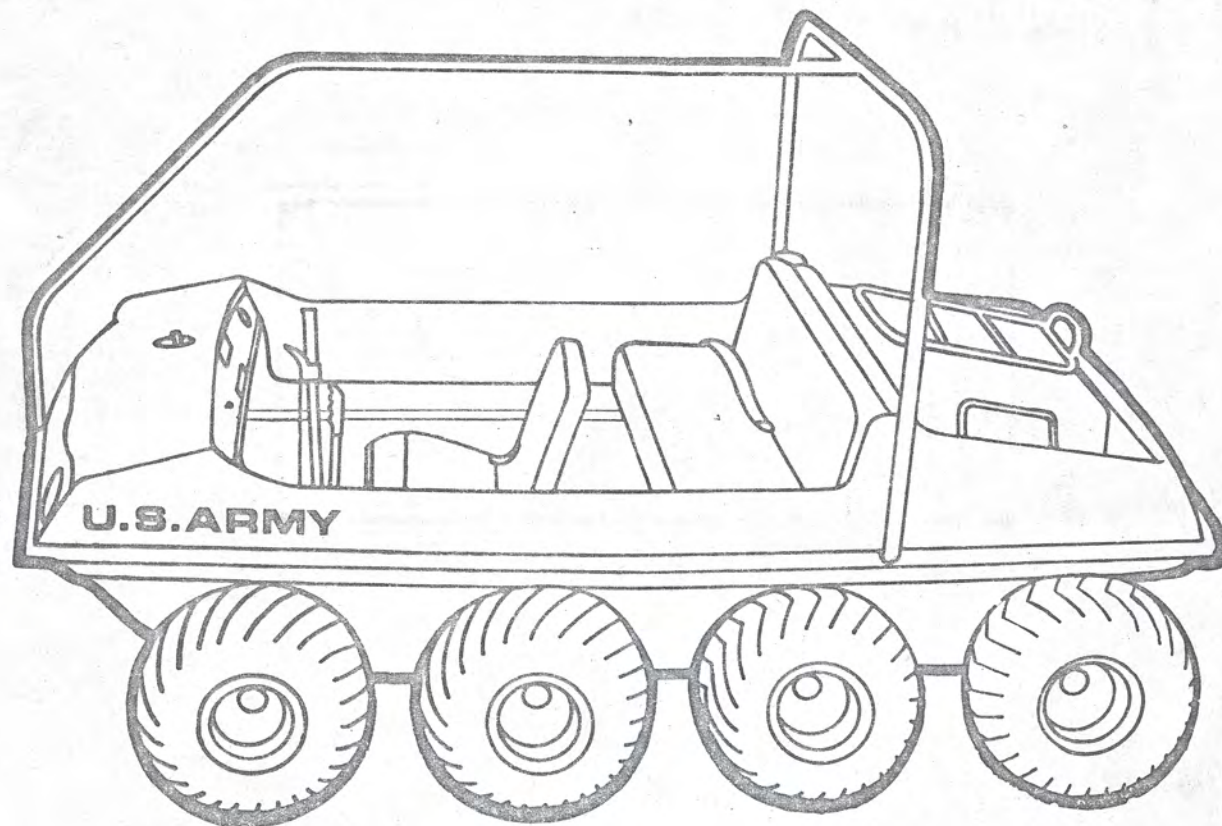


Howard Becker

CVS COMBAT VEHICLE SIMULATOR



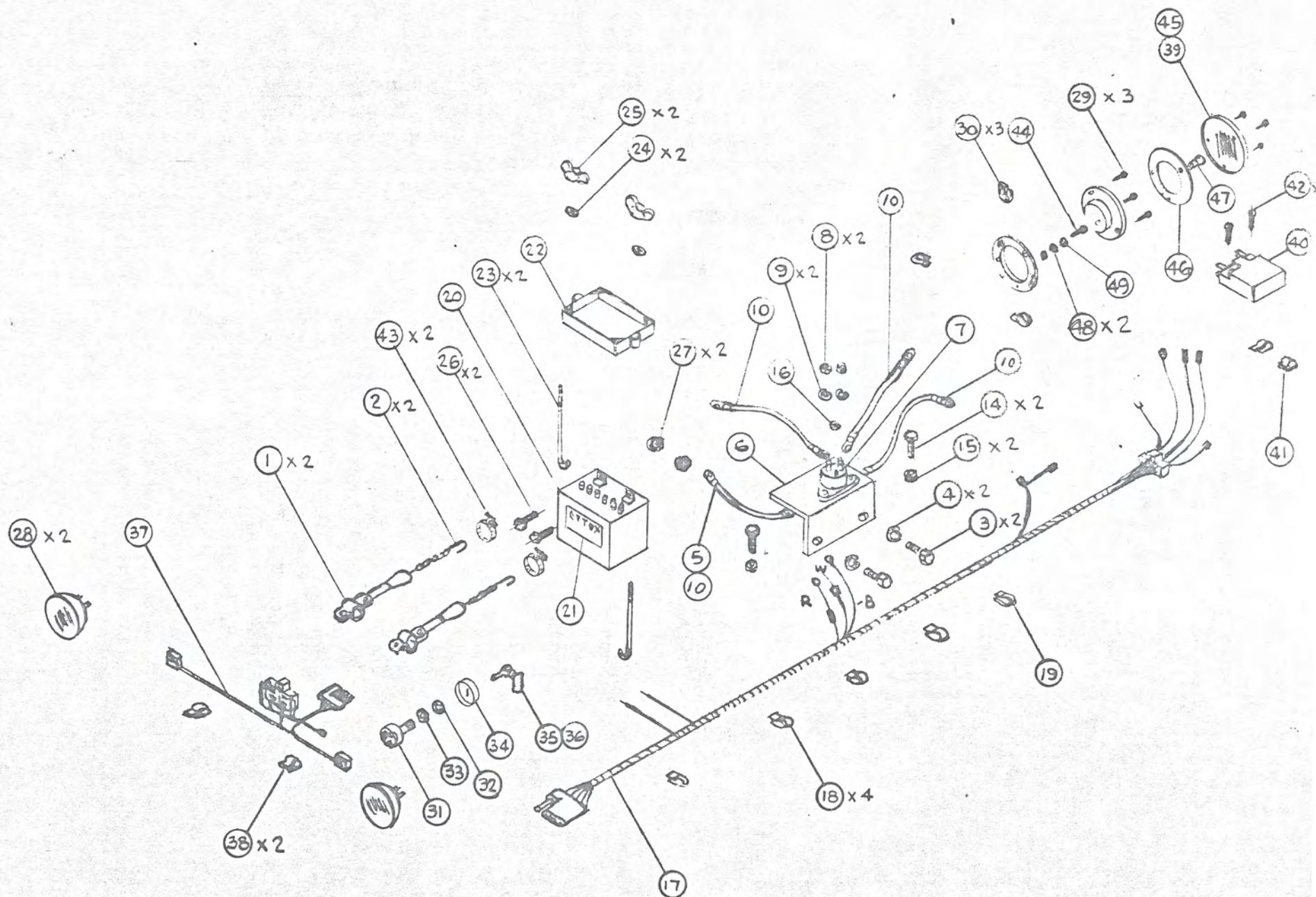
REVISED - 1-AUGUST-1973

PARTS MANUAL AND SERVICE MANUAL

TABLE OF CONTENTS

<u>GROUP</u>	<u>FUNCTIONAL GROUP</u>	<u>FIG.</u>	<u>PAGE</u>
000-10-000	ELECTRICAL	1	2,3,4,5
	Lights, Battery, Ignition Switch, Rectifier, Solenoid Stop Tailight Assembly		
000-11-000	FUEL		
	Carburetor Assembly Air Filter Assembly Gas Tank Assembly Fuel Line & Pump Assembly Throttle & Choke Assembly	2	6,7,8,9
000-12-000	BODY		
	Lower Body & Floor Pan Assembly Seat Assembly Upper Body & Roll Bar Assembly	3 4 5	10,11 12,13 14,15
000-13-000	STEERING	6	16,17
000-14-000			
000-15-000	FRAME, AXLES & WHEELS	7	18,19
000-16-000			
000-17-000	ENGINE		
	Crankcase Crankshaft Piston & Cylinder Electrical Equipment Starter & Ring Gear Assembly Fan Case & Impeller Recoil Starter Motor Mount Assembly	8 9 10 11 12 13 14 15	20,21 22,23 24,25 26,27,28,29 30,31 32,33 34,35 36,37
000-18-000	EXHAUST		
	Muffler, Heat Shields, Exhaust Assembly	16	38,39
000-21-000	TRANSMISSION		
	Transmission Frame Assembly Torque Converter Driven Assembly Transmission Shift Lever Assembly Transmission Assembly	17 17 17 18	40,41 40,41 40,41 42,43,44,45
000-22-000	DRIVE		
	Primary & Secondary Drive Sprocket Assy. Emergency Brake Assembly	19 19	46,47,48,49 46,47,48,49
	ENGINE REPAIR AND SERVICE		
	Wiring Schematic Disassembly & Assembly Timing Procedure Transmission Repair & Service Disassembly & Assembly	20 	50 51,52,53,54 55 56 57
	MODIFICATION KITS		58
	Fuel Body - Air Vent Exhaust Chain Idler	21 22 23 24	59,60 61,62 63,64 65,66

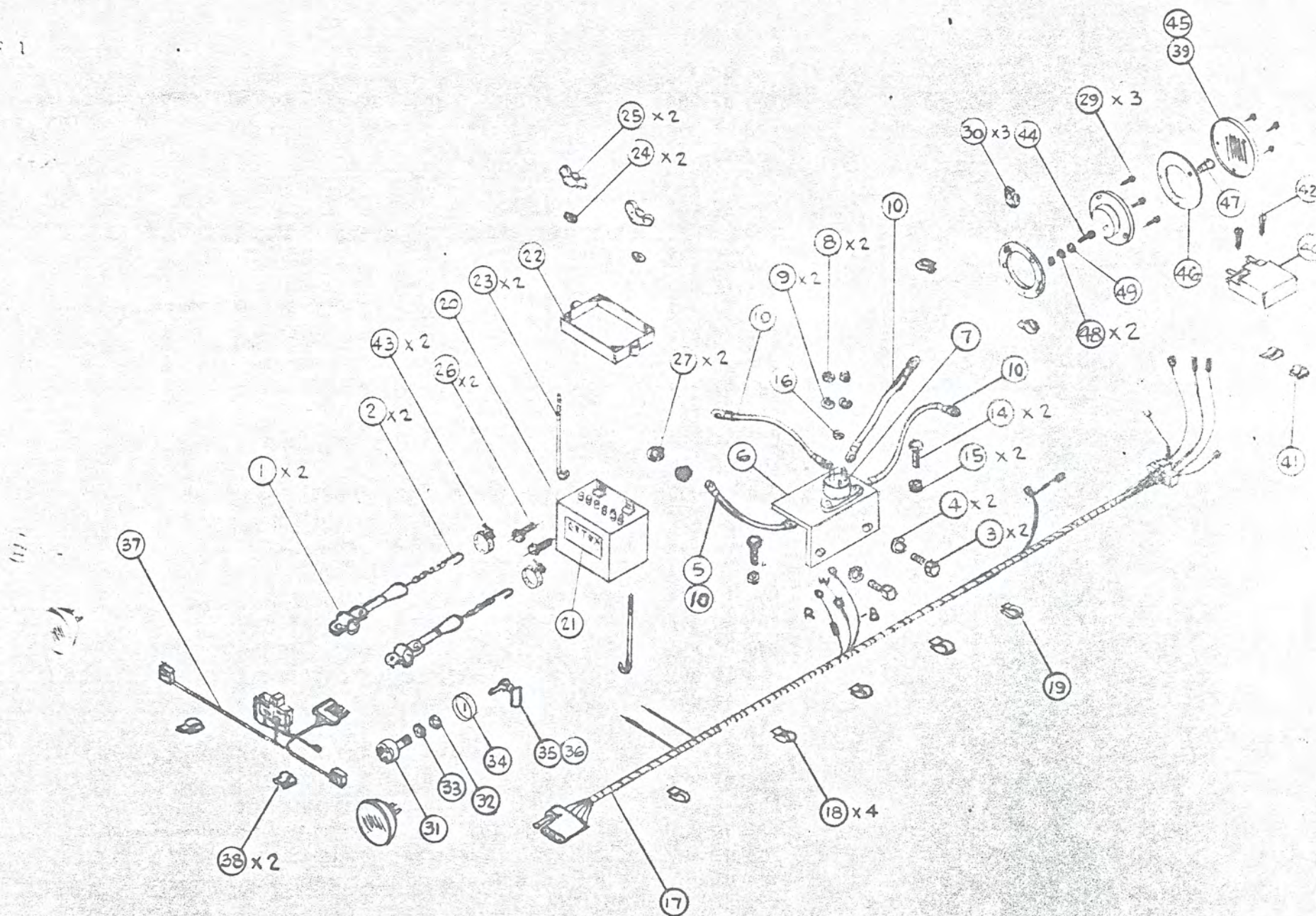
FIGURE 1



ELECT JAL

ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA.	MFG.ITEM	COMMON HDN	FABRICATE
1		Stop Light Switch W Spring	530-10-001	2	X		
2		Switch Spring Fastener	408-10-004	2	X		
3		Mtg. Bkt. Bolt 3/8-16X1" Hex.Hd.	100-30-314	3		X	
4		Mtg.Bkt Lock Washer	100-32-504	3		X	
5		Solenoid Cable Assy.	400-10-500	1	X		
6		Solenoid Mtg. Bracket	295-10-005	1	X		
7		Solenoid	300-10-010	1	X		
8		Nut 5/16-18	100-31-002	2		X	
9		Terminal Lock Washer 5/16 Med.	100-32-500	2		X	
10		Battery Cable	297-10-003	4	X		
14		Bolt 1/4-20X3/4 Hex.Hd.	100-30-309	2		X	
15		LockNut 1/4-20	100-31-405	2		X	
16		Nut 10-32	100-31-001	1		X	
17		Rear Wiring Harness	408-10-002	1	X		
18		Wire Harness Clip-frame	295-10-001	4	X		
19		Wire Harness Clip-solenoid	300-10-013	1	X		
20		Battery	297-10-001	1	X		
21		Battery Label	297-10-002	1	X		
22		Battery Hold Down Frame	295-10-002	1	X		
23		Battery Hold Down Bolt	295-10-003	2	X		
24		Washer	100-32-006	2	X		
25		Wing Nut 1/4-20	100-31-802	2		X	
26		Terminal Bolt 1/4-20X3/4	100-30-309	2		X	
27		Locknut 1/4-20 Whiz.	100-31-405	2		X	
28		Headlight	297-10-017	2	X		
29		Screw #10X3/4S.T.Washer Hd. (Taillight)	100-30-005	3		X	
30		Tinnerman Clip#C149822-10 (Taillight)	100-35-700	3		X	
31		Ignition Switch	300-10-004	1	X		
32		Ignition Switch Nut	300-10-007	1	X		
33		Washer (Palnut Face)	212-10-008	1	X		

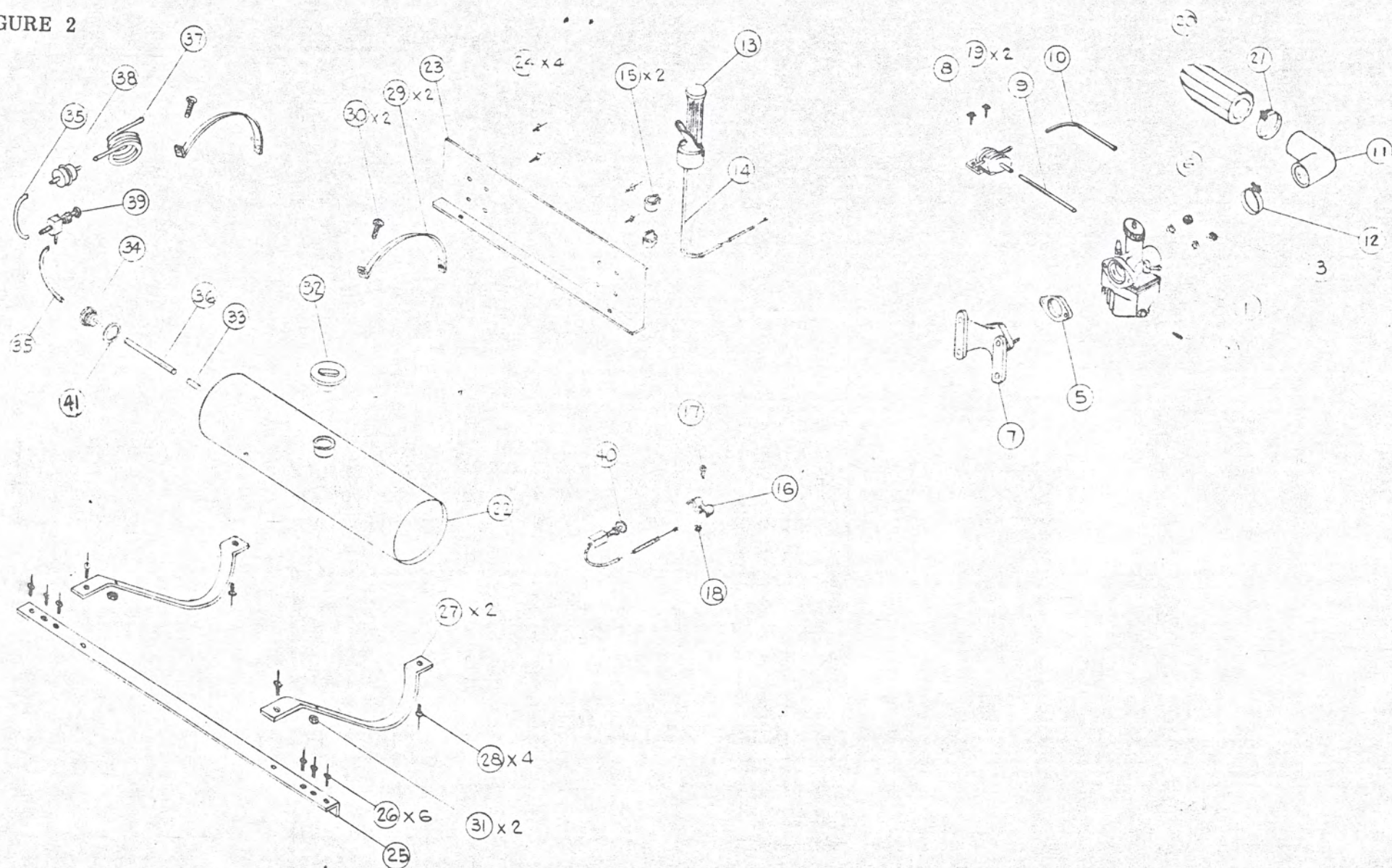
FIGURE 1



ELECTRICAL CONT.

