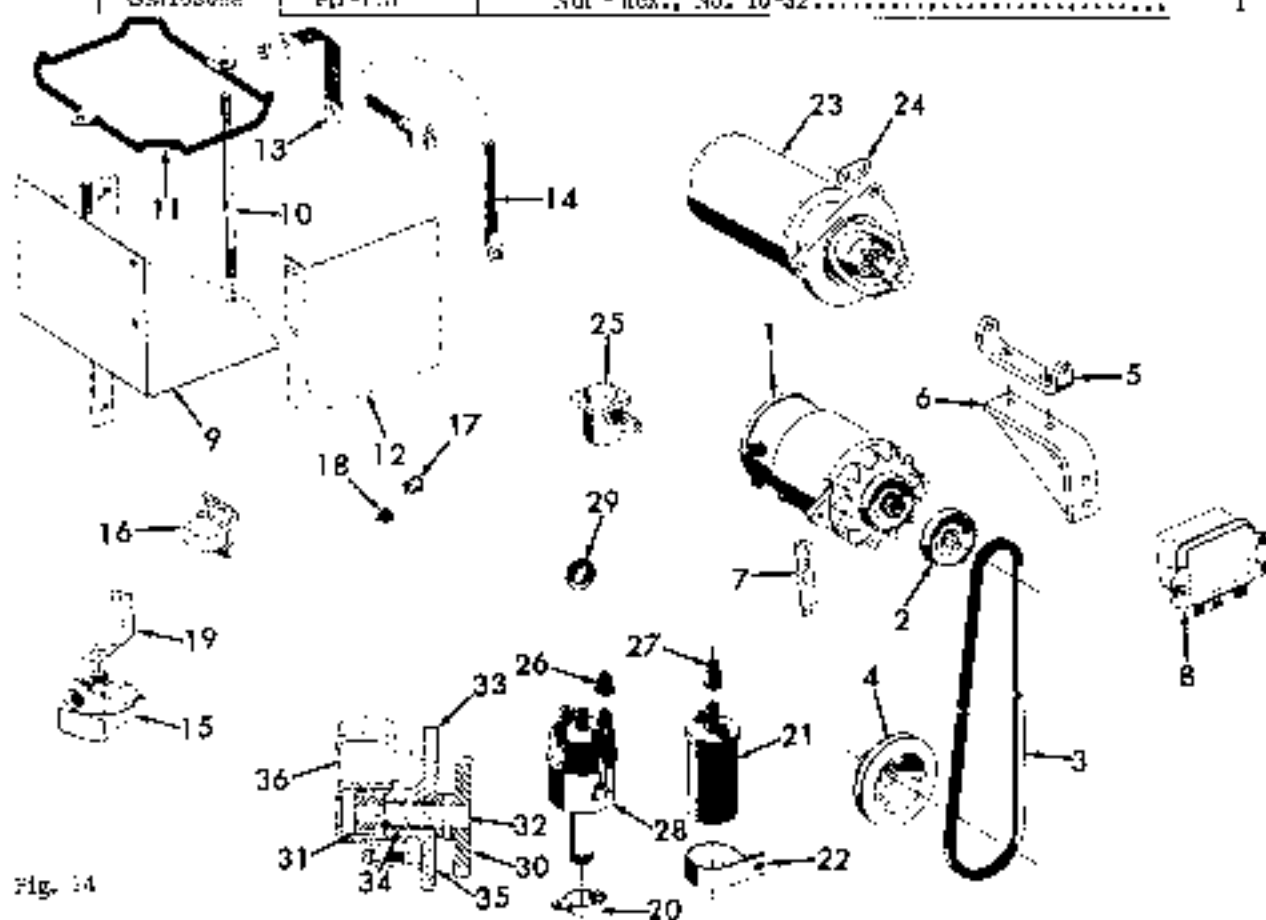


Fig. 14

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Ecs
		GENERATOR, REGULATOR, BATTERY AND ELECTRICAL SYSTEM	
		Group B	
		Used on MSA 20 II and 25 II Lift Trucks No. 28100438 and after.	
1	10A21293	Generator - less fan and pulley (Delco-Remy No. 113042E).....	1
2	-----	Nut - hex., (Delco-Remy No. 191524).....	1
3	-----	Washer - lock, (Delco-Remy No. 1341576).....	1
		NOTE: Order service parts for generator and starting motor direct from Delco-Remy Division or United Motor Service.	
		GM180677 - Bolt, hex., 5/16"-18 x 3/4".....	1
		GM180681 - Bolt, hex., 5/16"-18 x 1-1/4".....	2
		GM120378 - Nut, hex., 5/16"-18.....	2
		GM120383 - Washer, plain, 11/32" I.D., 11/16" O.D.,.....	1
		50A4256 - Washer, internal external lock, 5/16".....	1
		50A4257 - Washer, internal external lock, 3/8".....	1
4	10A17647	Pulley - generator, 2-13/16" O.D.....	1
5		GM124545 - Key, Woodruff, No. 5, 1/8" x 5/9".....	1
6	10A17648	Fan - generator.....	1
7	10A21401	Baffle - generator pulley.....	2
8	35A7263	Bolt - generator drive, 49" O.C.....	1
9	35A7270	Pulley - generator drive, on engine, 4-7/16" dia.....	1
		50A156 - Nut, hex., (Nylok, 1/2"-18).....	1
		50A2025 - Washer, plain, 17/32" I.D., 27/32" O.D.,.....	1
		GM138646 - Key, Woodruff, No. 7, 1/8" x 3/4".....	1
10	35A7286	Bracket - generator.....	1
11	36A7287	Support - generator bracket.....	1
		GM130126 - Bolt, hex., 3/8"-16 x 1-1/2".....	4
		GM120377 - Nut, hex., 3/8"-16.....	2
12	35A7285	Arm - generator adjusting.....	1
		GM130124 - Bolt, hex., 3/8"-16 x 1-1/4".....	1
		GM120377 - Nut, hex., 3/8"-16.....	1
		50A4219 - Washer, plain, 13/32" I.D., 13/16" OD.....	2
13	35A5137	Regulator - (Delco-Remy 113003).....	1
		50A4253 - Washer, internal external lock, 7/4".....	2
		50A3616 - Bolt, hex., 1/4"-20 x 3/4".....	3
14	10P2342	Battery - dry, 12 volt, 35A, GTX 58, 24 month.....	1
14	10P2342	Battery - dry, 12 volt, 35A, SS 53, 36 month.....	1
	10P2368	Electrolyte - 5 gallon.....	-
	10P2369	Hose - electrolyte dispenser, for 5 gallon container.....	-
15	36A3722	Hold-down - battery.....	1
16		50A3768 - Nut, wing, Zinc, 1/4"-20.....	2
		50A4201 - Washer, plain, Zinc, 9/32" I.D., 5/8" O.D.,.....	2
17	35A3718	Hook - battery hold-down.....	1
18	35A3305	Cable - battery ground.....	1
19	35A3302	Cable - battery to starter.....	1
20	35A3756	Boot - battery, positive terminal.....	1
21	35A4771	Harness - wiring, upper.....	1
22	35A4773	Harness - wiring, lower, with 2-30 amp. and 1-1E amp. fuses.....	1
23	15P912	Strap - rubber.....	1
24	35A7667	Harness - wiring, generator to regulator.....	1
25		50A4682 - Clip, battery cable and harness.....	4
26		50A4687 - Clip, battery cable.....	5
27	35A7762	Horn.....	1
28	35A7761	Nut - hex., Gripco, 7/8"-20.....	1
29	35A403	Relay - horn (35A216 Inter.).....	1
30	35A7764	Wire - relay to horn wire, 14 Ga. x 8" long.....	1
31	35A6395	Button - horn.....	1
32	35A7179	Wire - horn button to relay wire, 14 Ga. x 21" long.....	1
33	35A7178	Wire - horn button to ground, 14 Ga. x 19" long.....	1
34	10A20339	Bushing - insulation, horn wire (50A3361).....	1
35	35A7735	Bracket - horn.....	1

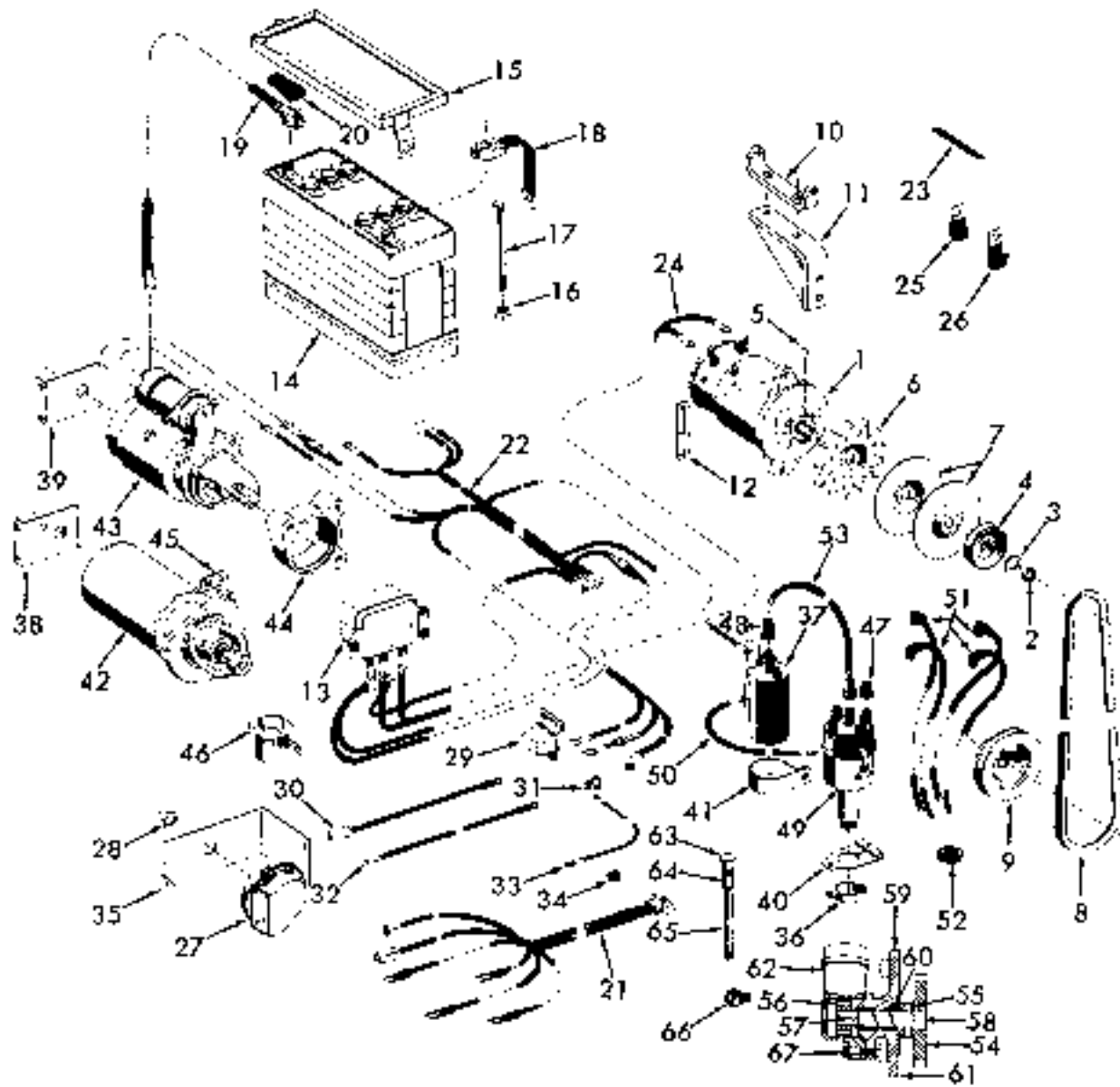


Fig. 16

MSA SERIES LIFT TRUCKS

Ref No.	Part No.	DESCRIPTION	No Pcs
GENERATOR, REGULATOR, BATTERY AND ELECTRICAL SYSTEM (Cont'd)			
Group II			
Used on MSA 20 II and 25 II Lift Trucks No. 2810043b and after.			
	Moline No.	Wisconsin No.	
36	35P1469	HP439	Collar - distributor
37	35P1470	YF56	Coil - ignition (Prestolite No. 200667).....
	35P328	PC396	Stud - starter bracket, 5/16" x 24.....
38	15P549	PC514A	Bracket - starter support, for 35P1470 starter.....
39	35P1833	PG514C	Bracket - starter support, for 35A8847 and 35A8870 starters
40	35P1471	PC543A	Arm - advance
41	35P1472	PG556-3	Crimp - coil
42	35P1473	YA18-3	Starter - 12 volt (Prestolite No. MB34103)
			NOTE: See Mobilift Service Bulletin No. B-18 for re- placement starter.
43	35A8847	-----	Starter - with solenoid, 12 volt, special, slotted, ...
44	35A8870	-----	Starter - with solenoid, 12 volt, (Delco-Remy No. 1197390)
	-----	-----	35A5128 - Bolt, hex., 3/8" x 2-1/2".....
	35P2033	PC-542	Stud - starter mounting, 3/8"-16 x 3/8"-24 x 2-10/16" long
45	35P1854	9C328	Spacer - starting motor, for 35A8847 and 35A8870 starters
46	35P1474	YD-296	Connector - terminal, for ground strap
47	35P1475	YC-77-51	Solenoid - starting motor, used with 35P1473 starter..
48	35P1476	Y1-15R-7	Wire - assembly, solenoid to starter, for 35P1473 starter
49	35P1477	YD-20	Cap - terminal, for ignition wires
50	35P1478	YD-20A	Cap - terminal, coil
51	35P1479	YF10-A-81	Distributor (Prestolite No. AD6064-2F)
			Includes the following 4 parts:
	35P1451	-----	Point Set - distributor (Prestolite No. ICS 2224D)
	35P1450	-----	Condenser - distributor (Prestolite No. ICS2042-3S1) ..
	35P1761	-----	Rotor - distributor (Prestolite JG-1657R)
	35P2003	-----	Cap - distributor (Prestolite No. 1G1324D).....
52	35P1480	Y1352-8	Wire - ignition coil to distributor, 14 Ga. x 6" long..
53	35P1481	Y1285M	Cable Set - distributor ignition
54	35P1482	F1198	Grommet - cables
55	35P1483	Y1309-15	Cable - coil to distributor, 15" long
56	35P1484	GD101-1	Gear - distributor drive
57	-----	PA313	Pin - groove, drive gear, 5/32" x 1" long
58	35P1485	G786	Pinion - drive shaft
59	-----	PA64	Pin - pinion, distributor drive, 1/9" x 3/4" long.....
60	35P1486	TA120-3	Shaft - distributor drive
61	35P1487	TB117B-51	Adapter - distributor drive
62	35P1488	NG132	Washer - distributor drive shaft
63	35P1489	QD415A	Gasket - for distributor adapter
64	35P1490	TB119	Housing - distributor drive
65	-----	RE14	Oiler - distributor drive
66	GM167094	RF170A	Coupler - oiler to pipe, 1/8"
67	35A4465	RF304	Pipe - oiler, 1/8" pipe x 4"
68	-----	RF398	Elbow - pipe to drive housing, 1/8" x 90°
69	35P2019	XB-106	Bolt - center bore, No. 10-32 x 1"
70	GM109688	PD-115	Nut - hex., No. 10-32

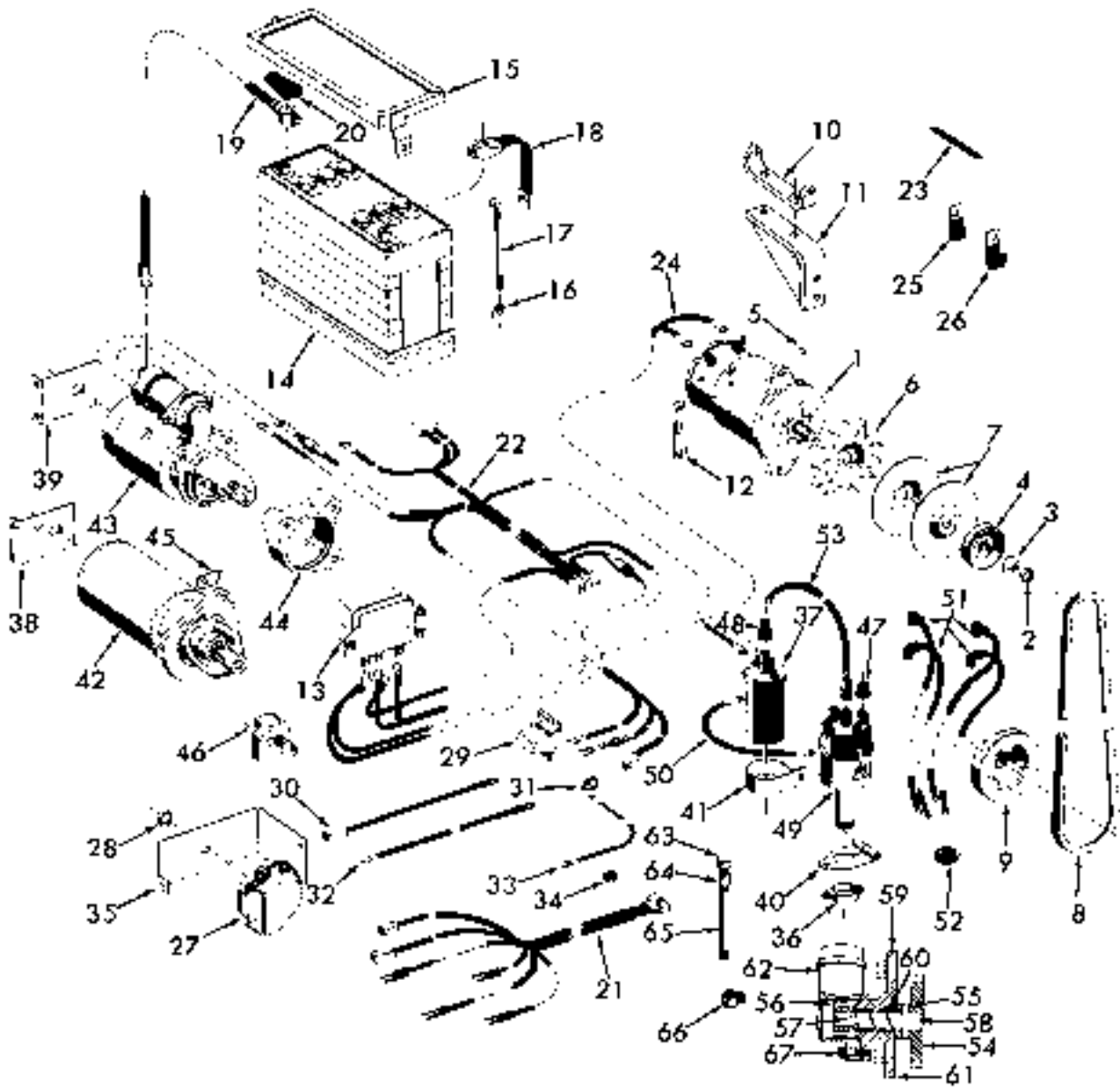


Fig. 15

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs
FUEL TANK AND FUEL PUMP			
1	35A9146	Tank - fuel (36A3819)	1
2		30A2461 - Elbow, tank, 1/8" x 90°	1
3		50A2017 - Shut-off, fuel tank	1
		GM117243 - Plug, pipe, 1/8" drain	1
		50A9364 - Bolt, hex., 5/8"-16 x 3/4"	10
		50A1800 - Nut, hex., 3/8"-16	10
		Includes the following part:	
	35A7308	Insulation - tank, used with 36A3819 tank	1
4	35A4167	Gauge - fuel tank	1
5	35A178	Cap - filler, fire proof	1
		Includes the following 9 parts:	
6	35P55	Cap - filler	1
7	35P468	Pin - filler cap	1
8	35P56	Arm - filler cap	1
9	35P467	Pin - arm to cap	1
10	35P57	Spring - arm	1
11	35P58	Catch - arm	1
12	35P469	Pin - arm catch	1
13	35P59	Flange - screen	1
14	35P60	Screen - assembly	1
15	35A6359	Cup - handle, fuel tank	1
		GM196126 - Bolt, hex., 5/8"-16 x 1-1/2"	2-1
		50A154 - Nut, hex., (Nylon) 3/8"-10	2-1
		50A3065 - Washer, plain, 18/92" I.D., 1" O.D.	2-1
		50A1926 - Bolt, hex., 3/8"-16 x 2-1/2"	2
	10A17423	Spacer - handle, 3/8" heavy pipe x 1" long	2
16	30A1641	Washer - bellville	8-4
17	35A4168	Hose - fuel, pump to carburetor	1
18	35A179	Hose - fuel, tank to pump	1
		50A2481 - Elbow, carburetor, 1/8"-90°	1
		50A4687 - Clip, fuel line	1
20		GM9402836 - Elbow, 90°, 1/8" to 1/16"-20	1
21	35A7708	* Pump - fuel, electric (Autopulse Reg. 20-3)	1
		Includes the following 6 parts:	
		GM189018 - Bolt, hex., 1/4"-20 x 5/8"	2
22		GM105404 - Nipple, pipe, close, 1/8"	1
23		50A2490 - Elbow, filter to pump, 1/8" x 45°	1
24	35P1263	* Housing - assembly	1
	35P1264	* Coil - assembly, with bellows and armature	1
25	35P1265	* Body - pump	1
	35P1266	* Flng - body	1
26	35P1267	* Gasket - pump, between body and housing	1
		* NOTE: Used on MSA 23-28 Lift Trucks to No. 29100513 Itc.	
	35A8639	** Pump - fuel (Genlx No. 47T160)	1
		Includes the following 13 parts:	
		50A5517 - Terminal, single collector	1
	35P1366	** Cover - pump	1
	35P1367	** Gasket - cover	1
	35P1368	** Magnet - pump	1
	35P1369	** Filter - pump	1
	35P1390	** Retainer - cup and plunger	1
	35P1391	** Washer - cup gasket	1
	35P1392	** Gasket - spring cup	1
	35P1393	** Cup and Valve - pump	1
	35P1394	** Spring - plunger return	1
	35P1395	** Plunger - pump	1
	35A8672	** Adapter - fuel pump	1
		** 50A3848 - Bolt, hex., 1/4"-20 x 3/4"	2
		** 50A870 - Bolt, co. hd., 1/4"-20 x 3/4"	2
		** 50A1396 - Nut, hex., 1/4"-20	4

MSA SERIES LIFT TRUCKS

Ref. No	Part No.	DESCRIPTION	No. Pcs.
		FUEL TANK AND FUEL PUMP (Con't)	
	33A3307	** Wire - fuel pump to ignition switch, fused, 14 Ga. & 6" long	1
27	33A7712	**NOTE: Used on MSA 20 II and 30 II Lift Trucks No. 28100316 and after. Strainer - fuel filter	1
		Includes the following 6 parts:	
28	33F12c1	Cover - filter	1
29	30P12c3	Bowl - metal	1
30	35P12c3	Ball - assembly	1
31	10P2364	Strainer - element	1
32	10P2365	Gasket - bowl	1
33	10P2366	Gasket - element sealing	1

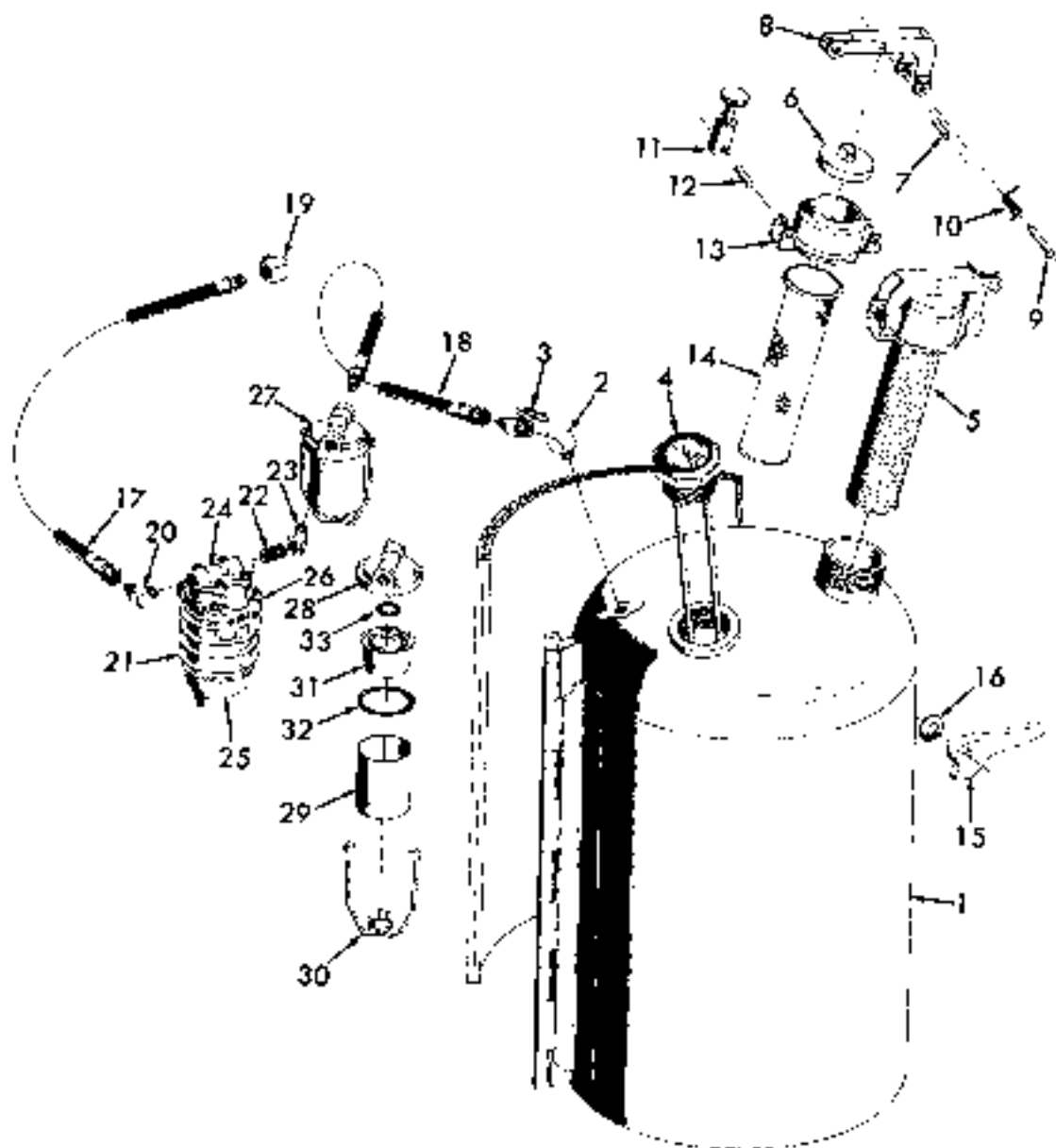


Fig. 16

M3A SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
		LP GAS EQUIPMENT	
	35A5033	*Tank - LP-Gas, 20 lb.	1
	80A5005	*Support - tank	1
	35A4961	*Hinge - support	2
	15A5948	*Pin - hinge	2
	35P1774	*Clamp - tank (35A4969 Inter.)	1
		*GM193182 - Bolt, hex., 3/8" - 16 x 1"	1
		*GM177923 - Nut, corner, 1/2" x 3/4"	2
		*Note: Used on LP-Gas equipped trucks with 20 lb. tank.	
	D213E	**Tank - LP-Gas, 88-1/2 lb.	1
	35A3296	**Door - tank service	1
	35A3297	**Guide - hood, 1" x 1-1/4"	2
	35A3298	**Trace - hood, angle, 1-1/4" x 29-1/4"	2
	35A3299	**Guide - hood support, 1" offset, 2" x 2-1/4"	4
	35A3300	**Support - side member, 3/8" x 3" x 7-7/8"	2
	35P308	**Strap - tank, L.H.	1
	35P51E	**Strap - tank, R.H.	1
		**50A3864 - Bolt, hex., 3/8" - 16 x 1/4"	4
		**50A386E - Bolt, hex., 3/8" - 16 x 1"	6
		**50A1900 - Nut, hex., 3/8" - 16	12
		**NOTE: Used on LP-Gas equipped trucks with 88-1/2 lb. tank.	
1	35P1296	Vaporizer - assembly	1
	35P1095	Repair Kit - vaporizer (includes diaphragm, seat, seals and washers)	1
	35P1298	Bracket - vaporizer	1
		GM193180 - Bolt, hex., 3/8" - 16 x 3/4"	1
2	35P1084	Solenoid - 22 volt	1
3	35P1085	Regulator - Zenith Model C	1
		Includes the following 2 parts:	
	35P1872	Valve - block and spring assembly	1
	35P1873	Screw - adjusting, fuel pressure	1
	35P1086	Repair Kit - regulator (includes diaphragm, gaskets and seals)	1
		-GM115036 - Nipple, pipe, close, 1/4" N.P.T.	1
		+50A4468 - Nipple, 1/4" x 2-1/2"	1
		50A378 - Elbow, street, 1/4" N.P.T.	1
		GM119247 - Nipple, pipe, 1/4" N.P.T. x 4"	1
		GM144813 - Adapter, tube, 1/4" N.P.T. x 3/8"	1
4	35P2297	Elbow - adapter, with adjusting screw	1
5	35P1299	Carburetor	1
	35P1087	Gasket - carburetor	1
6	35P509	Elbow - carburetor	1
		50A2476 - Elbow, street, 3/8" - 90°	1
7	35P514	Bulldozed - filter	1
		Includes the following 2 parts:	
		GM144355 - Elbow, adapter, 1/4" N.P.T. x 3/8"	3
	35P1005	Element - filter	1
	35P1638	Spring - filter	2
8	35P1598	Hose - filter to tank, 14" long (35P1303)	1
9	35P1301	Hose - filter to solenoid, 22" long	1
10	35P1599	Hose - carburetor to regulator, 22" long (35P1302)	1
	85A8789	Grommet - fuel line, 3/4" I.D. x 1-1/8" O.D. x 2-1/2" long	1
11	35P1393	Wire - regulator to vacuum switch, 6" long	1
12	35P1775	Wire - pressure switch to ignition switch, fused, 16" long (35P1304)	1
13	35P1395	Switch - vacuum	1
		+GM137967 - Nipple, pipe, 1/8" N.P.T. x 9"	1
		+50A4463 - Nipple, pipe, 1/8" N.P.T. x 3"	1
		50A2481 - Elbow, street, 1/8" N.P.T. x 90°	1
		+50A4485 - Nipple, pipe, 1/8" N.P.T. x 4"	1
14	35P619	Coupling - hose to tank, female	1
15	D2179	Coupling - hose to tank, male	1
		Includes the following 2 parts:	
	90A1701	"O" Ring - coupling	1
	35P176H	Gasket - coupling	1

MSA SERIES LIFT TRUCKS

Ref. No	Part No.	DESCRIPTION	No. Pcs.
LP GAS EQUIPMENT (Cont'd)			
16	35P530	Dash - plug, instrument panel	1
	80P1306	Clamp - hose	1
		GM181393 - Bolt, hex., 7/16" -20 x 3/4"	1
		*GM166122 - Bolt, hex., 3/8" -10 x 1"	2
		*GM102835 - Nut, hex., 3/8"-16	2
	35P615	Relief Valve	1
	35P1307	*Coupling - relief valve	1
	35P1306	*Coupling - relief valve	1
	35P1309	*Adapter - relief valve	1
		*GM119033 - Elbow, adapter, 3/8" N.P.T. x 45°	1
		*GM121207 - Nipple, pipe, close, 3/8" N.P.T.	2
		*50A2476 - Elbow, street, 3/8" N.P.T. x 90°	1
	35P1311	*Hose - relief valve	1
80P1310	*Clamp - hose	1	
	*NOTE: Used on LP-Gas equipped trucks with 30 lb. tank.		
17	35A 773R	Manifold - engine, LP-Gas	1
	85R61	Spark Plug - LP-Gas, 18 MM AC-M23 or Champion D9J	4
	35P1490	Bushing - carburetor to air cleaner hose, 1" x 1-5/8" I.D. x 1-5/8" O.D. ..	1
		+NOTE: Used on MSA 20 and 25 Lift Trucks to No. 23100437 Inc. ++NOTE: Used on MSA 20 II and 25 II Lift Trucks No. 23100438 and after.	