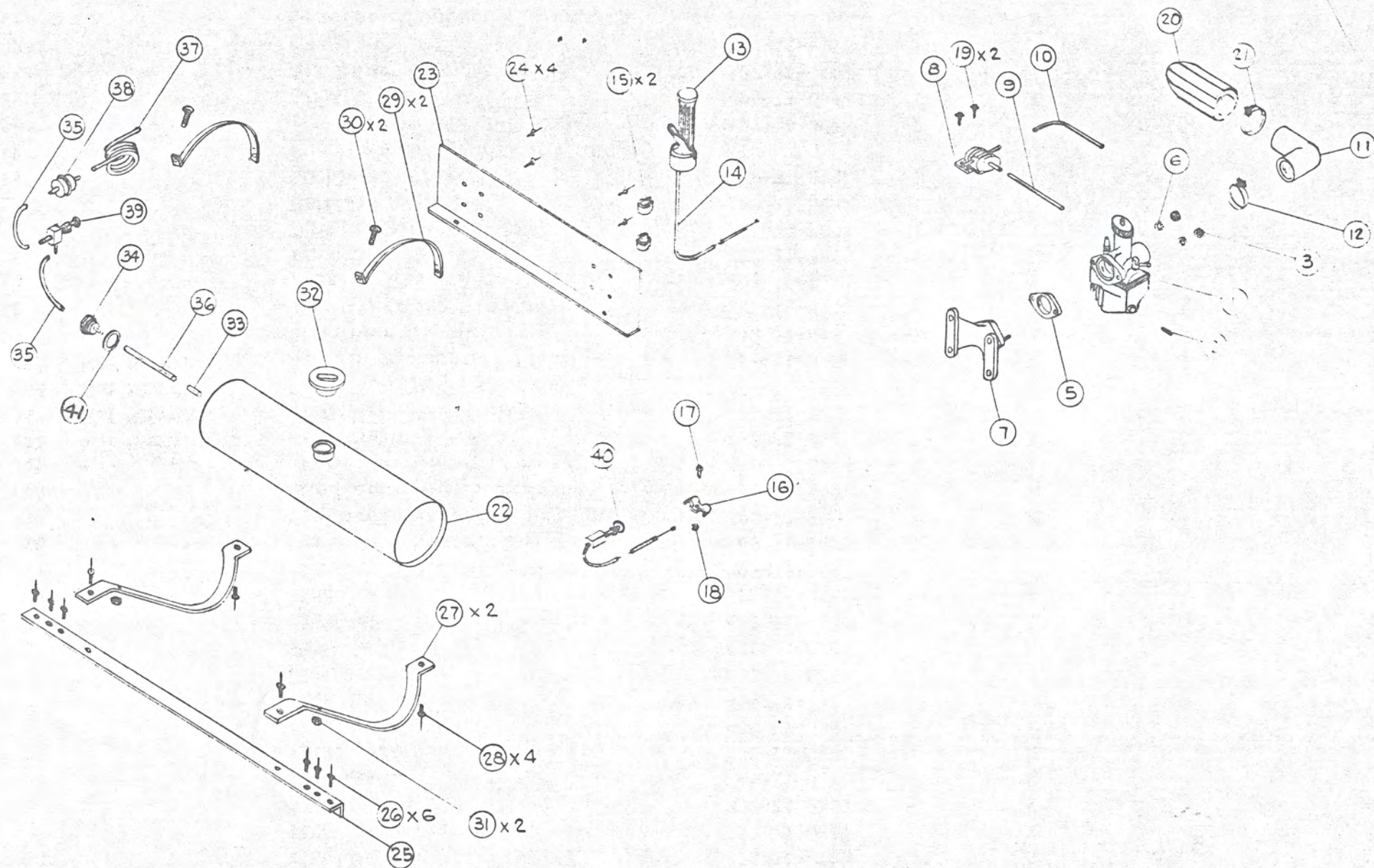
ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA.	MFG. ITEM	COMMON HDW	FABRICATE
34		Ignition Switch Weather Cap	300-10-005	1	X		
35		Ignition Switch Key	212-10-007	1	X		
36		Plastic Key Holder Tag	297-10-013	1	X		
37		Front Wire Harness	408-10-001	1	X		
38		Wire Harness Retainer	300-10-013	1	X		
39		Tail Light	408-10-003	1	X		
40		Rectifier	300-10-011	1	X		
41		Rectifier Wire Clip	300-10-014	2	X		
42		Rectifier Mtg Screw #12X 3/4 Wash. Hd., S.T.	100-30-004	2		X	
43		Worm Drive Clamp	100-35-203	2		X	
44		Screw #10-30x 1/2	100-30-003	1		X	
45		Replacement Lens	408-10-006	1	X		
46		Replacement Gasket	408-10-007	1	X		
47		Replacement 1157 Bulb	408-10-008	1	X		
48		#10/32 Nut	100-31-001	2		X	
49		#10 Washer	100-32-001	1		X	

FIGURE 2



ITEM	FSN	DESCRIPTION	FUEL	ATV	QUA.	MFG.ITEM	COMMON	FABRICATE
				PART NO.			HDW	
1		Carburetor Assembly 400		400-11-002	1	X		
2		Carburetor Jet			1	X		
		#100 Jet		252-11-018		X		
		#105 Jet		252-11-051		X		
		#110 Jet		252-11-052		X		
		#115 Jet		440-11-011		X		
		#117.5 Jet		295-11-020		X		
		#120 Jet		400-11-003		X		
		#125 Jet		400-11-017		X		
		#130 Jet		295-11-024		X		
		#135 Jet		400-11-016		X		
		#140 Jet		400-11-018		X		
		#145 Jet		295-11-026		X		
		#150 Jet		295-11-027		X		
3		Carburetor Mounting Nut 5/16-18		100-31-002	2		X	
5		Carburetor Insulator Adpator		400-11-001	1	X		
6		Carburetor Mtg.Lockwasher 5/16Med.		100-32-500	2		X	
7		Carburetor Manifold Assy.		400-11-004	1			X
8		Fuel Pump		295-11-009	1	X		
9		Fuel Pump Pulse Line		400-11-007	1			X
10		Fuel Line-Carb. to Pump		400-11-008	1			X
11		Air Filter Mounting Elbow		295-11-012	1	X		
12		Air Filter Clamp		252-11-013	1	X		
13		Throttle Lever Assembly		295-11-014	1	X		
14		Throttle Cable Assembly		408-11-001	1	X		
15		Throttle Cable Clamp		297-11-017	3	X		
16		Throttle & Choke Clamp		295-11-008	1	X		
17		Bolt #10/32 X 1/2		100-30-003	1		X	
18		Locknut #10/32		100-31-004	1		X	
19		Fuel Pump Mtg. Screw #12X3/4						
		Washer Hd. Self Tap		100-30-004	2		X	
20		Air Filter		295-11-011	1	X		
21		Air Filter Clamp		252-11-013	1	X		
22		Gas Tank		300-11-001	1	X		
23		Gas Tank Support Plt. Painted		300-11-500	1	X		
24		Suppt.Plate Rivet 3/16 Dia. 6-4		100-33-006	4		X	

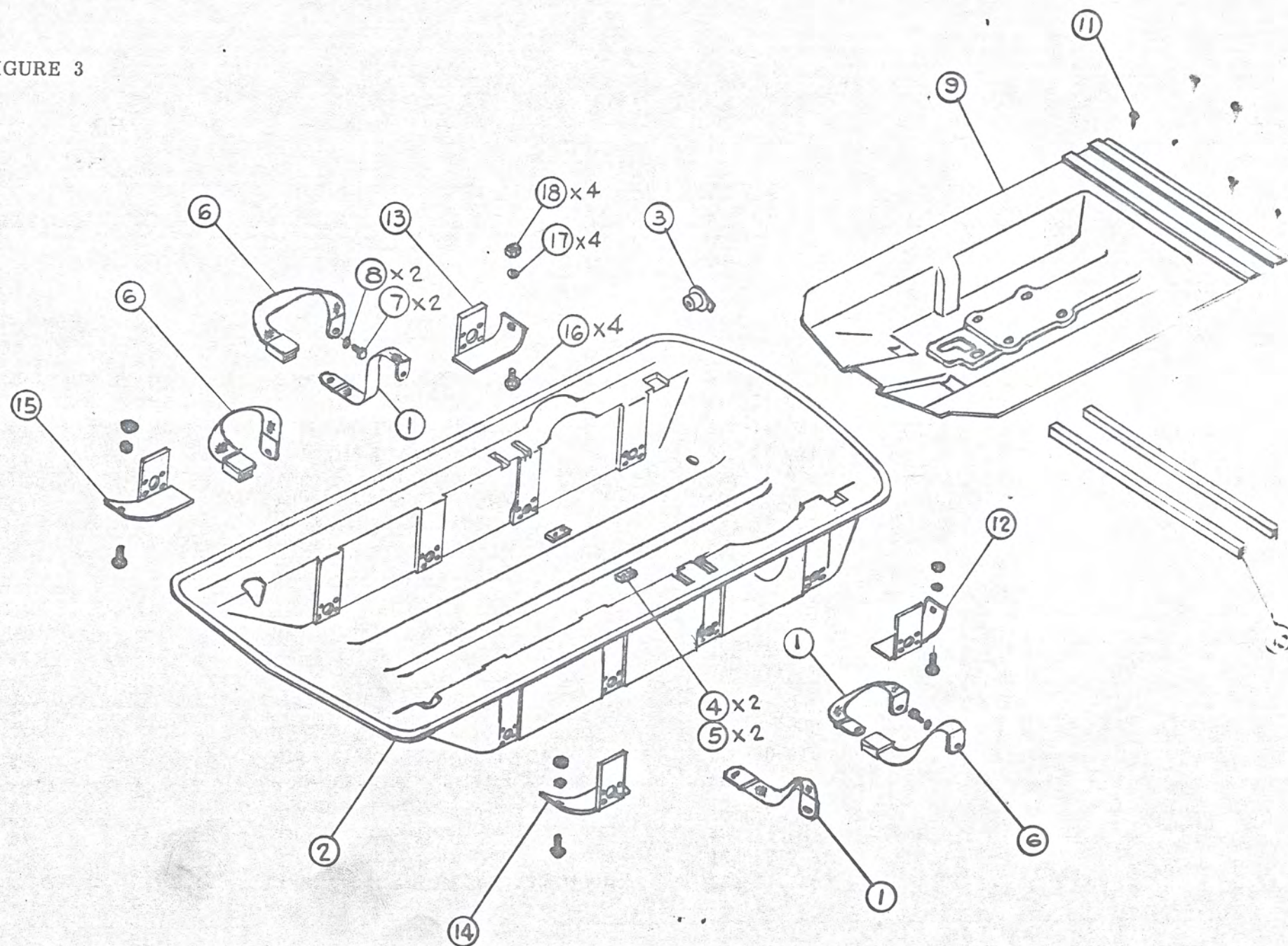
FIGURE 2



FUEL CONT

ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA.	MFG.ITEM	COMMON HDW	FABRICATE
25		Gas Tank Fr.Angle Brace,Painted	297-11-500	1			X
26		Brace Rivet 3/16 Dia. 6-4	100-33-006	6		X	
27		Gas Tank Bottom Strap, Painted	300-11-501	2	X		
28		Rivet 3/16 Dia. Pop Steel	100-33-007	4		X	
29		Gas Tank Top Strap, Painted	300-11-502	2	X		
30		Bolt 1/4-20 X1 1/2 Rd.Hd. Carr.	100-30-310	2		X	
31		Locknut 1/4-20	100-31-400	2		X	
32		Gas Tank Cap	297-11-002	1	X		
33		Fuel Strainer - In Tank	300-11-002	1	X		
34		Fuel Tank Hose Fitting	295-11-015	1	X		
35		Fuel Tank Pick-up Tube	212-11-008	2			X
36		Fuel Line - In Tank	212-11-005	1			X
37		Fuel Line(In-line Filter to Tank)	408-11-003	1			X
38		Fuel Filter in-line	297-11-004	1	X		
39		Shut-off Assy: Fuel	297-11-003	1	X		
40		Choke Cable Assembly	408-11-002	1	X		
41	Not Shown	Fuel Tank Hose Fitting Gasket	295-11-016	1			
42	Not Shown	Throttle Lever Pin	295-11-031	1	X		
43	Not Shown	Throttle Lever	295-11-033	1	X		
44	Not Shown	Throttle Pin Ring	295-11-032	1	X		
45	Not Shown	Fuel Line (Bulk)	295-11-005	-	X		