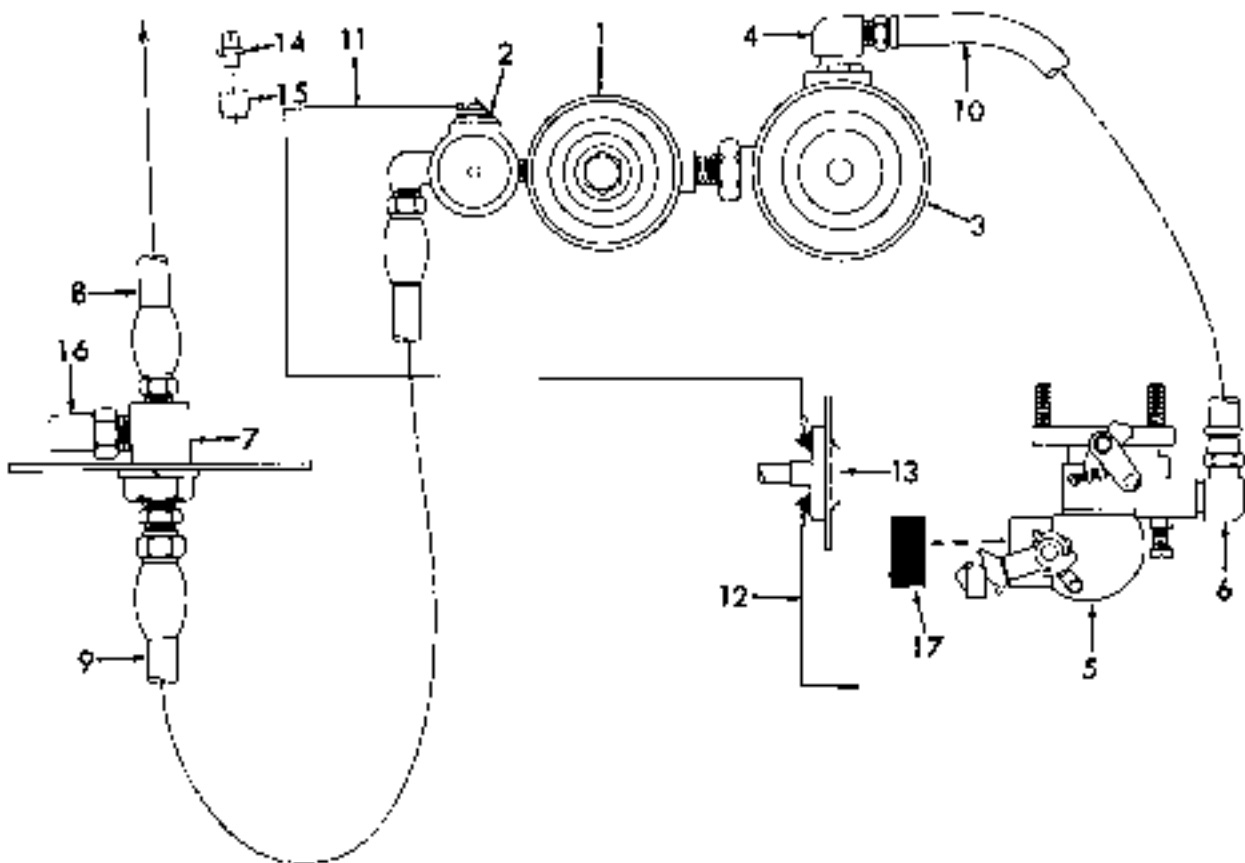


Fig. 17

MSA SERIES LIFT TRUCKS

Kit No.	Part No.	DESCRIPTION	No. Pcs.
ADAPTER HOUSING AND DAMPENER DRIVE			
1	35A7261	Housing - adapter	1
		GM141240 - Pin, dowel, housing, 3/8" x 3/4"	2
2	35A7260	Stud - housing, 7/16"-14 x 1-11/16"	4
		GM271561 - Nut, hex., 7/16"-14	4
		30A1925 - Bolt, hex., 3/8"-16 x 2-1/2"	7
		GM180124 - Bolt, hex., 3/8"-16 x 1-1/4"	3
		GM180132 - Bolt, hex., 3/8"-16 x 2-1/4"	2
3	35A7268	Hub - dampener mount	1
		GM124555 - Key, Woodruff, No. 13	1
4	35A7407	Gasket - hub	1
5	35A7405	Washer - stat, lock, 1-17/32" I.D.	1
6	35A7428	Nut - hex., 1/2"-12 UNF	1
7	35A7733	Dampener - drive, 8-7/8" O.D.	1
		GM190077 - Bolt, hex., 5/16"-18 x 3/4"	6
8	35A7378	* Baffle - engine	1
		* NOTE: Used on MSA 20 and 25 Lift Trucks to No. 26100437 Inc.	
	35A9747	** Cover - engine, mounts over spark plugs, 3" x 9"	1
		** NOTE: Used on MSA 20 and 25 Lift Trucks No. 26100482 and after.	
		GM120583 - Screw, rd. hd., 1/4"-20 x 5/8"	3
ENGINE MOUNTING BOLTS AND BRACKET			
9	35A7656	Plate - engine adjusting	1
		GM180124 - Bolt, hex., 3/8"-16 x 1-1/4"	2
		50A3489 - Washer, plain, 13/32" I.D., 1-1/8" O.D.	2
10	35A7653	Mounting - engine	1
		50A2641 - Bolt, hex., (Nylok) 1/2"-13 x 2"	1
		50A3438 - Washer, plain, 17/32" I.D., 1-1/2" O.D.	1
11	35A7651	Stem - engine mounting	A, B,

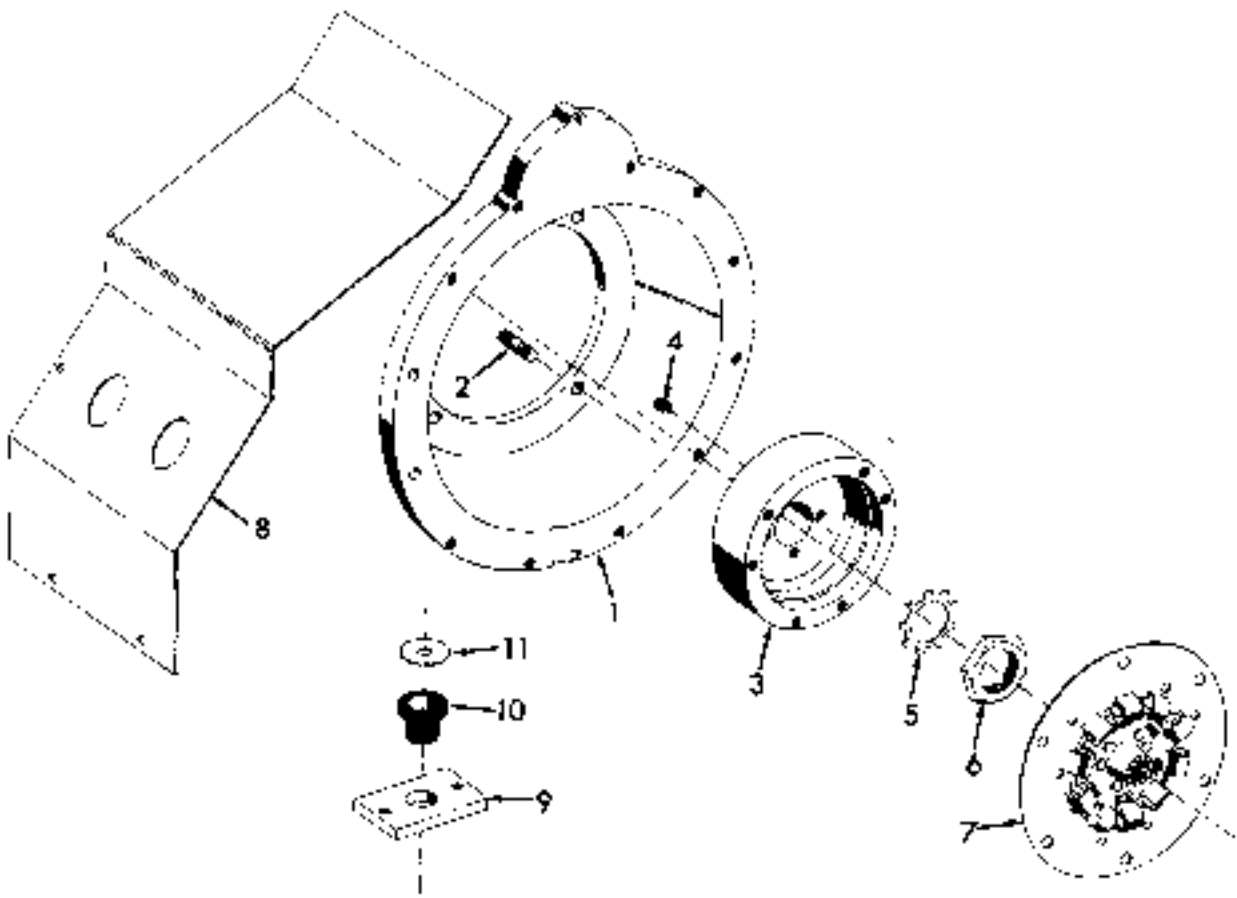


Fig. 18

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
TRANSMISSION CASE			
1	35A7227	Case - transmission	1
		GM444885 - Plug, draft, 1/8" x 27	1
		GM180149 - Bolt, hex., 7/16" - 14 x 1-1/2"	5
		GM180161 - Bolt, hex., 7/16" - 14 x 1-3/4"	6
		GM180165 - Bolt, hex., 7/16" - 14 x 2-1/4"	2
		GM271501 - Nut, hex., 7/16" - 14	2
		GM188582 - Bolt, hex., 7/16" - 14 x 4-1/4"	2
2	JT7205	Stud - adapter to case	2
3	35A4136	Adapter - transmission case	1
4	35A4463	*Gasket - adapter	1
5	35A4136	Cover - transmission case	1
		GM145849 - Ball, cover, 9/32" dia.	1
		GM180124 - Bolt, hex., 3/8" - 16 x 1-1/4"	15
		GM180128 - Bolt, hex., 3/8" - 16 x 1-3/4"	3
6	35A4463	*Gasket - transmission case cover	1
7	10A9792	Pin - dowel, cover to case	4
8	35A4412	Cap - bearing	1
		GM180122 - Bolt, hex., 3/8" - 16 x 1"	5
9	35A4456	*Shim - bearing cap, .002", red	A.R.
10	35A4424	*Shim - bearing cap, .003", green	A.R.
11	35A4425	*Shim - bearing cap, .005", blue	A.R.
12	35A4430 35R36	*Shim - bearing cap, .020", yellow	A.R.
		*Kit - gaskets, transmission and differential overhaul	-
		NOTE: Kit includes parts identified with a single asterisk ().	
13	35A2112	Plug - pipe, draft (Magnetic)	1
	35P1755	Oil - transmission, Donax T-4, 1 gallon	-
	35P1756	Oil - transmission, Donax T-4, 5 gallon	-

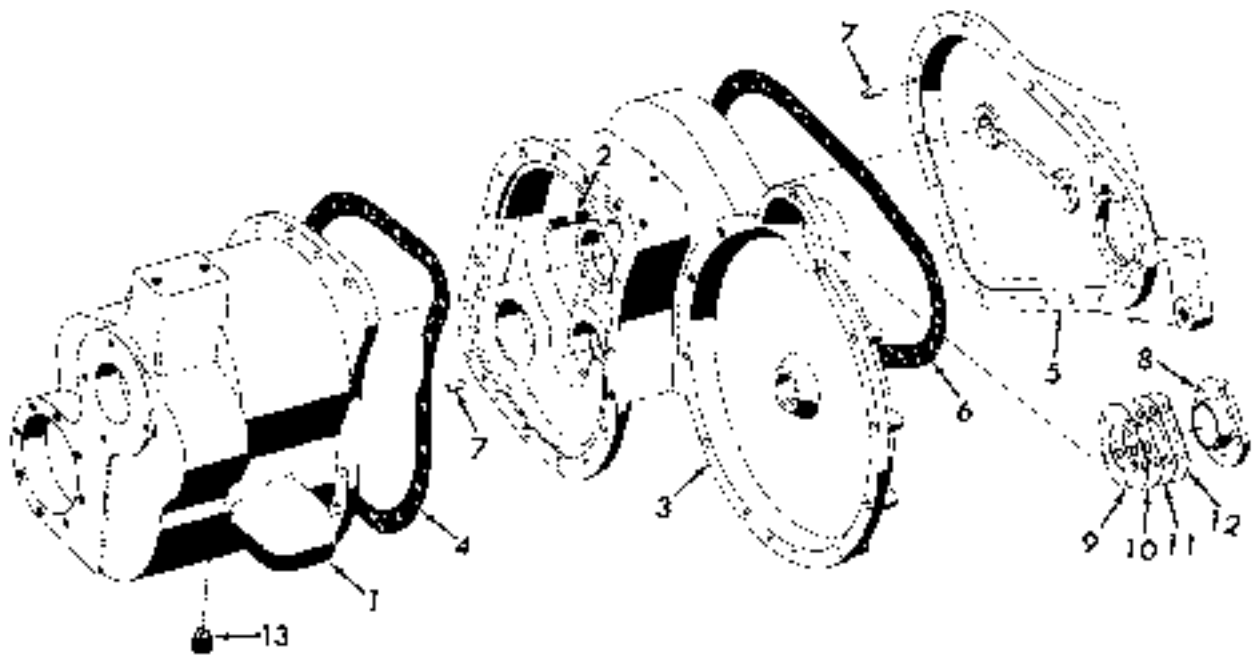


Fig. 19

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Per
		TRANSMISSION	
	35A54	Housing - assembly Consists of the following 11 parts:	1
1	35A 7710	Housing	1
2	35A 6783	Piston	2
3	35A 7708	Plate - friction	2
4	35A 8263	Plate - backing, same as 35A 334 with 16 micro finish Caution: MSA lift trucks must use only plates with 16 micro finish.	2
5	35A 335	Ring - backup	2
6	10A 15823	Ring - piston	2
7	35A 339	Ring - retainer, backup ring	2
8	35A 355	Ring - oil seal	2
9	35A 381	Spring - piston	2
10	35A 338	Retainer - spring	2
11	35A 340	Ring - snap, spring retainer	2
12	35A 3822	Shaft - input, with steel balls and orifices GM140641 - Ball, steel, 5/16"	1 2
13	10A 7936	*"O" Ring - input shaft, 1-1/2" I.D. x 1-3/4" O.D. (50A 765)	3
14	80A 7183	Screw - set, socket head, 1/2"-13 x 3/8"	1
15	35A 341	*Ring - oil seal, *In 35A 88 kit	4
	80A 86	*Kit - gasket, transmission and differential overhaul *NOTE: Kit includes parts identified with a single asterisk (*).	1
16	80A 4123	Carrier - forward	1
17	35A 4131	Carrier - reverse	1
18	10A 8712	Rollers - carrier, short	108
19	80A 7963	Rollers - carrier, long	108
20	35A 7665	Spacer - rollers, short, for 35A 4123 carrier	1
21	80A 7964	Spacer - rollers, long, for 35A 4131 carrier	1
22		35A 2883 - Ring, backup, quad, ring	1
23	80A 3923	Washer - carrier thrust, outer	2
24	35A 7666	Washer - carrier thrust, inner	2
25	10A 7830	Cone - bearing, input shaft	1
26	10A 7831	Cup - bearing, input shaft	1
27	10A 4762	Cone - bearing, input shaft, valve end	1
28	10A 7571	Cup - bearing, input shaft, valve end	1
29	35A 3621	Gear - clutch, input shaft	1
30	35A 4141	Countershaft	1
31	35A 3610	Gear - forward, on countershaft, 58 teeth	1
32	80A 4143	Gear - output, on countershaft	1
33	10A 4702	Ring - retainer, countershaft gears (50A 1689)	3
34	80A 4142	Gear - reverse, on countershaft	1
35	15A 6627	Cone - bearing, countershaft	1
36	10A 863	Cup - bearing, countershaft	1
37	10A 6702	Cone - bearing, countershaft, valve end	1
38	10A 7571	Cup - bearing, countershaft, valve end	1
39	80A 4133	Carrier - differential, with gear	1
40	35A 4422	Cone - bearing carrier	1
	10A 7637	Cup - bearing, for 35A 4422 cone, Ref. No. 40	1
41	35A 6785	Flange - differential carrier 10A 1440 - Screw, counterbore, 3/8" x 10 x 1"	1 8
42	80A 4161	Cone - bearing, carrier flange	1
43	10A 7233	Cup - bearing, carrier flange	1
44	35A 4380	Gear - bevel	2
45	35A 7346	Washer - thrust, gear, .6312	A, R
46	35A 7347	Washer - thrust, gear, .6332	A, R
47	35A 7348	Washer - thrust, gear, .6362	A, R
48	35A 8552	Washer - thrust, gear, .639	A, R
49	35A 8710	Washer - thrust, gear, .645	A, R

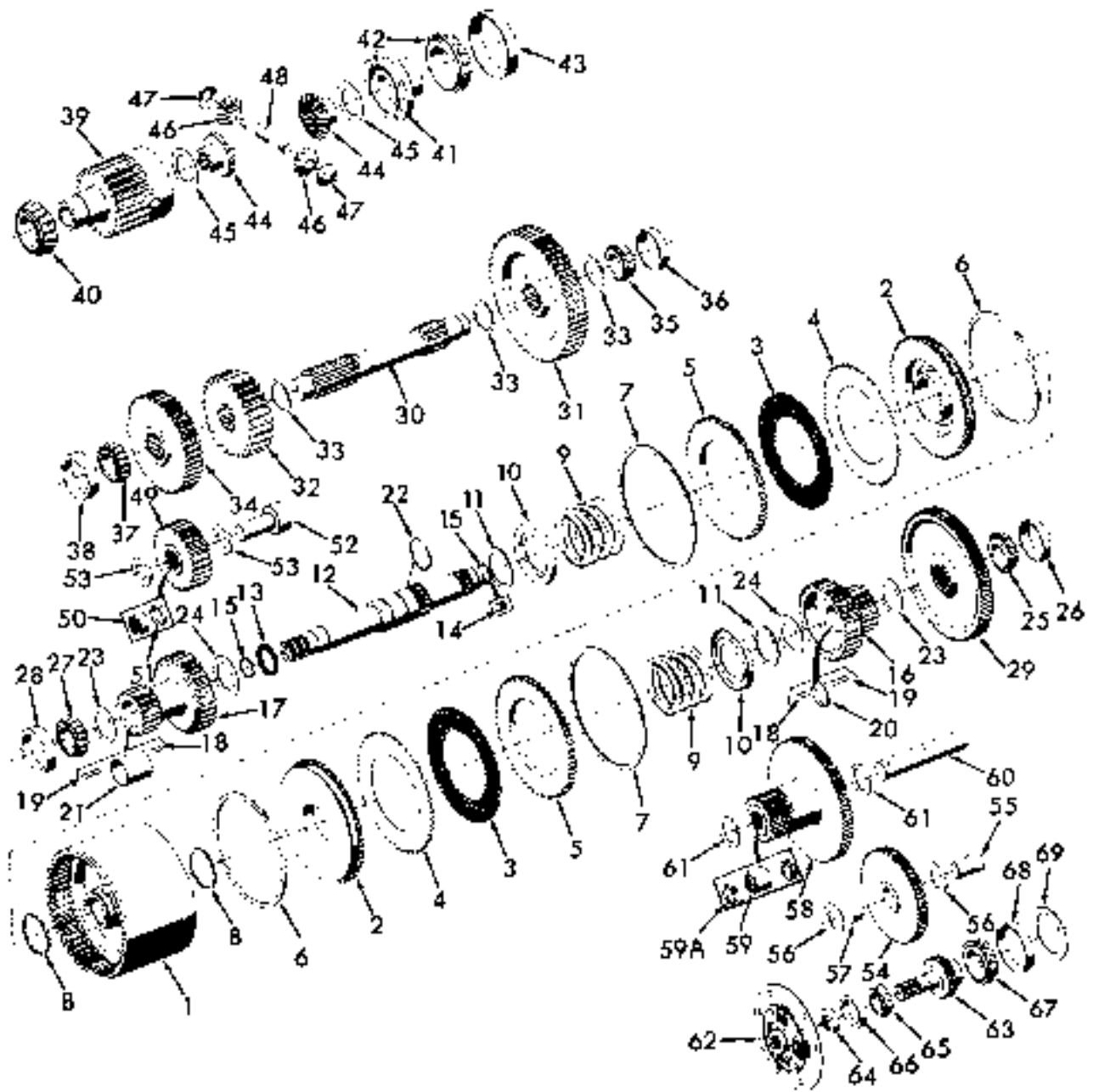


Fig. 20

M3A SERIES LIFT TRUCKS

Ref. No	Part No	DESCRIPTION	No. Per
TRANSMISSION (Gear'd)			
46	36A4337	Pinion - bevel gear	2
47	35A4354	Washer - pinion thrust	2
48	35A4395	Shaft - pinion	1
		55A2846 - Pin, roll, 3/16" x 1-3/4"	1
49	36A4140	Gear - reverse idler, with needle bearing and spacers	1
		55A2845 - Pin, roll, 3/16" x 3/4"	1
50	35A353	Bearing - needle, idler gear	2
51	36A3777	Spacer - needle bearing	1
52	36A4139	Shaft - reverse, idler gear, with roll pin	1
		55A2845 - Pin, roll, 3/16" x 3/4"	1
		55A279 - Ring, retainer, idler shaft	1
53	35A4144	Washer - thrust, reverse gear	2
54	36A3614	Gear - idler	1
55	36A3615	Shaft - idler gear, with roll pin	1
		55A2832 - Pin, roll, 3/16" x 1"	1
56	36A3617	Washer - thrust, idler gear	2
57	35A4140	Bearing - needle, idler shaft	2
59	36A3618	Gear - compound, idler, with needle bearings and retaining rings	1
59	36A3772	Bearing - needle, idler gear	2
59A		50A4792 - Retaining ring, needle bearing	4
60	36A3619	Shaft - idler gear, with roll pin	1
		55A2832 - Pin, roll, 3/16" x 1"	1
61	36A4148	Washer - thrust, idler gear	2
62	35A7735	Dampener - assembly, on flywheel, 9-7/8" O.D.	1
		GM180077 - Bolt, hex., 5/16"-18 x 3/4"	6
63	35A3609	Gear - input, in dampener	1
64	35A4175	*Seal - oil, dampener assembly	1
	36R36	*Kit - gasket, transmission and differential overhaul	1
65	35A3607	Gear - bearing, input gear, dampener end	1
66	10A14902	Cup - bearing, input gear, dampener end	1
67	15A12648	Gear - bearing, input gear, pump end	1
68	16A12647	Cup - bearing, input gear, pump end	1
69	35A4145	Spacer - input gear	1
		NOTE: Kit includes parts identified with a single asterisk ().	

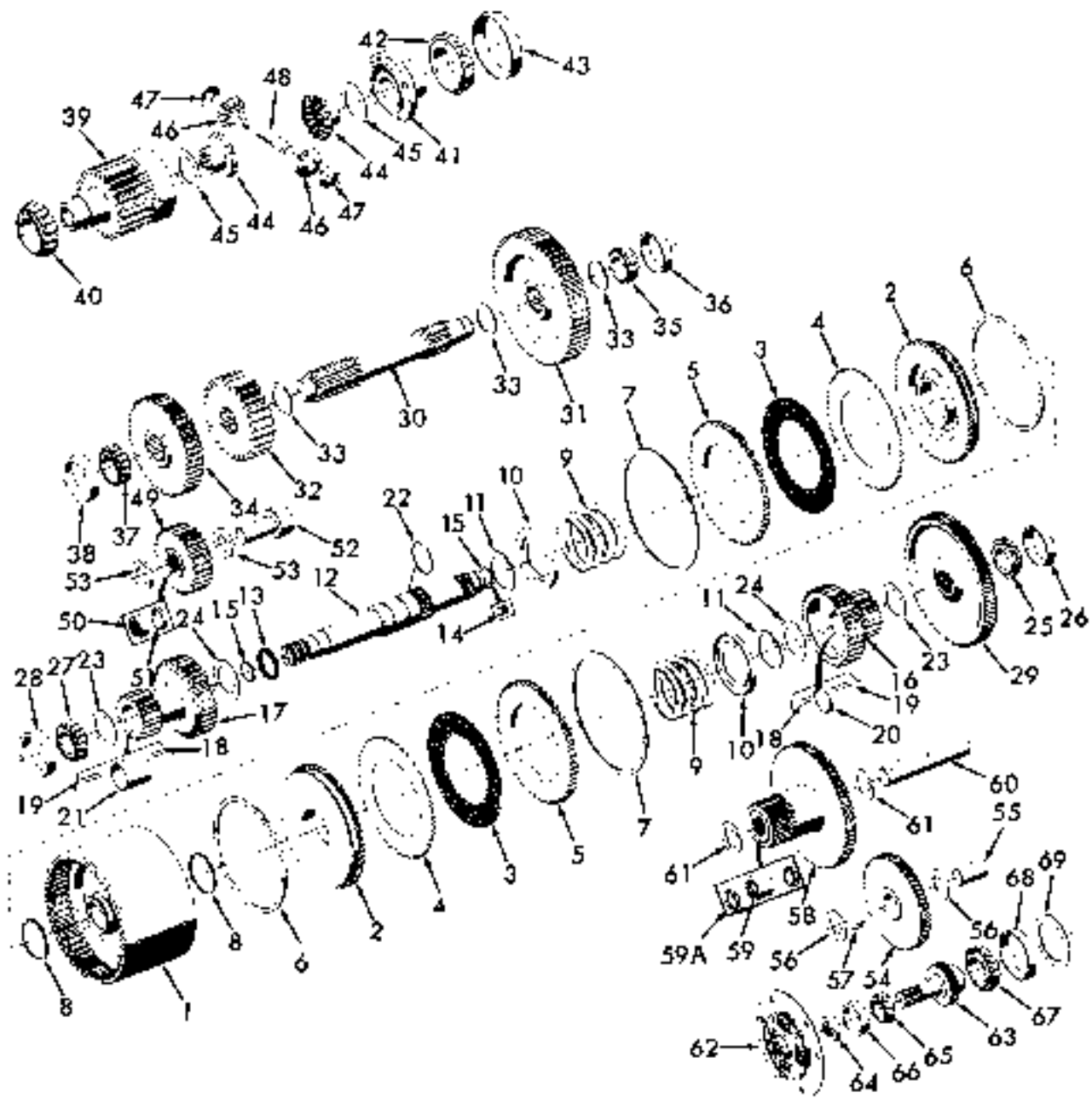


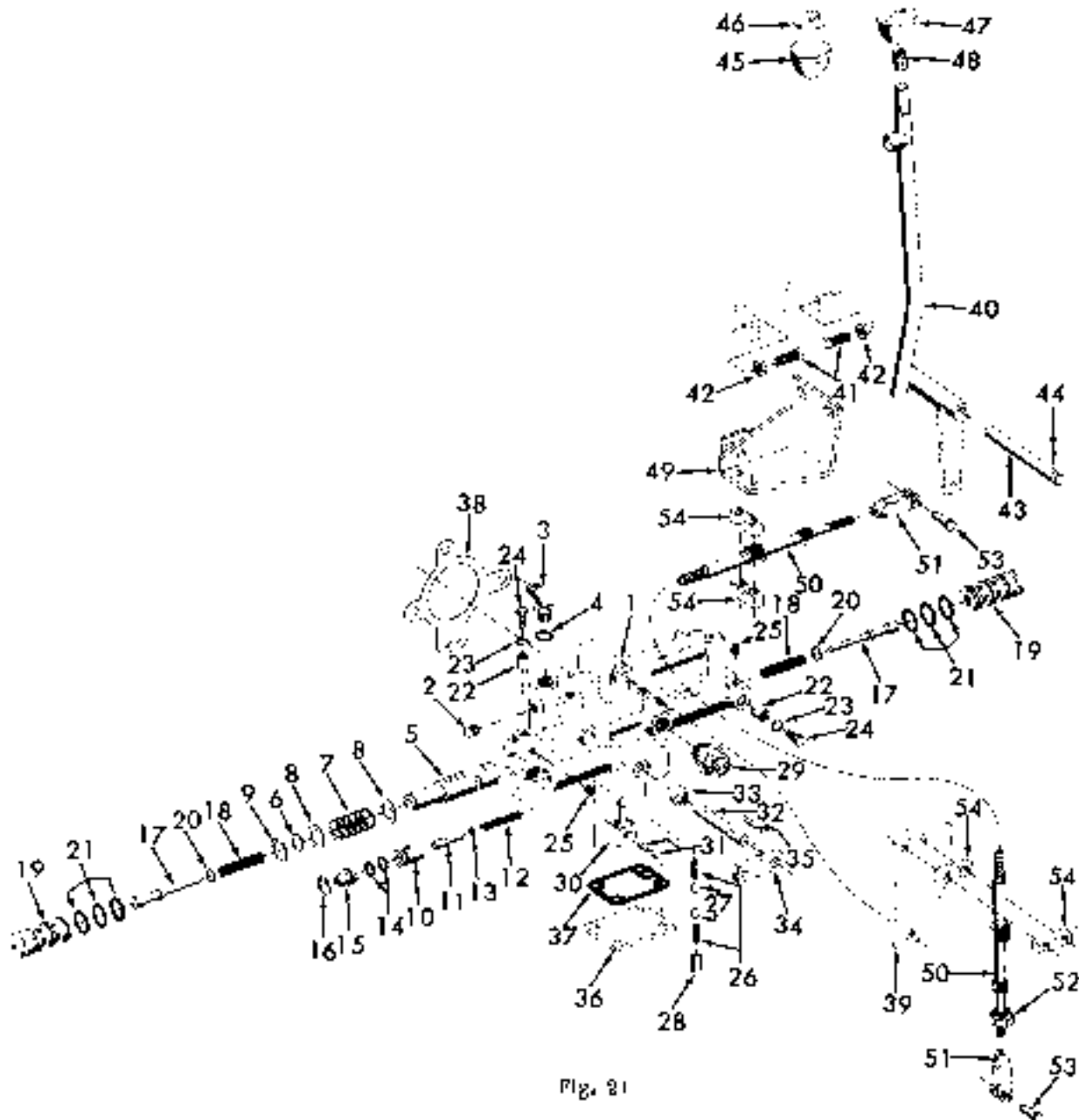
Fig. 20

M3A SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pos.
TRANSMISSION CONTROL VALVE AND CONTROLS			
1	35A1467	Valve - assembly, complete Includes the following 23 parts:	1
		50A1926 - Bolt, hex., 3/8"-16 x 3-1/4"	2
		50A1923 - Bolt, hex., 3/8"-16 x 3-3/4"	2
2		GM4448 - Plug, pipe, 1/2"-27	3
3		50A1923 - Elbow, valve, 3/16"-16 x 90°	1
4	10A1640c	"O" Ring - elbow to valve body	1
5	35A5171	Spool - valve, 4-7/16" long (35A7137)	1
		//NOTE: When replacing 35A7137 spool with 35A5171, use 35A8170 lever.	
6		50A2241 - Ring, snap, spool (Spicolex R576)	1
7	35A7743	Spring - spool	1
8	35A7129	Washer - spool	2
9		50A2241 - Ring, snap, washer retainer	1
10	35A1200	Valve - relief, 3/4" O.D. x 1-1/8" long	1
11	35A1249	Piston - relief valve	1
12	35A7147	Spring - relief valve	1
13	35A5107	Shim - relief valve, 3/8" O.D. x 1/32" thick	2
14	10A0329	Seal - "O" ring, valve and block, 3/4" O.D.	2
15	35A5177	Block - valve	1
16	10A6330	Ring - snap, block retaining	1
17	35A7128	Spool - inching	2
18	35A7744	Spring - inching spool	2
19	35A7127	Spool - control	2
20		50A2246 - Ring, snap, spool	2
21	10A880b	Seal - "O" ring, spool	6
22	35A7186	Eccentric - hydraulic valve adjusting	2
23		30A192 - Ring, snap, eccentric	2
24		GM180020 - Bolt, hex., 1/4"-20 x 3/4"	2
25		30A2740 - Set Screw, (Nylo's), 5/16"-16	2
26	35A9341	Spring - Jerent, 3/32" dia. x 27/32" long (35A7745)	2
27		GM143643 - Ball, steel, 3/5" dia.	2
28	35A7107	Pin - detent, valve detent	1
29	35A7687	Switch - neutral start, in body	1
30	35A9170	Lever - control arm (35A7127)	1
31		35A167b - Pin, roll, 3/16" dia. x 7/16"	2
32	35A4940	Shaft - control arm, 1/2" x 3-3/8"	1
33	35A4946	Seal - shaft, control arm	1
34	35A9367	//Lever - control arm (35A7127)	1
		//NOTE: When replacing 35A7127 lever with 35A9367, use 35A9342 plate.	
35		30A2543 - Pin, roll, 3/16" dia. x 3/4"	1
36	35A7181	Cover - valve body	1
		GM160019 - Bolt, hex., 1/4"-20 x 5/8"	4
37	35A7182	-Gasket - cover	1
38	35A7170	+Shim - body to transmission case, .002, red	A,R.
39	35A7171	+Shim - body to transmission case, .003, green	A,R.
40	35A7172	+Shim - body to transmission case, .004, blue	A,R.
41	35A7173	+Shim - body to transmission case, .005, yellow	A,R.
42	30R3E	+Kit - gasket, transmission and differential overhaul	-
		+NOTE: Parts with cross (-) included in 30R3E.	
43	35A9342	**Plate - mounting, control valve cable clamp (35A7150 - 35A8743)	1
		**NOTE: When replacing 35A7150 plate with 35A9342, use 35A9367 lever.	
44	35A6151	Lever - transmission control (35A6151)	1
45		GM134363 - Set Screw, cup point, lever adjusting, 3/8"-16 x 1"	2
46		GM124829 - Nut, hex, jam, 3/8"-16	2
47	35A6153	Support - lever, 1/2" x 1-1/4"	1
48		50A2525 - Pin, roll, 3/16" x 1"	1
49	35A4119	Knob - lever, for 35A6151 lever	1
50	35A4190	Label - knob, transmission control, for 35A4119 knob	1
51	35A4812	Knob - lever, solid, for 35A8815 lever	1
52		30A4887 - Insert, knob, for 35A6312 knob	1

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pos.
TRANSMISSION CONTROL VALVE AND CONTROLS (Cont'd)			
49	35A8102	Bracket - transmission control lever	1
		GM180122 - Bolt, hex., 3/8"-16 x 1"	2
		GM180079 - Bolt, hex., 5/16"-18 x 1"	1
		GM12037E - Nut, hex., 5/16"-18	1
		GM120393 - Washer, plain, 11/32" I.D., 11/16" O.D.	2
50	35A6434	*Cable - transmission control, 59" long	1
50	35A372b	**Cable - transmission control, 63" long	1
		*NOTE: Used on MSA 20 and 25 Lift Trucks to No. 28100437 Inc.	
		**NOTE: Used on MSA 20 II and 25 II Lift Trucks no. 28100429 and after.	
51		GM174897 - Clevis, cable, short, 5/16" x 24	2
52		GM124829 - Nut, hex., jam, 3/16" x 24	2
53		GM120690 - Pin, clevis, 5/16"	2
		GM103870 - Pin, cotter, 5/32" x 3/4"	2
54	35A8416	Clamp - cable	4
		GM180065 - Bolt, hex., 5/16"-18 x 1-3/4"	4



MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs
DRIVE AXLE, WHEELS AND TIRES			
1	35A 6298	Housing - axle, left hand	1
2	35A 6299	Housing - axle, right hand	1
		GM159145 - Bolt, hex., 7/16" - 14 x 1-3/8".....	16
3	35A 6300	Shaft - axle, left hand	1
4	35A 6301	Shaft - axle, right hand	1
		56A2746 - Screw, flat head, 3/8" - 10 x 1".....	4
5	35A 6302	Housing - bearing	2
6	35A 4423	Stud - bearing housing	12
		56A1694 - Nut, wheel, 1/2" - 20	12
7	10A 5521	*"O" Ring - left hand axle housing	1
8	EC13	*"O" Ring - right hand axle housing	1
9	35A 6400	*Seal - oil, axle housing	2
10	10A 7807	Cup - bearing, left hand axle housing, inner	1
11	35A 5844	Bearing - ball, axle housing, outer	2
12	16A 16066	Ring - retainer, ball bearing, on axle housing, 2-3/8" dia.	2
		56A1758 - Ring, retaining, in bearing housing	2
14	35A 6304	*Ring - sealing, wheel to housing	2
15	35A 4443	*Shim - left hand axle housing, .002	A.R.
16	35A 4444	*Shim - left hand axle housing, .003	A.R.
17	35A 4447	*Shim - left hand axle housing, .005	A.R.
18	35A 4448	*Shim - left hand axle housing, .020	A.R.
	36R86	*Kit - gasket, transmission and differential overhaul	1
		NOTE: Kit includes parts identified with a single asterisk ().	
19	35A 6327	Wheel - less tire, MSA 20 and 25	2
20	35A 4333	Tire - cushion, 16-1/4" x 6" x 11-1/4".....	2
21	35A 6325	Wheel - less tire, MSA 30 and 35	2
22	35A 4334	Tire - cushion, 16-1/4" x 7" x 11-1/4".....	2

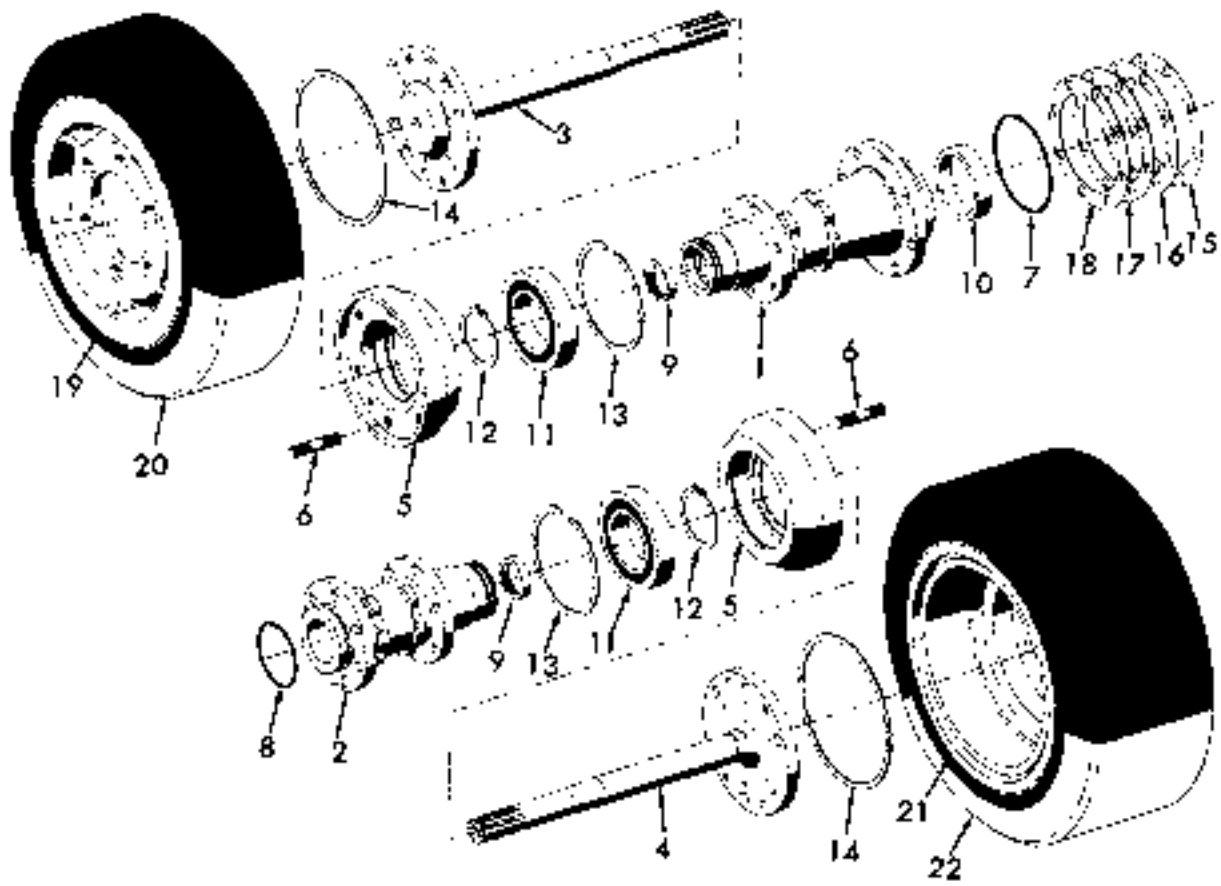


Fig. 22

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
BRAKES AND BRAKE LINKAGE			
1	35A4406	Brake - left hand	1
.	35A4407	Brake - right hand	1
		Each includes the following 18 parts:	
	35A1441 - Bolt, 12 pt., 3/8" x 16 x 1-1/4"		11
	35A1155 - Screw, cap, flat head, 3/8" x 16 x 1-3/4"		6
	GM120977 - Nut, hex., 3/8" - 16		22
	35A1442 - Bolt, 12 pt., 3/8" - 16 x 1-1/2"		6
2	35A7851	Washer - flat, (Special) cut, 7/16" I.D., 1" O.D.	10
	35A2605 - Washer, flat, 7/16" I.D., 1" O.D.		2
3	35F1692	Plate - backing, left hand (35F1382)	1
3	35F1698	Plate - backing, right hand (35F1203)	1
4	35F1270	Shoe - assembly, with lining	4
		Includes the following 2 parts:	
5	35F1271	Kit - lining, with rivets (enough for 1 truck)	2
6	JT3127	Rivet - lining	48
7	35F1272	Lever - actuating	2
8	35F1273	Eccentric - shoe adjusting	4
9		GM120269 - Nut, hex., 3/8" - 24	4
10	35F1274	Anchor - pin	4
11	35P1275	Plate - anchor pin	2
12	35P1276	Cap - anchor pin	4
13		GM138026 - Nut, hex., 1/2" - 20	4
14	35P1277	Stem - returning lever, L.H.	1
14	35P1278	Stem - actuating lever, R.H.	1
15	35P1279	Spring - shoe return	2
16	35A3807	Pedal - brake, with bushings	1
17	35A7808	Bushing - brake pedal	2
18	35A7810	Shaft - pivot, brake pedal	1
		GM139077 - Bolt, hex., 5/16" - 18 x 3/4"	1
19	10A2748	Spacer - shaft to pedal	1
20	35A4397	Spring - tension, brake pedal	2
21	35A7250	Eye Bolt - spring, 1/2"	2
		GM120228 - Nut, hex. jam, 1/2" - 13	4
22	35A7799	Shaft - spring mounting	1
		GM121222 - Pin, center, 3/32" x 3/4"	3
23	35A284	Shaft - brake release	1
24		GM144249 - Clevis, adjusting, 3/8" - 24	1-2
25		GM128072 - Pin, clevis, 3/8"	1
		GM124926 - Nut, hex., jam, 3/4" - 24	4
26	35A4331	Equalizer - brake	1
27	35A7872	Pivot - sleeve, long	1
28	35A7871	Pivot - sleeve, short	1
		Each includes the following 2 parts:	
29	35A7659	Bushing - pivot	4
30	35A7670	Seal - pivot	4
31	35A7668	Shaft - sleeve pivot	1
32	35A4327	Clamp - pivot shaft to frame	8
33	35A4329	Red - brake, right hand	1
34	35A4319	Red - brake, left hand	1
		GM120395 - Washer, plain, 11/32" I.D., 1 1/16" O.D.	2
		GM137141 - Pin, center, 1/16" x 5/8"	2
35		GM142720 - Ball joint	2
		GM124320 - Nut, hex. jam, 5/16" - 24	4
36	35A6649	Plate - brake pivot, left hand	1
37	35A6650	Plate - brake pivot, right hand	1
38	35A4300	Bushing - brake plate	2
39	35A4325	Plate - mounting (35A4344)	1
		35A651 - Plug, snap, (Pro-Arc 3103-02) for 35A4325 plate	4-2
40	2014667	Ring - snap, (Pro-Arc 3133-02) for 35A4325 plate	2
41	35A3732	Cable - brake	1

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Per
BRAKES AND BRAKE LINKAGE (Cont'd)			
42	35A6543	Clevis - brake cable (GM144243).....	2
43		GM103496 - Pin, clevis, 3/8".....	2
		GM141405 - Pin, cotter, 7/64" x 3/4".....	2
44	36A6444	Stud - reducer bushing, used with 35A6543 clevis, 5/8"-16 to 3/8"-24.....	2
45		GM103494 - Pin, clevis, 1/4".....	2
		GM133562 - Pin, cotter, 1/16" x 3/4".....	2
		GM131004 - Bolt, hex., 5/16"-24 x 1-1/8".....	6
46	36A7811	Bell - crank, control rod.....	1
		Includes the following parts:	
47	35A7806	Bearing - bell crank.....	2
48	35A7809	Shaft - bell crank.....	1
49	35A6397	Pin - lock, shaft.....	1
50		50A1627 - Ring, snap, shaft.....	1
51	36A7301	Rod - bell crank to pedal.....	1
52		GM138079 - Pin, rod clevis.....	1
53		GM121222 - Pin, cotter, 3/32" x 3/4".....	1

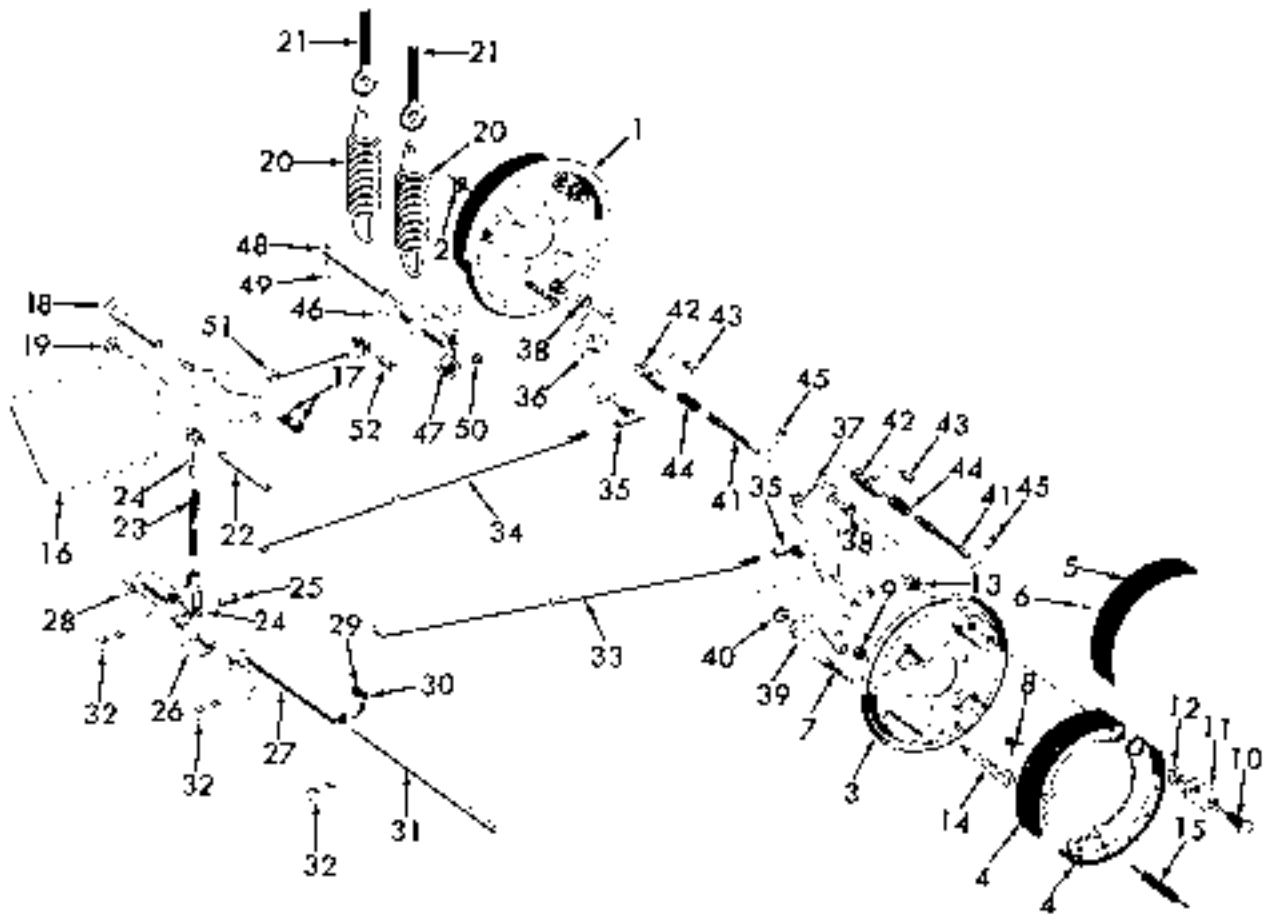


Fig. 23

MSA SERIES LIFT TRUCKS

Ref No	Part No	DESCRIPTION	No Pcs.
STEERING GEAR			
1	35A3590	Housing - steering gear	1
2	35A6254	Shaft - steering	1
3	35A9594	Cover - steering housing	1
4		GM444726 - Plug, pipe, 1/2"	2
5	10A19477	Seal - oil, steering shaft (10A19329)	1
6	35A353E	Gear - bevel, steering shaft	1
7		GM102647 - Nut, lock gear, 1/2"-20	1
		GM103375 - Pin, cotter, 3/32" x 1-1/4"	1
8	7A438	Key - lock, bevel gear to shaft	1
9	10A7330	Cone - bearing, bevel gear	2
10	10A7591	Cup - bearing, bevel gear	2
11	85A5120	Shim - bevel gear bearings, .005 thick	A,R
12	86A5119	Shim - bevel gear bearings, .010 thick	A,R
13		50A994 - Ring, snap, bevel gear bearing (Tru-Arc N5000-237)	2
14		50A990 - Nut, adjusting, bevel gear bearing	1
15		50A991 - Washer, lock, adjusting nut	1
16	35A7749	Gear - worm, right hand steering	1
16	35A7751	Gear - worm, left hand steering	1
17	35A3504	Shaft - worm gear, 4-13/16" long	1
18	PA2131	Key - lock, worm gear to shaft	1
19	10A14963	Cone - bearing, worm gear shaft	2
20	10A14362	Cup - bearing, worm gear shaft	2
21	10A17157	Ring - snap, worm gear bearing (Tru-Arc N5000-260)	1
22	35A4102	Shim - worm gear bearing, .003 thick	A,R
23	35A4104	Shim - worm gear bearing, .010 thick	A,R
24	35A8582	Plug - expansion, worm gear opening, 2-1/16" dia.	1
25	35A3596	Seal - oil, worm gear shaft	1
26	35A3581	Cover - worm gear shaft	1
27		50A998 - Bolt, hex., Nylock, 1/4"-20 x 3/4"	5
28	35A5121	Shim - cover, .002 thick	A,R
29	35A5122	Shim - cover, .003 thick	A,R
30	M539	"O" Ring - cover, 2-55/64" I.D., 3-9/64" O.D.	1
31	35A774E	Worm - steering, right hand steering	1
31	35A7750	Worm - steering, left hand steering	1
32		35A965 - Nut, lock, steering worm	1
33		35A966 - Washer, lock nut	1
34	35A3509	Bearing - needle, steering worm	1
35	10A735	Bearing - ball, steering worm	1
36	30A1567	Ring - snap, ball bearing, inner (Tru-Arc N5000-296)	1
37		50A982 - Ring, snap, ball bearing, outer	1
38	35A4103	Shim - ball bearing, inner, .005 thick	A,R
39	35A4101	Shim - ball bearing, inner, .010 thick	A,R
40	35A3602	Shim - ball bearing, outer, .005 thick	A,R
41	35A3583	Cover - steering worm	1
42	35A4781	Wheel - hand, steering	1
43		GM103697 - Key, Woodruff, No. 11, 3/16" x 7/8"	1
44		50A159 - Nut, hex., (Nylock), 1/2"-20	1
		GM103375 - Pin, cotter, 3/32" x 1-1/4"	1
45		GM142099 - Plug, button, hand wheel, 1-1/4"	1
46	35A8613	Shaft - spinner knob (35A4783)	1
		GM120394 - Washer, plain, 19/32" I.D.	1
		50A155 - Nut, hex., (Nylock), 3/8"-24	1
		50A154 - Nut, hex., (Nylock), 3/8"-16	1
47	35A4794	Shafting - spinner shaft	1
48	35A4119	Knob - spinner, hand wheel, for 35A4793 shaft	1
49	35A4792	Insert - spinner knob, 13/16" O.D.	1
50	35A3295	Knob - spinner, hand wheel, for 35A8613 shaft	1
51		50A4887 - Insert, knob, for 35A8295 knob	1
52	35A6256	"U" Bolt - steering gear mounting	1
		GM120369 - Nut, hex., 3/8"-24	2

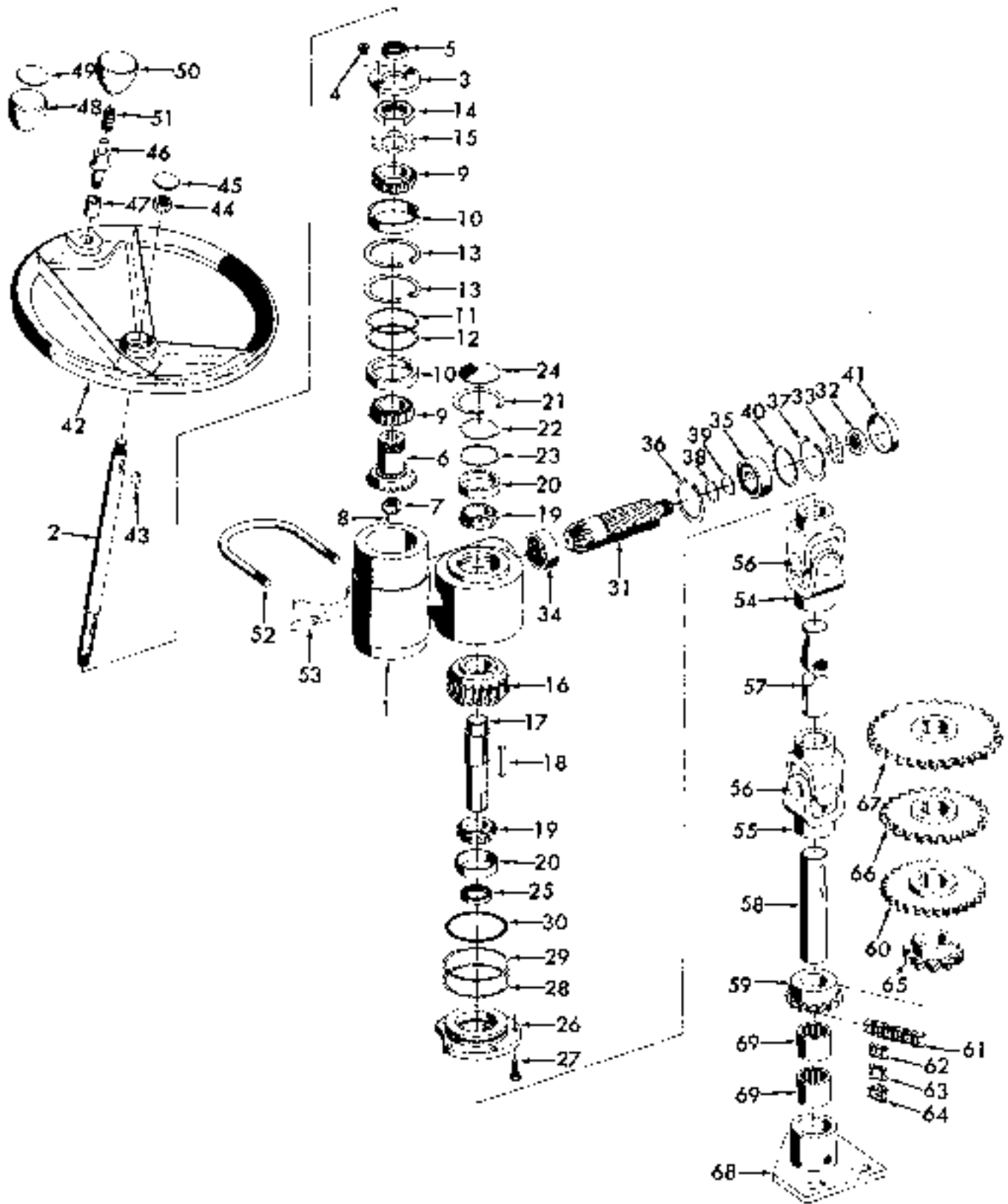


Fig. 24

MSA SERIES LIFT TRUCKS

Kit No.	Part No.	DESCRIPTION	No. Pcs.
		STEERING GEAR (Cont'd)	
53	35A 6907	Clamp - steering gear housing	1
54	35A 7295	U-joint - steering shaft, upper	1
55	35A 7296	U-joint - steering shaft, lower	2
		Each includes the following part:	
		GM113732 - Key, Woodruff, No. 15	1
		GM108628 - Key, Woodruff, No. 21	2
		30A4137 - Set Screw, hex. socket, 3/8" x 3/4"	4
		30A5742 - Nut, hex. jam, 3/8" x 16	4
58	10P715	Kit - center cross	2
57	35A 7297	Shaft - steering, between joints	1
59	35A 7298	Shaft - steering sprocket	1
		GM117807 - Key, Woodruff, No. 27	1
		30A2614 - Washer, plain, 1-17/64" I.D., 1-11/16" O.D.	2
		30A2412 - Washer, plain, 1-17/64" I.D., 2" O.D.	1
59	35A 9389	*Sprocket - shaft, steering, 18 teeth	1
60	35A 7604	*Sprocket - pivot yoke shaft, 30 teeth	1
61	-----	*Chain - steering gear to sprocket, 65 lks., for MSA 20 and 25 use 15P922 ..	1
61	-----	*Chain - steering gear to sprocket, 109 lks., for MSA 30 and 35 use 15P923 ..	1
	15P923	*Chain - 10 feet of 1/2" pitch roller chain (approx. 229 links)	-
62	15P924	*Link - roller	-
62	15P925	*Link - connecting	-
64	15P926	*Link - offset	-
		*NOTE: Used on MSA Series Lift Trucks to No. 28100238 Inc.	
65	35A 8088	**Sprocket - shaft, steering, 13 teeth	1
66	35A 8069	**Sprocket - pivot yoke shaft, 24 teeth	1
61	-----	**Chain - 5/8 P., steering gear to sprocket, 68 links, use 15P927	1
		**NOTE: Used on MSA Series Lift Trucks No. 28100237 thru 28100815 Inc.	
65	35A 8068	#Sprocket - shaft, steering, 13 teeth	1
67	35A 8441	#Sprocket - pivot yoke shaft, 31 teeth	1
61	-----	#Chain - 5/8 P., steering gear to sprocket, 71 links, use 15P927	1
		#NOTE: Used on MSA Series Lift Trucks No. 28100816 and after.	
	15P927	Chain - 10 feet of 5/8" pitch roller chain (Approx. 192 links)	-
62	15P928	Link - roller	-
63	9006C	Link - connecting	-
64	15P929	Link - offset	-
65	35A 7299	Cage - shaft, steering sprocket	1
		GM180175 - Bolt, hex., 1/2" x 13 x 1-1/4"	5
		GM120390 - Washer, plain, 17/32" I.D., 1-1/16" O.D.	3
		GM104365 - Fitting, grease, 1/8" x 90°	1
69	35A 1847	Bearing - cage, needle	2

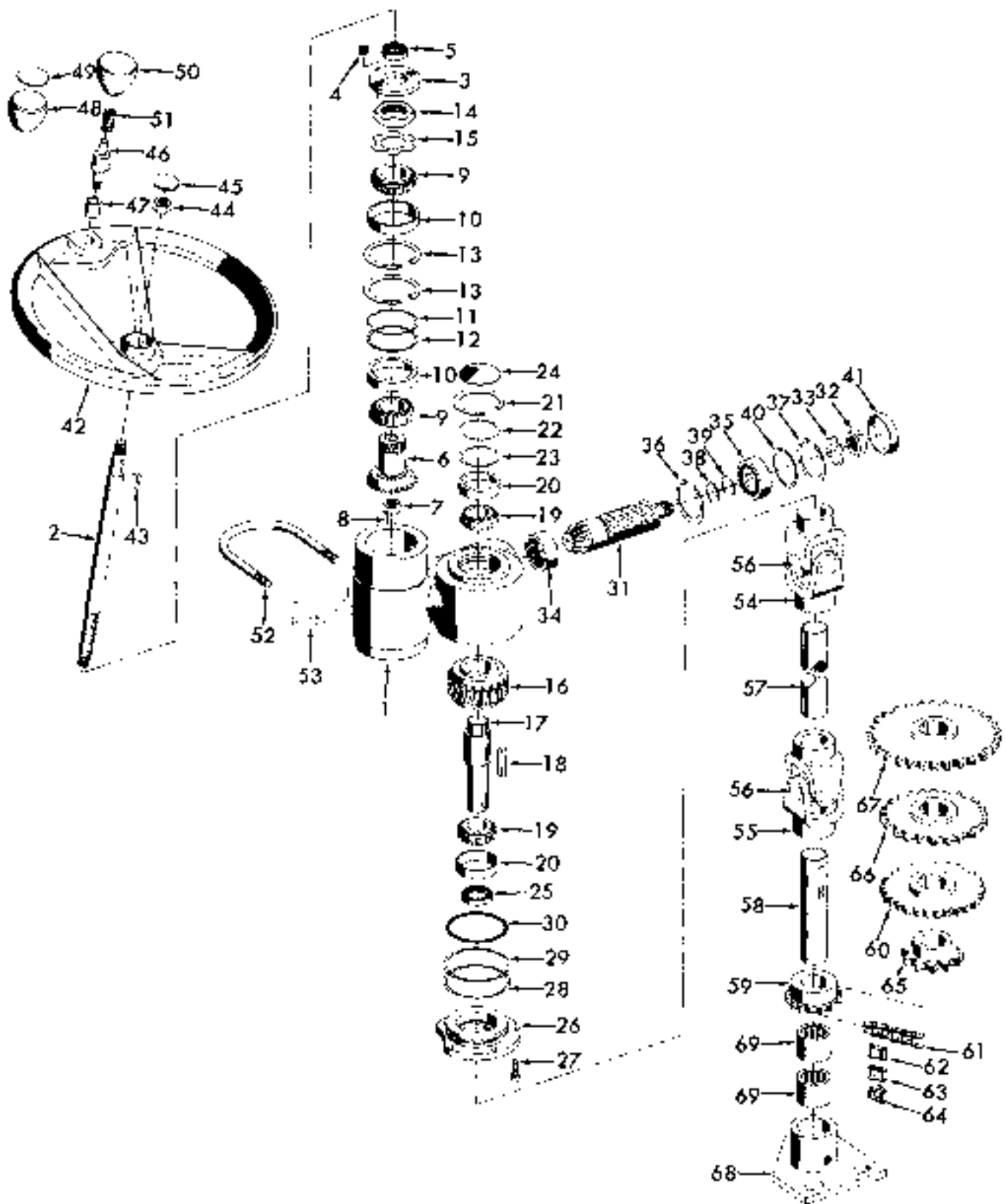


Fig. 26

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs
STEERING AXLE AND WHEELS			
1	35A3602	Yoke - pivot, steering wheels	1
2	35A4109	Seal - oil, pivot yoke, lower	1
3	35A3603	Seal - oil, pivot yoke, upper	1
4	10A7007	Cup - bearing, pivot yoke, lower	1
5	10A2406	Cone - bearing, pivot yoke, lower	1
6	10A7008	Cup - bearing, pivot yoke, upper	1
7	10A7001	Cone - bearing, pivot yoke, upper	1
8		30A967 - Ring, snap, upper bearing	1
9	35A3014	*Sprocket - pivot yoke shaft *NOTE: Used on MSA Series Lift Trucks to No. 28100235 Inc.	1
10	35A9059	**Sprocket - pivot, yoke shaft, 24 teeth **NOTE: Used on MSA Series Lift Trucks No. 28100237 thru 28100615 Inc.	1
11	3548641	+Sprocket - pivot yoke shaft, 31 teeth -NOTE: Used on MSA Series Lift Trucks No. 28100616 and after.	1
12	F444	Key - shaft to sprocket	2
13	35A4123	Plate - retainer, sprocket to shaft	1
14		30A649 - Screw, plate retainer, 3/8" - 18 x 3/4"	2
15	35A4110	Shim - retainer plate, .005 thick	A, B,
15	35A4111	Shim - retainer plate, .018 thick	A, B,
15	35A7826	Shim - retainer plate, .042 thick	A, B,
16	35A4124	Shaft - axle, steering wheels	1
17	35A7824	Nut - axle shaft, slotted, 1-1/8" - 12 GM102867 - Pin, center, 1/16" x 2" GM271290 - Fitting, grease, 1/4" - 2E, 89 ⁰	2 2 2
18	F398	Bearing - ball, axle shaft	4
19	X391	Slinger - oil, axle shaft, center	2-5-4
20	X398	Slinger - oil, axle shaft, center, used on early models with 2 spacers	1
21	35A4122	Spacer - pivot yoke, MSA 20-25 only, 1" or 2-1/4" long	2-1
22	T171	Pin - steering axle to pivot yoke	1
23	35A4108	Wheel - steering, with cushion tire, for MSA 20-25	2
24	35A4107	Tire - cushion, 4 x 4 x 8-1/2, for MSA 20-25	2
25	35A4120	Wheel - steering, with cushion tire, for MSA 30-35	2
26	R293	Tire - cushion, 5 x 5 x 8, for MSA 30-35	2