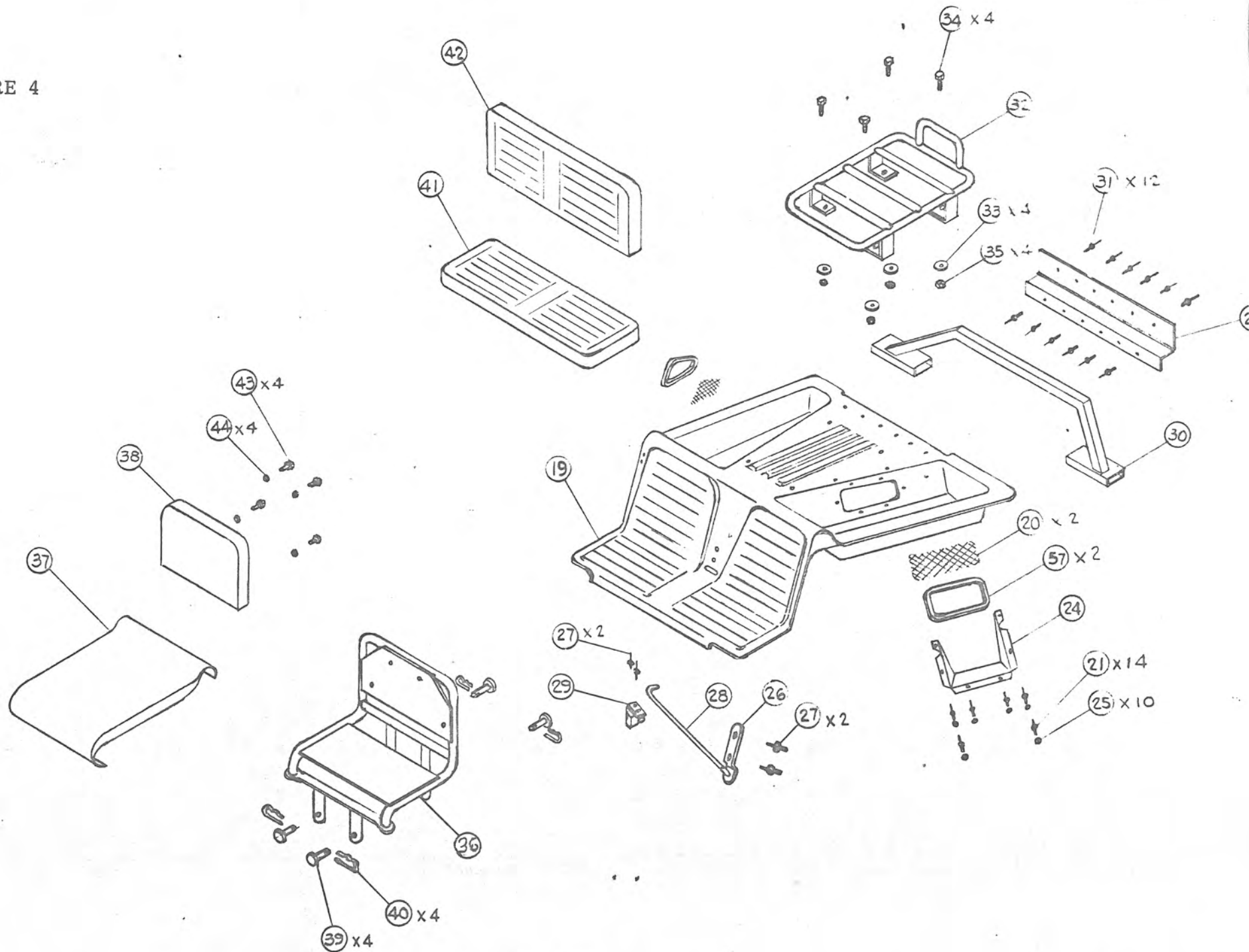
FIGURE 3



BODY
Lower Body and Floor Pan Assemb

ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA.	MFG.ITEM	COMMON HDW	FABRICATE
1		Male Seat Belt	408-12-030	3	X		
2		Lower Body	408-12-001	1			X
3		Drain Plug	300-12-017	1	X		
4		30T Sprocket Pad	408-12-004	2	X		
5		3/16 Large Flange Rivet	100-35-309	4		X	
6		Seat Belt (Female)	408-12-030	3	X		
7		Bolt 7/16-20X1" Hex.Hd.Gr.5	100-30-618	2		X	
8		Washer 7/16 Dia. Sae (Plain)	100-32-009	2		X	
9		Floor Pan	408-12-003	1			X
10		Seat Tube (Painted)	295-12-500	2			X
11		Fillister Hd. Screw 10-16X $\frac{1}{2}$	100-30-008	8		X	
12		L.H.Rear Skid Shield, Painted	408-12-507	1	X		
13		R.H.Rear Skid Shield, Painted	408-12-509	1	X		
14		L.H.Fr. Skid Shield, Painted	408-12-511	1	X		
15		R.H. Fr. Skid Shield, Painted	408-12-513	1	X		
16		5/16-18X3/4 Rd. Hd. Sqr. Neck Bolt	100-30-320	4		X	
17		5/16 Fender Washer	100-32-022	4		X	
18		5/16 (Coneloc) Locknut	100-31-410	4		X	

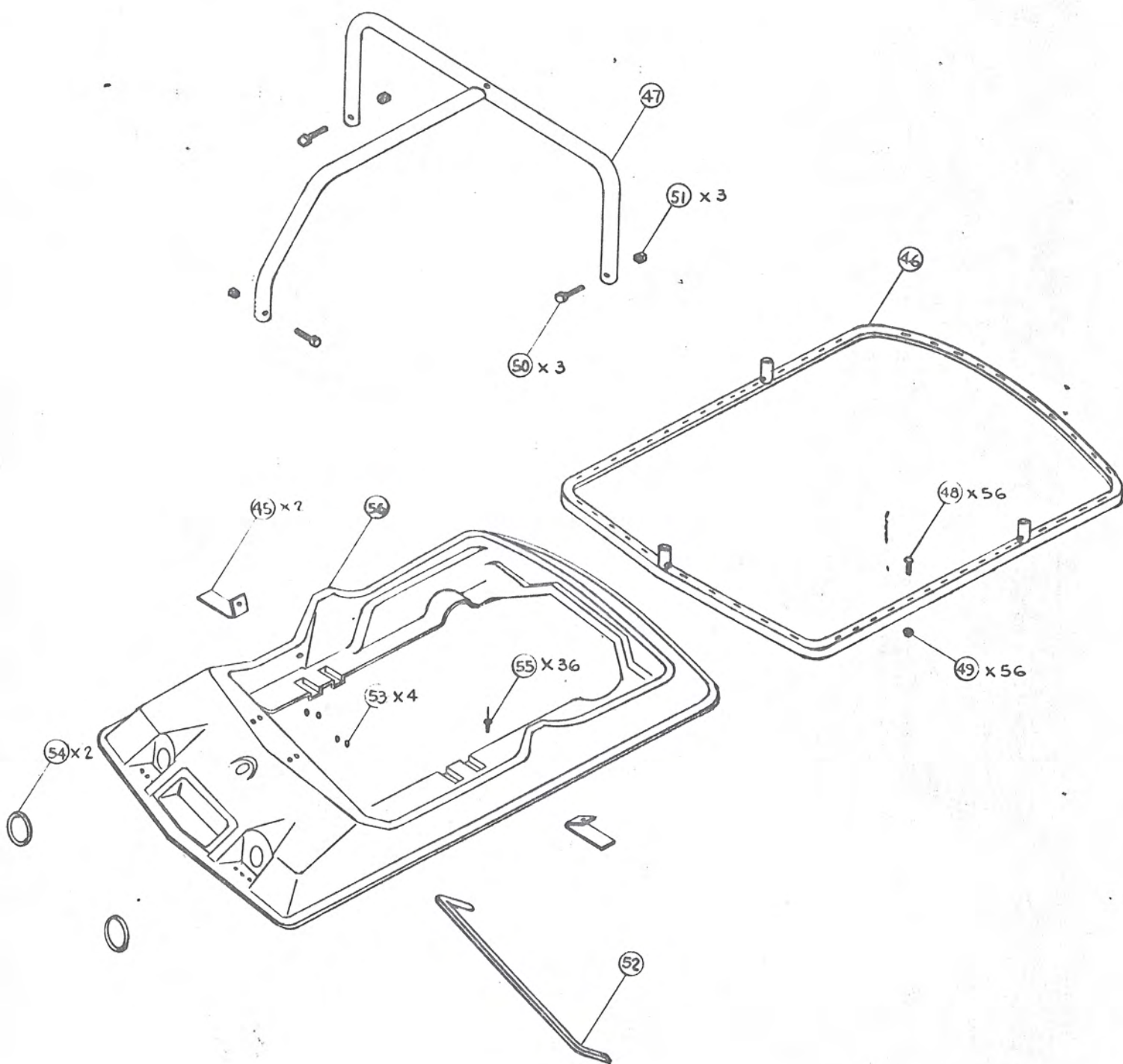
FIGURE 4



BODY
Seat Assembly

ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA.	MFG.ITEM	COMM/MT E276	FABRIC/CL
19		Seat & Engine Cowling Assy.	408-12-524	1			X
20		Air Screen, Painted	295-12-502	2			X
21		Rivet 3/16 Dia. 6-8	100-33-005	14		X	
22		Rivet 3/16 Dia. 6-4	100-33-006	20		X	
23		Engine Cowling Hinge	295-12-007	1	X		
24		Air Outlet Duct	252-12-003	1	X		
25		Washer #10	100-32-001	10		X	
26		Cowling & Seat Suppt.Rod Bkt.	408-12-009	1	X		
27		Rivet 3/16 Dia. Pop Steel	100-33-007	4		X	
28		Cowling & Seat Suppt. Rod	408-12-010	1	X		
29		Support Rod Catch Assembly	408-12-521	1			X
30		Engine Cowling Hinge Suppt.,Painted	295-12-501	1			X
31		Rivet 3/16 Dia. 6-8	100-33-005	12		X	
32		Carrier Rack Painted	408-12-520	1			X
33		Washer 1/4 I/D X 1/4 O.D. Fender Painted	100-32-018	4		X	
34		Bolt 1/4-20X3/4 Carr.	100-30-343	4		X	
35		Locknut 1/4-20 (Coneloc)	100-31-400	4		X	
36		Bucket Seat Assy.	408-12-516	1			X
37		Bottom Seat Pad	408-12-517	1	X		
38		Back Rest Pad	408-12-518	1	X		
39		Clevis Pin 3/8 Dia.	100-35-403	4		X	
40		Hitch Pin #14 W.W.	100-35-409	4		X	
41		Bottom Cushion Assembly	212-12-502	1	X		
42		Back Cushion Asembly	212-12-503	1	X		
43		Bolt 1/4-20 X 1/2 Hex. Hd.	100-30-306	4		X	
44		Lock Washer 1/4 Med.	100-32-509	4		X	
57		Air Screen Trim	295-12-014	2			X

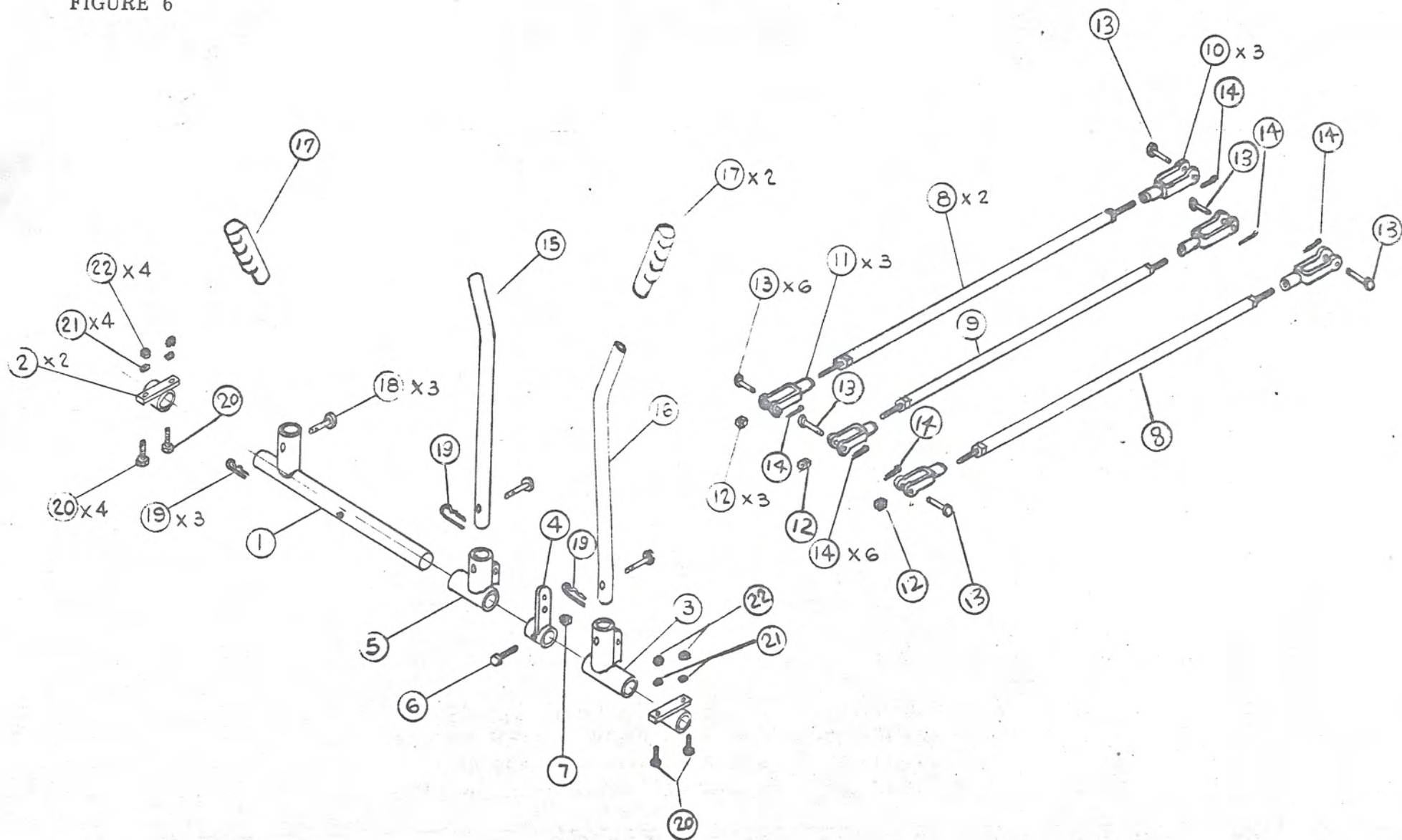
FIGURE 5



BOI
Upper Body & Roll Bar Assembly

ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA:	MFG.ITEM	COMMON HDW	FABRICATE
45		Seat Belt Bkt.Weld'nt, Painted	408-12-505	2			X
46		Rub Rail Moulding Assy., Painted	408-12-503	1			X
47		Roll Bar Assy. Painted	408-12-501	1			X
48		Bolt 1/4-20X1" Rd.Hd.Sqr.Neck	100-30-350	56		X	
49		Locknut 1/4-20 Wiz..	100-31-405	56		X	
50		Bolt 3/8-24X2" Hex.Hd.Gr.5	100-30-351	3		X	
51		Locknut 3/8-24 (Coneloc) (Roll Bar)	100-31-407	3		X	
52		Dash Edge Moulding	297-12-009	1			X
53		Dash Rivet Cap	300-12-009	4	X		
54		Head Light Retainer Ring	295-12-026	2	X		
55		Upper Body Rivet	100-33-006	36		X	
56		Upper Body	408-12-002	1			X

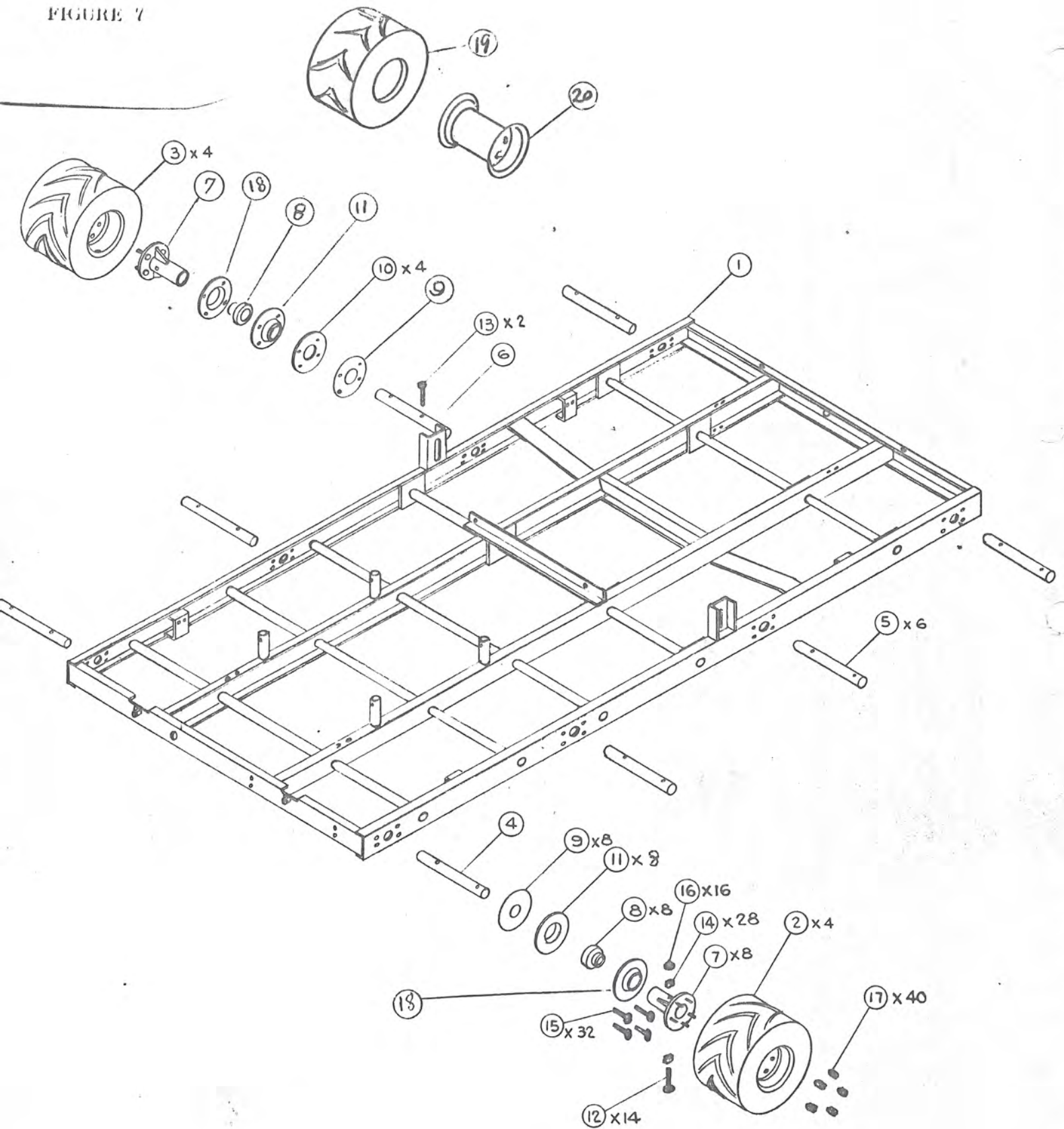
FIGURE 6



STEERING

ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA.	MFG.ITEM	COMMON HDW	FABRICATI
1		Steering Pivot Rd Weld'nt Plate	408-13-501	1			X
2		Steering Rod Spacer, Painted	408-13-506	2			X
3		L.H. Steering Receptacle, Painted	408-13-503	1			X
4		Shift Brkt. Weld'nt, Painted	408-13-508	1			X
5		R.H. Steering Receptacle, Painted	408-13-505	1			X
6		5/16 - 24 X 1 - 34 Hex.Hd.Bolt Gr.5	100-30-321	1		X	
7		5/16 - 24 Locknut (Coneloc)	100-31-406	1		X	
8		Adjustable Steering Rod Plate	408-13-510	2			X
9		Adjustable Shift Rod Plated	408-13-512	1	X		
10		Adjustable Steering Yoke L.H.	295-13-001	3	X		
11		Adjustable Steering Yoke R.H.	295-13-002	3	X		
12		3/8 - 24 Locknut	100-31-004	3		X	
13		3/8 Dia. Clevis Pin	100-35-413	6		X	
14		3/32 Dia. X 1" Cotter Pin	100-35-406	6		X	
15		Steering Lever R.H.	408-13-012	1			X
16		Steering Lever L.H.	408-13-011	1			X
17		Steering Hand Grip	295-13-017	2	X		
18		Steering Lever Pin 3/8 Dia X 1½	295-13-014	3	X		
19		Steering Lever Hair Pin	295-13-015	3	X		
20		Bolt 3/8-16X3/4 Hex. Hd.	100-30-337	4		X	
21		Washer 3/8 Plain	100-32-006	4		X	
22		Locknut 3/8-16	100-31-401	4		X	

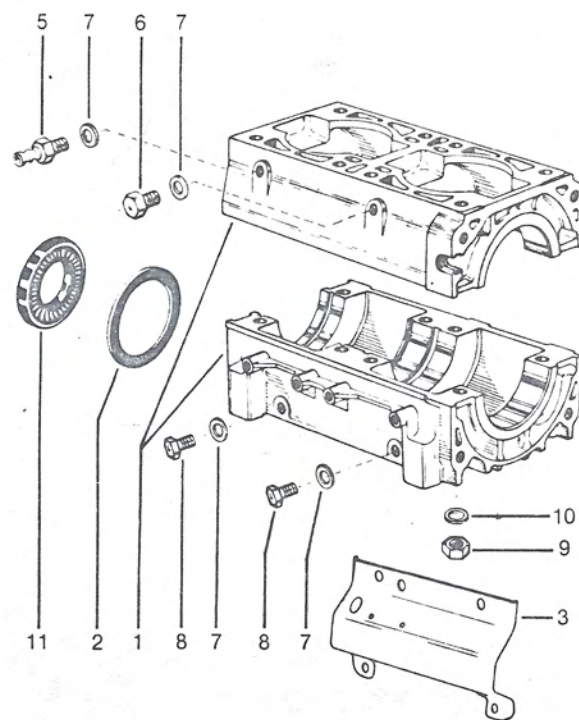
FIGURE 7



FRAME, AXLE & WHEELS

ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA.	MFG.ITEM	COMMON HDW	FABRICATE
1		Frame Assembly, Painted	408-14-501	1			X
2		L.H. Tire & Wheel	408-15-001	4	X		
3		R.H. Tire & Wheel	408-15-002	4	X		
4		L.F. Axle (Speedometer)	408-16-504	1			X
5		ATTEX Axle	408-16-503	6			X
6		R.H. Rear Center Axle	408-16-502	1			X
7		Axle Hub Assembly, Painted	408-16-501	8			X
8		Axle Bearing, Outer	295-16-006	8	X		
9		Neoprene Seal, Axle	295-16-008	8	X		
10		Plastic Outer Bearing Spacer	295-16-007	4	X		
11		Axle Bearing Flange	295-16-501	8	X		
12		Axle Drive Bolt	295-16-009	14	X		
13		L & R Rear Center Spool Bolt 3/8- 24 X3" Hex. Hd.	100-30-351	2		X	
14		Axle Drive Cup Washer	295-16-011	28	X		
15		Bolt 5/16-18X1" 1/4 Hex.Hd.Flange	100-30-340	32		X	
16		Axle Drive Nut	295-16-010	16	X		
17		Lug Nut Hub	408-16-002	40	X		
18		Bearing Flange, Outer	252-16-502	8			
19		Tire	408-15-003	8			
20		Wheel	408-15-004	8			

FIGURE 8

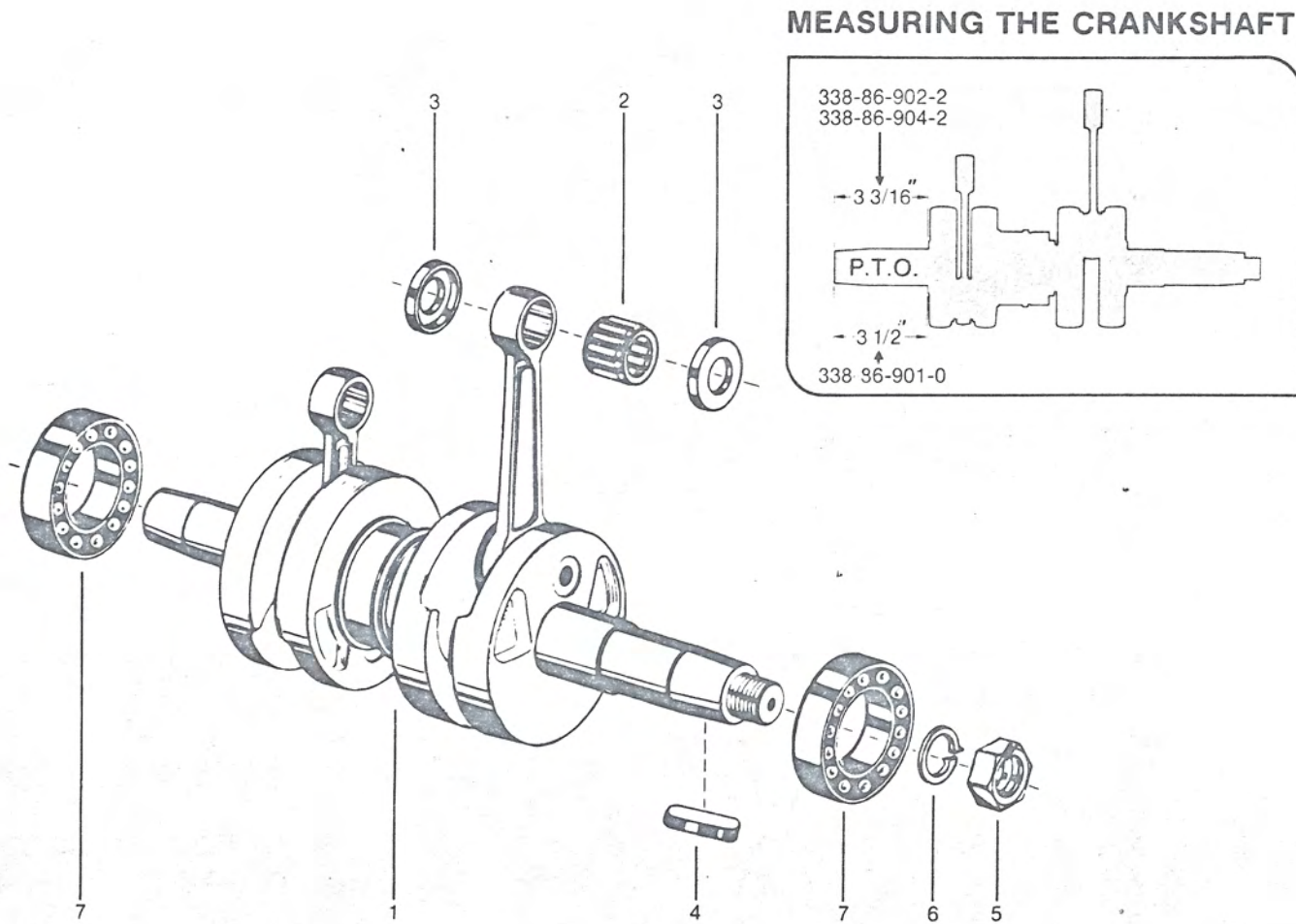


Type 1 Crankcase Used on Model LR-340/2 (2F-340-1) with serial numbers up to 338-17109, on Model LR-399/2 (2F-400-1) with serial numbers up to 399-39535 and Model LR-440/2 (2F-4402) with serial numbers up to 438-1122.

CRANKCASE

ITEM	JLO	DESCRIPTION	ATV	QUA.	MFG.ITEM	COMMON	
			PART NO.			HDW	FABRICATE
1	338-01-810-20	Crankcase, complete (includes upper & lower halves) New Style	399-17-142	1	X		
2	338-03-007-0	Washer	399-17-144	1	X		
3	338-11-008-1	Coil Cover	399-17-149	1	X		
5	002-45-513-26	Impulse Connector	295-17-120	1	X		
6	000-41-480-53	Plug	297-17-119	1	X		
7	000-35-000-70	Gasket Ring	297-17-101	4	X		
8	000-41-010-81	Screw	399-17-110	2	X		
9	000-41-970-10	Nut	252-17-131	8	X		
10	000-40-422-09	Spring Washer	297-17-107	8	X		
11	000-42-318-91	Oil Seal (Electric Start)	399-17-121	1	X		
12	338-01-810-11	Crankcase, complete (includes upper & Lower halves) Old Style	399-17-208	1	X		

FIGURE 9

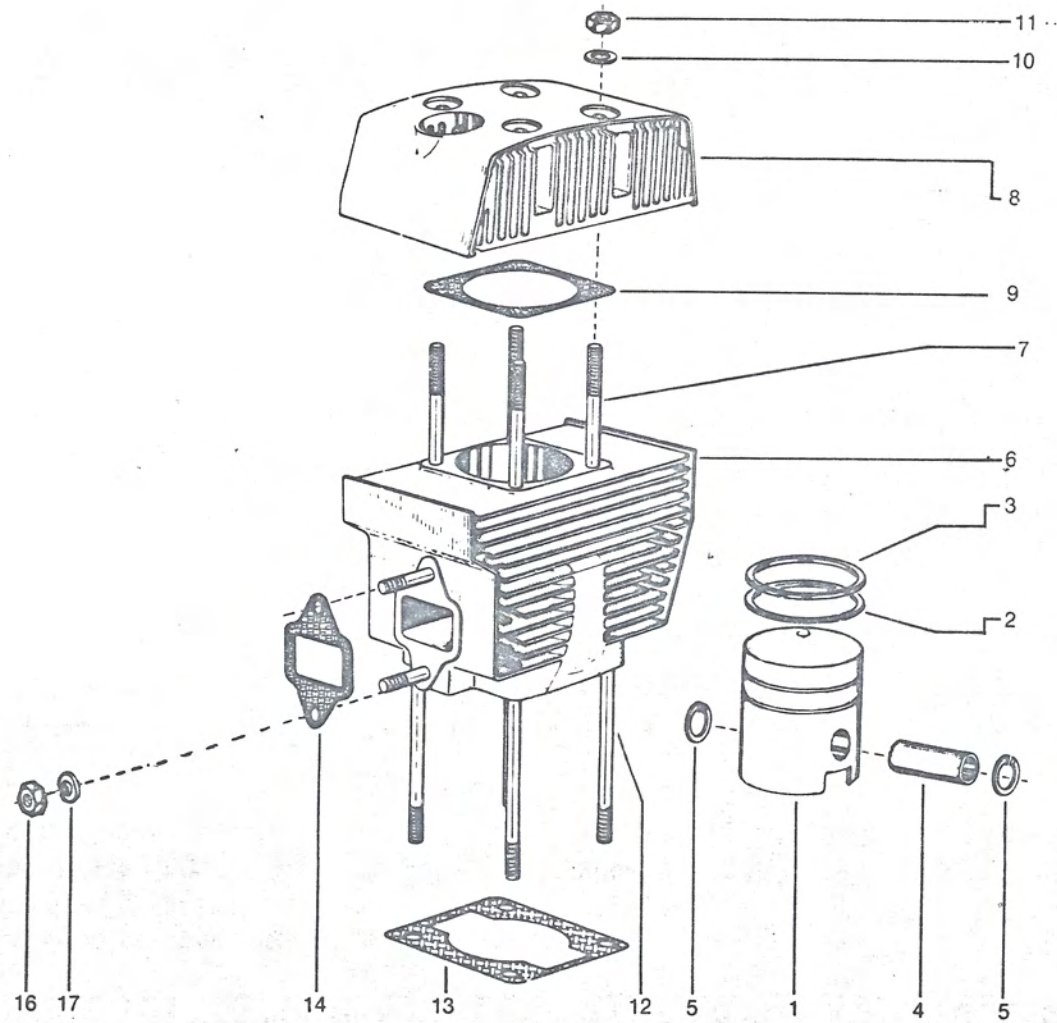


CRANKSHAFT

I HNE

ITEM	JLO	DESCRIPTION	ATV PART NO.	QUA:	MFG.ITEM	COMMON HDW	ABRICATE
1	338-86-902-2	Crankshaft, complete, including items 2 thru 6 (3-3/16")	399-17-167	1	X		
2	000-39-112-53	Needle Bearing	399-17-102	2	X		
3	338-03-006-1	Check Plate	399-17-143	4	X		
4	000-40-896-15	Key	297-17-113	1	X		
5	000-41-955-07	Nut	297-17-126	1	X		
6	000-40-645-20	Lock Washer	297-17-110	1	X		
7	000-39-075-21	Ball Bearing	399-17-182	2	X		

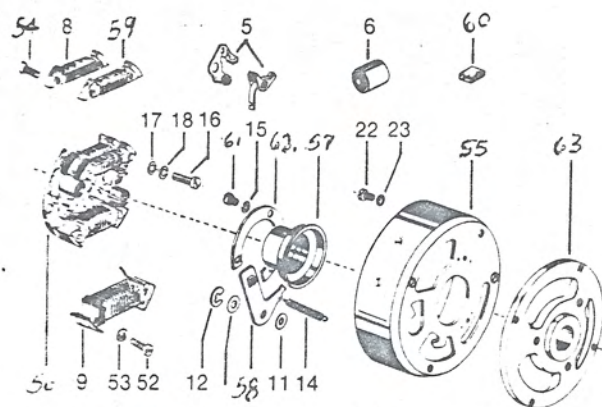
FIGURE 10



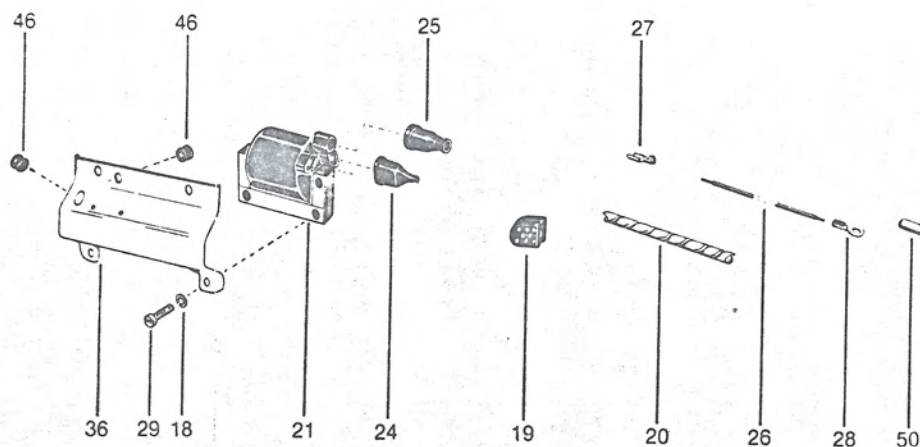
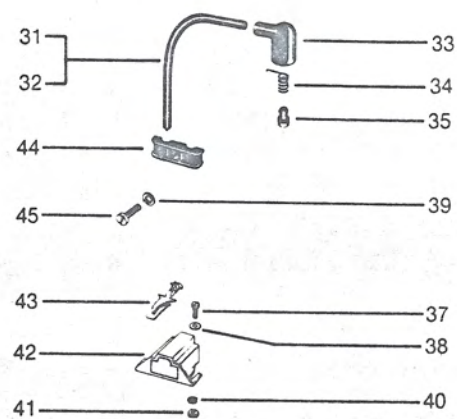
PISTON AND CYLINDER