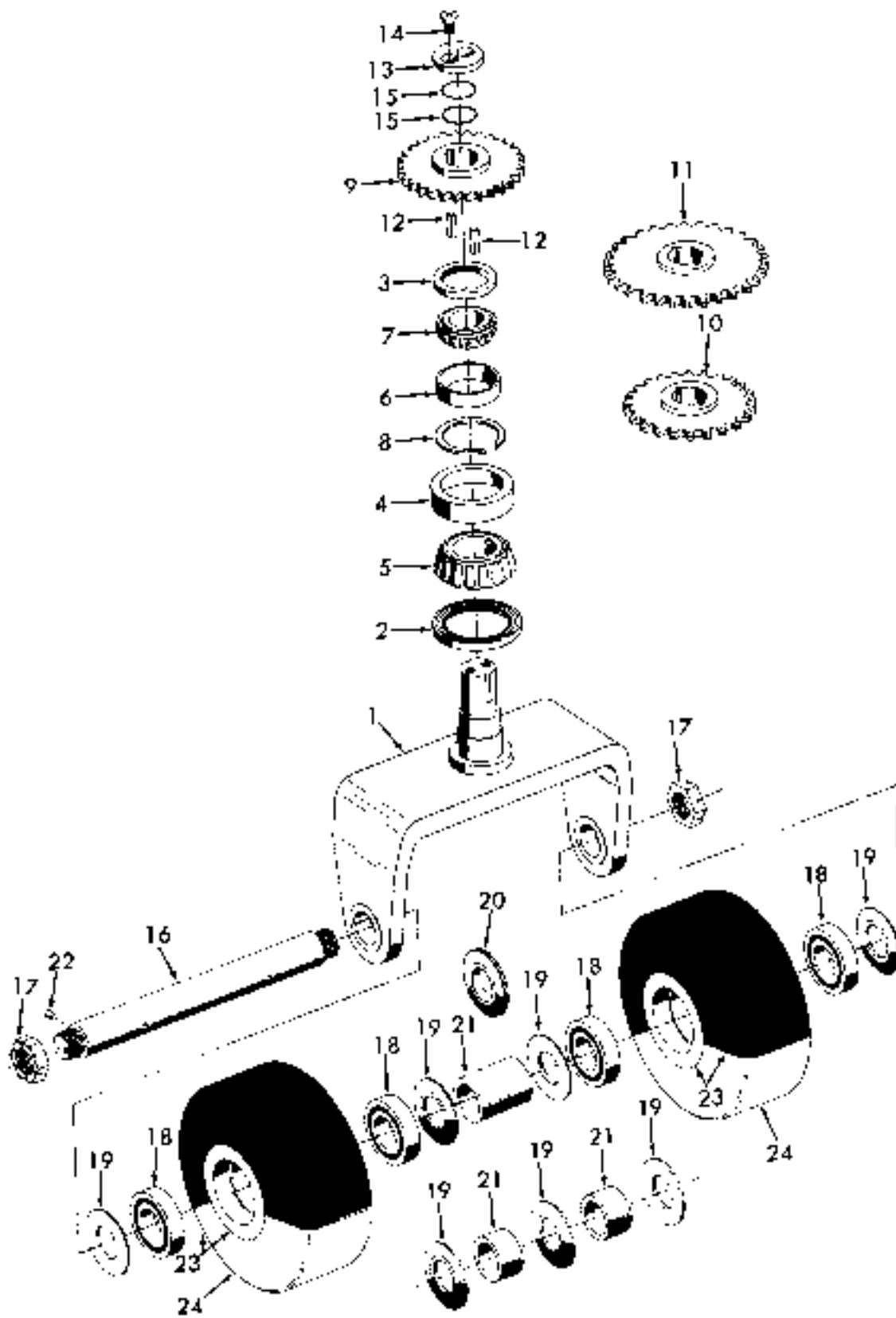


Fig. 85

MSA SERIES LIFT TRUCKS

Rei. No.	Part No.	DESCRIPTION	No. Pcs.
THROTTLE CONTROLS			
1	85A8819	Pedal - accelerator (85A8288)	1
2	85A8138	** Pad - pedal (noeplate), 4" x 7"	1
2	85A9134	** Pad - heel, no counterweight, 7" x 7-3/8"	1
4	85A8260	Hinge - accelerator pedal	1
		GM172450 - Bolt, self tapping, 5/16"-18 x 5/8"	2
5	85A8201	Pin - hinge to pedal	1
6	85A8262	Pin - pedal	1
		GM126308 - Washer, plain, 11/32"	1
		GM103021 - Pin, cutter, 1/16" x 1/2"	1
7	85A7094	* Cable - accelerator pedal, 40" long	1
7	85A8620	** Cable - accelerator pedal, 38" long	1
8		GM120814 - Nut, hex., No. 10-32	2
9		GM186956 - Clevis, 10-32	1
10	85A7109	Spring - tension, accelerator cable	1
11	85A7395	Clip - spring anchor	1
12	85A7626	* Ball - crank, throttle control	1
14	85A8593	** Ball - crank, throttle control	1
15	85A7355	Bracket - ball crank	1
		85A9659 - Bolt, hex., 5/16"-18 x 1-7/8"	1
		85A9616 - Bolt, hex., 1/4"-20 x 1/2"	5
		85A1898 - Nut, hex., 1/4"-20	2
		85A1777 - Nut, lock, to ball crank, 1/4"-20	1
		85A8821 - Washer, plain, 17/64" L.D., 5/8" O.D.	2
16	10A10739	Spacer - ball crank	1
		85A8855 - Pin, clevis, 3/16"	1
17	85A7675	* Rod - throttle control, 1/8" x 6"	1
		GM191598 - Pin, cutter, 3/64" x 3/8"	1
		*NOTE: Used on MSA 20-20 II-25 and 25 II Lift Trucks to No. 28100618 Inc.	
18	85A8595	** Rod - throttle control, 3/16" x 4-18/16" long	1
		** 85A3619 - Pin, cutter, 1/16" x 1/2"	1
19		** 85A4816 - Ball, joint, #10-32, rod to carburetor arm	1
20		** 85A5001 - Nut, hex., #10-32	1
		**NOTE: Used on MSA 20 II and 25 II Lift Trucks No. 28100618 and alter.	
21	85A7871	Bracket - cable mounting	1

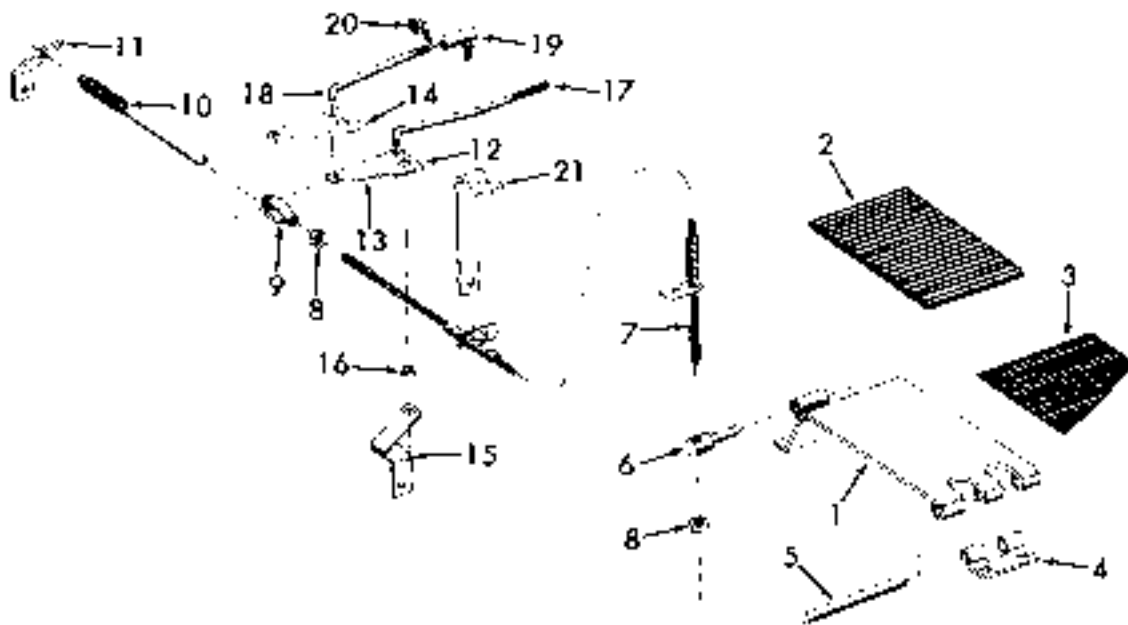


Fig. 26

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Qty.
INSTRUMENT PANEL AND INSTRUMENTS Group I Used on MSA 20 and 25 Lift Trucks to No. 26100255 Inc.			
1	35A 6275	Panel - instrument	1
		50A3646 - Bolt, hex., 1/4" -20 x 3/4"	4
		50A 1895 - Nut, hex., 1/4"-20	4
		GM142073 - Buses, plug, 13/32"	2
2	35A 4277	Hour Meter	1
		GM100757 - Screw, round head, No. E-22 x 3/8"	6
3	10A 3438	Dampener - vibration, hour meter	1
4	35A 4112	Switch - ignition and starter	1
5	35A 4114	Plate - instruction, ignition and starter switch	1
6	35A 4115	Indicator - generator	1
7	35A 7609	Switch - pressure, hour meter	1
	35A 4779	Wire - hour meter to ignition switch	1
8	10A 4922	Choke Control	1
		GM138542 - Washer, int. lock	1
		GM124925 - Nut, hex. jam, 3/8"-24	1
		50A3812 - Clamp, choke cable	1
9	35A 6123	Plate - cover, auxiliary valve opening	1
		GM139026 - Bolt, hex., 1/4" -20 x 3/4"	4
		GM123375 - Nut, hex., 1/4"-20	4

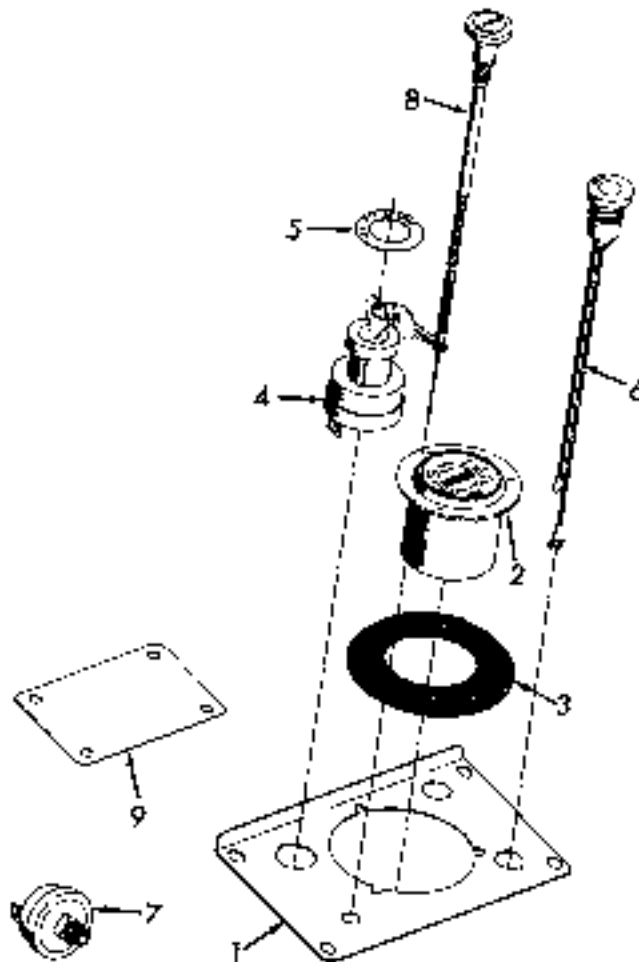


Fig. 27

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
INSTRUMENT PANEL AND INSTRUMENTS			
Group 11			
Used on MSA 20 and 25 Lift Trucks No. 29100296 and after.			
1	35A8030	Panel - instrument	1
		50A8646 - Bolt, hex., 1/4"-20 x 3/4"	4
		50A1638 - Nut, hex., 1/4"-20	4
2	35A8583	Hour Meter	1
3	85A8640	Switch - ignition and starter	1
		Includes the following parts:	
4	35P1559	Key - switch	2
5	95A9607	Wire - fused, fuel pump to ignition switch, 14 Ga. x 3" long	1
6	35A4115	Indicator - generator	1
7	35A7608	Switch - pressure, hour meter	1
8	35A4770	Wire - hourmeter to ignition switch	1
9	15A4322	Choke Control	1
		GM133542 - Washer, internal lock	1
		GM124926 - Nut, hex., jam, 3/8"-24	1
		50A2812 - Clamp, choke cable	1
10	35A6123	Plate - cover, auxiliary valve opening	1
		GM190026 - Bolt, hex., 1/4"-20 x 3/4"	4
		GM120375 - Nut, hex., 1/4"-20	4

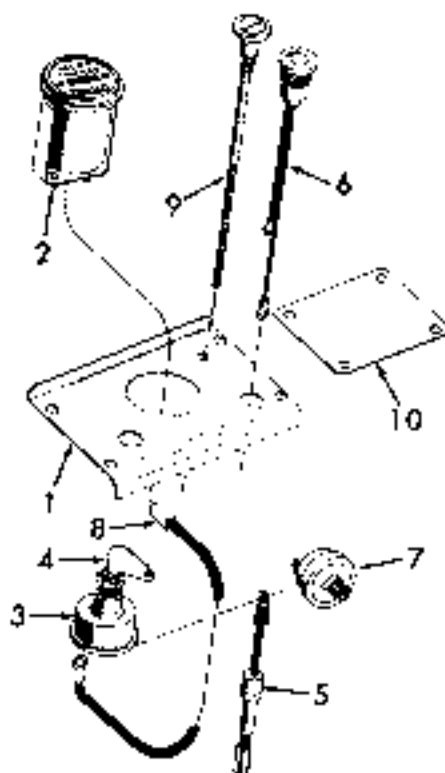


Fig. 2c

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
FRAME AND COUNTERWEIGHT			
1	3EA6104	Frame - main	1
2	35A8289	Plug - magnetic, 3/4"-16, recessed sq. hd. (35A3254)	1
3	35A7334	Bolt - frame to drive train, 5/8"-11 x 1-1/2"	4
4	35A8926	Bolt - frame to drive train, R.H., upper, 5/8"-11 x 1-7/8"	4
5	3EA7115	Bracket - on top of hydraulic tank	1
6	36A7117	Support - bracket to drive train	1
		GM271540 - Bolt, hex., 5/8"-11 x 1-1/4"	4
		GM271547 - Bolt, hex., 5/8"-11 x 1-1/2"	4
		GM131018 - Washer, plain, 21/32" I.D., 1-5/16" O.D.	12
		GM124589 - Nut, hex., 5/8"-11	4
7	36A8326	Support - drive train, left hand axle (36A7225)	1
8	20H4567	Snap Ring - support (Tru-Axle 5238-E2)	1
9	36A7245	Tie - frame, right hand	1
10	35A7243	Tie Bar - frame, left hand side	1
		GM180177 - Bolt, hex., 1/2"-13 x 1-1/2"	4
21	35A7920	Eye - lifting, power train	1
		30A3662 - Bolt, hex., 1/2"-13 x 1-3/4"	2
12	36A8322	*Breather - with dip stick	1
13	35A8069	**Dipstick - hydraulic tank less breather	1
	35A7140	*Insulation - on hydraulic oil tank, 1" x 6" x 2"	1
		*NOTE: Used on MSA Trucks No. 28100011 Inc.	
		**NOTE: Used on MSA Trucks No. 28100012 and after.	
14	-----	Counterweight - MSA 20-25 (Order from Mobilift Sales Dept.)	1
		GM271750 - Bolt, hex., 5/8"-18 x 2-1/2"	4
		GM131018 - Washer, plain, 21/32" I.D., 1-5/16" O.D.	4
15	35A6198	Stud - counterweight, 3/4" x 4-1/4"	4
		GM131017 - Washer, plain, 21/32" I.D., 1-1/2" O.D.	4
		GM420399 - Nut, hex., 3/4"-16	4
16	36A8368	+Cover - chain	1
17	36A5660	--Cover - chain	1
		+NOTE: Used on MSA 20, 20 II, 25 and 25 II to No. 28100015 Inc.	
		++NOTE: Used on MSA 20 II and 25 II No. 28100010 and after.	
18	35A4404	Counterweight - auxiliary, for MSA 25	2
		GM280175 - Bolt, hex., 1/2"-13 x 1-3/4"	4
		GM120396 - Washer, plain, 17/32" I.D., 1-1/16" O.D.	4
		GM100462 - Fitting, grease, 1/8" x 90°	2
19	36A9128	Shield - engine throat and frame	1

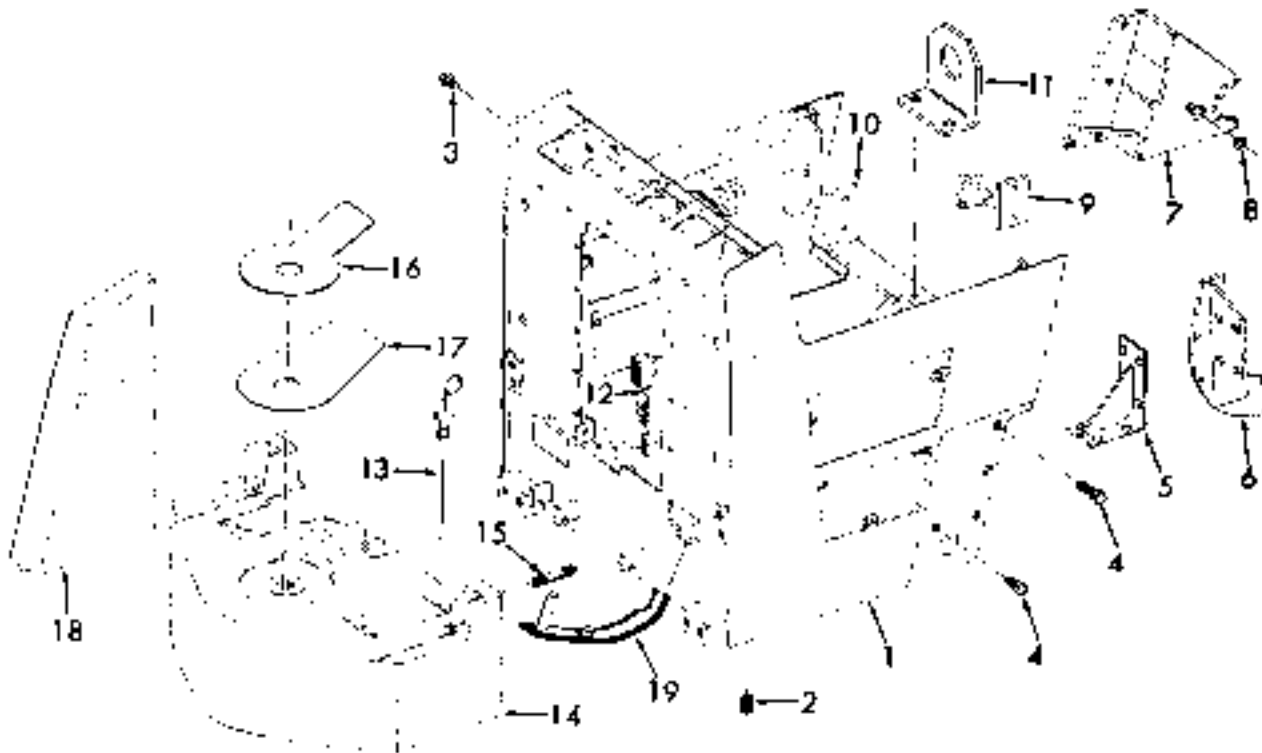


Fig. 28

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	Qty. Per
HOOD AND OVERHEAD GUARD			
1	36A6411	Hood	1
		GM160677 - Bolt, hex., 5/16"-16 x 3/4"	4
2	35A3736	Bar - angle, hood bumper, 31-1/2" long (35A642e)	1
		GM160122 - Bolt, hex., 3/8"-16 x 1"	2
3	10A13467	Groundnut - bumper bar	4
4	36A1667	Catch - hood	1
		GM160016 - Bolt, hex., 1/4"-20 x 1/2"	1
5	35A7274	Galle	2
6	35A9181	Cover - lower left hand (35A726a)	1
7	35A6874	Cover - lower right hand	1
		GM120633 - Screw, round head, 1/4"-20 x 5/8"	10
		50A4870 - Fastener, screw	10
8	35A7673	*Baffle - engine, left hand side	1
		*GM160677 - Bolt, hex., 5/16"-16 x 3/4"	2
		*GM120233 - Washer, flat, 11/32" I.D., 11/16" O.D.	2
9	35A7746	**Insulation - hood, 3/4" x 24" x 30"	1
10	35A3744	**Insulation - hood, 1" x 7-1/2" x 31"	1
11		**50A5062 - Insulation, hood, front, 1" x 10-1/2" x 31"	1
12		**50A5006 - Insulation, hood, center, 1" x 4" x 31"	1
		**50A5159 - Insulation, hood, hinge end, 1" x 5" x 30"	1
13	36A6787	**Baffle - fuel tank, R.H. side	1
14	36A8731	**Baffle - fuel tank, front	1
		**50A3666 - Bolt, hex., 5/16"-14 x 3/4"	2
15	35A6733	**Baffle - engine, side	1
16	35A8734	**Baffle - engine, front	1
		**50A3996 - Screw, slotted machine, #10-24 x 5/8"	18
		**50A3771 - Nut, tinnermans, #10-24	13
		**50A4682 - Screw, hex., self tapping, #20-24 x 3/8"	2
		**50A4242 - Washer, internal lock, #10	2
17		**50A3774 - Plug, baffle, 5/8", (for gasoline trucks)	2
18		**50A3693 - Plug, baffle, 1-1/4" (for gasoline trucks)	1
19	36A9112	**Baffle - upper, 2-3/8" x 14-1/4"	1
20	36A9367	**Baffle - center	1
21	36A9114	**Baffle - lower	1
		**50A8096 - Screw, slotted machine, #10-24 x 3/8"	4
		**50A3771 - Nut, tinnermans, #10-24	4
		**50A8666 - Bolt, hex., 3/8"-10 x 1"	1
22	35A9121	**Insulation - baffle, upper, 1/2" x 13-1/2" x 14-8/16"	1
23		**50A5157 - Insulation, baffle, center	1
24	35A9122	**Insulation - baffle, lower, U-shaped, 1/2" x 13" x 15-1/8"	1
25	36A9140	**Insulation - baffle, vertical, 1/2" x 8-1/4" x 25-3/8"	1
		*NOTE: Used on MSA 20 and 25 Lift Trucks to No. 28100437 Inc.	
		*NOTE: Used on MSA 20 II and 25 II Lift Trucks No. 28100438 and after.	
26	35A6709	Link - hood latch, lower, on units less overhead guard	2
27	35A8173	Link - hood latch, lower, on units with overhead guard	2
28	D694	Shaft - link to control bracket and hood, 3/8" x 1-5/8"	2
29	35A6969	Spacer - between links, on shaft	1
30	36A6718	Shaft - links, 5/16" x 2-7/16"	2
		GM103878 - Pin, center, 3/32" x 3/4"	8
31	35A6970	Hook - spring, on shaft	1
32	36A6972	Spring - tension, on lower shaft	1
33	MC140	Spacer - link	1
34	36A6714	Link - hood latch, upper, on units less overhead guard	2
35	36A8172	Link - hood latch, upper, on units with overhead guard	2
		GM103340 - Washer, plate, 11/32" I.D., 11/16" O.D.	4
36	10A8657	Spacer - link, upper	1
37	-----	Guard - overhead (35A48E2), order from Mobilift Sales Dept.	1
		50A8604 - Bolt, hex., 3/8"-16 x 3/4"	2
		50A2778 - Bolt, hex., 1/2"-13 x 2"	6

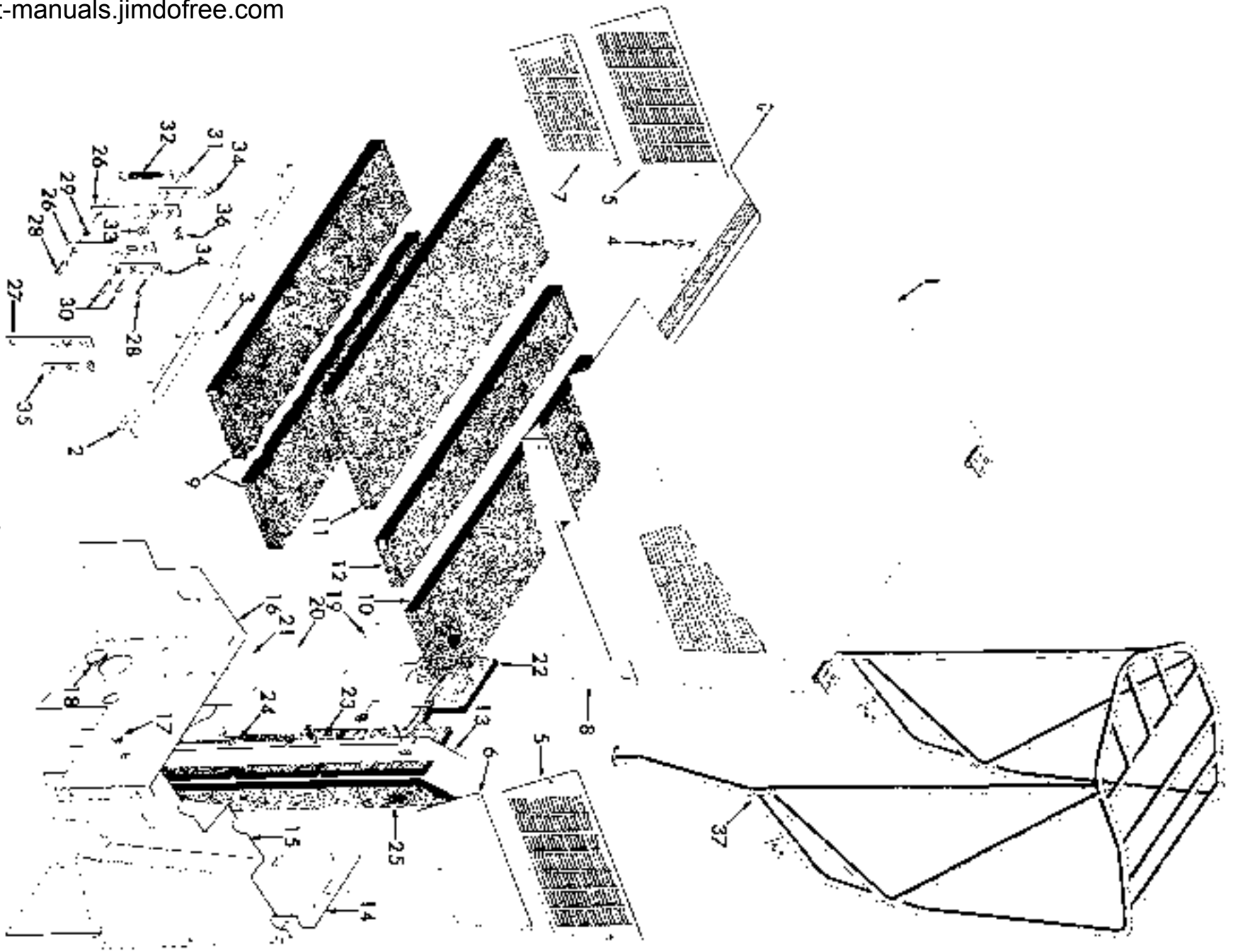


Fig. 30

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
		OIL LINES AND FILTER	
		Group 1	
		Used on MSA 20, 20M, 25, and 25 II Lift Trucks to No. 28100815 Inc.	
1	35A7765	*Filter - assembly	1
		Includes the following 4 parts:	
		*GM180124 - Bolt, hex., 3/8"-16 x 1-1/4"	2
		*GM120377 - Nut, hex., 3/8"-16	2
2	10P1869	*Cover - top, casting	1
		*GM181411 - Bolt, hex., 7/16"-20 N.F. x 3"	1
		*GM116104 - Washer, copper, 29/64" I.D., 1/16" thick	1
3	10P1852	*Gasket - cover, 3-9/16" O.D.	1
4	85P1812	*Element - filter	1
5	10P1885	*Shell - assembly	1
5A		*GM105687 - Elbow, filter, 1" x 90°, street elbow	3
6	35A8046	*Hose - spacer, 1" I.D., 1-1/4" O.D. x 1-1/4" long	1
7	35A8045	*Nipple - pipe, filter hose, 1" x 2"	3
8	35A8047	*Hose - filter to tank, 1-1/4" I.D. x 17-1/2"	1
9	35A8048	*Hose - filter to pump, 1-1/4" I.D. x 9"	1
		*NOTE: Used on Lift Trucks to No. 28100011.	
10	35A8015	**Filter - assembly, 6-1/2" O.D. x 4-13/16" long	1
11	35A8018	**Valve - filter	1
12	35A8083	**Gasket - filter	1
13	35A8026	**Cover - hydraulic filter	1
		**50A8666 - Bolt, hex., 5/16"-18 x 1"	6
		**50A4221 - Washer, plain, 5/16"	6
14		**50A1749 - Stat-o-seal, cover, 5/16"	6
15		**GMP402568 - Elbow, cover, 1" pipe to 1-5/16" JIC-90°	1
16	35A7921	**Tube - filter	1
17	35A8062	**Hose - tank to pump, 1" I.D. x 9"	1
18	35A8041	**Tube - hose to pump	1
19	35A8051	**Breather - reservoir, on tube	1
20		**GM144112 - Elbow, tank breather port, 1/4"-90°	1
21	35A8054	**Nipple - tee, 1/4" pipe x 2" long	1
22	35A8087	**Hose - vent, to breather, 1/2" I.D. x 21" long	1
		**50A4308 - Clamp, hose, 3/4"	2
		**NOTE: Used on Lift Trucks No. 28100012 and after.	
23	35A8049	Clamp - hose, worm type	4-2
24		GM9410976 - Elbow, valve inlet, 7/8"-14 x 90°	1
25		GM9411106 - Connector, pump outlet, 7/8"-14 x 45°	1
26	10A16265	"O" Ring - elbow and connector	2
27	35A7727	Hose - with tube assembly, pump to valve	1
28	35A4855	Hose - hydraulic tank to transmission	1
29		50A4746 - Nipple, tee-in, transmission case, 1-1/2" x 2-1/2"	1
		GM105432 - Clamp, hose, 2-1/4"	2
31	10A16006	Nipple - valve outlet, 2-1/2" long	1
32	35A3119	Elbow - valve, 3/4" x 90°	1
		GM444637 - Plug, pipe, hex. head, 3/4"-14 N.P.T.	1
33	35A7037	Nipple - tee, hose to elbow, 1" I.D. x 5-1/2"	1
34	35A6484	Hose - valve outlet to tank	1
		GM105475 - Clamp, hose, 1-3/8"	2
35	35A5118	Hose - valve to lift cylinder	1
36		50A4422 - Elbow, valve to hose, 7/8"-14 x 45°	1
37		GM9410294 - Connector, lift cylinder, straight, 7/8"-14	1
38	10A16285	"O" Ring - elbow and connector	2
39		GM9410976 - Elbow, pump, flow divider and valve transmission	2
40	10A16403	"O" Ring - elbow, pump flow divider to transmission valve	2
		50A4306 - Clamp, hose, lift cylinder	1
41	10A5814	Spring - clamp	1
42	35A7680	Anchor - spring, on transmission case	1
		50A749 - Strap, hose	1
43	35A7124	Hose - pump to transmission valve	1
44	35A4342	Hose - vent	1

MSA SERIES LIFT TRUCKS

Ref. No	Part No	DESCRIPTION	No. Pos
OIL LINES AND FILTER (Cont'd)			
45		GM940989 - Tee, vent line to transmission, 1/8".....	1
46		GM141117 - Elbow, vent line, 1/8" -45° street.....	1
47	35A 7073	Nipple - tee to elbow, 1/8" I.D. x 1-1/2".....	3
49	56A 4340	Hose - vent, 3/8" I.D. x 21-1/2".....	1
		GM145619 - Clamp, hose, 3/8".....	4
49	25A 5001	Restrictor - reducer, valve tilt port, lower, 3/4"-18 to 9/16"-18 x 1-1/16".....	1
50	95A 0632	Bushing - reducer, in valve tilt port, upper, 3/4"-10 to 9/16"-18 x 1-1/16".....	1
		50A2776 - Clip, tilt hose, R.H. side.....	1
		50A3337 - Clip, tilt hose, L.H. side.....	1
		50A2776 - Clip, lift cylinder hose, R.H. side.....	1
51	10A 12012	"O" Ring - bushing.....	2
32		GM9410976 - Elbow, valve, 9/16"-18 x 90°.....	6
52	10A 16405	"O" Ring - elbows, 9/16"-18 x 90°.....	6
54	30A 7367	Hose - valve to tee, back tilt, 14" long.....	1
56	35A 7553	Hose - valve to tee, forward tilt, 1E" long.....	1
50		GM9410230 - Elbow, hose to tee, 9/16"-19 x 90°.....	2
37		50A2891 - Tee, oil lines, 9/16"-19.....	2
58	85A 7084	Hose - tilt cylinder, rear left hand, 38" long.....	1
58	35A 7555	Hose - tilt cylinder, front left hand, and rear and front for right hand, 45".....	2

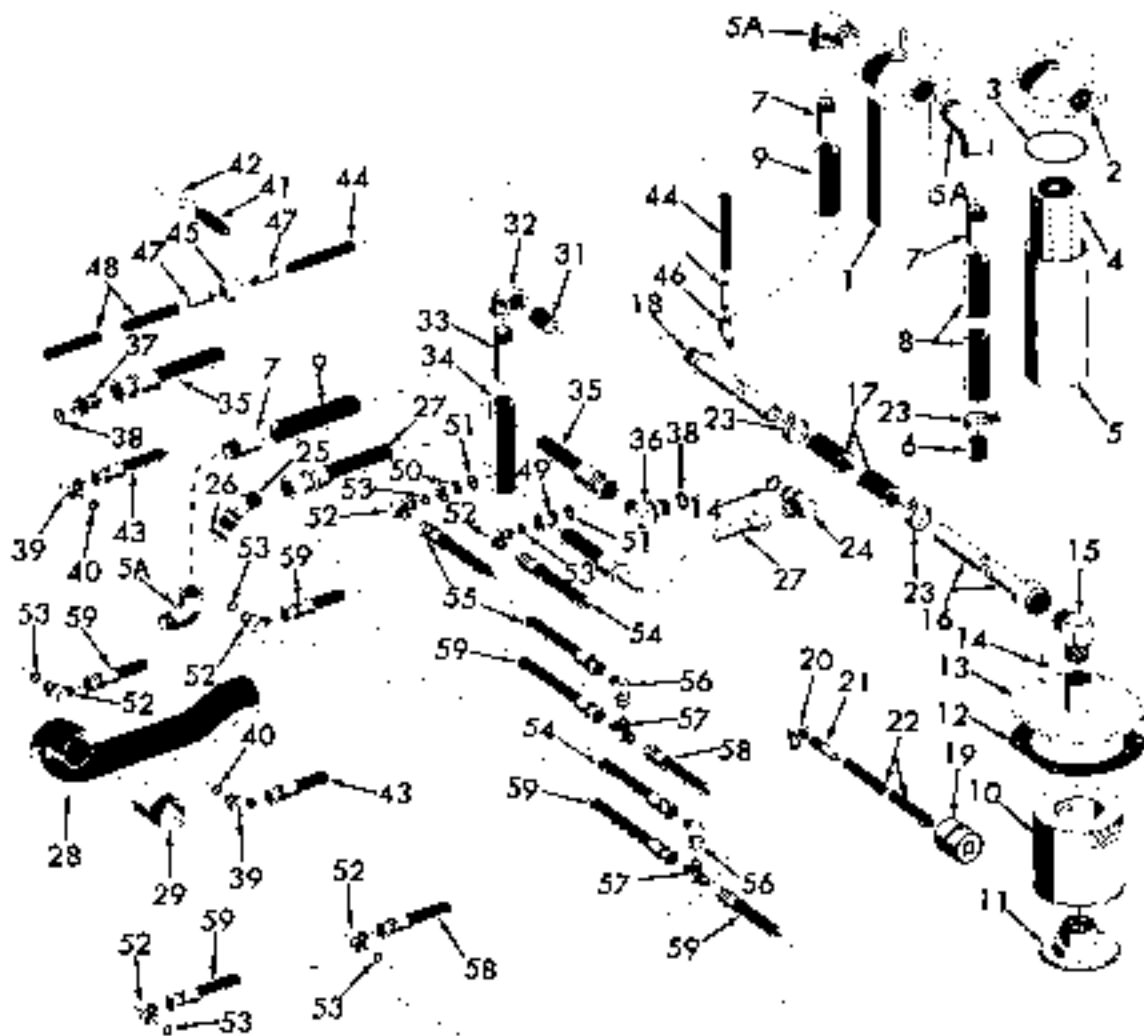


Fig. 3:

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
OIL LINES AND FILTER			
Group II			
Used on MSA 20 II and 25 II No. 2810061E and after.			
1	35A8018	Filter - assembly, 5-1/8" O.D. x 4-13/16" Long	1
2	35A8019	Valve - filter	1
3	35A8033	Gasket - filter	1
4	35A8018	Cover - hydraulic filter	1
		50A3657 - Bolt, hex., 5/16"-19 x 1-1/4"	6
		50A4221 - Washer, plain, 3/8" I.D., 7/8" O.D.	6
		50A4749 - Star-o-seal, cover bolts, 5/16" I.D.	6
		50A4830 - Elbow, cover, 1-3/4" pipe to 1-5/8"-12 JIC-90°	1
7	35A8021	Tube - filter, curved, 1-1/4" O.D. x 20-1/4" long	1
8	35A8014	Hose - tube to pump, 1-1/4" I.D. x 4" long	1
9	35A8049	Clamp - hose, worm type	2
10	35A8051	Breather - reservoir, on tube	1
11		50A4759 - Clip, hose to frame	1
12		GM144112 - Elbow, tank breather port, 1/4"-90°	1
13	35A8054	Nipple - tee, 1/4" pipe x 2" long	1
14	35A8037	Hose - vent to breather, 1/2" I.D. x 21" long	1
15		50A4356 - Clamp, hose, 3/4"	2
16		GM941097R - Elbow, valve inlet, 7/8"-14, 90°	1
17		GM9411106 - Elbow, pump outlet, 7/8"-14, 45°	1
18	10A16235	"O" Ring - elbow and connector	2
19	35A7727	Hose - with tube assembly, pump to valve	1
20	35A4055	Hose - hydraulic tank to transmission	1
21		50A4746 - Nipple, tee, transmission case, 1-1/2" x 2-1/2"	1
22		GM105482 - Clamp, hose, 2-1/4"	2
23		50A4505 - Nipple, valve outlet, 3/4" x 2"	1
24	35A8119	Elbow - valve, 3/4" x 90°	1
25		GM444837 - Plug, pipe, hex. head, 3/4"-14	1
26	35A7087	Nipple - tee, hose to elbow, 3/4" pipe x 3" long	1
27	35A8454	Hose - valve outlet to tank	1
28		GM105475 - Clamp, hose, 1-3/8"	2
29	35A8114	Hose - valve to lift cylinder	1
30		50A4422 - Elbow, valve to hose, 7/8"-14, 45°	1
31		GM9410204 - Connector, lift cylinder, straight, 7/8"-14	1
32	10A16235	"O" Ring - elbow and connector	2
33		GM9410976 - Elbow, pump, flow divider and transmission valve	2
34	10A16405	"O" Ring - elbow	2
35	35A7124	Hose - pump to transmission valve	1
36	35A4342	Hose - vent, 2/2" I.D. x 26-1/2"	1
37		GM9409939 - Tee, vent line to transmission, 1/2"	1
38		GM144117 - Elbow, vent line, 1/2"-45° street	1
39		50A2394 - Nipple, tee and elbow, 1/8" I.D. x 1-1/2"	3
40	35A4340	Hose - vent, 3/8" I.D. x 21-1/2" long	1
41		GM145619 - Clamp, hose, 5/8"	4
42	35A5001	Restrictor - reducer, valve inlet, lower, 3/4"-18 to 3/16"-18 x 1-1/16"	1
43	35A5002	Bushing - reducer, in valve inlet port, upper, 3/4"-18 to 3/16"-18 x 2-1/16"	1
44	10A12012	"O" Ring - restrictor and bushing	2
45		50A4539 - Tee, valve, 3/16"-18	2
46	10A16405	"O" Ring - tee and elbows	6
47		35A4223 - Elbow, lift cylinder ports, 9/16"-15 J.I.C.	4
48	35A5200	Hose - with tube assembly, lift cylinder, R.H. rear port to control valve	1
49	35A5202	Hose - with tube assembly, lift cylinder, R.H. front port to control valve	1
50	35A5195	Tube - lift cylinder, L.H., tee to tube and hose, rear port	1
51	35A5204	Hose - with tube assembly, lift cylinder, L.H., rear port to tube	1
52	35A5197	Tube - lift cylinder, L.H., tee to tube and hose, front port	1
53	35A5205	Hose - with tube assembly, lift cylinder, L.H., front port to tube	1
54		50A4637 - Clip, hoses	2
		50A3655 - Bolt, hex., 5/16"-18 x 2/4"	2
		50A3730 - Nut, hex., 5/16"-18	1

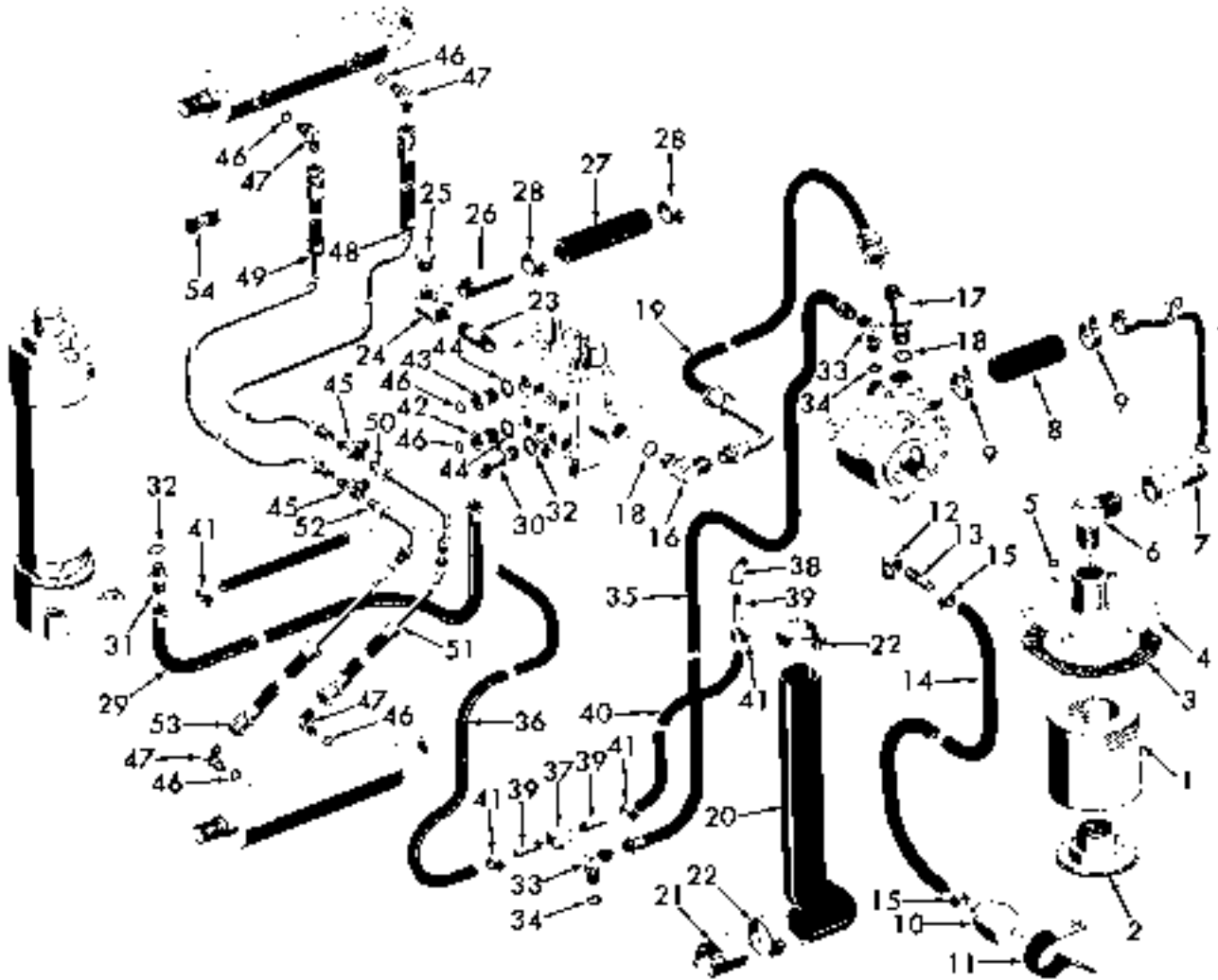


Fig. 32

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
HYDRAULIC PUMP			
Group 1			
Used on MSA 20, 20 II, 25, and 25 II Lift Trucks to No. 23100615 Inc.			
1	35A39E0	Pump - hydraulic, with flow control valve, 16.7 G.P.M. (Webster No. 2YDS2-RA) Includes the following 24 parts:	1
		50A1629 - Bolt, hex., 3/8"-16 x 4"	2
2	35F1253	Shaft - drive, with gear	1
3	85P1255	Gear - idler, with idler shaft	1
4	35F1255	Body - pump, assembly	1
		Includes the following part:	
5	35F207	Bearing - needle, drive and idler shafts	2
6	35P1267	Retainer - with oil seal	1
		Includes the following part:	
7	86P1206	Seal - Oil	1
8	10P1366	Screw - pan head, thread cutting, #10-24 x 3/8"	4
9	10P2327	Seal - "O" ring, retainer, 3/32" x 1-3/4" x 1-5/16"	1
10	35P1290	Plate - gear	1
11	10P2025	Pin - dowel, 3/8" x 1-11/32"	2
		50A3761 - Bolt, hex., 3/16"-18 x 2-1/4"	6
12	10P2015	Plate - wear, body end	1
13	10P2014	Plate - wear, cover end	1
14	10P2018	Seal - wear plate, cover, rubber	2
15	35P254	Seal - wear plate, inner, rubber	2
16	35P251	Ring - back-up, wear plate seal, ivory	2
17	10P2021	Seal - "O" ring, 3/8" I.D.	2
18	35P1256	Cover - pump, outer	1
		Includes the following part:	
19	35P297	Bearing - needle, drive and idler shafts	2
20	35P1292	Body - flow divider	1
		50A3653 - Bolt, hex., 5/16"-18 x 1-1/2"	3
21	86P1291	"O" Ring - body, flow divider to pump cover	2
22	10P1391	Piston - flow divider	1
23	10P1592	Spring - flow control piston, 27 coil, 2-1/4" long	1
24	10P1393	Plug - flow control piston, 3/4"-18 N.F.	1
25	85P1294	"O" Ring - plug, 3/4"	1
26	35P293	Valve - relief	1
27	35P1293	Spring - relief valve, 1" long	1
28	35P292	Plug - relief valve spring	1
29	35P292	Shim - relief valve	A.R.
30	35A443U	Shim - pump to cover, green, .003	A.R.
30	35A443A	Shim - pump to cover, blue, .005	A.R.
30	35A444U	Shim - pump to cover, yellow, .020	A.R.
30	35A8224	Shim - pump, metal, .003	A.R.
30	35A8223	Shim - pump, metal, .005	A.R.
30	35A8225	Shim - pump, metal, .010	A.R.
30	35A8222	Shim - pump, metal, .020	A.R.
31	35A4145	Spacer - pump to cover, 3/32" x 2-11/32" I.D. x 2-7/32" O.D.	1

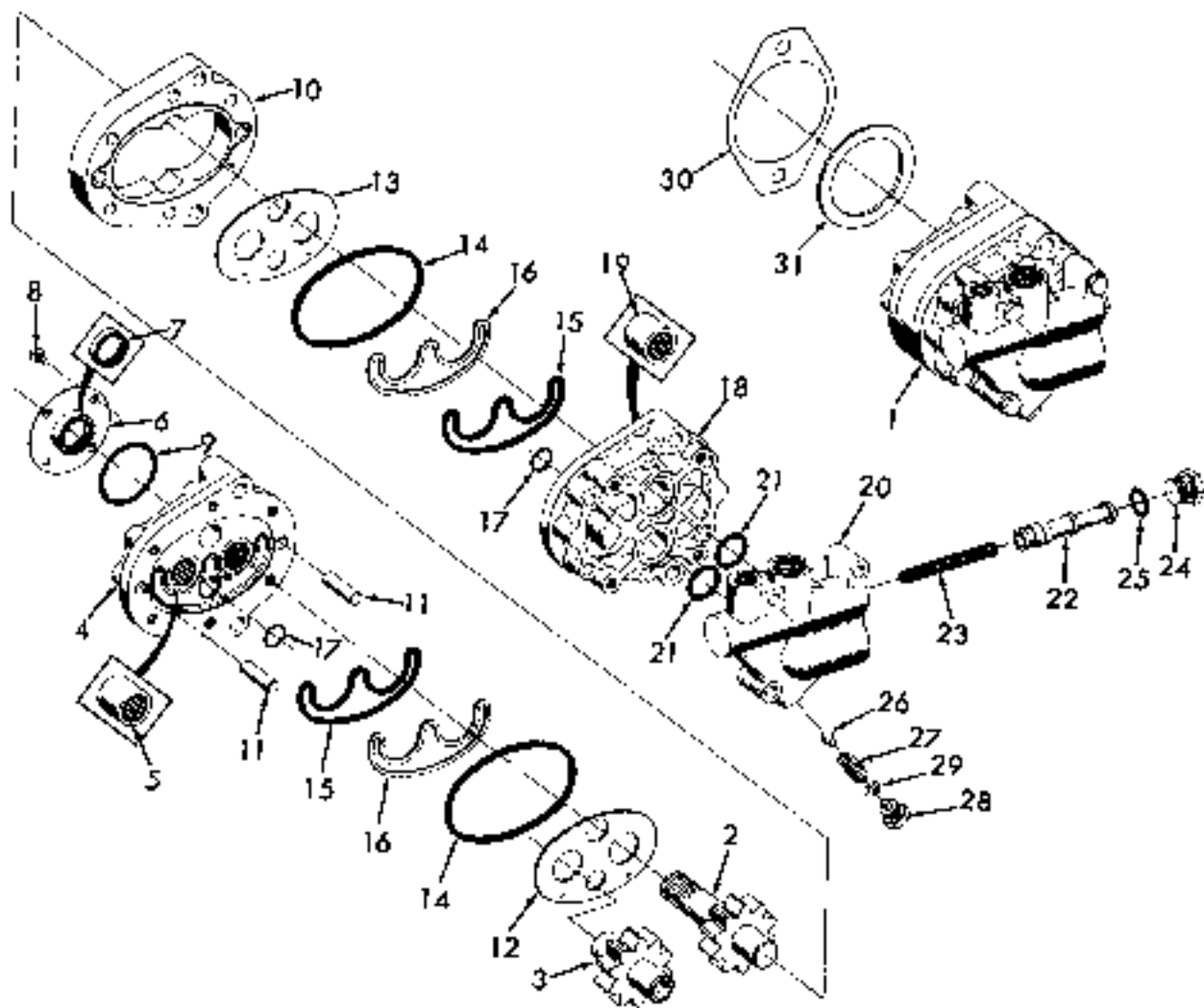


Fig. 88

Ref. No.	Part No.	DESCRIPTION	No. Pos.
		HYDRAULIC PUMP Group II	
		Used on M5A 20 II and 25 II Lift Trucks No. 29100616 and after.	
1	*****	Pump - hydraulic (Webster No. 2YLD54-05), for replacement order 10A21659 pump; and 10A21286 flow divider.....	1
		Consists of Ref. No. 2 through 86:	
2	10A24659	Pump - hydraulic	1
		Includes Ref. No. 3 through 29:	
		30A1929 - Bolt, hex., 3/8" -16 x 4'	2
3	35P2058	Body - assembly, front	1
4	10P3074	Cover - assembly, rear	1
		Each includes the following parts:	
5	35P207	Bearing - needle, drive and idler shafts	4
6	35P2059	Shaft - drive, with drive gear	1
7	35P1287	Retainer - with oil seal	1
		Includes the following part:	
8	35P1290	*Seal - oil	1
9	10P196E	Screw - pan head, std. cutting, No. 10-24 x 3/3"	4
10	10P2027	*Seal - "O" ring, retainer, 1-3/4" I.D. x 1-15/16" O.D.	1
11	35P2069	Gear - idler.....	1
12	85P2061	Plate - gear, .8011 thick	1
13	35P2062	Pin - dowel, gear plate, 3/8" x 1-7/16"	2
		50A3E72 - Bolt, hex., 3/8" -16 x 2-3/4"	6
14	10P2019	Plate - wear, pump body	1
15	10P2014	Plate - wear, pump cover.....	1
16	10P3077	*Seal - wear plate, outer, rubber	2
17	85P284	*Seal - wear plate, inner, rubber	2
18	10P3067	*Ring - back-up, wear plate seal	2
19	10P2021	*Seal - "O" ring, 5/8" I.D., 3/4" O.D. (35P287)	2
20	35P2031	*Seal - "O" ring, manifold to pump	2
21	10A24238	Flow Divider - assembly	1
		Includes Ref. No. 22 through 29:	
22	85P2038	Piston	1
23	10P1592	Spring - piston, 27 coils	1
24	10P1596	Plug - piston and spring, 3/4" -16 N.F.	1
25	35P1294	Seal - "O" ring, plug, 7/8" O.D.	1
26	30P2034	Valve	1
27	35P2065	Spring - valve	1
28	85P288	Shim - valve spring	A.R.
29	35P292	Plug - valve, 1/2" -20 N.F.	1
30	35P2039	Bolt - hex. socket, 5/16" -18 x 1-3/4"	4
	35R69	*Kit - seals	1
		NOTE: These parts identified with an asterisk () are included in seal kit.	
31	35A4439	Shim - pump to cover, green, .003	A.R.
31	35A4488	Shim - pump to cover, blue, .005	A.R.
31	35A4440	Shim - pump to cover, yellow, .026	A.R.
31	35A4224	Shim - pump, metal, .003	A.R.
31	35A5223	Shim - pump, metal, .005	A.R.
31	35A5205	Shim - pump, metal, .010	A.R.
31	35A5222	Shim - pump, metal, .020	A.R.
32	35A4145	Spacer - pump to cover, 3/32" x 2-17/32" I.D., 3-7/32" O.D.	1

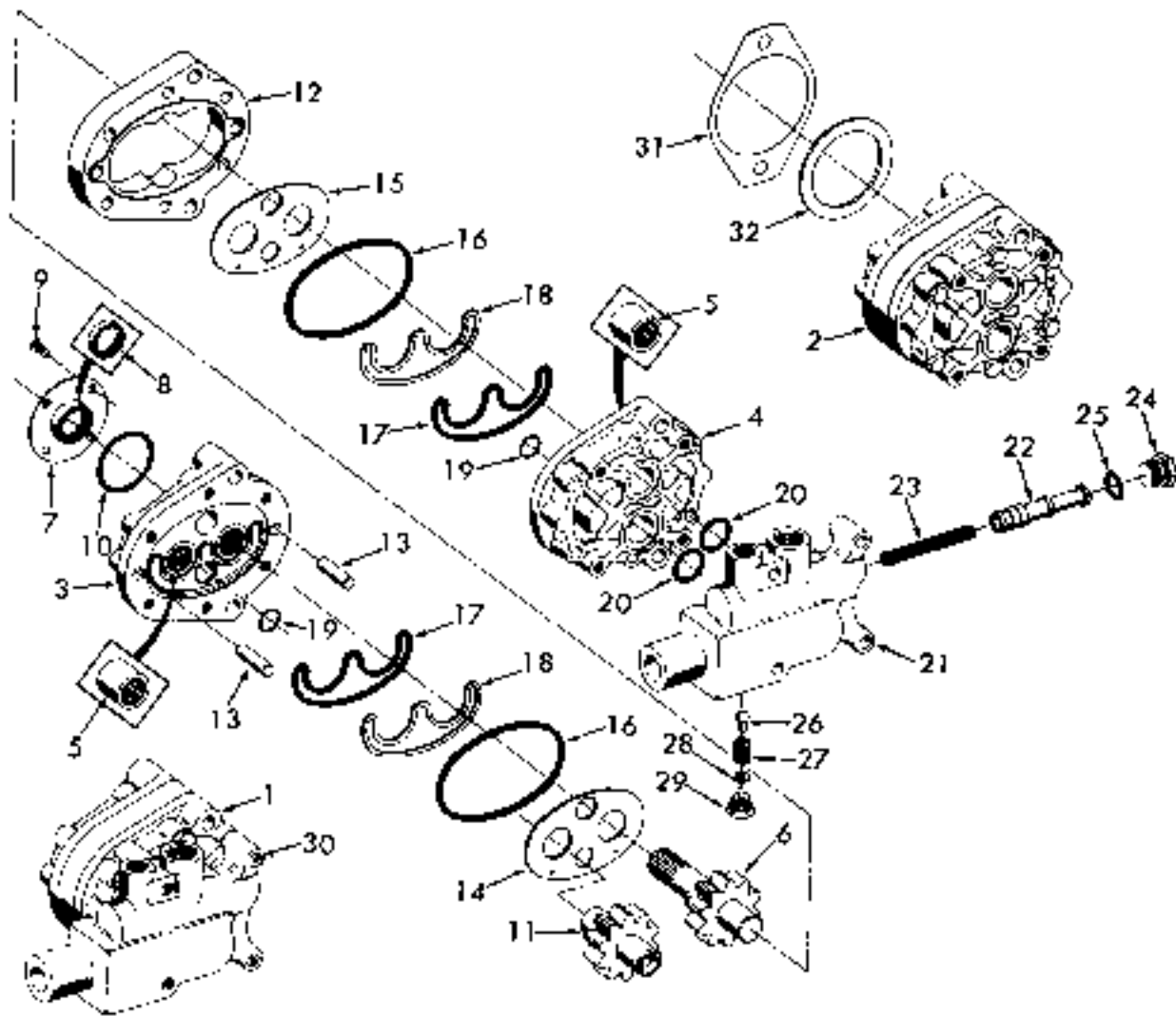


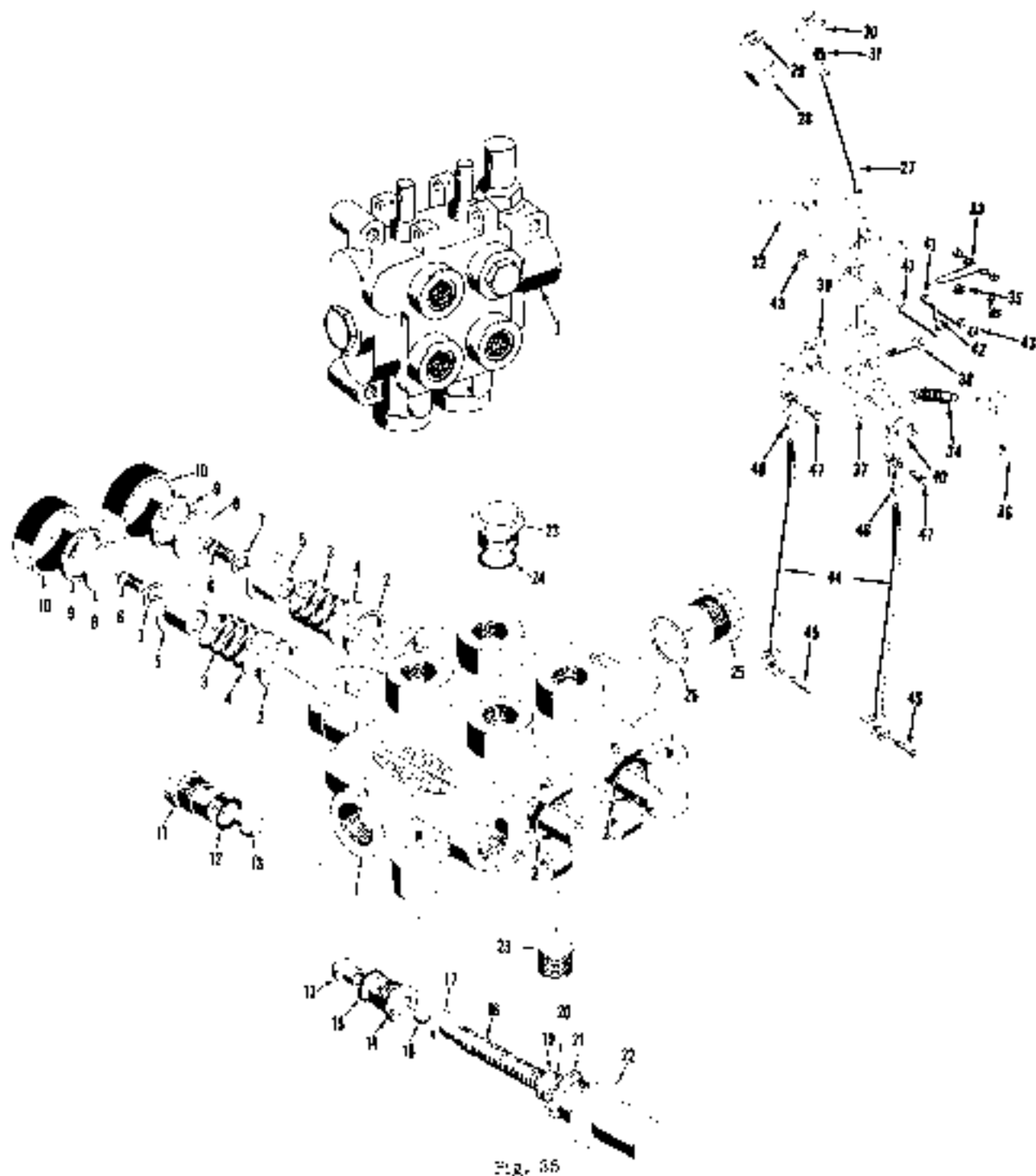
Fig. 34

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
MAST CONTROL LEVERS AND VALVE			
1	36A5903	Valve - mast control, assembly, MSA 20-25	1
1	36A5904	Valve - mast control, assembly, MSA 30-35	1
		Each includes the following 23 parts:	
		50A1825 - Bolt, hex., 3/8" - 18 x 2-1/2"	3
		GM120377 - Nut, hex., 3/8" - 16	8
2	15P660	Seal - spool	4
3	15P656	Spring - spool centering	2
4	10P1652	Washer - stop, centering spring	2
5	15P654	Collar - stop, centering spring	2
6	15P652	Bolt - stop collar	2
7	10P1650	Washer - lock, stop collar bolt	2
8	15P655	Disc - stop collar	2
9	15P657	Ring - susp, stop disc	2
10	15P662	Bonnet - rubber, spool opening	2
11	83P215	Plug - ball check	1
12	10A4522	"O" Ring - ball check plug	1
13	83P218	Plunger - check and relief valve	2
	20P4777	Spring - plunger, check valve	1
14	83P21E	Seat - relief valve	1
15	10A12012	"O" Ring - relief valve seat	1
16	35P227	Spring - relief	1
17	35P222	Guide - relief spring	1
18	35P213	Ball - relief guide	1
19	10A16483	Washer - spacer, relief spring	1
20	10A16480	Shim - relief spring	1
21	10A16457	Gasket - relief spring cap	1
22	35P220	Cap - relief spring	1
23	35P1248	Plug - port, 7/8" - 14 UNF	2
24	35P225	"O" Ring - port plug	1
25	35P1034	Plug - conversion	2
26	15P747	Gasket - conversion plug	2
27	36A3430	+Lever - control, lift and tilt (36A6032)	1
28	36A4119	Knob - control lever, for 36A6032 threaded lever	1
29	36A4189	Label - lever, lift and tilt, for 36A4119 knob	1
30	36A3E11	+Knob - control lever, solid, for 36A3430 lever	2
31		+50A4887 - Insert, knob	1
32	36A3422	+Bracket - lever mounting (36A3124)	1
		GM130082 - Bolt, hex., 1/4" - 20 x 1"	6
		GM120375 - Nut, hex., 1/4" - 20	6
33	36A7780	Spring - lever, used with 36A6032 lever	1
34	10A6314	Spring - lever	1
35	36A6039	Stop Washer - lever, used with 36A7780 spring	1
36	16A24261	+Bracket - spring, L-shaped, 4" long	1
		+50A3657 - Bolt, hex., 3/8" - 18 x 1-1/4"	1
		+50A1900 - Nut, hex., 3/8" - 16	1
	35K87	+Kit - control lever	1
		NOTE: 35K87 Kit includes parts identified with a cross (+), used to convert 36A6032 lever to new style lever 36A3430.	
37	50A6026	Pivot - lever	1
38	36A6684	Bolt - pivot bar	1
		50A1043 - Nut, hex., (Ema), 5/16" - 24	1
39	36A6159	Bell Crank - control lever, right hand	1
40	36A6149	Bell Crank - control lever, left hand	1
41	36A6096	Shaft - bell crank	2
42	36A6099	Lock Pin - shaft, used on 36A6096 shaft with only 1 groove for snap ring	1
43		50A1827 - Snap ring, shaft	1-2
44	36A6153	Link - connecting, valve to bell crank	2
		GM124829 - Nut, hex. jam, 3/8" - 12	2
45	13A12513	Swor - N. hd., 1/4" x 1-1/2"	2
		GM120393 - Washer, plain, 11/62" I.D., 11/16" O.D.	2

M5A SERIES LIPT TRUCKS

Ref. No	Part No.	DESCRIPTION	No. Pcs
MAST CONTROL LEVERS AND VALVE (Cont'd)			
48		GM193373 - Pin, cotter, 3/32" x 3/4".....	2
		GM174867 - Clevis, short, 3/16" x 24.....	2
		GM124820 - Nut, hex. jam, 5/16" x 24.....	2
17		GM124690 - Pin, clevis, 5/16" x 33/32".....	2
		GM193373 - Pin, cotter, 3/32" x 3/4".....	1



MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
TILT CYLINDER			
1	36A7284	Cylinder - assembly, 6" F, 11" B Includes the following 30 parts:	2
2	35P2249	Shell - assembly	2
3	35P1250	Piston - half	2
4	35P1251	Piston - half	2
5	35P2272	Seal - "O" ring, piston to rod	2
6	35P1252	Rider - nylon, piston	4
7	35P1253	Packing - assembly	2
8	35P1254	Rod - piston, 13-5/8" long	2
9	35P1255	Nut - piston rod	2
10	35P1256	Retainer - piston rod seals	2
11	35P2257	Bushing - piston rod retainer	2
12	10A7956	Seal - "O" ring, retainer to bushing	2
13	35P2258	Packing - assembly, retainer bushing	2
14	10A4729	Seal - "O" ring, retainer to outer shell	2
15	35P221	Ring - back-up, outer retainer seal	2
16	35P1259	Washer - threaded, with nylon peller	2
17	35P235	Peller - nylon	2
18	35P2200	Ring - wiper, piston rod	2
19	35B7235	End - piston rod, with bushing	2
20	15A13163	Bushing - piston rod end GM181648 - Bolt, hex. head, 3/8"-24 x 1-1/2" GM120368 - Nut, hex., 3/8"-24	2 2 2
E1	35A7236	Bearing - cylinder, head end	1
22	35A5301	Pin - cylinder, rod end, front, 1-1/4" x 3-1/4"	2
23	35A3588	Pin - cylinder, head end, rear, 1" x 2-5/16" (35A7256) 35A2352 - Pin, roll, 1/4" x 3" 35A4062 - Pin, roll, 1/4" x 1-3/8"	2 2 4