ITEM	JLO	DESCRIPTION	ATV PART NO.	QUA:	MFG.ITEM	COMMON HDW	FABRIC
1	399-05-902-1	Piston Complete, including items 2 thru 5	399-17-169	2	X		
2	000-42-124-71	Piston Ring (Bottom)	399-17-119	2	X		
3	000-42-144-74	Piston Ring (Top)	399-17-120	2	X		
4	338-05-002-0	Wrist Pin	399-17-145	2	X		
5	000-42-621-42	Circlip	399-17-108	4	X		
6	399-07-850-1	Cylinder, comp. including item 7	399-17-172	2	X		
7	000-41-240-85	Stud	399-17-111	8	X		
8	399-07-064-0	Cylinder Head	399-17-171	2	X		
9	399-07-006-1	Cylinder Head Gasket	399-17-170	2	X		
10	000-40-510-10	Washer	399-17-106	8	X		
11	000-41-970-11	Nut	252-17-192	8	X		
12	000-41-243-60	Stud	399-17-112	8	X		
13	338-07-008-0	Cylinder Base Gasket	399-17-146	2	X		
14	338-07-011-0	Intake Gasket	399-17-147	2	X		
16	000-41-970-10	Nut	252-17-131	4	X		
17	000-40-422-09	Spring Washer	297-17-107	4	X		

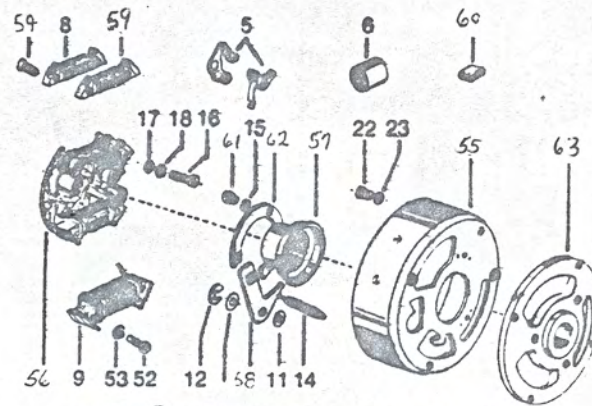
FIGURE 11



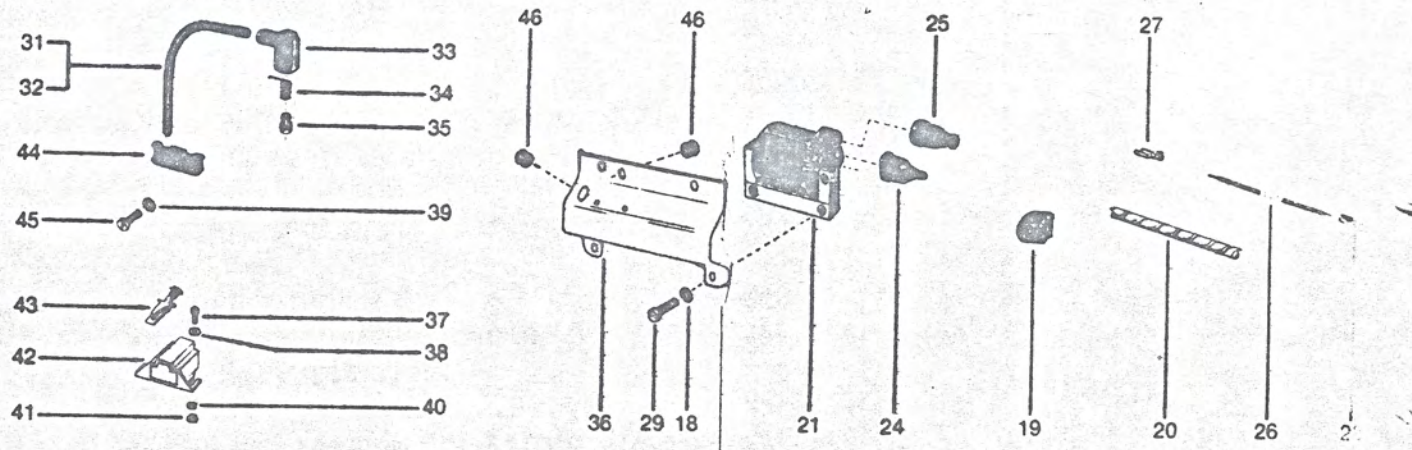
TYPE A MAGNETO... with two ignition
generating coils and one lighting coil.



ITEM	JLO	DESCRIPTION	ATV PART NO.	QUA.	MFG. ITEM	COMMON HPW	ABRICATE
1	000-43-051-98	Magnetic Flywheel Assy. (Old Style)	399-17-122	1	X		
2	000-43-053-31	Armature Plate Assy. (Old Style)	399-17-123	1	X		
3	000-43-057-28	Cam (Old Style)	399-17-127	1	X		
4	000-43-060-19	Centrifugal Weight (Old Style)	295-17-112	1	X		
5	000-43-062-23	Ignition Points (2)	252-17-140	2	X		
6	000-43-065-30	Condenser	252-17-142	2	X		
7	000-43-055-37	Ignition Generating Coil (Old Style)	399-17-125	2	X		
8	000-43-055-38	Ignition Generating Coil	399-17-126	1	X		
9	000-43-055-34	Lighting Coil	399-17-124	1	X		
10	000-43-063-13	Lubricating Wick (Old Style)	399-17-128	1	X		
11	000-43-125-59	Washer	295-17-113	1	X		
12	000-40-760-08	Retainer	297-17-112	1	X		
13	000-41-500-94	Screw (Old Style)	297-17-120	3	X		
14	000-43-087-68	Spiral Spring (Old Style)	297-17-139	1	X		
15	000-40-422-06	Spring Washer (Old Style)	399-17-103	3	X		
16	000-41-501-15	Screw	399-17-181	2	X		
17	000-40-510-06	Washer	252-17-105	2	X		
18	000-40-645-05	Lock Washer	252-17-108	6	X		
19	002-44-450-01	Grommet	399-17-133	1	X		
20	002-44-127-16	Spiral Band	399-17-130	1	X		
21	000-43-056-06	Ignition Coil	297-17-134	2	X		
22	000-41-504-35	Screw	399-17-114	4	X		
23	000-40-645-06	Lock Washer	252-17-109	4	X		
24	002-44-498-00	Protective Cap	297-17-148	4	X		
25	002-44-499-00	Protective Cap	297-17-150	2	X		
26	002-44-190-11	Ground Cable (4-5/16")	399-17-131	2	X		
27	002-44-523-00	Connector - Spade Type	297-17-151	4	X		
28	000-43-100-04	Connector - Eyelet Type	297-17-140	2	X		
29	000-41-501-20	Screw	399-17-113	4	X		
30	338-11-002-1	Magnetic Flywheel Flange (New Type)	399-17-148	1	X		
31	002-44-152-36	Ignition Cable (14")	399-17-132	1	X		
32	002-44-152-52	Ignition Cable (20-7/17")	295-17-116	1	X		
33	002-44-275-00	Spark Plug Connector	252-17-143	2	X		



TYPE ● MAGNETO...with two ignition
generating coils and one lighting coil.

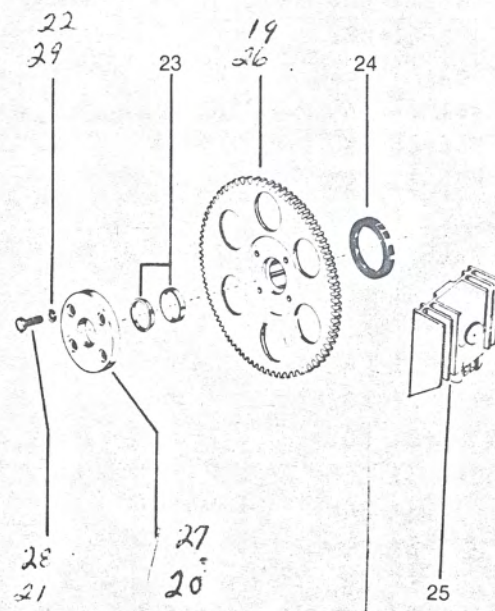


ELECTRICAL CONT.

GINE

ITEM	JLO	DESCRIPTION	ATV PART NO.	QUA.	MFG.ITEM	COMMON HDW	FABRICATE
34	002-44-276-00	Spring	252-17-144	2	X		
35	002-41-277-90	Contact Nut	252-17-145	2	X		
36	338-11-008-1	Cover Plate(See Crankcase Sec.)	399-17-149	2	X		
37	000-41-500-97	Screw	252-17-124	2	X		
38	000-40-510-05	Washer	399-17-105	2	X		
39	000-40-422-08	Spring Washer	295-17-103	1	X		
40	000-40-645-04	Lock Washer	252-17-107	2	X		
41	000-41-970-06	Nut	252-17-129	2	X		
42	002-44-556-00	Connector Housing	399-17-136	1	X		
43	002-44-550-00	Connector - Spade Type	399-17-135	5	X		
44	002-50-120-08	Ignition Cable Bracket	399-17-137	1	X		
45	000-41-501-38	Screw	252-17-126	1	X		
46	002-44-430-00	Grommet	295-17-117	2	X		
49	000-43-125-38	Ring Segment	297-17-141	1	X		
50	002-44-472-90	Sleeve	399-17-134	1	X		
51	000-41-581-06	Ignition Coil Screw (Old Style)	399-17-116	2	X		
52	000-41-501-20	Ignition Coil Screw	399-17-113	2	X		
53	000-40-645-05	Lock Washer	252-17-108	2	X		
54	000-41-501-18	Ignition Coil Screw (New Style)	252-17-125	2	X		
55	000-43-051-99	Magnetic Flywheel Assy. (New Style)	399-17-188	1	X		
56	000-43-053-42	Armature Plate Assy. (New Style)	399-17-192	1	X		
57	000-43-057-27	Cam (New Style)	339-17-189	1	X		
58	000-43-060-21	Centrifugal Weight (New Style)	399-17-190	1	X		
59	000-43-056-13	Ignition Generating Coil (New Style)	399-17-195	1	X		
60	000-43-063-12	Lubricating Wick (New Style)	252-17-141	1	X		
61	000-44-501-12	Screw (New Type)	399-17-209	3	X		
62	000-40-422-07	Spring Washer (New Type)	297-17-106	2	X		
63	338-11-002-0	Magnetic Flywheel Flange (Old Style)	399-17-210	1	X		

FIGURE 12

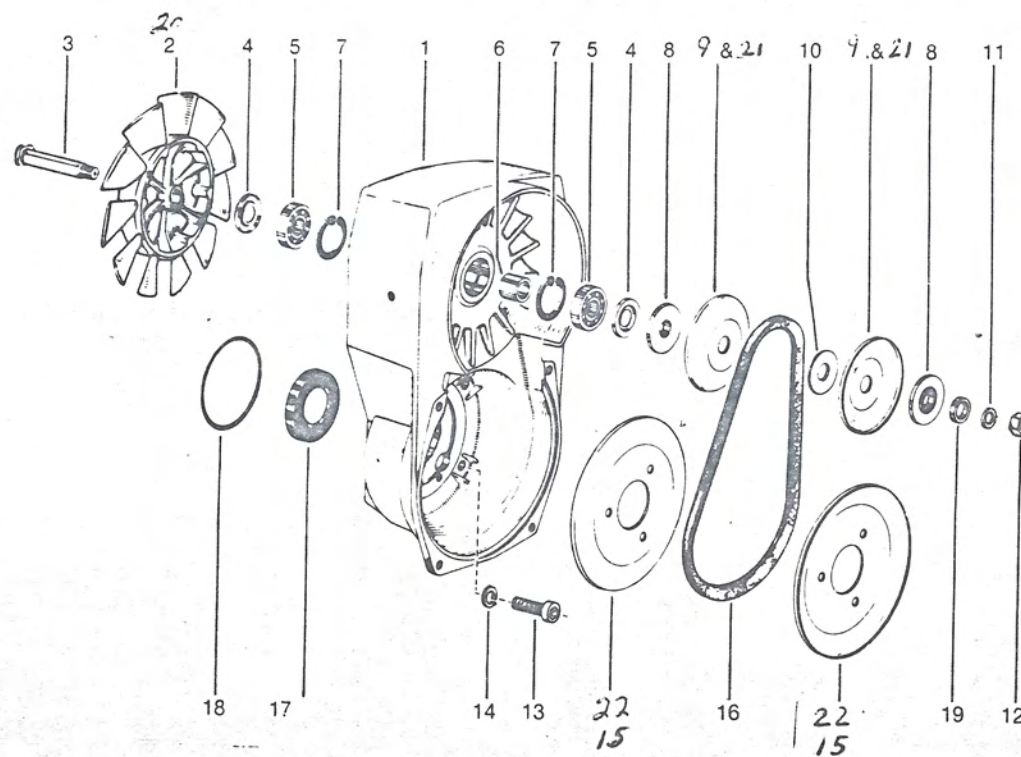


STAR R & RING GEAR ASSEMBLY

ENGINE

ITEM	JLO	DESCRIPTION	ATV PART NO.	QUA.	MFG:ITEM	COMMON HDW	FABRICATE
19	338-11-010-1	Ring Gear, 8mm (New Type)	399-17-150	1	X		
20	338-11-015-2	Pressure Flange, 8mm (New Style)	399-17-151	1	X		
21	000-41-741-23	Screw, 8 mm (New Style)	399-17-117	4	X		
22	000-40-645-08	Lock Washer, 8mm (New Style)	252-17-110	4	X		
23	002-42-640-30	Clamping Rings (Set of 2)	399-17-129	1	X		
24	000-42-318-91	Oil Seal	399-17-121	1	X		
25	000-43-083-52	Rectifier	300-10-011	1	X		
26	338-11-010-0	Ring Gear, 6mm (Old Style)	399-17-213	1	X		
27	338-11-015-1	Pressure Flange, 6mm (Old Style)	399-17-214	1	X		
28	000-41-740-11	Screw, 7mm (Old Style)	399-17-215	4	X		
29	000-40-645-06	Lock Washer, 6mm (Old Style)	252-17-109	4	X		

FIGURE 13

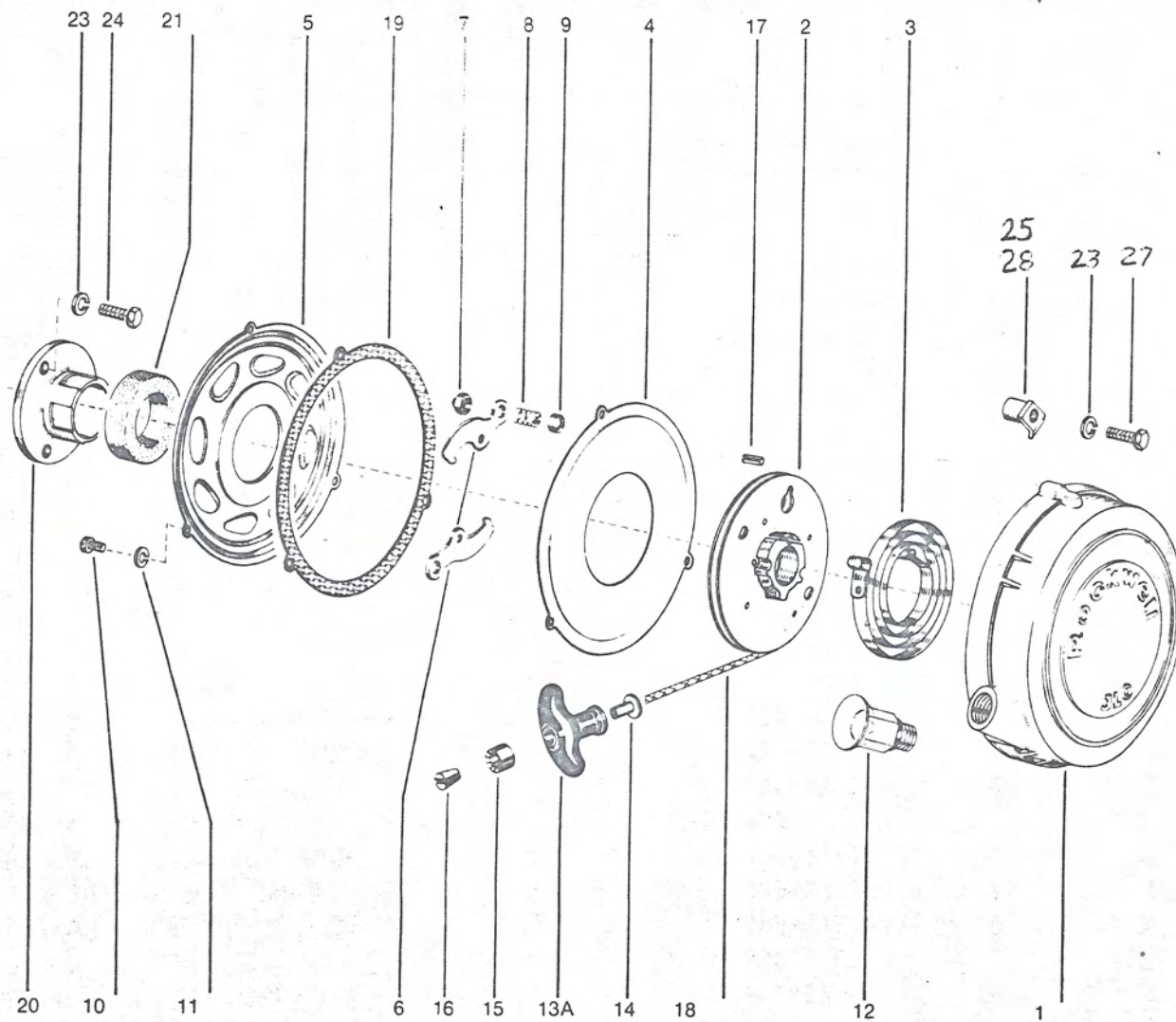


FAN CASE & IMPELLER

ENGINE

ITEM	JLO	DESCRIPTION	ATV PART NO.	QUA.	MFG. ITEM	COMMON HDW	FABRICATED
1	338-14-002-0	Fan Case	399-17-153	1	X		
2	399-14-003-0	Impeller (11 Blade Type)	399-17-175	1	X		
3	338-14-007-0	Shaft	399-17-154	1	X		
4	000-40-477-35	Nilos Ring	399-17-104	2	X		
5	000-39-071-13	Ball Bearing	399-17-101	2	X		
6	338-14-008-0	Spacer	399-17-155	1	X		
7	000-40-614-32	Circlip	399-17-107	2	X		
8	338-14-009-0	Clamp Washer	399-17-156	2	X		
9	399-14-002-0	Pulley Half (Small Blade Type)	399-17-174	2	X		
10	338-14-012-0	Spacer	399-17-157	4	X		
11	000-40-645-10	lock Washer	252-17-111	1	X		
12	000-41-952-02	Nut	399-17-178	1	X		
13	000-41-741-28	Screw	399-17-118	4	X		
14	000-40-646-07	Lock Washer	297-17-111	4	X		
15	399-19-601-0	Pulley Half (Large Blade Type)	399-17-173	2	X		
16	000-42-175-08	V-Belt	399-17-179	1	X		
17	000-42-315-48	Oil Seal	297-17-130	1	X		
18	002-52-665-00	O-Ring	399-17-138	1	X		
19	338-14-015-0	Spacer	399-17-158	1	X		
20	338-14-004-0	Impeller (7 Blade)	399-17-205	1	X		
21	338-14-006-0	Pulley Half (Small Blade Type)	399-17-206	1	X		
22	338-14-005-0	Pulley Half (Large Blade Type)	399-17-207	1	X		

FIGURE 14

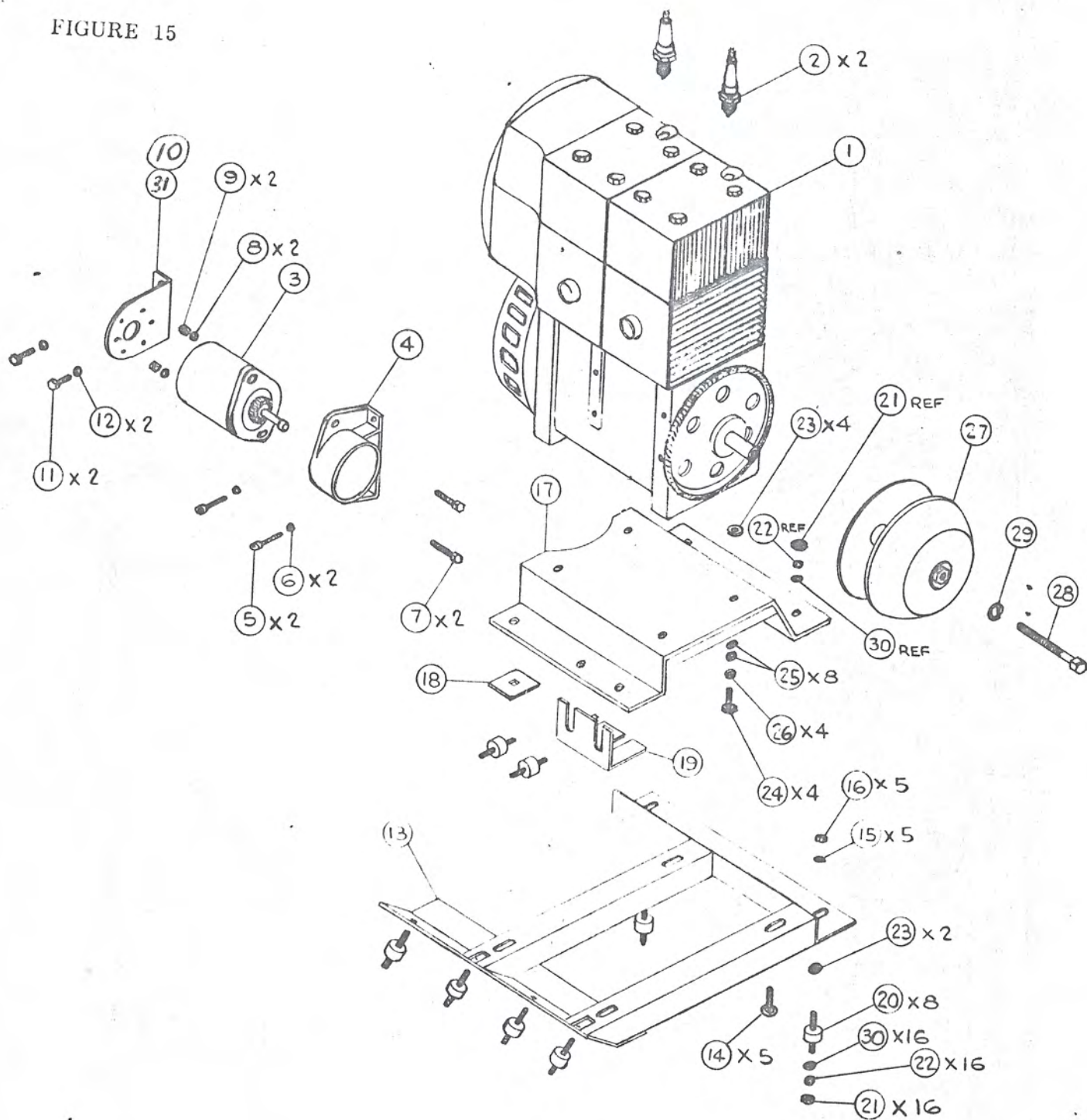


RECOIL STARTER

ENGINE

ITEM	JLO	DESCRIPTION	ATV PART NO.	QUA.	MFG. ITEM	COMMON ITEM	FABRICATE
Not Shown		Recoil Starter, complete with Rope, 65" (Including items 1 thru 19)	399-17-165	1	X		
1	338-41-003-1	Recoil Starter Housing	399-17-160	1	X		
2	197-41-070-0	Rope Drum	399-17-141	1	X		
3	252-41-429-2	Recoil Spring	252-17-179	1	X		
4	338-41-006-0	Intermediate Plate	399-17-162	1	X		
5	338-41-005-0	Cover Plate	399-17-161	1	X		
6	252-41-065-1	Starter Pawl	252-17-175	2	X		
7	252-41-066-0	Spring Cap	252-17-176	2	X		
8	252-41-067-0	Pressure Spring	252-17-177	2	X		
9	102-41-499-0	Inner Spring Cap	252-17-152	2	X		
10	000-41-534-43	Screw (Old Style)	399-17-115	3	X		
11	000-40-645-04	Lock Washer	252-17-107	3	X		
12	102-41-469-0	Rope Bushing	252-17-151	1	X		
13	102-41-801-00	Handle, complete (including items 13A thru 16) (Not Shown)	399-17-140	1	X		
13A	252-41-007-0	Handle	252-17-165	1	X		
14	252-41-009-0	Bushing	252-17-167	1	X		
15	252-41-015-0	Retaining Ring	252-17-168	1	X		
16	252-41-016-0	Retaining Key	252-17-169	1	X		
17	000-40-391-45	Roll Pin	252-17-104	2	X		
18	252-41-807-0	Rope, 65"	252-17-182	1	X		
19	338-41-007-0	Gasket	399-17-163	1	X		
20	338-41-810-0	Carrier	399-17-166	1	X		
21	079-11-017-0	Dust Seal	399-17-139	1	X		
22	000-41-501-36	Screw (New Style) (Not Shown)	399-17-177	1	X		
23	000-40-645-06	Lock Washer	252-17-109	7	X		
24	000-41-010-69	Screw	297-17-114	3	X		
25	338-41-016-0	Recoil Starter Clamp (New Style)	399-17-164	4	X		
Not Shown		Gasket Set with Seals	399-17-176	2	X		
26	000-41-617-89	Screw (New Style) (Not Shown)	399-17-211	3	X		
27	000-41-010-74	Screw (Old Style)	252-17-117	3	X		
28	338-41-809-0	Recoil Starter Clamp (Old Style)	399-17-212	4	X		