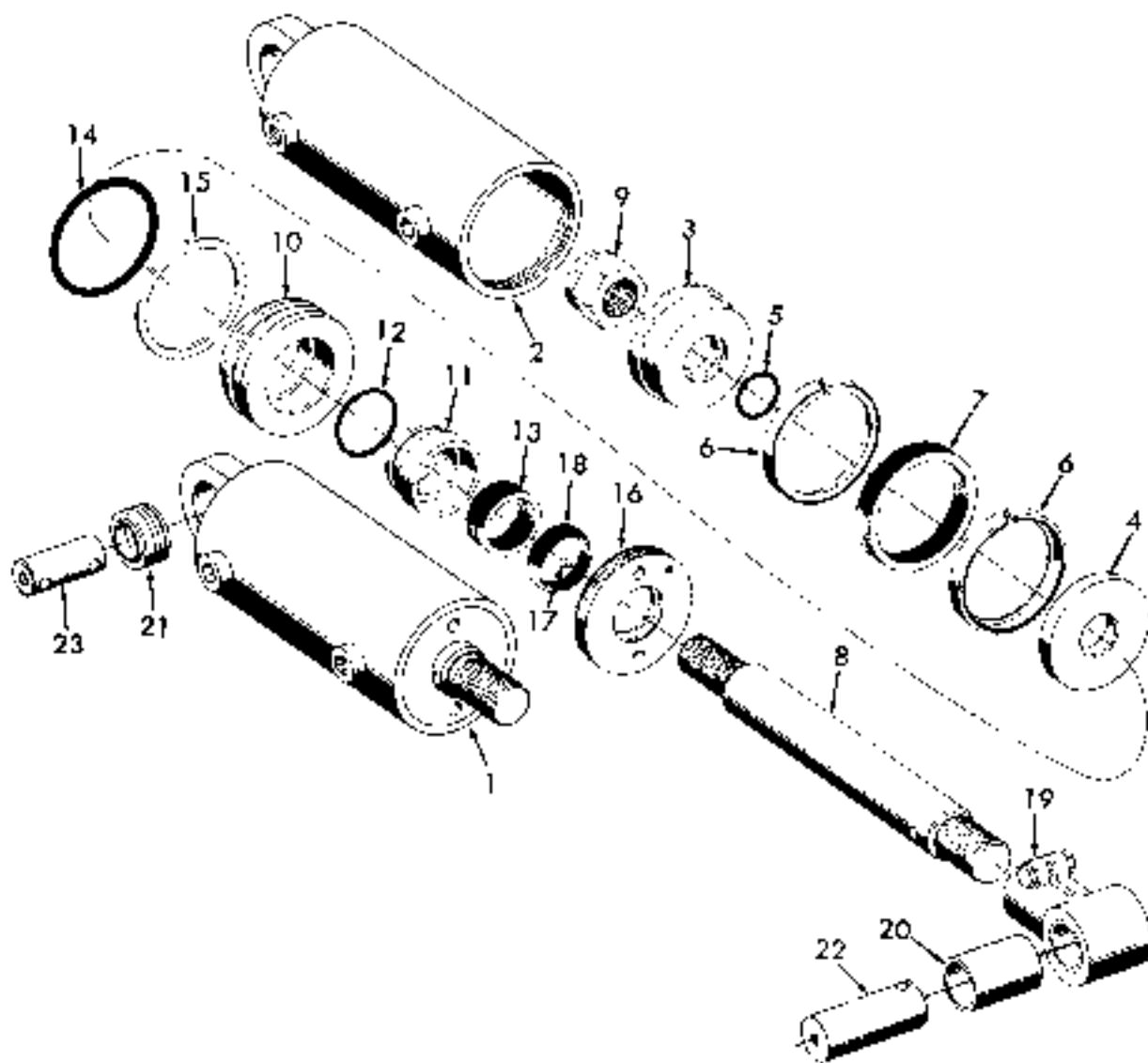


Fig. 38

M5A SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
		DUPLEX MAST	
1	-----	Rail - outer, assembly, see chart on page 72 Includes the following part:	1
		GM191738 - Fitting, grease, 1/8" straight	4
2	35A 6790	Screw - bearing cap, 1/2"-13 x 2-1/2"	4
3	35A 4046	Bushing - bearing cap	2
4	-----	Rail - inner assembly, see chart on page 72 Includes the following part:	1
4A	35A 3686	Pin - bearing, inner rail	6
5	35A 3692	Shoe - mast 50A1876 - Screw, hex. socket, 3/8"-16 x 5/8"	6 12
6	35A 3693	Shim - mast shoe	A, 2
7	35A 3601	Roller - mast	10
8	35A 3867	Bearing - mast roller	10
9		50A1877 - Ring, snap, mast bearing	10
10	30A1681	Ring - snap, mast bearing	10
11	-----	Carriage - assembly, Order from Mobilift Sales Dept. Includes the following part:	1
11A	35A 3688	Pin - bearing, carriage	4
12	35A 622	Bearing - thrust, carriage	4
13	35A 5459	Pin - thrust bearing 50A4135 - Set screw, socket head, cup point, 3/8"-16 x 1/2"	4 2
14	-----	Rack - load safety, Order from Mobilift Sales Dept. 50A232 - Bolt, hex., 5/8"-11 x 1-1/2" GM124347 - Nut, hex., 5/8"-11	1 6 6
	55A 6791	Bracket - mounting, load rack to carriage	2
15	-----	Chain - 4 x 8 lacing, No. BL54E, see chart on page 72	2
15	-----	Chain - 3 x 4 lacing, No. BL534, see chart on page 72	1
18	35A 3702	Anchor - chain, 2-1/2" long, for BL54E chain	2
18	35A 5510	Anchor - chain, 2-1/2" long, for BL534 chain	2
21	35A 4082	Pin - chain anchor, 16/64" x 1-5/16"	4
20	35A 8702	Anchor - chain, 4-1/4" long, for BL54E chain	2
20	35A 5509	Anchor - chain, 4-1/4" long, for BL534 chain	2
19	35A 8700	Pin - chain anchor, 5/8" x 1-3/4" long 50A1976 - Ring, retainer, anchor pin 50A1975 - Ring, retainer, chain pin	2 2 6
22	-----	Rod - chain anchor, see chart on page 72 GM124944 - Nut, hex., jam, 3/8"-18	2 6
	35A 4333	Nut - spherical, 3/8"-18	2
23	-----	Cylinder - lift, see chart on page 72 GM180126 - Bolt, hex., 3/8"-16 x 1-1/2" GM124829 - Nut, hex. jam, 3/8"-18	1 1 1
24	36A 3712	Head - piston GM102592 - Set screw, cup point, 3/16"-19 x 1/2"	1 1
25	35A 3604	Guide - piston head GM180173 - Bolt, hex., 1/2"-18 x 1-1/4"	2 4
26	35A 4207	Block - stop, outer rail GM180174 - Bolt, hex., 1/2"-18 x 1-1/8"	2 4
27	35A 6987	Sheave - chain, 3" dia.	4
25	35A 6995	Sheave - chain, 4-5/8" dia.	2
29	35A 0376	Bearing - sheave	6
30	35A 4079	Pin - sheave bearing, 2-3/8" long 50A2867 - Pin, roll, 5/32" x 5/8"	6 6
31	-----	Fork - lifting, see chart on page 72	2
32	35A 603	Pin - fork stop, 2-1/16" long	2
33	35A 669	Lever - stop pin	2
34	35A 607	Spring - stop pin 50A2882 - Pin, roll, 3/16" x 1"	2 2
	35A 4097	Washer - fork lock, 1/16" x 21/32" I.D., 7/8" O.D.	2
35	36A 3707	Latch - fork, includes bushing	1
36	10A 13028	Bushing - latch, 3/8" I.D., 3/8" long	1

MSA SERIES LIFT TRUCKS

Kit No.	Part No.	DESCRIPTION	No Per
DUPLEX MAST (Cont'd)			
37	35A4084	Pin - latch, 5/8" x 1-7/8"	1
		50A2884 - Pin, roll, 8/16" x 1-1/2"	1
38	35A3688	Cap - latch dog	1
39	85A8697	Plunger - latch dog	1
40	35A368E	Spring - latch dog	1
41	85A7949	Tube - vent, curved, 1/4" and 3/8" O.D.	1
42	Hose - vent tube, see chart on page 72	1
		50A9578 - Clamp, hose, 7/16"	2
43	35A7307	Elbow - vent hose, 90°, 1/4"-18" N.P.T.	1
44	85A7691	Strap - vent hose	2
		GM133073 - Screw, rd. hd., 1/4"-20 x 2-1/2"	2
45	85A1464	Spacer - vent hose	2

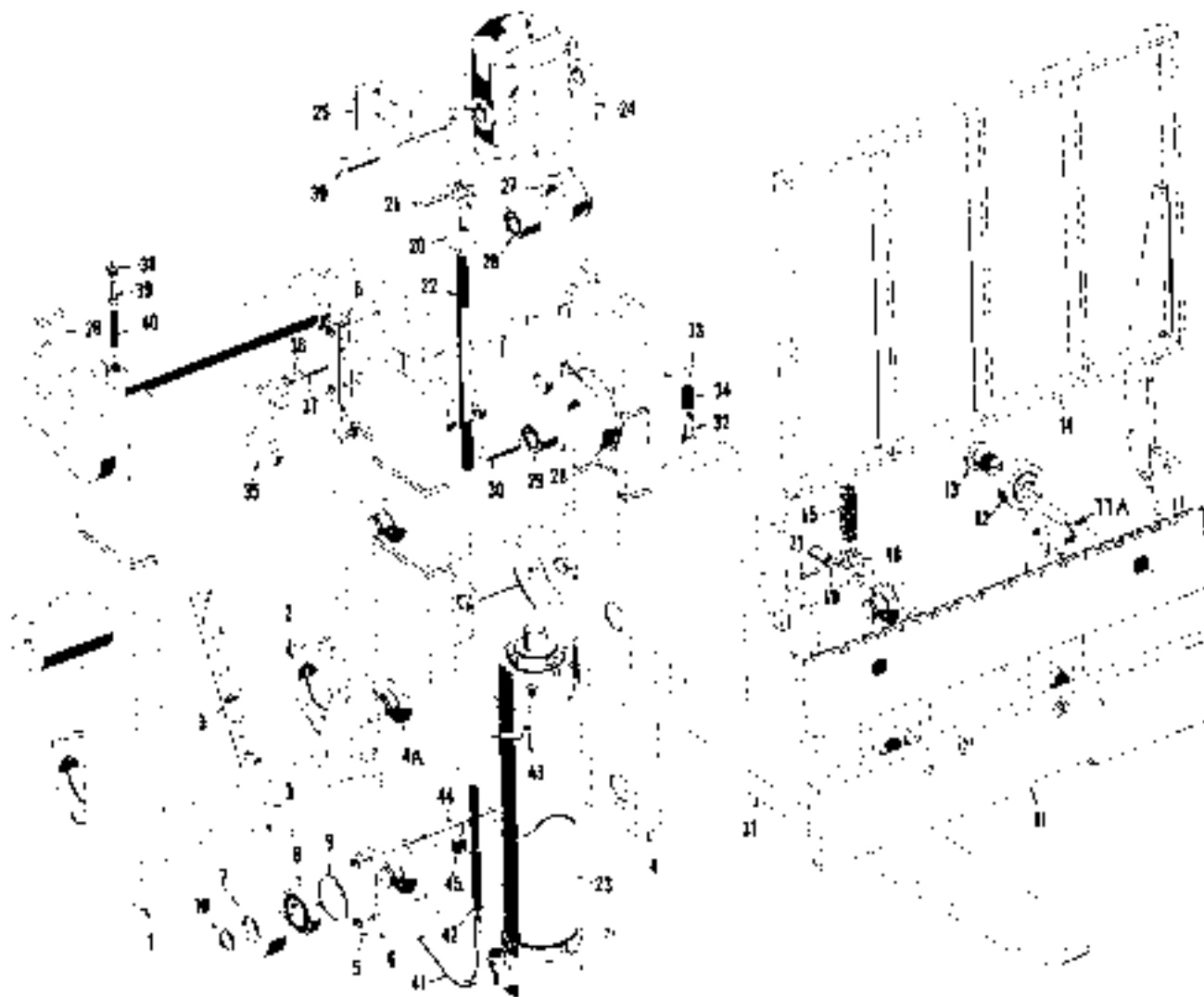


Fig. 37

MSA SERIES LIFT TRUCKS

Ref. No	Part No.	DESCRIPTION	No Per
DUPLEX LIFT CYLINDER			
1	35A7887	Cylinder - lift, complete, 34-7/8" long	1
1	35A7895	Cylinder - lift, complete, 39-7/8" long	1
1	35A7900	Cylinder - lift, complete, 43-3/8" long	1
Each includes the following 40 parts:			
2	35P1136	Shell - for 34-7/8" cylinder, for cylinders with 1/2" lock nut (Ref. 30)...	1
2	35P1455	Shell - for 34-7/8" cylinder, for cylinders with 3/4" lock nut (Ref. 30)...	1
2	35P1187	Shell - for 39-7/8" cylinder, for cylinders with 1/2" lock nut (Ref. 30)...	1
2	35P1456	Shell - for 39-7/8" cylinder, for cylinders with 3/4" lock nut (Ref. 30)...	1
2	35P1198	Shell - for 43-3/8" cylinder, for cylinders with 1/2" lock nut (Ref. 30)...	1
2	35P1457	Shell - for 43-3/8" cylinder, for cylinders with 3/4" lock nut (Ref. 30)...	1
3	35P693	Screw - button head, cylinder shell	1
4	35P632	*Screw - button head screw	2
5	35P1199	Tube - intermediate, for 34-7/8" cylinder	1
5	35P1200	Tube - intermediate, for 39-7/8" cylinder	2
5	35P1201	Tube - intermediate, for 43-3/8" cylinder	1
6	35P1202	Plunger - for 35-1/2" cylinder	2
6	35P1203	Plunger - for 40-1/2" cylinder	1
8	35P1204	Plunger - for 44" cylinder	1
7	35P189	*Ring - wiper, intermediate tube (35P1205 Inter.)	1
6	35P132	*Spring - garter, wiper ring	2
9	35P1207	Retainer - wiper ring	2
10	10A7346	*"O" Ring - retainer, 3-3/4" I.D., 4" O.D.	2
11	35P1209	Bushing - intermediate tube	1
12	35P1208	*"O" Ring - intermediate tube bushing, 2-3/8" I.D., 3-5/8" O.D.	1
13	35P1210	*Ring - back-up, "O" ring	1
14	35P1211	*Packing - tube bushing	1
15	35P1212	*Ring - wiper, plunger	1
16	35P1206	*Spring - garter, wiper ring	1
17	35P1213	Retainer - plunger wiper ring	1
18	35P174	*"O" Ring - wiper retainer, 2-1/2" I.D., 2-3/4" O.D.	1
19	35P1214	Piston	1
20	35P1215	*Packing - piston	1
21	10A7958	*"O" Ring - piston, inner, 1-1/2" I.D., 1-3/4" O.D.	1
22	35P1216	*Ring - back-up, "O" ring	1
23	35P1217	Ring - snap, piston retainer	1
24	35P1218	Bearing - intermediate tube	1
25	35P1219	Ring - bearing retainer	1
26	35P1220	Ring - snap, bearing	2
27	35P1268	Head - cylinder, for cylinders with 1/2" lock nut, ref. 30	2
27	35P1438	Head - cylinder, for cylinders with 3/4" lock nut, ref. 30	1
28	35P1222	*"O" Ring - cylinder head, 3-7/8" I.D., 4-1/8" O.D.	2
29	35P1439	*Ring - back-up, head "O" ring (35P1222)	1
29A	35P1400	*Ring - cylinder head, nylon, upper, for cylinders with 3/4" lock nut (Ref. 30)	2
	35R71	*Repair Kit - lift cylinder (35R69)	*
*NOTE: Repair Kit consists of the above items identified by an asterisk.			
30	35P1224	Nut - lock, cylinder head, for cylinders with 1/2" lock nut (Ref. 30)...	1
30	35P1461	Nut - lock, cylinder head, for cylinders with 3/4" lock nut (Ref. 30)...	1
31	35A4209	Spacer - intermediate tube, 1/4" x 3-2/8" O.D., for 34-7/8" and 39-7/8" cylinders	1
31	35A3453	Spacer - intermediate tube, 1" x 3-3/8" O.D. for 34-7/8" cylinder	1
32	35A4100	Spacer - plunger, 1/4" x 2-3/8" O.D., for 34-7/8" and 39-7/8" cylinder	1
33	35A4098	Spacer - plunger, 1" x 2-3/8" O.D., for 34-7/8" cylinder	1
34	35A7912	Spring - oil restrictor	1
34	35A7793	Washer - perforated, oil restrictor	1
35	35A7792	Spacer - oil restrictor	1
36	35A7793	Hat - sleeve	1
37	35P1221	Nut - end, cylinder top, 2-1/8" long	1
	35P1227	Lock Washer - top	1

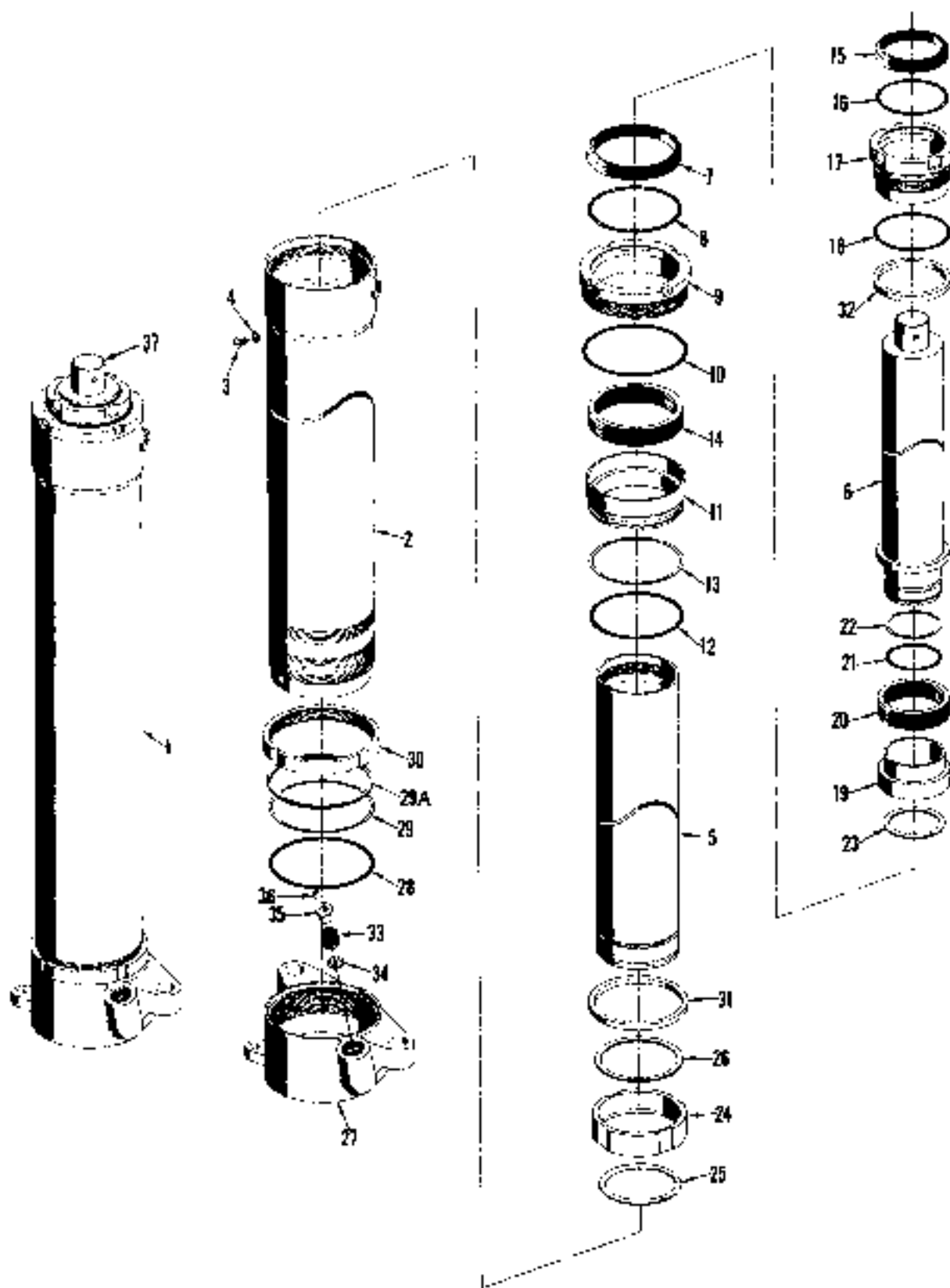


Fig. 28

MSA SERIES LIFT TRUCKS

VARIABLE PARTS CHART FOR DUPLEX MAST

Outer Rail	Inner Rail	Cylinder Assy.	Chain Assy. - BL546	Chain Assy. - BL534	Chain Anchor Rod	Vent Hose	Mast	
							M, F, H, L.	O. A. H. L.
36A 4210 - 60-1/2"	36A 4240 - 60-1/2"	35A 7882 - 32-3/8"	35A 4315 - 201 lks.	35A 8519 - 201 lks.	35A 4321 - 12"	35A 7328 - 19"	91"	68-1/2"
36A 4211 - 62"	36A 4241 - 62"	35A 7883 - 32-3/8"	35A 4315 - 201 lks.	35A 8519 - 201 lks.	35A 4322 - 15"	35A 7329 - 19"	94"	65"
36A 4212 - 68-1/2"	36A 4242 - 67-1/2"	35A 7884 - 32-3/8"	35A 4315 - 201 lks.	35A 8519 - 201 lks.	35A 4324 - 15"	35A 7328 - 19"	97"	66-1/2"
36A 4213 - 65"	36A 4243 - 65"	35A 7885 - 32-3/8"	35A 4315 - 201 lks.	35A 8519 - 201 lks.	35A 4326 - 21"	35A 7328 - 19"	100"	68"
36A 4214 - 68-1/2"	36A 4244 - 66-1/2"	35A 7888 - 34-7/8"	35A 4315 - 201 lks.	35A 8519 - 201 lks.	35A 4325 - 24"	35A 7329 - 21-1/2"	102"	69-1/2"
36A 4216 - 68"	36A 4245 - 69"	35A 7887 - 34-7/8"	35A 4316 - 225 lks.	35A 8520 - 225 lks.	35A 4321 - 12"	35A 7329 - 21-1/2"	106"	71"
36A 4218 - 69-1/2"	36A 4246 - 69-1/2"	35A 7888 - 34-7/8"	35A 4316 - 225 lks.	35A 8520 - 225 lks.	35A 4322 - 15"	35A 7329 - 21-1/2"	109"	72-1/2"
36A 4217 - 71"	36A 4247 - 71"	35A 7890 - 37-3/8"	35A 4316 - 225 lks.	35A 8520 - 225 lks.	35A 4324 - 15"	35A 7330 - 24"	112"	74"
36A 4218 - 72-1/2"	36A 4248 - 72-1/2"	35A 7890 - 37-3/8"	35A 4316 - 225 lks.	35A 8520 - 225 lks.	35A 4324 - 21"	35A 7330 - 24"	115"	73-1/2"
36A 4219 - 74"	36A 4249 - 74"	35A 7891 - 37-3/8"	35A 4316 - 225 lks.	35A 8520 - 225 lks.	35A 4328 - 24"	35A 7330 - 24"	118"	77"
36A 4220 - 75-1/2"	36A 4250 - 75-1/2"	35A 7892 - 37-3/8"	35A 4317 - 249 lks.	35A 8521 - 249 lks.	35A 4321 - 12"	35A 7330 - 24"	121"	78-1/2"
36A 4221 - 77"	36A 4251 - 77"	35A 7890 - 39-7/8"	35A 4317 - 249 lks.	35A 8521 - 249 lks.	35A 4322 - 15"	35A 7331 - 26-1/2"	124"	80"
36A 4222 - 72-1/2"	36A 4252 - 75-1/2"	35A 7894 - 39-7/8"	35A 4317 - 249 lks.	35A 8521 - 249 lks.	35A 4324 - 16"	35A 7331 - 26-1/2"	127"	81-1/2"
36A 4223 - 80"	36A 4253 - 80"	35A 7895 - 39-7/8"	35A 4317 - 249 lks.	35A 8521 - 249 lks.	35A 4326 - 21"	35A 7331 - 26-1/2"	130"	83"
36A 4224 - 81-1/2"	36A 4254 - 81-1/2"	35A 7896 - 48-3/8"	35A 4317 - 249 lks.	35A 8521 - 249 lks.	35A 4328 - 24"	35A 7332 - 30"	133"	84-1/2"
36A 4225 - 83"	36A 4255 - 83"	35A 7897 - 43-3/8"	35A 4318 - 273 lks.	35A 8522 - 273 lks.	35A 4321 - 12"	35A 7332 - 30"	136"	86"
36A 4226 - 84-1/2"	36A 4256 - 84-1/2"	35A 7899 - 48-3/8"	35A 4318 - 273 lks.	35A 8522 - 273 lks.	35A 4322 - 15"	35A 7332 - 30"	139"	87-1/2"
36A 4227 - 50"	36A 4257 - 86"	35A 7899 - 43-3/8"	35A 4318 - 273 lks.	35A 8522 - 273 lks.	35A 4324 - 18"	35A 7332 - 30"	142"	89"
36A 4228 - 67-1/2"	36A 4258 - 87-1/2"	35A 7900 - 48-3/8"	35A 4318 - 273 lks.	35A 8522 - 273 lks.	35A 4326 - 21"	35A 7332 - 30"	145"	90-1/2"
36A 4229 - 89-1/2"	36A 4259 - 89-1/2"	35A 7901 - 48-3/8"	35A 4318 - 273 lks.	35A 8522 - 273 lks.	35A 4328 - 25"	35A 7333 - 35"	148"	92-1/2"
36A 4230 - 91"	36A 4260 - 91"	35A 7902 - 46-3/8"	35A 4318 - 273 lks.	35A 8522 - 273 lks.	35A 4328 - 28"	35A 7333 - 38"	151"	94"
36A 4231 - 92-1/2"	36A 4261 - 92-1/2"	35A 7903 - 48-3/8"	35A 4318 - 273 lks.	35A 8522 - 273 lks.	35A 4331 - 31"	35A 7333 - 33"	154"	95-1/2"
36A 4232 - 94"	36A 4262 - 94"	35A 7904 - 46-3/8"	35A 4318 - 273 lks.	35A 8522 - 273 lks.	35A 4329 - 35"	35A 7333 - 33"	157"	97"
36A 4233 - 95-1/2"	36A 4263 - 95-1/2"	35A 7905 - 49-3/8"	35A 4319 - 313 lks.	35A 8523 - 313 lks.	35A 4321 - 12"	35A 7334 - 36"	160"	95-1/2"
36A 4234 - 97-1/2"	36A 4264 - 97-1/2"	35A 7906 - 49-3/8"	35A 4319 - 313 lks.	35A 8523 - 313 lks.	35A 4329 - 10"	35A 7334 - 36"	163"	100-1/2"
36A 4235 - 99"	36A 4265 - 99"	35A 7907 - 49-3/8"	35A 4319 - 313 lks.	35A 8523 - 313 lks.	35A 4323 - 19"	35A 7334 - 36"	166"	102"
36A 4236 - 100-1/2"	36A 4266 - 100-1/2"	35A 7906 - 49-3/8"	35A 4320 - 329 lks.	35A 8524 - 329 lks.	35A 4321 - 12"	35A 7334 - 36"	169"	103-1/2"
36A 4237 - 105"	36A 4267 - 102"	35A 7909 - 52-3/8"	35A 4320 - 329 lks.	35A 8524 - 329 lks.	35A 4322 - 16"	35A 7335 - 37-1/2"	172"	105"
36A 4238 - 105-1/2"	36A 4268 - 103-1/2"	35A 7910 - 52-3/8"	35A 4320 - 329 lks.	35A 8524 - 329 lks.	35A 4324 - 15"	35A 7335 - 37-1/2"	175"	106-1/2"
36A 4239 - 105-1/2"	36A 4269 - 105-1/2"	35A 7911 - 52-3/8"	35A 4320 - 329 lks.	35A 8524 - 329 lks.	35A 4327 - 22"	35A 7335 - 37-1/2"	178"	108-1/2"

NOTE: For breakdown of lift cylinder see page 70.

NOTE: Order replacement parts on Forks, Extension Forks, Carriages and Safety Racks from Mobilift Sales Department.

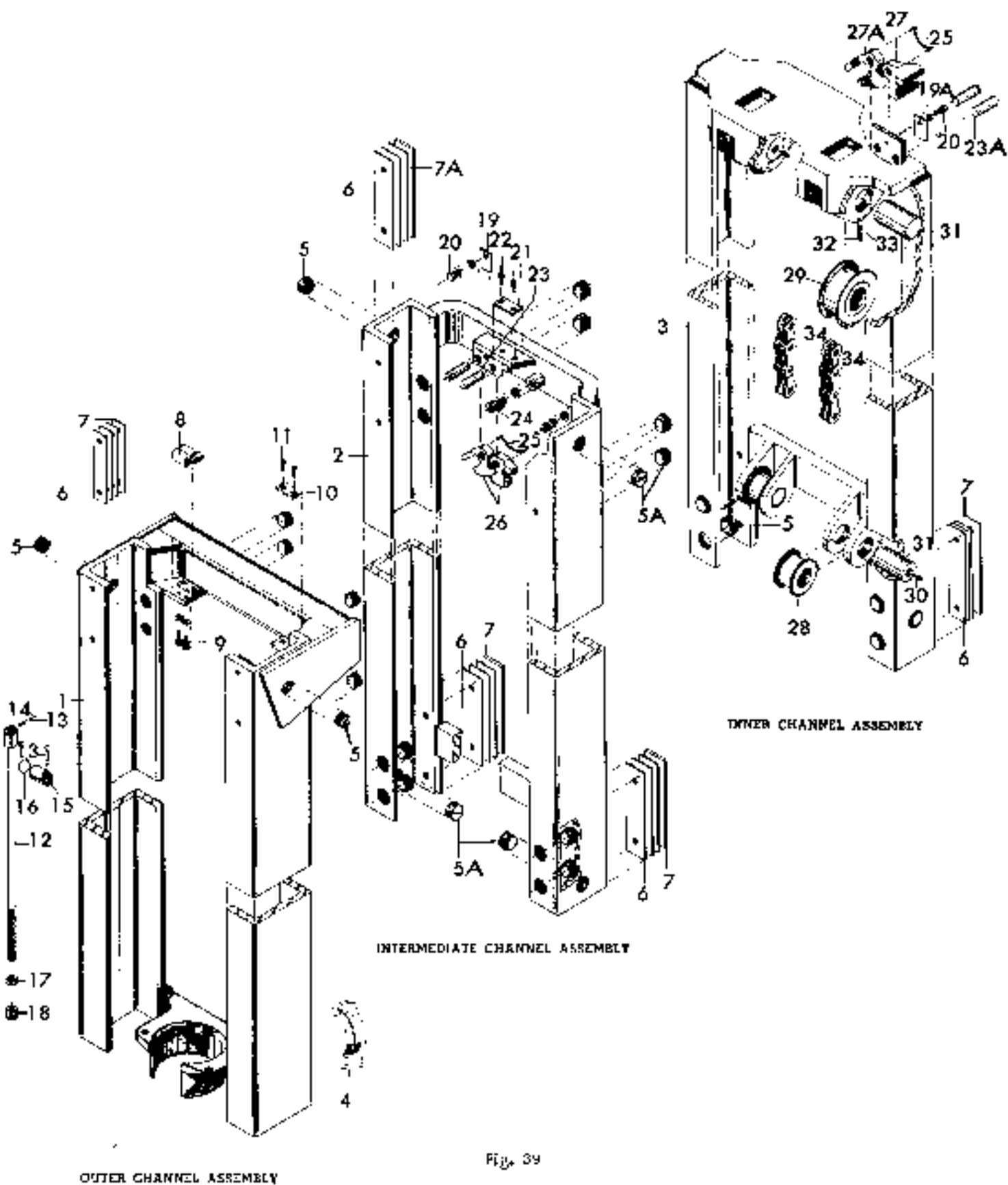
Ref. No.	Part No.	DESCRIPTION	Qty. Per
DECALS AND EMBLEMS			
	35A8315	Decal - Mobilift, on mast (35A6089), 2-1/2" x 15".....	2
	35A8716	Decal - plain, on side, 1-1/2" x 30-1/2".....	2
	35A8717	Decal - plain, right hand side.....	1
	35A8718	Decal - plain, left hand side.....	1
	35A4969	Emblem - Mobilift, 1-7/16" x 3-29/32".....	2
		GM181014 - Washer, plain, 5/32" I.D., 3/8" O.D.	8
		GM254256 - Nut, square, No. 8-32.....	8
	35A8814	Decal - Mobilift, on side of hood, 2-1/4" x 13-1/2".....	2
	35A8001	Decal - warning, ramp descending, 1-3/16" x 3".....	1
	35A8002	Decal - capacity, 2000 lb. at 15" L.C., 1-3/8" x 4".....	1
	35A8003	Decal - capacity, 2500 lb. at 15" L.C., 1-3/8" x 4".....	1
	35A8822	Decal - Mobilmatic Edw.....	1
	35A8821	Decal - High Free Lift.....	2
	15A8109	Decal - LP-Gas fuel specifications, 2" x 3-1/4".....	1
PAINT			
	15P1014	Paint - 16 oz., pressurized, prairie gold.....	-
	15P1015	Paint - quart, prairie gold.....	-
	15P1018	Paint - gallon, prairie gold.....	-
TRANSMISSION OIL			
	35P1755	Oil - transmission, 1 gallon.....	-
	35P1756	Oil - transmission, 5 gallons.....	-

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
UPRIGHT FOR TRIPLEX TRI-FREE LIFT (Cascade Viewmast) Group I - for MSA 20 and 25			
1	-----	*Channel - outer assembly	1
2	-----	*Channel - center assembly	1
3	-----	*Channel - inner assembly	1
*NOTE: Order above parts by M.F.H. and O.A.H.L.			
4	35P2054	Cap - bearing, outer tail pivot	2
		50A1205 - Screw, bearing cap, 5/8"-11 x 2-1/2"	4
5	85P188F	Plug - channel, outer and inner	12
5A	35P2022	Plug - channel, center	12
6	35P1889	Strut - bearing	A, R,
7	35P1840	Bearing - channels, outer and inner	4
7A	35P2025	Bearing - channels, center	4
	-----	Bolt - hex., 3/8"-24 x 1/2"	16
8	35P1841	Trip	1
9	-----	Bolt - hex., 3/8"-24 x 1"	2
10	35P1500	Pad	1
11	-----	Bolt - hex., 1/4"-28 x 3/8"	2
12	25P2022	Rod - lift	2
13	35P1843	Pin - rod and anchor	4
14	35P1844	Retainer - pin	2
15	35P2029	Anchor - chain, outer channel	2
17		GM114482 - Nut, hex. jam, 5/8"-13	2
18		50A1011 - Nut, hex., (Nylock) 5/8"-16	2
19	50F1849	Keeper - pins, center channel	1
19A	35P2036	Keeper - pins, inner channel	1
20	-----	Bolt - hex., 3/8"-24 x 1/2"	2
21	35P1850	Pad - center channel	1
22	-----	Bolt - hex., 1/4"-28 x 3/8"	2
23	35P1850	Pin - latch, center channel	2
23A	35P2035	Pin - latch, inner channel	1
24	-----	Bolt - hex., socket, 1/2"-18 x 3/4"	1
25	35P1851	Spring - latch, center channel	2
25A	35P2037	Spring - latch, inner channel	1
26	35P1852	Latch - lift, center channel	2
27	35P2038	Latch - lift, inner channel, L.H.	1
27A	35P2039	Latch - lift, inner channel, R.H.	1
28	35P2026	Sheave - chain, lower	2
29	35P2026	Sheave - chain, upper	2
30	-----	Pitting - grease, straight, 1/4"-29	4
31	35P2027	Shaft - sheaves	4
32	-----	Screw - hex. socket, jam, 1/4"-20	4
33	-----	Set Screw - hex. socket, 5/16"-24 x 5/8"	4
34	-----	Chain - lift, see chart below, 3/4" pitch BL634	2

CHAIN FOR LIFT - 3/4" Pitch BL634

M.F.H.	O.A.H.L.	Chain Length	M.F.H.	O.A.H.L.	Chain Length
132"	73"	156-7/8"	161"	76"	163-1/8"
137"	73"	158-7/8"	166"	76"	163-1/8"
141"	70"	158-7/8"	169"	78"	163-1/8"
145"	70"	158-7/8"	169"	82"	199-3/8"
149"	70"	158-7/8"	173"	82"	199-3/8"
151"	70"	158-7/8"	177"	82"	199-3/8"
149"	76"	163-1/8"	181"	82"	199-3/8"
158"	78"	163-1/8"	185"	82"	199-3/8"
157"	78"	163-1/8"			



MSA SERIES LIFT TRUCKS

Rel. No.	Part No.	DESCRIPTION	No. Pcs.
		1 WPIEX TRI-FREE LIFT CYLINDER (Cascade Viewmast) Group II 4" Diameter, for MSA 20 and 20	
1	-----	*Cylinder - assembly, complete	1
		*NOTE: Order above part by M, F, H, and O, A, H, L.	
		Each includes the following 57 parts:	
2	35P1457	Shell - cylinder, outer, for 70" O.A.H.L. mast	1
2	35P2041	Shell - cylinder, outer, for 75" O.A.H.L. mast	1
2	35P2042	Shell - cylinder, outer, for 82" O.A.H.L. mast	1
3	35P338	Screw - button head, cylinder shell	1
4	35P332	**Seal - button head screw	1
5	35P1201	Tube - cylinder, intermediate, for 70" O.A.H.L. mast	1
5	35P2043	Tube - cylinder, intermediate, for 75" O.A.H.L. mast	1
5	35P2044	Tube - cylinder, intermediate, for 82" O.A.H.L. mast	1
6	35P2045	Plunger - cylinder, inner, for 70" O.A.H.L. mast	1
6	35P2046	Plunger - cylinder, inner, for 75" O.A.H.L. mast	1
6	35P2047	Plunger - cylinder, inner, for 82" O.A.H.L. mast	1
7	35P183	**Ring - wiper, intermediate tube	1
8	35P182	**Spring - garter, wiper ring	1
9	35P1207	Retainer - wiper ring	1
10	10A 7846	**"O" Ring - retainer	1
11	35P1206	Bushing - intermediate tube	1
12	35P1209	**"O" Ring - intermediate tube bushing	1
13	35P1210	**Ring - back-up, "O" ring	1
14	35P2213	**Packing - cone bushing	1
15	35P1212	**Ring - wiper, plunger	1
16	35P1306	**Spring - garter, wiper ring	1
17	35P2213	Retainer - plunger wiper ring	2
18	35P174	**"O" Ring - wiper retainer	1
19	35P1314	Piston	1
20	35P1211	**Packing - piston	1
21	10A 7956	**"O" Ring - piston, inner	2
22	35P1216	**Ring - back-up, "O" ring	1
23	35P1217	Ring - snap, piston retainer	1
24	35P1218	Bearing - intermediate tube	1
25	35P1213	Ring - bearing retainer	1
26	35P1220	Ring - snap, bearing	1
27	35P2040	Head - cylinder	1
28	35P1222	**"O" Ring - cylinder head, lower	1
29	35P1459	**Ring - back-up, head "O" ring	1
30	35P1460	**Ring - cylinder head, upper	1
31	35P2048	Repair Kit - for cylinder	1
		NOTE: Repair Kit consists of the above items identified by a double asterisk ().	
32	35P1461	Nut - lock, cylinder head	1
33	35P1333	Body - restrictor	1
34	10A16236	"O" Ring - body	1
35	35A4932	Spring - oil restrictor	1
36	35P1337	Washer - perforated, oil restrictor	1
37	35P142	Spacer - oil restrictor	1

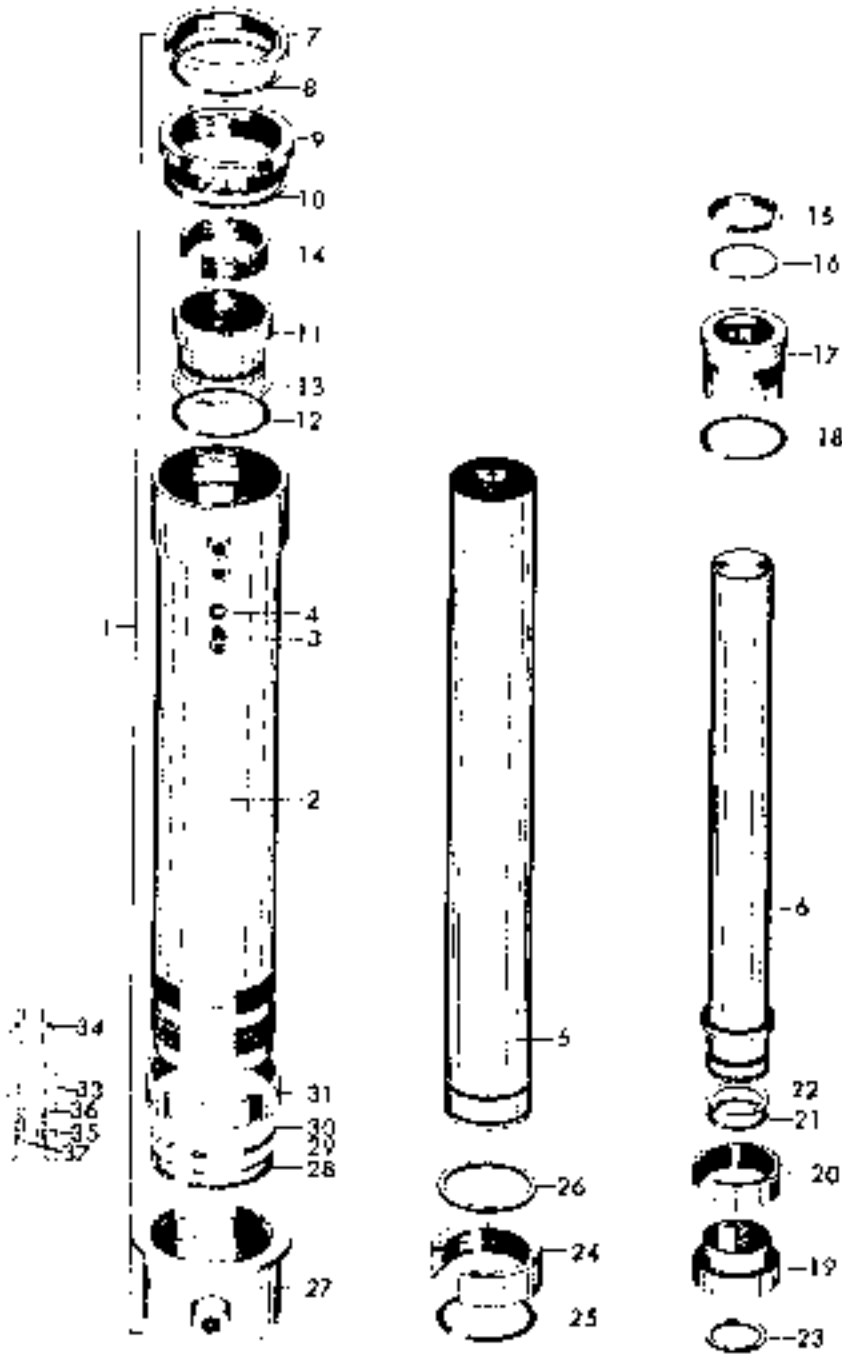


Fig. 40

MSA SERIES LIFT TRUCKS

Ref. No	Part No.	DESCRIPTION	No. Pcs.
CROSS HEAD FOR UPRIGHT (Cascade Viewmast) Group III - for MSA 20 and 25			
1	35P2049	Cross Head - upright	1
2	-----	Bolt - socket head, 1/4"-20 x 1-1/4".....	2
3	35P1230	Pad - head	1
4	-----	Bolt - flat head, hex. socket, 1/4"-20 x 1/8".....	2
5	35P2020	Sheave - cross head	2
6	35P2027	Shaft - sheave	2
7	-----	Socket Jam Screw - 1/4"-20	2
8	-----	Set Screw - cup point, hex. socket, 1/4"-20 x 3/8".....	2
9	-----	Fitting - grease, straight, 1/4"-26	2
10	35P2052	Shoe - head	2
11	-----	Bolt - hex, socket, 1/2"-13 x 3/4".....	2
12	-----	Bolt - hex. anchor, 5/8"-11 x 1".....	2
13	35P2053	Shim - shoe	A.R.

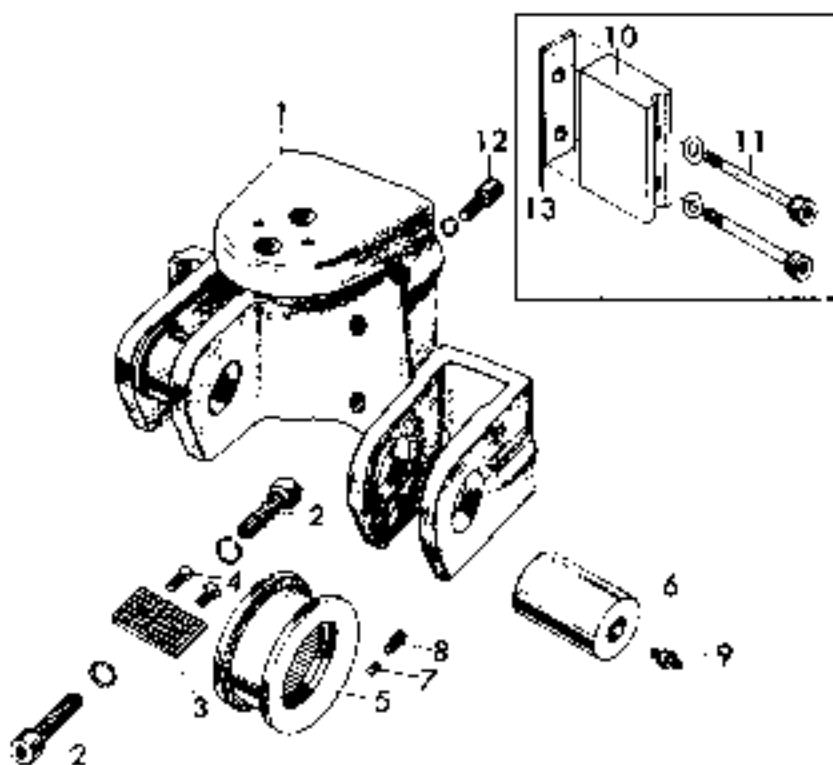


Fig. 41

ADAPTING PARTS FOR TRIPLEX T&F-FREE LIFT (Cascade Viewmast) Group IV - for MSA 20 and 25			
35A 4616	Bushing - axle	2	
50A 4028	Fitting, grease, 1/8" straight	2	
35A 7349	Tube - vent, L-shaped, 1/4" O.D. x 3/8" O.D. tubing	1	
35A 7383	Hose - vent, 1/4" I.D. x 35" long	1	
35A 7307	Elbow - vent hose, 90°, 1/4"-18 N.P.T.	1	
50A 3573	Clamp, hose, 7/16"	2	

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.
CARRIAGE FOR TRIPLEX TFM-FREE LIFT (Cascade Viewmast) Group V - for MSA 20 and 25			
1	-----	Carriage - assembly, order from: Mobilift Sales Department..... Includes the following parts:	1
2	35P2054	Wear pad - carriage	2
3	-----	Bolt - hex. socket, flat head, 1/4"-20 x 1/2"	4
4	35P2053	Shim - wear pad	A.R.
5	85P1865	Roller - assembly, carriage guides	4
6	-----	Bolt - hex. socket, 1/2"-13 x 1-1/2"	4
7	85P1860	Nut - bolt, roller support, 1/2"-13	4
8	-----	Screw - adjusting, roller assembly, half dog, nylock, 5/8"-11 x 1"	4
9	35P1863	Roller - carriage	4
10	35P1867	Sleeve - roller	4
11	35P1854	Washer - roller, inner	4
12	-----	Fitting - grease, straight, 1/4"-28	5
13	35P1869	Plug - roller, outer	4
14	35P1864	Screw - hex. socket, 5/16"-13 x 1"	2
15	35P2056	Bar - yoke	1
16	35P2057	Yoke - carriage	1
	-----	Bolt - hex., 3/8"-24 x 2"	2

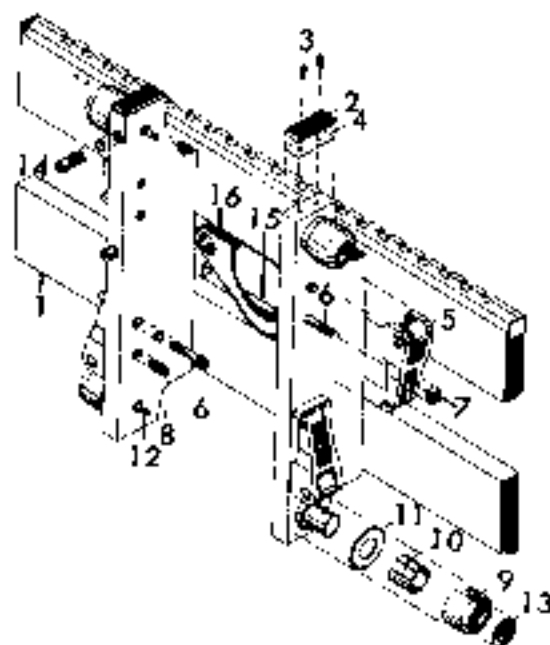


Fig. 42

MSA SERIES LIPT TRUCKS

Ref. No	Part No.	DESCRIPTION	No. Per
		TRIFLEX MAST - TRIFREE LIFT (Knickerbocker) - 2500# Group 1	
1	-----	*Rail - outer assembly	1
		50A11E9 - Bolt, 12 pt., 1/2"-13 x 2-1/2"	4
		GM120384 - Washer, lock, 1/2"	4
2	-----	*Rail - inner assembly	1
3	-----	*Rail - center assembly	1
4	35P1612	Pad - wear	38
5	35P1648	*Cylinder - assembly, see page 3 for breakdown	1
6	35P1649	Roller - chain	4
7	35P1650	Race - inner	4
8	35P1651	Bearing - roller	4
9	35P1652	Washer - thrust, inner	4
10	35P1653	Washer - thrust, outer	4
11	-----	Fitting - grease, 1/4" drive (Alemite 1668)	4
12	35P1654	Ring - bearing retainer, outer	4
13	35P1655	Chain - lift, 5/8" pitch (No. 8L384)	4
14	35P1656	Pin - chain connecting	4
15	35P1657	Anchor - chain	4
16	35P1658	Plate - chain anchor	2
17		50A3697 - Bolt, hex., 5/8"-11 x 2-1/2"	4
18		50A1912 - Nut, hex., 5/8"-11	4
19	35P1659	Elbow - cylinder to hose, 90°	1
20	35P1660	Connector - hose to elbow	1
21	35P1661	*Hose - cylinder	1
22	35P1662	Fitting - hose to elbow	1
23	35P1193	Clamp - fitting	1
24	35P1663	Elbow - hose	1
25	35P1665	Spacer - cylinder pilot to inner cylinder	1
26	35P1664	Screw - spacer	1
27	35P1667	Anchor - chain, lower	4
28	35P166E	Pin - chain connecting	4
29	35P1668	Roll Peg - carriage	4
30	35P667	Washer - thrust, bearing, inner and outer	6
31	35P1621	Bearing - roller	4
32	35P1620	Spacer - bearing	4
33	35P1622	Tire - roller	4
34	35P1623	Ring - retaining, roller	4
35	35P1768	Fitting - grease, 1/4" drive x 45° (Alemite 1669)	4
36		GM215554 - Bolt, hex., 3/8"-24 x 1-3/4"	4
37	35P1194	Screw - shaft support, for fitting, 5/8"-24 x 1-3/4"	4
38	-----	Fitting - grease, (Alemite 1728-17)	4
39	35P1146	Shaft - roller	5
40	35P1145	Support - shaft	4
41	35P1147	Roller - shaft	4
		*NOTE: Order parts for lift by serial number of mast plus MPH and OAH.	
42	35A4046	Bushing - axle	2
		GM4445E3 - Plug, pipe, hydraulic tank	1
43	35A5301	Pin - tilt	2
		50A2852 - Pin, roll, 1/4" x 2-1/2"	2
		GM191753 - Fitting, grease, 1/4" straight	3
44	35A7015	Carriage - 32"	-
44	35A7046	Carriage - 34"	-
44	35A7047	Carriage - 35"	-
44	35A7048	Carriage - 38"	-
44	35A7049	Carriage - 40"	-
44	35A7050	Carriage - 42"	-
44	35A7051	Carriage - 44"	-
44	35A7052	Carriage - 46"	-
44	35A7053	Carriage - 48"	-

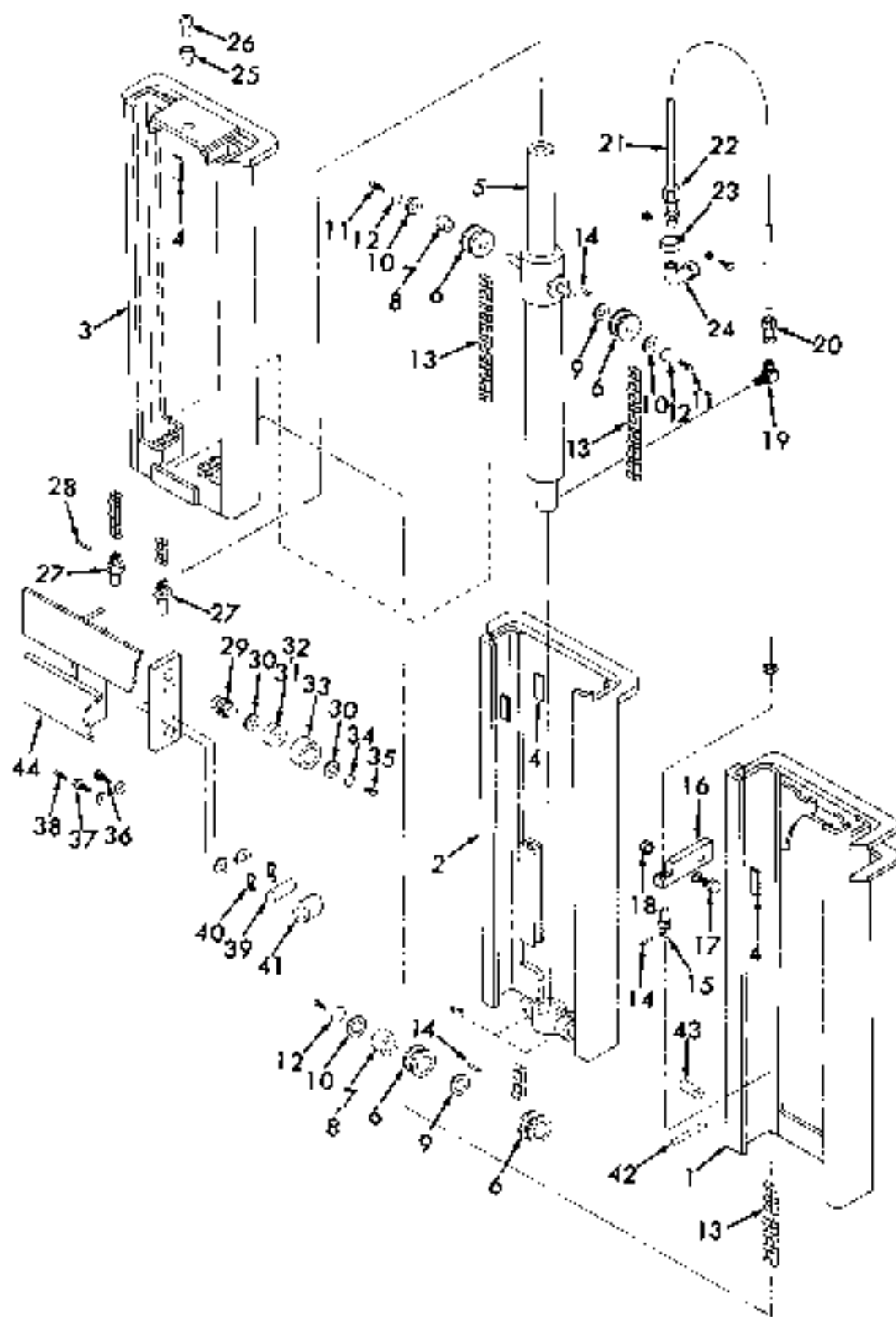


Fig. 43

MSA SERIES LIFT TRUCKS

Ref. No	Part No	DESCRIPTION	No. Pcs
		LIFT CYLINDER - TRIFREE LIFT (Knickerbocker) - 2500# Group II	
1	35F1648	*Cylinder - lift, assembly Includes the following 27 parts:	1
2	35F1711	*Tube - cylinder, outer	1
3	35F1712	*Tube - interstage	1
4	35F1713	*Tube - plunger, inner	1
5	35F1726	Packing Set - outer cylinder, lower section, 4-1/2" O.D.	1
6	35F1727	Nut - packing, lower section	1
7	35F1729	Set Screw - packing nut	1
8	35F1728	Ring - wiper, packing nut	1
9	35F1720	Spacer - packing	1
10	35F1724	Ring - wear, outer cylinder	2
11	35F1731	Ring - stop, outer cylinder, bottom section	1
12	35F1732	Ring - snap, stop ring, inner	1
13	35F1733	Ring - snap, stop ring, outer	1
14	35F1717	Packing Set - outer cylinder, top section, 4" O.D.	1
15	35F1714	Nut - packing, top section, outer	1
16	35F1716	Ring - wiper, upper packing nut	1
17	35F1718	"O" Ring - upper packing nut, 5-1/4" O.D.	1
18	35F1730	Packing Set - plunger to interstage, 3" O.D.	1
19	35F1734	Gland - plunger packing	1
20	35F1736	"O" Ring - plunger gland, 3-1/4" O.D.	1
21	35F1735	Ring - wiper, plunger gland	1
22	35F1729	Ring - wear, plunger to interstage, upper	1
23	35F1718	Cap - interstage, upper	1
24	35F1719	"O" Ring - interstage cap, 4-1/8" O.D.	1
25	35F1720	Washer - backup, interstage cap	1
26	35F1721	Screw - vent, interstage cap	1
27	35F1722	Washer - seal, vent screw	1
	35F1737	Pipe Plug - outer cylinder	1
		*NOTE: Order parts for cylinder giving serial number of mast plus MFI and OAH.	
29	35A8048	Body - restrictor	1
29	35A7913	Spring - oil restrictor	1
30	35A7796	Disc - oil restrictor	1
31	35A7792	Sleeve - oil restrictor	1
32	35A7793	Bar - oil restrictor	1
33		50A4425 - Elbow, connecting, 90°	1
34		50A4428 - Connector, restrictor	1
35	10A16285	"O" Ring - fittings	2

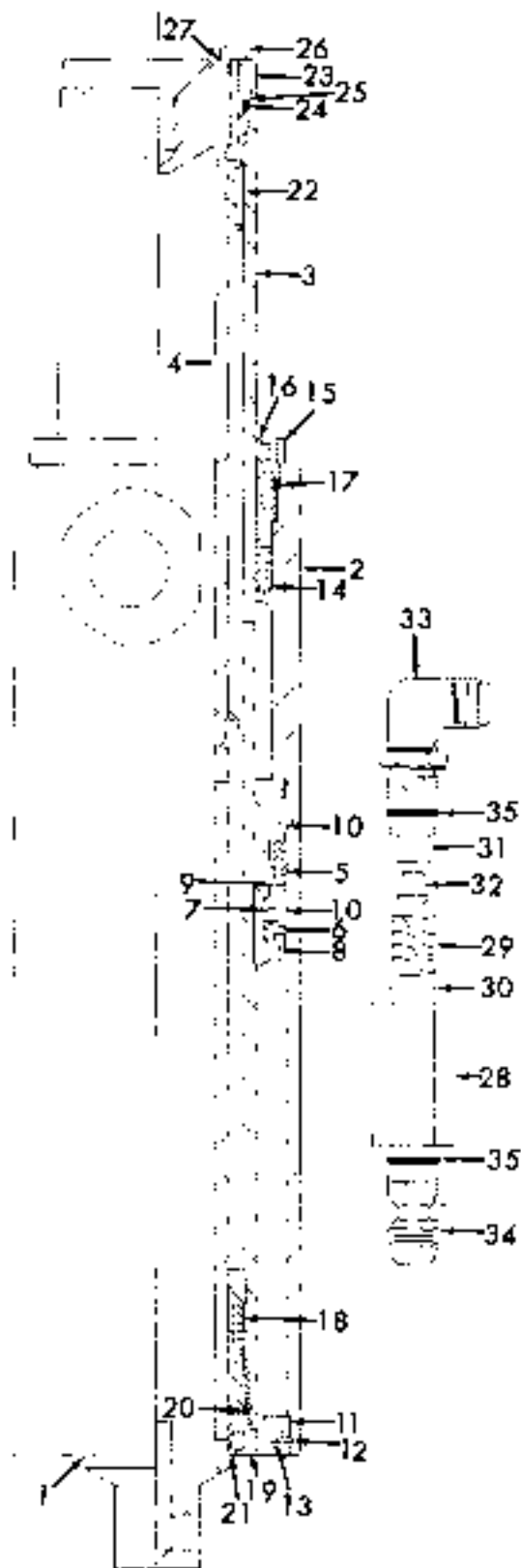


Fig. 44

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs
		TRIPLEX MAST - MULTI LIFT (Knickerbocker) - 2500# Group III	
1	-----	Rail - outer assembly	1
		50A1180 - Bolt, 12 pt., 1/2"-19 x 2-1/2"	4
		GM120394 - Washer, lock, 1/2"	4
2	-----	Rail - center assembly	1
3	-----	Rail - inner assembly	1
4	35P1E12	Pad - wear	36
5	35P1C14	*Cylinder - assembly, see page 86 for breakdown	1
6	35P653	Screw - cylinder	1
7	35P1C17	Spacer - cylinder mounting	1
8	35P1E13	Lock - roller shaft	4
10	35P1C16	Shaft - chain roller, inner	4
11	35P176F	Fitting - grease, 1/4" drive x 45° (Alemite 1E2E)	4
12	35P667	Washer - bearing	2
13	35P669	Bearing - 3" chain roller	4
14	35P654	Roller - chain, 3" dia.	4
15	35P661	Anchor - chain, turnbuckle and carriage	4
16	35P1624	*Chain - lift, 5/8" pitch No. RL534	4
17	35P1C18	Anchor - chain	4
18		GM219753 - Nut, hex., jam, 3/4"-16	4
19	35P666	Turnbuckle - anchor rod	2
20	35P1615	*Rod - lift	2
		*NOTE: Order parts for lift by serial number of mast plus MCH and OAH.	
		GM219759 - Nut, hex., jam, 3/4"-16	2
21		Ring - bearing retaining	4
22	35P1823	Bearing - roller	4
23	35P1821	Tire - roller	4
24	35P1825	Washer - bearing	8
25	35P667	Race - bearing, inner	4
26	35P1146	Shaft - roller	4
27	35P1145	Support - shaft	3
28	35P1134	Screw - shaft support	4
29	-----	Fitting - grease (Alemite No. 1728A)	1
31		GM215524 - Bolt, hex., 3/8"-24 x 1-3/4"	4
32		50A4239 - Washer, shake proof, 5/8"	8
33		50A4205 - Washer, plain, 5/8"	8
34	35P1147	Roller - shaft	4
35	35A4046	Bushing - axle	2
36	35A3301	Pin - dit	2
		50A3862 - Pin, roll, 1/4" x 2-1/2"	2
		GM191758 - Fitting, grease, 1/8" straight	3
		GM44362 - Plug, pipe, for hydraulic tank, 1/8"-27	1

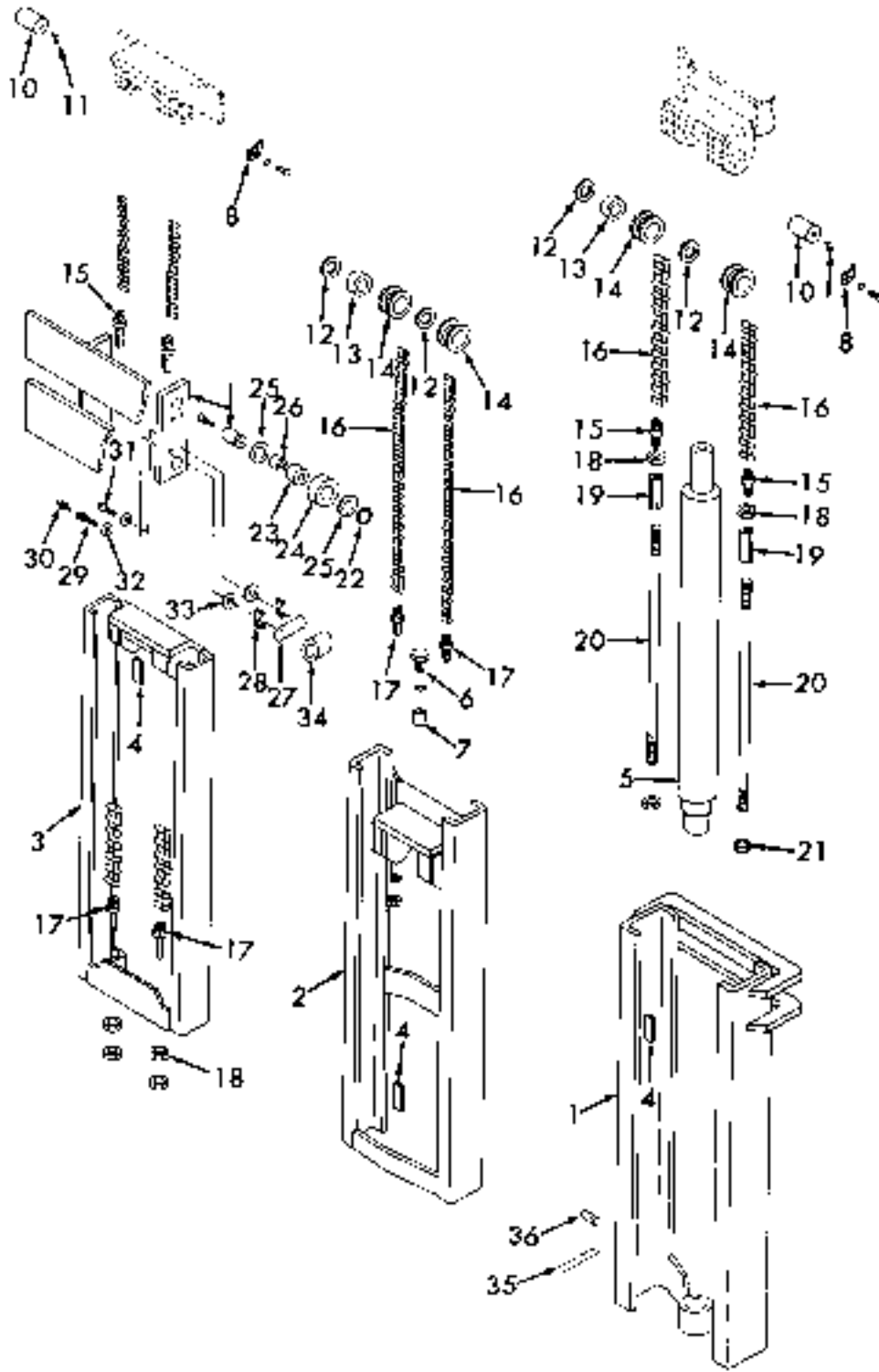


Fig. 45

MSA SERIES LIFT TRUCKS

Ref. No	Part No	DESCRIPTION	No. Pcs
		LIFT CYLINDER - MULTI LIFT (Knickerbocker) - 2500# Group IV	
1	85P1614	*Cylinder - lift, assembly, 3-3/4" O.D.	1
		Includes the following 13 parts:	
2	85P1635	*Cylinder - with base, assembly	1
3	85P1626	*Rod - piston	2
		*NOTE: Order parts by serial number of mast plus MFH and OAHL,	
4	85P1684	Snap Ring - piston	1
5	85P1633	**O" Ring - piston, 1" I.D., 1-1/4" O.D.	1
6	85P1631	Piston - cylinder	1
7	85P1632	**Ring - wiper, piston, 3-1/4" O.D.	1
8	85P1627	Head - cylinder	1
9	85P1630	Bushing - head	1
10	85P1636	Ring - retaining, bushing	1
11	85P1629	Ring - retaining, cylinder head	1
12	85P1628	Cap - cylinder head	1
13	85P1634	**O" Ring - cap, 1-7/16" I.D., 1"	1
14	85P1637	**Wiper - cap	1
	85P1638	**Packing Kit - cylinder (includes parts identified with double asterisk),	1
15	85A7807	fitting - vent	1
16		50A3573 - Clamp, hose, 7/16"	2
17	85A7843	Tube - vent	1
18	85A7834	Hose - vent, for 62" OAHL and 128" MFH, 1/4" I.D. x 36"	1
18	85A7860	Hose - vent, for 50" OAHL and 135" MFH, 1/4" I.D. x 39"	1
18	85A7851	Hose - vent, for 35" OAHL and 144" MFH, 1/4" I.D. x 42"	1
18	85A7842	Hose - vent, for 73" OAHL and 153" MFH, 1/4" I.D. x 45"	1
18	85A7823	Hose - vent, for 74" OAHL and 162" MFH, 1/4" I.D. x 48"	1
18	85A7844	Hose - vent, for 77" OAHL and 171" MFH, 1/4" I.D. x 51"	1
18	85A7855	Hose - vent, for 80" OAHL and 180" MFH, 1/4" I.D. x 54"	1
18	85A7886	Hose - vent, for 85" OAHL and 189" MFH, 1/4" I.D. x 57"	1
18	85A7867	Hose - vent, for 86" OAHL and 198" MFH, 1/4" I.D. x 60"	1
18	85A7869	Hose - vent, for 89" OAHL and 207" MFH, 1/4" I.D. x 63"	1
19	85A7070	Strap - vent hose	1
		GM133856 - Screw, rd. hd., 1/4"-20 x 1-1/2"	1
		GM123375 - Nut, hex., 1/4"-20	1
20	85A1464	Spacer - strap	1
21	85A8099	Body - oil restrictor	1
22	85A7013	Spring - oil restrictor	1
23	85A7796	Disc - oil restrictor	1
24	85A7782	Sleeve - oil restrictor	1
25	85A7793	Hat - oil restrictor	1
26		85A4425 - Elbow, 90°	1
27		85A4428 - Connector, body	1
28	10A15265	O" Ring - fittings	2