FIGURE 15

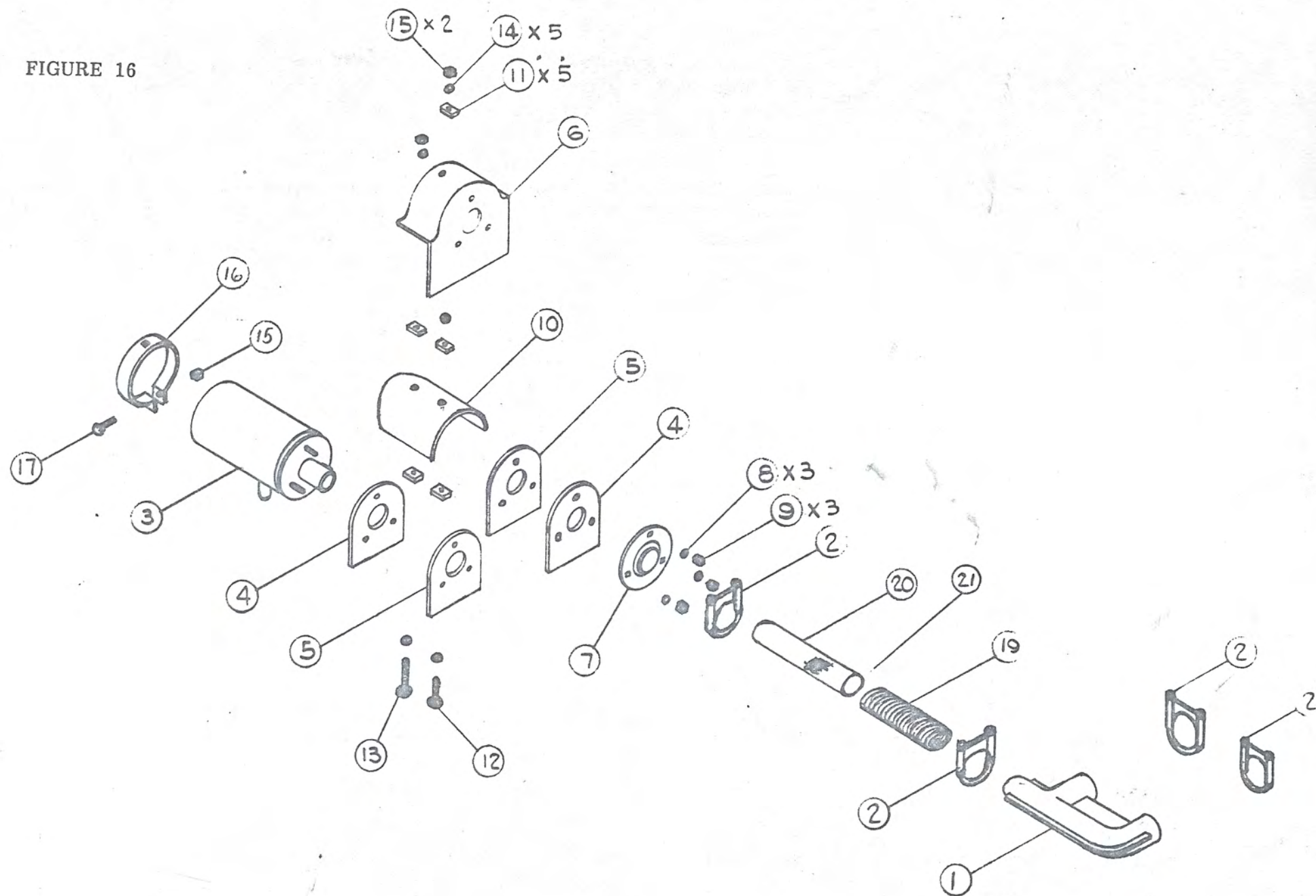


MOTOR MOUNT ASSEMBLY

ENG

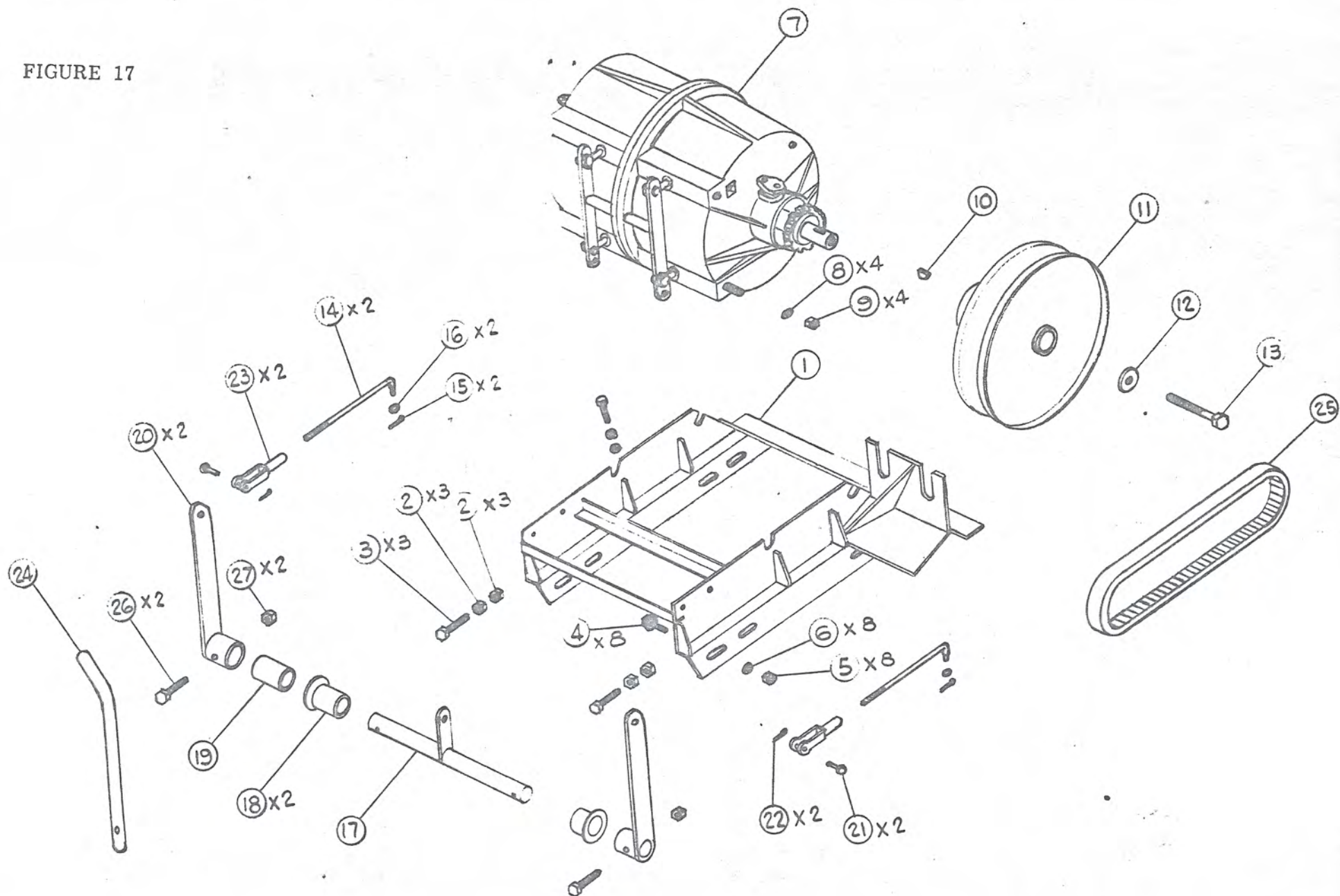
ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA.	MFG. ITEM	COMMON HDW	LUBRICATE
1		JLO LR 399-2 Engine	400-17-008	1	X		
2		Spark Plug - Champion N3	400-17-016	2	X		
3		Starter Motor (Sno Start)	400-17-018	1	X		
4		Starter Bracket (Flywheel Side)	400-17-019	1	X		
5		Starter Bracket Allen Bolt	400-17-020	2	X		
6		Starter Bracket Lock Washer	400-17-021	2	X		
7		Starter to Bracket Bolt Hex.Hd.	400-17-022	2	X		
8		Starter to Bracket Lock Washer	400-17-023	2	X		
9		Starter to Bracket Nut	400-17-024	2	X		
10		Starter Bracket (Pull Start Side)	400-17-025	1	X		
		(Sno Start)					
11		Starter to Bracket Bolt Hex. Hd.	400-17-026	2	X		
12		Starter Bracket Lock Washer	400-17-027	2	X		
13		Motor Mount Frame Assy., Painted	400-17-500	1			X
14		Motor Mount Frame Bolt 7/16-14X1Carr.	100-30-602	5		X	
15		Mount Frame Washer 7/16X7/8 Bellville	100-32-507	5		X	
16		Mount Lock Nut 7/16-14	100-31-601	5		X	
17		Motor Base plate Assy., Painted	400-17-501	1			X
18		Motor Mount Base Plate Spacer, Painted	400-17-502	1			X
19		Motor Mt. Rear Reinf. Plate, Painted	400-17-503	1			X
20		Rubber Motor Mount Cushion	297-17-003	8	X		
21		Rubber Motor Mount Nut	100-31-003	16		X	
22		Rubber Motor Mt. Lock Washer 3/8Med	100-32-504	16		X	
23		Motor Mt. Spacer 7/16X1-1/8X1/8	100-32-008	6		X	
24		Engine Bolt 7/16-14X1" Hex. Hd.	100-30-606	4		X	
25		Engine Washer 7/16 SAE	100-32-009	8		X	
26		Engine Lock Washer 7/16 Med.	100-32-506	4		X	
27		910 Torque Converter-Drive	400-17-015	1	X		
28		Torque Converter Bolt 1/2-20X5-1/2 Hex.					
		Head	100-30-610	1		X	
29		Torque Converter Lock Washer 1/2Med	100-32-508	1		X	
30		Washer 5/16 USS	100-32-007	16		X	
31		Rear Mtg. Brkt. (Old Boss Location)	400-17-033	1		X	

FIGURE 16



ITEM	FSN	DESCRIPTION	ATV	QUA.	MFG.ITEM	COMMON	
			PART NO.			HDW	FABRICATE
1		Donaldson Exhaust Manifold	400-18-011	1	X		
2		1-5/8" Exhaust Pipe Clamp ACS	400-18-023	4	X		
3		Muffler Assy. Painted	400-18-500	1			X
4		Vertical Heat Shield (AL)	400-18-014	2	X		
5		Vertical Heat Shield(Asbestos)	400-18-015	2	X		
6		Plastic Heat Shield	400-18-022	1	X		
7		Vertical Heat Shield Retainer	295-18-019	1	X		
8		Washer 3/8 Dia. SAE	100-32-003	3		X	
9		Nut 3/8-16	100-31-003	3		X	
10		Muffler Horiz. Outer Heat Shield	400-18-024	1	X		
11		Heat Shield Asbestos Shield	297-18-009	5	X		
12		Inner Horiz.Shield Bolt $\frac{1}{4}$ 20x2"Carr.	100-30-334	1		X	
13		Outer Horiz.Shield Bolt $\frac{1}{4}$ 20x2- $\frac{1}{2}$ Carr.	100-30-311	1		X	
14		Washer 5/16 Dia. USS	100-32-007	5		X	
15		Nut $\frac{1}{4}$ -20 Wiz.	100-31-405	3		X	
16		Muffler Support Clamp	400-18-025	1	X		
17		Bolt $\frac{1}{4}$ -20x1- $\frac{1}{2}$ Carr.	100-30-310	1		X	
19		Flex Pipe	400-18-010	1			X
20		Flex Tubing Heat Shield	295-18-007	1	X		
21		Heat Shield Clamp 1-3/4x2"	100-35-202	2		X	

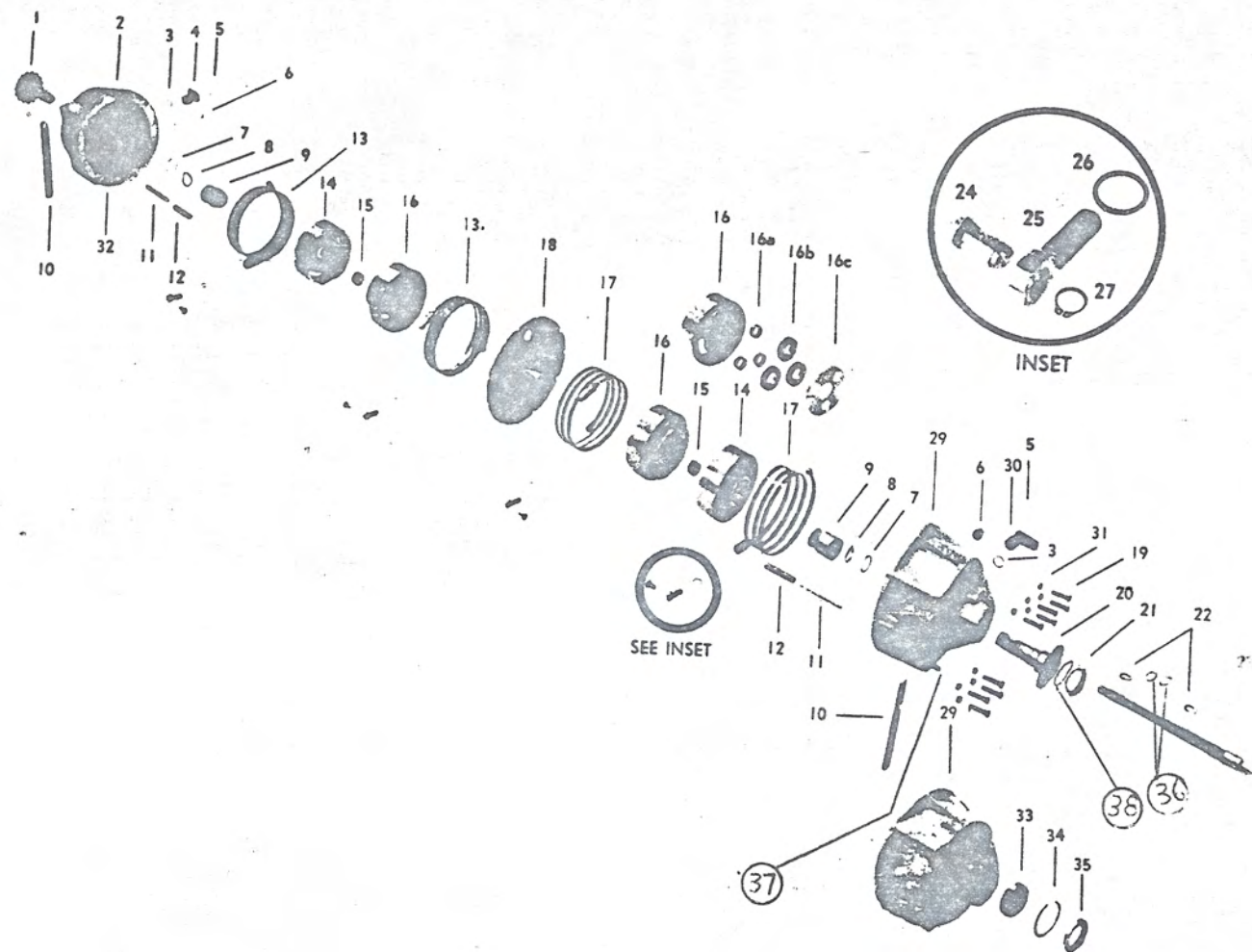
FIGURE 17



TRANSMISSION

ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA.	MFG.ITEM	COMMON HDW	FABRICATE
1		Trans. Mounting Frame Assy, Painted	400-21-500	1			X
2		Adjusting Nut $\frac{1}{2}$ -20	100-31-201	6		X	
3		Adjusting Bolt $\frac{1}{2}$ -20x2- $\frac{1}{2}$ Hex. Hd.	100-30-604	3		X	
4		Trans. Frame Bolt 7/16-14x1 Carr.	100-30-602	8		X	
5		Trans. Frame Nut 7/16-14	100-31-601	8		X	
6		Trans. Frame Washer 7/16x7/8 Belleville	100-32-507	8		X	
7		B-W Transmission	295-21-001	1	X		
8		Trans. Mtg. Washer, Belleville 3/8x1- $\frac{1}{4}$	100-32-505	4		X	
9		Trans. Mtg. Lock Nut 3/8-24	100-31-407	4		X	
10		Trans. Wood Ruff Key	295-21-002	1	X		
11		Trans. T/S Conv. Driven	400-21-003	1	X		
12		Trans. Conv. Washer, Belleville 3/8x1- $\frac{1}{4}$	100-32-505	1		X	
13		Trans. Conv. Bolt 3/8-24x3- $\frac{1}{2}$	100-30-318	1		X	
14		Trans. Shifter Rod Plated	408-21-503	2			X
15		Cotter Pin 1/8x1"	100-35-402	2		X	
16		1/4 SAE Plain Washer, Zinc Plated	100-32-004	2		X	
17		Trans. Shift Pivot Rod Weld'nt, Plated	408-21-501	1			X
18		Flanged Nylon Liner	408-21-002	2	X		
19		Shift Rod Spacer, Painted	408-21-505	1			X
20		Shift Arm Assy. Painted	408-21-504	2			X
21		5/16 Dia. Clevis Pin	100-35-411	2		X	
22		3/32x1" Cotter Pin	100-35-406	2		X	
23		Shift Yoke 5/16-24	400-21-013	2	X		
24		Shift Lever	408-21-007	1			X
25		Drive Belt	400-21-006	1	X		
26		3/8-24x1-3/4 Hex. Hd. Bolt	100-30-316	2		X	
27		3/8-24 (Coneloc) Lock Nut	100-31-407	2		X	