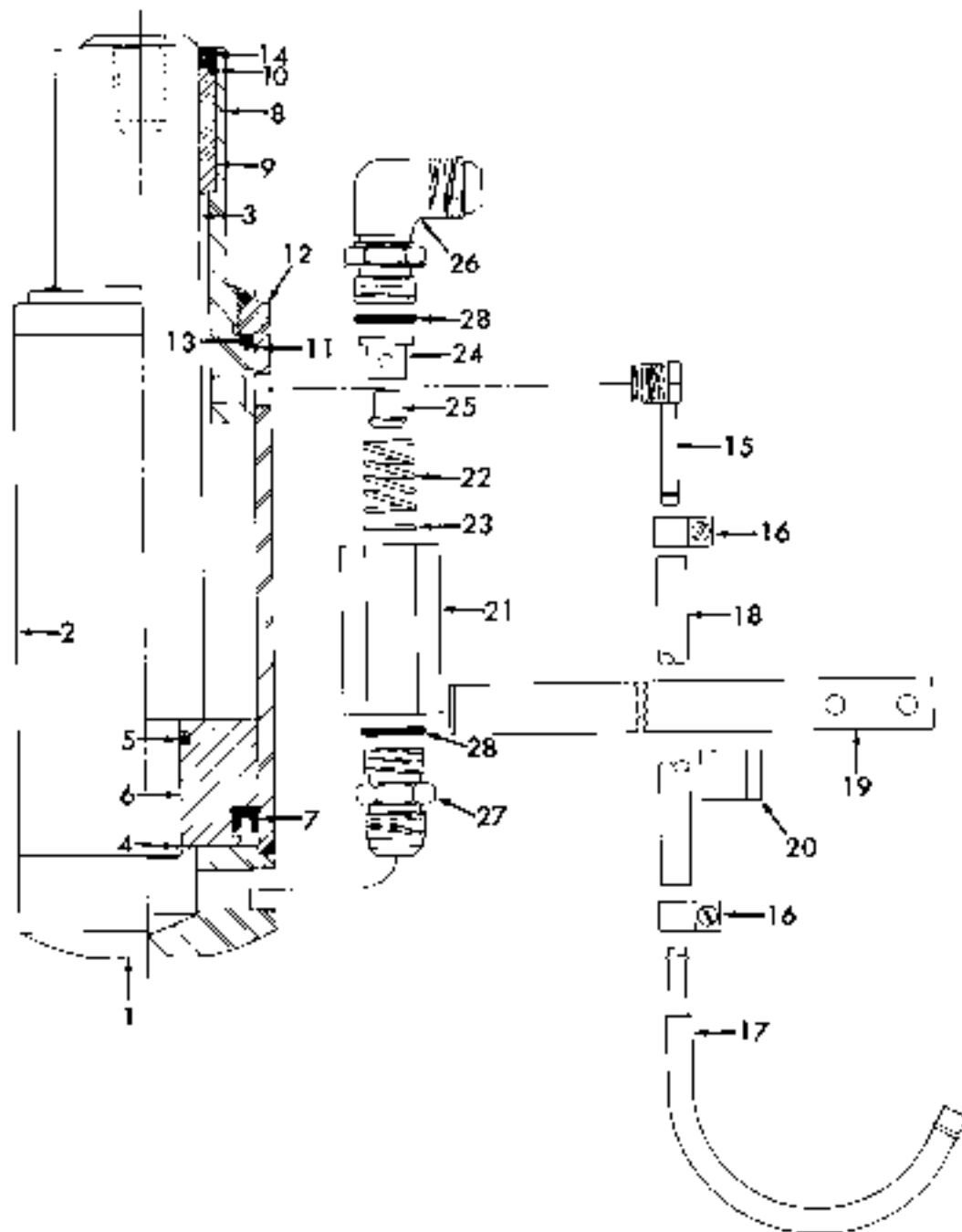


Fig. 48

Ref. No.	Part No.	DESCRIPTION	No. Pcs.	
			Single	Double
SHEAVE TAKE-UP - FOR HOSES				
1	36A8083	Function Block - hoses	1	2
2	36A8080	Support - assembly, R.H.	-	1
3	36A8081	Support - assembly, L.H.	1	1
4	36A8093	Bracket - support, R.H.	-	1
5	36A8082	Bracket - support, L.H.	1	1
6	10A11140	Snap Ring - support pin	1	2
7	35A8038	Block - guide rod	1	2
8	35B8090	Block - sheave take-up Includes the following part:	1	2
9	35A8085	Pin - sheave, 1" x 3-1/2"	1	2
10	10A11140	Snap Ring - pin	1	2
11	-----	Hose - junction block to elbow, see chart on bottom of page	2	4
12	-----	Hose - elbow to auxiliary valve, see chart on bottom of page	2	4
	35P1640	Hose - 1' of 3/8" I.D., single braid hose	-	-
13		30A2620 - Fitting, hose ends	3	16
14		50A4859 - Elbow, hoses, upper ends, 90°	2	4
15		50A4428 - Elbow, hoses, to valve, 90°	2	4
16	10A16405	"O" Ring - elbow	2	4
17	35A8094	Clamp - hose, mounts to support 50A3859 - Bolt, hex., 1/4" x 20 x 1-1/2" 50A1838 - Nut, hex., 1/4" x 20	1 1 2	2 2 4
18	35A8049	Clamp - hose, mounts to front air cylinder hose	1	2
19	35A8304	Band - hoses, 3/4" I.D. x 1" long	30	60
20	-----	Rod - guide, see chart on bottom of page 30A3747 - Nut, hex. jam, 3/4" x 10	- 4	- 8
21	35B8069	Sheave - block and support, 4-13/16" dia. Includes the following part:	2	4
22	35A8091	Bushing - sheave, 1" I.D. x 2" long	2	4

MPH	OAH	Guide Rod	Length	Hose Junction Block to Elbow	Hose Elbow to Aux. Valve
106"	71"	50A4837	43-3/4"	75"	72-1/2"
108"	72-1/2"	50A4838	45-1/4"	80-1/2"	74"
112"	74"	50A4840	46-3/4"	82"	75-1/2"
115"	75-1/2"	50A4842	48-1/4"	83-1/2"	77"
118"	77"	50A4844	49-3/4"	85"	78-1/2"
121"	78-1/2"	50A4846	51-1/4"	86-1/2"	80"
124"	80"	50A4848	52-3/4"	88"	81-1/2"
127"	81-1/2"	50A4852	54-1/4"	89-1/2"	83"
130"	83"	50A4839	46"	91"	84-1/2"
133"	84-1/2"	50A4840	46-3/4"	92-1/2"	86"
136"	86"	50A4841	47-1/2"	94"	87-1/2"
139"	87-1/2"	50A4842	48-1/4"	95-1/2"	89"
142"	89"	50A4843	49"	97"	90-1/2"
145"	90-1/2"	50A4844	49-3/4"	98-1/2"	92"
148"	92-1/2"	50A4845	51"	100-1/2"	93-1/2"
151"	94"	50A4847	51-3/4"	102"	95"
154"	95-1/2"	50A4848	52-1/2"	103-1/2"	96-1/2"
157"	97"	50A4850	53-1/4"	105"	98"
160"	98-1/2"	50A4851	54"	106-1/2"	99-1/2"
163"	100-1/2"	50A4853	55-1/4"	108-1/2"	101"
166"	102"	50A4854	56"	110"	102-1/2"
169"	103-1/2"	50A4855	56-3/4"	111-1/2"	104"
172"	105"	50A4856	57-1/2"	113"	105-1/2"
175"	106-1/2"	50A4857	58-1/4"	114-1/2"	107"
178"	108-1/2"	50A4858	59-1/4"	116-1/2"	108-1/2"

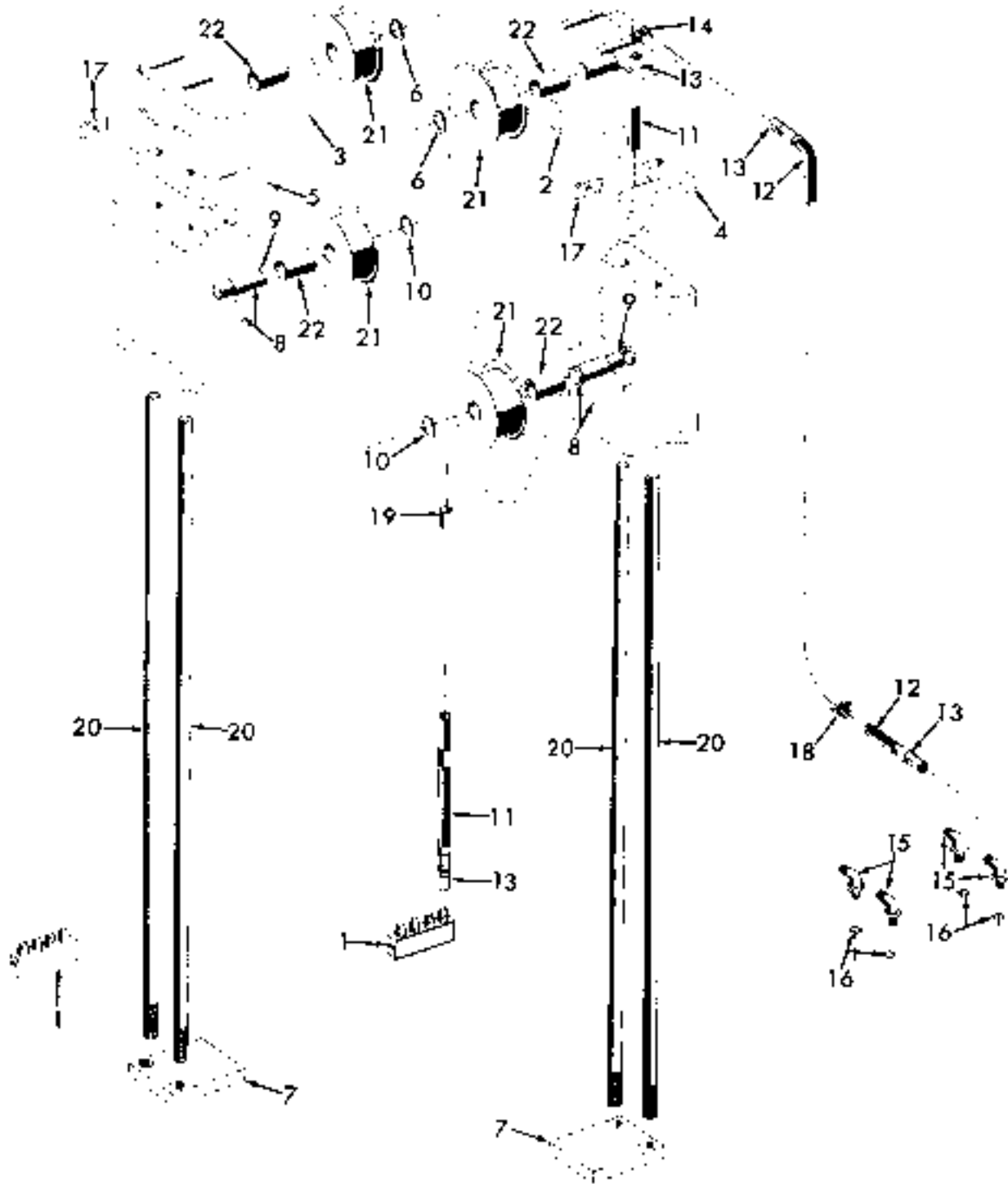


Fig. 47

MSA SERIES LIFT TRUCKS

Qty. No.	Part No.	DESCRIPTION	Nos. Pcs.	
			Narrow Reel	Wide Reel
HOSE REELS				
1	35A1489	Reel - hose, left hand, 91" thru 207" (Duplex Mast)	1	-
1	35A0889	Reel - hose, left hand, 91" thru 207" (Triplex Mast)	-	1
1	35A3244	Reel - hose, right hand, 91" thru 207" (Duplex Mast)	1	-
1	35A0884	Reel - hose, right hand, 91" thru 207" (Triplex Mast)	-	1
Each includes the following 21 parts:				
		50A3679 - Bolt, hex., Zinc, 1/2"-13 x 1"	2	2
2	35P1175	Shaft - assembly, reel	1	-
2	35P1176	Shaft - assembly, reel	-	1
3	35P1173	Nipple - shaft, 2"	1	1
4	35P1172	Elbow - nipple, female	1	1
5	35P1174	Elbow - shaft, male end	1	1
6	35P1182	Hub - reel	1	-
6	35P1183	Hub - reel	-	1
7	10A7956	"O" Ring - shaft	3	3
8	35P1031	Ring - back-up, "O" ring	4	4
9	35P1184	Snap Ring - hub	1	1
10	35P1037	Elbow - hub, 45°	2	2
11	35P1155	Elbow - hub, 90°	2	2
12	35P1182	Bar - reel	1	-
12	35P1177	Bar - reel	-	1
13	35P1177	Flange - reel, inner	1	1
14	35P1178	Divider - reel, center ring	1	1
15	35P1181	Flange - reel, outer	1	1
		50A1690 - Nut, hex., 1/4"-20	4	4
		50A1922 - Bolt, hex., 5/16"-18 x 8-1/4"	6	-
		GM187953 - Bolt, hex., 5/16"-18 x 4-1/2"	-	6
		50A3730 - Nut, hex., 5/16"-18	6	6
16	35P1179	Spacer - flanges, 1-5/16" long	11	-
16	35P1180	Spacer - flanges, 1-15/16" long	-	11
17	35P1185	Spring - assembly, with cover, R.H.	1	1
17	35P1186	Spring - assembly, with cover, L.H.	1	1
18	35A1482	Block - junction, hydraulic hoses	1	1
Includes the following 12 parts:				
		50A3868 - Bolt, hex., 3/8"-16 x 1-1/2"	1	1
		50A4206 - Washer, plain, Zinc, 3/8"	1	1
19	35P1190	Body - block	1	1
20	35P1191	Flunger - body	1	1
21	35P1192	Plug - body	2	2
		GM145645 - Ball, steel, 7/16"	2	2
22	35P1193	Spring - ball	2	2
23	35P1194	Spacer - spring and ball	2	2
24	35P1060	Shaft - block	1	1
25	35P1189	"O" Ring - shaft	3	3
26	35P1188	Ring - back-up, "O" ring	2	2
27	35P1187	Snap Ring - shaft	2	2
28	35P1195	Connector - hose to shaft	2	2
29	10AE319	"O" Ring - connector, 3/8" I.D.	2	2
30	10AS035	"O" Ring - plug body, 12/32" I.D.	2	2
		GM0410076 - Connector, tubes to valve	2	2
	35P1060	Hose - reels, 1-foot of hose, 3/8" I.D., order length as needed for lift	2	2
		50A3820 - Fitting, hose ends	4	4
	10A18405	"O" Ring - fittings to valve	2	2
		50A2417 - Clip, upright, 3/4" wide	2	2
		50A2668 - Bolt, hex., 3/8"-18 x 1"	2	2

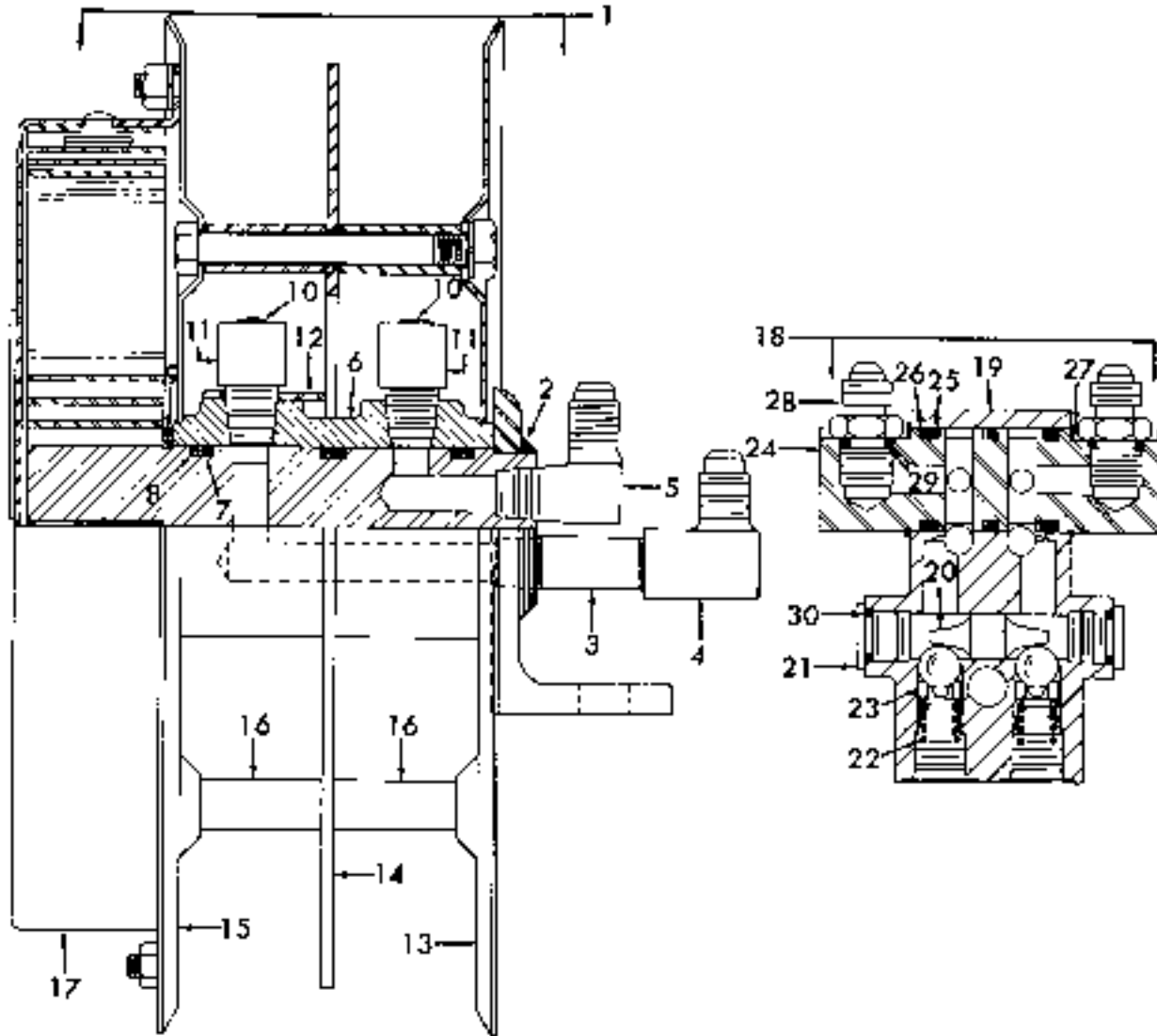


Fig. 48

M5A SERIES LIFT TRUCKS

Ref. No	Part No	DESCRIPTION	No Pcs	
			Single	Double
AUXILIARY VALVES				
1	35A6487	Valve - control, complete	1	-
1	35A6498	Valve - control, complete	-	1
Each includes the following 22 parts:				
		GM180134 - Bolt, hex., 3/8"-16 x 4-1/4"	3	2
		GM120977 - Nut, hex., 3/8"-16	2	3
		GM120998 - Washer, plain, 7/16" I.D., 1" O.D.	2	2
2	15P660	Seal - spool	2	4
3	15P658	Spring - spool centering	1	2
4	10P1932	Washer - stop, centering spring	1	2
5	15P654	Collar - stop, centering spring	1	2
6	15P652	Bolt - stop collar	1	2
7	10P1950	Washer - lock, stop collar bolt	1	2
8	15P655	Disc - stop collar	1	2
9	15P637	Ring - snap, stop disc	1	2
10	15P633	Bonnet - rubber, spool opening	1	2
11	95P215	Plug - ball check	1	1
12	10A8329	"O" Ring - ball check plug	1	1
13	25P219	Plunger - check and relief valve	2	2
	20P4777	Spring - plunger, check valve	1	1
14	35P216	Seat - relief valve	1	1
15	10A12018	"O" Ring - relief valve seat	1	1
16	35P227	Spring - relief	1	1
17	35P222	Guide - relief spring	1	1
18	35P213	Ball - relief guide	1	-
19	10A16489	Washer - spacer, relief spring	1	1
20	10A18490	Slide - relief spring	1	1
21	10A16487	Gasket - relief spring cap	1	1
22	25P220	Cap - relief spring	1	1
23	25P1068	Plug - pipe	1	-
24	35A6164	Bracket - mounting, auxiliary valve	1	1
		GM180122 - Bolt, hex., 3/8"-16 x 1"	2	2
25	35A6163	Brace - bracket	2	2
		GM180124 - Bolt, hex., 3/8"-16 x 1-1/4"	4	4
		GM120977 - Nut, hex., 3/8"-16	6	6
		GM120994 - Washer, plain, 13/32" I.D., 18/16" O.D.	4	4
26	35A6185	Bracket - lever mounting	1	-
28	35A6390	Bracket - lever mounting	-	-
		GM180322 - Bolt, hex., 1/4"-20 x 1"	4	4
		GM120975 - Nut, hex., 1/4"-20	4	4
27	25A7780	Spring - bracket	-	2
28	35A6309	Stop Washer - bolt	-	4
29	35A8817	Lever - control, air threaded (35A6356)	1	-
30	35A8615	Lever - control, nut threaded (35A8082)	-	-
30	35A4119	Knob - lever, for 35A6186 and 35A6032 levers	1	-
31	35A6354	Label - knob, for 35A4119 knob	-	1
	35A8295	Knob - lever, solid, for 35A8817 and 35A8016 levers	1	2
		35A4887 - Insert - knob	1	2
32	35A6095	Bar - pivot	-	1
32A		35A8817 - Pin, roll, 3/8" x 2"	-	1
33	35A6094	Ball Crank - lever	-	2
34	35A6096	Shaft - lever	1	1
35	35A6097	Lock Pin - shaft	1	1
		35A8227 - Snap Ring, shaft	1	1
36	35A6184	Link - assembly, control lever to valve	1	2
37	15A12319	Rivet - link, drilled, 1/4" x 1-1/2"	1	2
		GM120993 - Washer, plain, 11/32" I.D., 11/16" O.D.	1	2
38		GM147387 - Clevis, short, 5/16"-24	1	2
		GM194920 - Nut, hex. jam, 5/16"-24	1	2
39		GM123630 - Pin, clevis, 5/16"	1	2
		GM103373 - Pin, cotter, 3/32" x 3/4"	2	4
		GM124920 - Nut, hex. jam, 3/8"-18	-	1

MSA SERIES LIFT TRUCKS

Ref. No.	Part No.	DESCRIPTION	No. Pcs.	
			Single	Double
AUXILIARY VALVES (Cont'd)				
40	85A8120	Sleeve - power adapter, 7/16" x 14 x 1-3/8"	1	1
41	85A8117	Gasket - sleeve	1	1
42		50A1868 - Quad Ring, sleeve	1	1
43	12A15005	Nipple - valves, 3/4" x 2-1/2"	1	1
44	85A8119	Elbow - valve outlet, 3/4"	1	1
45		GM9413978 - Elbow, inlet, 7/8" x 14 JIC x 90°	2	2
46	10A18263	"O" Ring - elbow	2	2
47	35A7890	Nipple - outlet, auxiliary valve, 3/4" x 3-1/2"	1	-
47	10A18300	Nipple - outlet, auxiliary valve, 3/4" x 1-1/4"	-	1
48	35A7388	Elbow - valve, 3/4" x 45°	1	1
49	15A12216	Nipple - rod, 3/4" x 2"	2	2
50	35A7384	Hose - return, auxiliary valve to tank, 1" I.D. x 29"	1	1
		GM111614 - Clamp, hose, 1-1/2"	2	2
51	35A6738	Hose - control valve to auxiliary valve, 1/2" I.D. x 48"	1	1

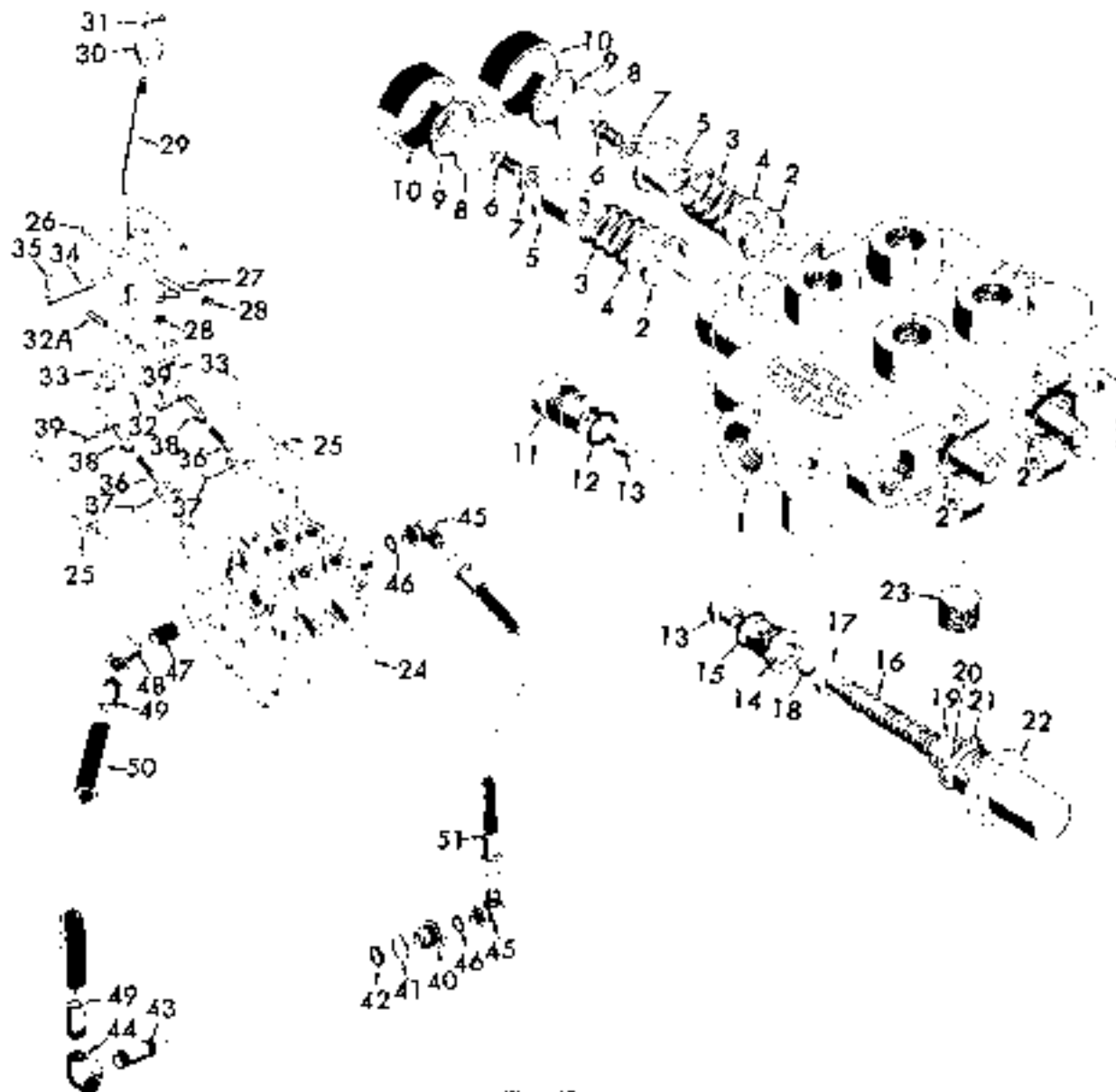


Fig. 48

MSA SERIES LIFT TRUCKS

Kit No	Part No	DESCRIPTION	No. Pcs
DIAL LEVER CONTROL - LIFT AND TILT			
1	30A8279	Plate - lever mounting	1
2	36A8280	Lever - lift, R.H.	1
3	36A8281	Lever - tilt, L.H.	1
4	36A8293	Knob - lift lever	1
5	35A8294	Knob - tilt lever	1
6		30A4687 - Insert, knob	2
7	35A8275	Shaft - levers	2
8		30A1827 - Snap Ring, shaft	4
9	36A8282	Link - connecting, lift rod	1
10	36A8283	Link - connecting, tilt rod	1
11	15A12213	Rivet - connecting link, clevis, 1/4" x 1-1/2"	2
		GM120892 - Washer, plain, 1-7/32" L.D., 1/16" O.D.	2
		GM135373 - Pin, cotter, 3/32" x 3/4"	2
12		GM174897 - Clevis, shrt, 5/16"-24	2
		GM124928 - Nut, hex, jam, 5/16"-24	2
13		GM120600 - Pin, clevis, 5/16" x 9/32"	2
		GM100273 - Pin, cotter, 3/32" x 5/4"	2
14	36A8274	Bracket - detent, lifting lever	1
		30A3656 - Bolt, hex., 5/16"-13 x 1"	2
		30A3730 - Nut, hex., 5/16"-13	2
		30A4221 - Washer, plain, 3/8" L.D., 7/8" O.D.	2
15	35A8284	Spring - detent	1
16		30A5082 - Ball, detent spring, 11/32" Dia.	1
17		30A4790 - Screw, hex, socket, lock type, 3/8"-16 x 1/2"	1
18		30A3742 - Nut, hex, jam, 3/8"-16	1

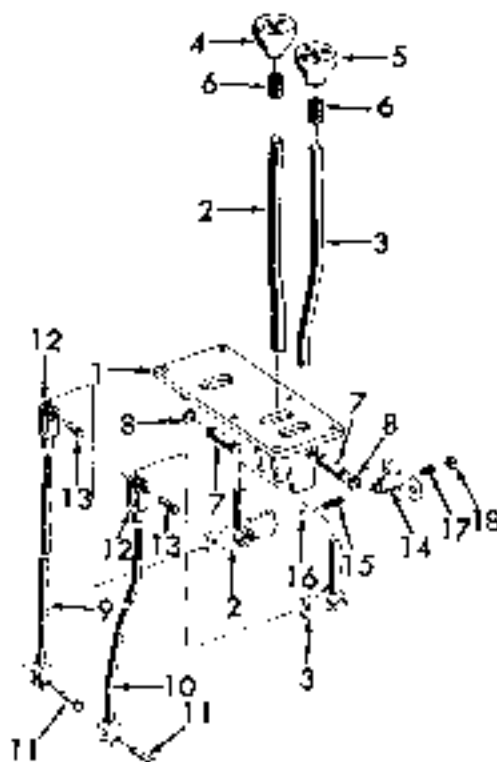


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