FIGURE 18

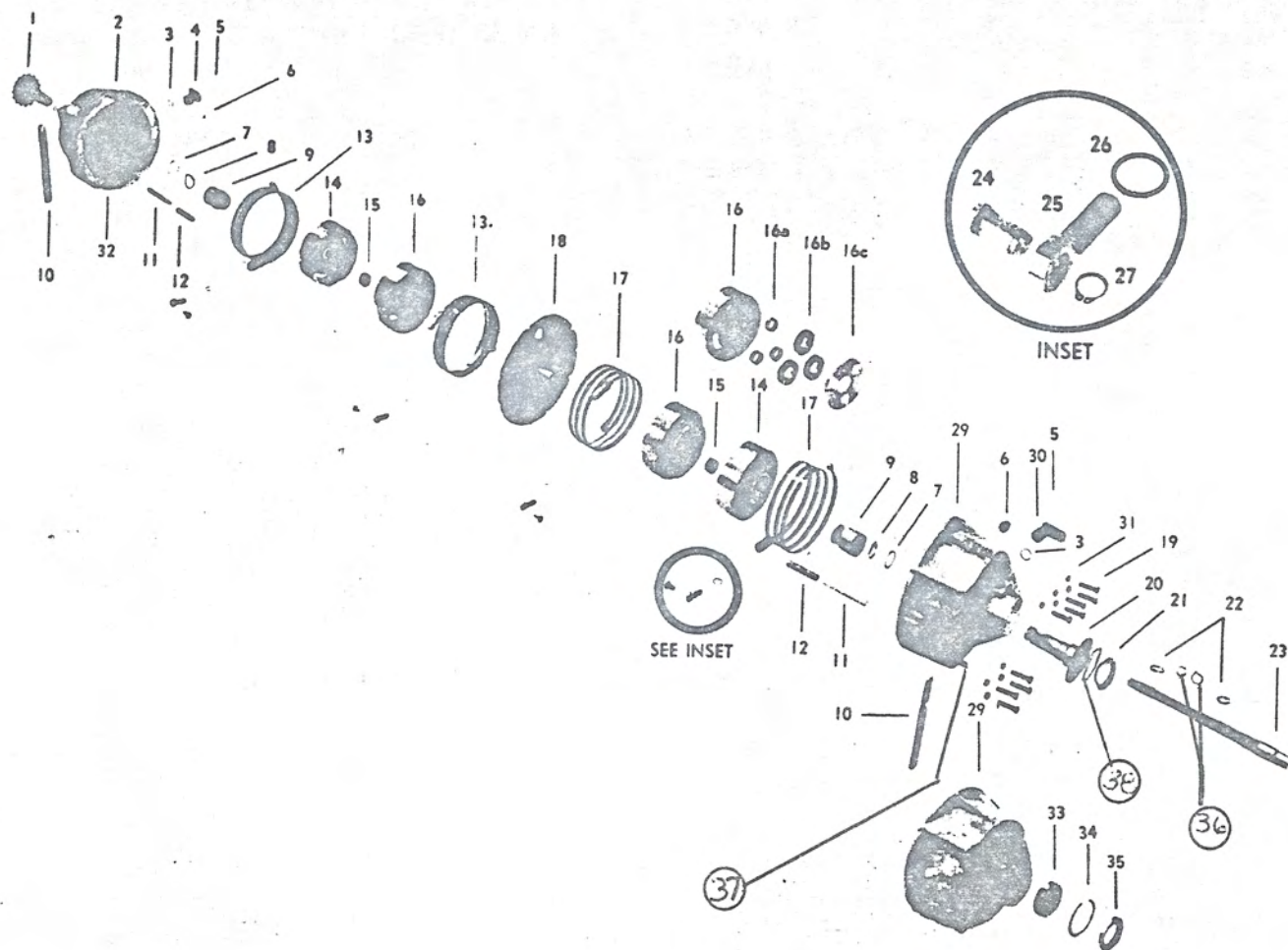


ATV TORQUE-O-MATIC

TRANSMISSION

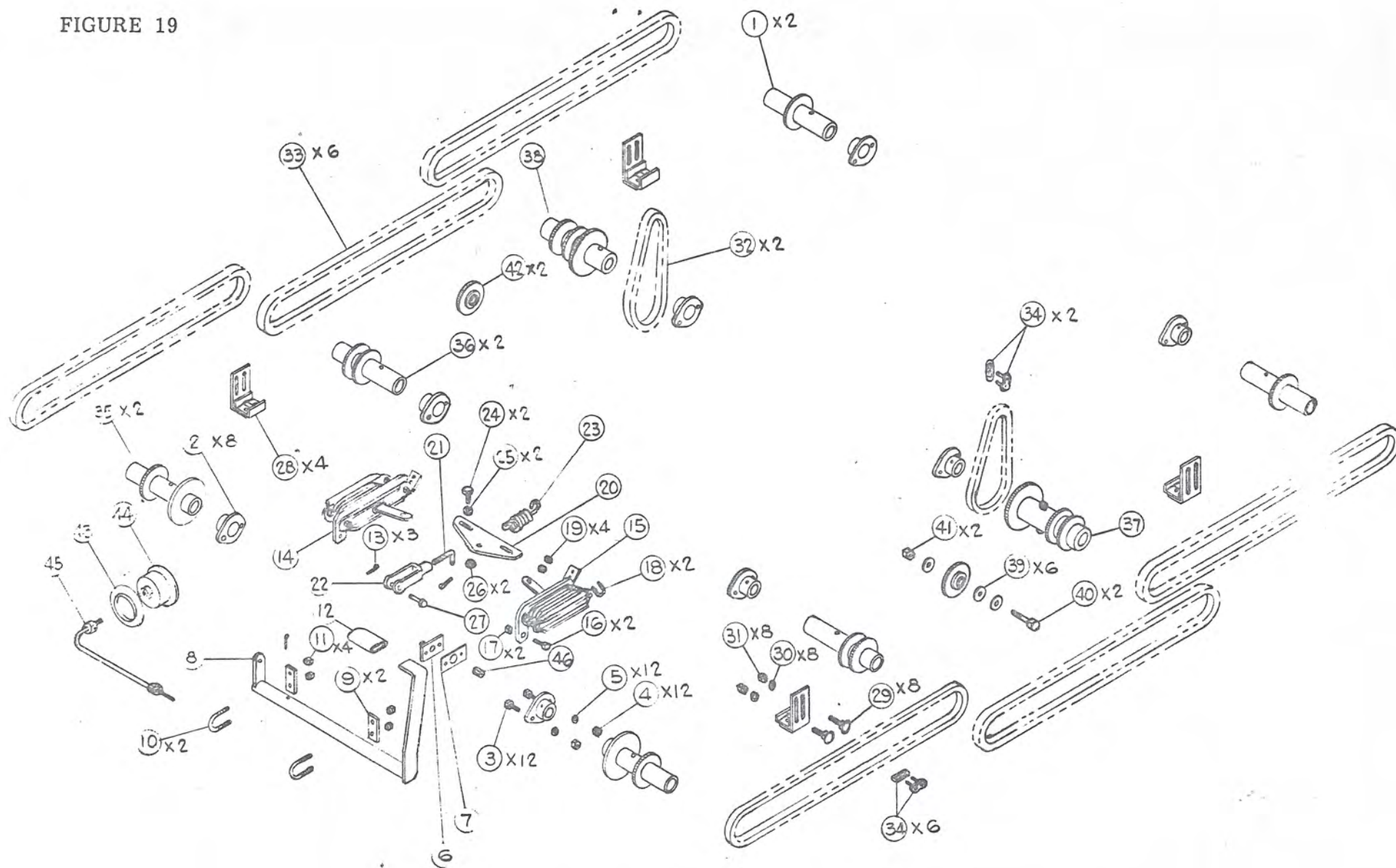
ITEM	BORG WARNER	DESCRIPTION	ATV PART NO.	QUA.	MFG. ITEM	COLLAR HD.	LUBRICATE
1	AT20-102	Output Shaft Assembly, Right	900-21-100	1	X		
2	1AT20-101	Housing, Right Main	900-21-101	1	X		
3	4804-TT	O Ring	900-21-102	2	X		
4	1AT20-40	Shift Lever, Right	900-21-103	1	X		
5	4828 J	Snap Ring	900-21-104	2	X		
6	03-04-001-01	Filler Plug	900-21-105	2	X		
7	4828L	Snap Ring	900-21-106	2	X		
8	T20-42	Spring Garter	900-21-107	2	X		
9	T20-15	Shift Collar	900-21-108	2	X		
10	T20-38	Bell Crank	900-21-109	2	X		
11	T20-51	Pin, Band Anchor	900-21-110	2	X		
12	T20-44	Sleeve	900-21-111	2	X		
13	AT20-133	Brake Band, Right	900-21-112	2	X		
14	AT20-6	Ring Gear, Brke Drum	900-21-113	2	X		
15	AT20-4	Sun Gear	900-21-114	2	X		
16	1AT20-30	Carrier Drum	900-21-115	2	X		
16A	4840X	Needle Bearing	900-21-116	6	X		
16B	AT20-5	Planet Gear	900-21-117	6	X		
16C	T20-54	Carrier Plate	900-21-118	2	X		
17	AT20-33	Brake Band, Left	900-21-119	2	X		
18	T20-8	Center Housing	900-21-120	1	X		
19	181343	Bolt	900-21-121	9	X		
20	T20-2	Output Shaft, Left	900-21-145	1	X		
21	T20-106	Oil Seal	900-21-123	1	X		
22	4979	C Ring	900-21-124	2	X		
23	T-20-16	Input Shaft	900-21-125	1	X		
24	T20-35	Clevis Pin	900-21-126	4	X		
25	T20-31	Eye Bolt	900-21-127	4	X		
26	4804-00	O Ring	900-21-128	4	X		
27	4828K	Snap Ring	900-21-129	4	X		
28	107823	Eye Bolt Lock Nut (Not Shown)	900-21-130	4	X		
29	1AT20-1	Housing, Left Main	900-21-131	1	X		
30	AT20-40	Shift Lever, Left	900-21-132	1	X		
31	214279	Lock Nut	900-21-133	9	X		
32	T20-145	Gasket	900-21-134	2	X		

FIGURE 18



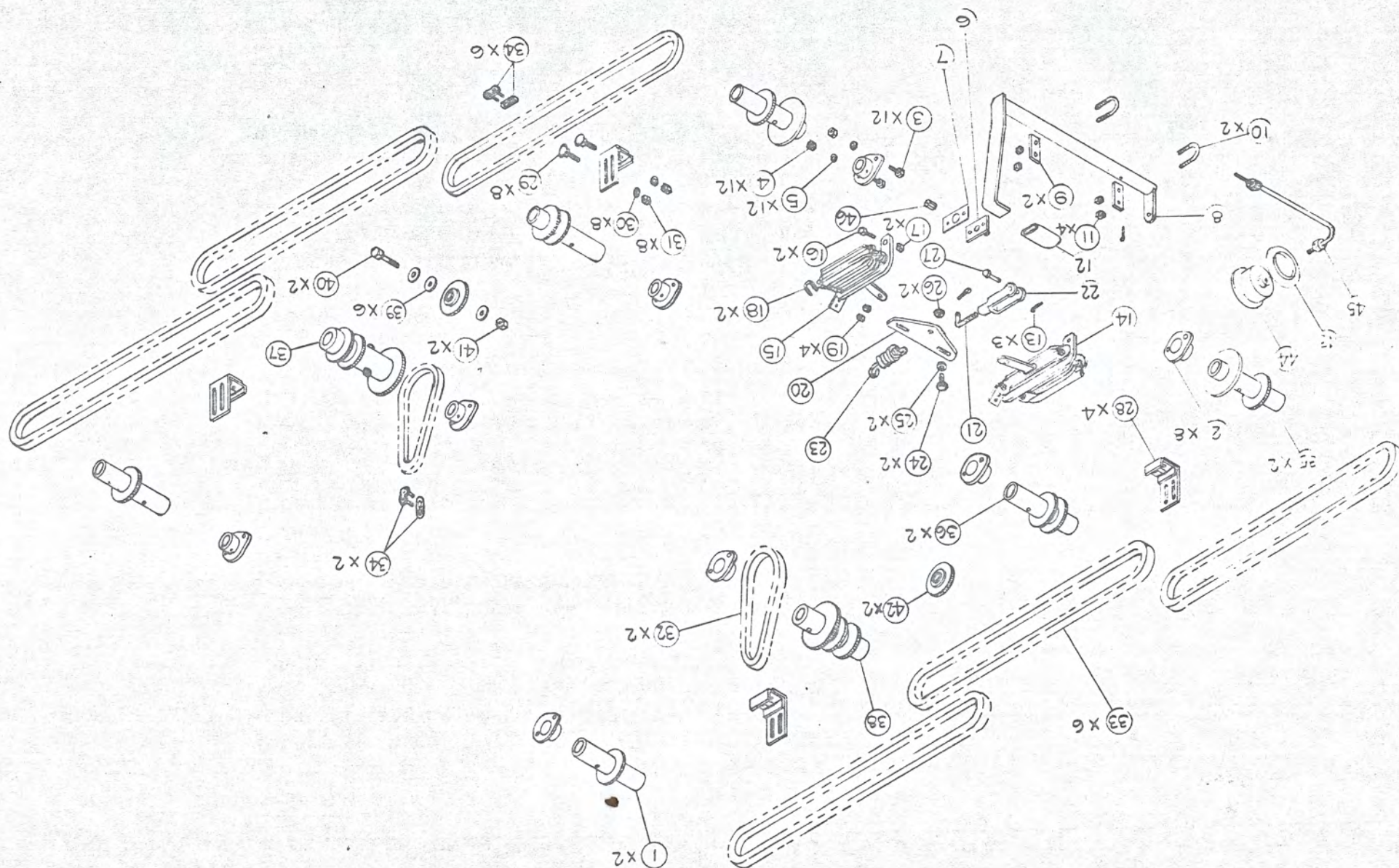
ITEM	BORG WARNER	DESCRIPTION	ATV PART NO.	QUA.	MFG. ITEM	COMMON HDW	FABRICATE
33	B207BS	Bearing	900-21-135	2	X		
34	4758A	Snap Ring	900-21-136	2	X		
35	T20-110	Oil Ring	900-21-137	1	X		
36	480402	Thrust Washer	900-21-142	2	X		
37	438159	Mounting Stud	900-21-143	4	X		
38		Bearing	900-21-144	1	X		

FIGURE 19



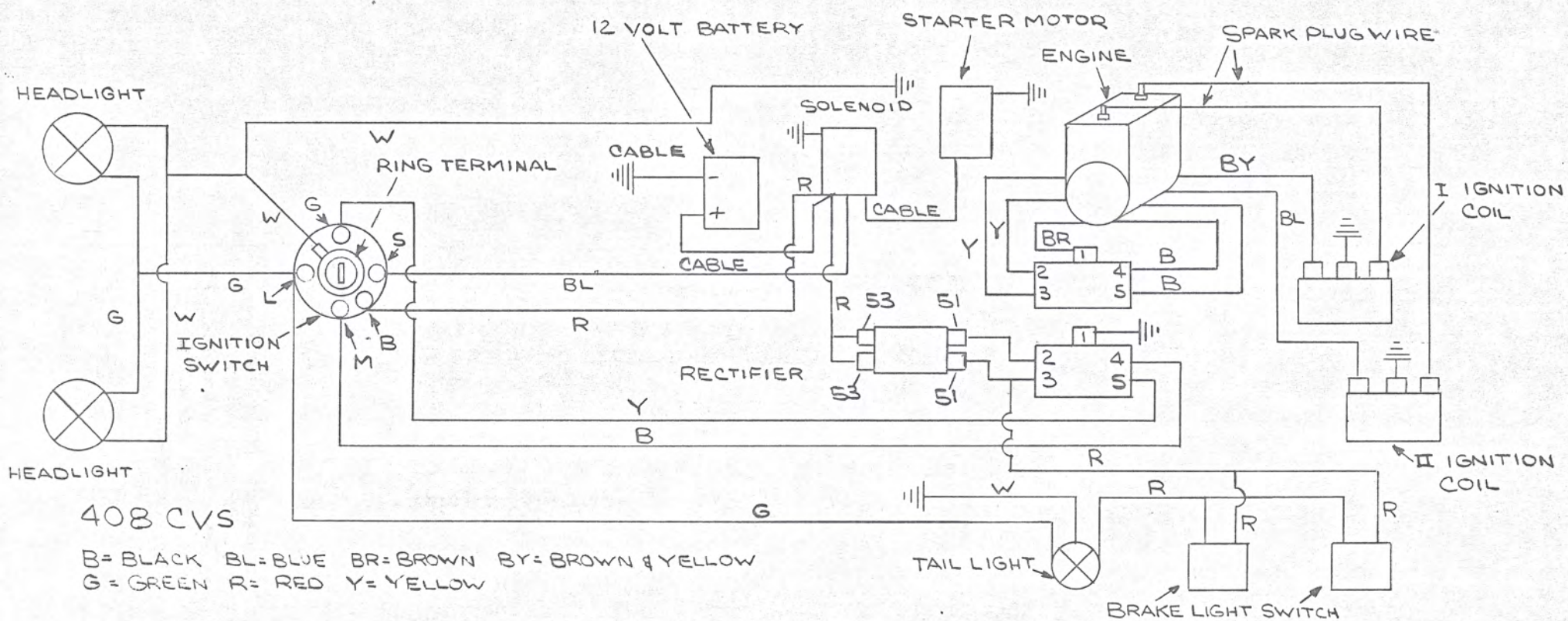
ITEM	12X	DESCRIPTION	DRIVE		QUA.	MFG.ITEM	COMMON		FABRICATE
			ATV	PART NO.			HDW		
1		Rear Drive Spool Assy., Painted		295-22-510	2				X
2		Inner Bearing		295-22-014	2	X			
3		Inner Bearing Bolt 7/16-14 Hex.Hd.		100-30-606	12		X		
4		Inner Bearing Locknut 7/16-14		100-31-601	12		X		
5		Inner Bearing Washer 7/16x7/8 Bell.		100-32-507	12		X		
6		Adapter Flange Assy., Plated (Speedo)		408-22-501	1				X
7		Adapter Flange Seal		408-22-004	1	X			
8		Emergency Brake Lever Assy., Painted		295-22-506	1				X
9		Emergency Brake Lever Spacer, Painted		295-22-505	2				X
10		U-Bolt 5/16-18-7/8		100-30-800	2		X		
11		Locknut 5/16-18		100-31-402	4		X		
12		Foot Lever Pad		295-22-032	1	X			
13		Cotter Pin 1/8x1"		100-35-404	3		X		
14		R.H. Brake Caliper Assy.		212-22-509	1				X
15		L.H. Brake Caliper Assy.		212-22-508	1				X
16		Bolt 5/16-24x1" Hex. Hd.		100-30-313	2		X		
17		Locknut 5/16-24		100-31-406	2		X		
18		U-Bolt 5/16-18x1"		100-30-801	2		X		
19		Locknut 5/16-18"		100-31-402	4		X		
20		Emergency Brake Equalizer Painted		295-22-503	1	X			
21		Emergency Brake Adj.Rod Painted		295-22-504	1	X			
22		Emergency Brake Adj. Yoke		295-13-002	1	X			
23		Emergency Brake Spring		295-22-026	1	X			
24		Bolt 3/8-24x1" Hex. Hd.		100-30-322	2		X		
25		Washer 3/8 SAE		100-32-003	2		X		
26		Locknut 3/8-24		100-31-407	2		X		
27		Clevis Pin 3/8W9/64 Dia. Hole		100-35-403	1		X		
28		L.H. & R.H. Chain Tensioner Assy.		252-22-532	4				X
29		Bolt 3/8-16x1" Carr.		100-30-319	8		X		
30		Washer 3/8 Dia. SAE		100-32-016	8		X		
31		Locknut 3/8-16		100-31-401	8		X		
32		Primary Drive Chain		408-22-006	2	X			

FIGURE 19



DRIVE CONT.

ITEM	FSN	DESCRIPTION	ATV PART NO.	QUA.	MFG.ITEM	COMMON HDW	FABRICATE
33		Secondary Drive Chain	408-22-013	6	X		
34		Master Link	295-22-002	8	X		
35		Front Drive Spool Painted	408-22-506	2			X
36		Front Center Drive Spool Painted	408-22-507	2			X
37		L.H. Rear Center Drive Spool Painted	408-22-508	1			X
38		R.H. Rear Center Drive Spool Painted	408-22-509	1			X
39		Washer $\frac{1}{2}$ Dia. SAE	100-32-005	6		X	
40		Bolt $\frac{1}{2}$ -20x2 Hex. Hd	100-30-605	2		X	
41		Lock Nut $\frac{1}{2}$ -20 Coneloc	100-31-600	2		X	
42		Front Idler	295-22-016	2	X		
43		Speedometer Mounting Spacer	408-22-005	1	X		
44		Speedometer Head	408-22-001	1	X		
45		Speedometer Cable Housing	400-22-018	1	X		
46		Axle Adpator (L.F.)	400-22-021	1	X		



Disassembly and Assembly Procedure

Disassembly

A. Recoil Starter

Remove four screws holding recoil to fan housing and the spacers and washers. Remove recoil assembly, complete. (For detailed service instructions refer to Recoil Starter, Disassembly and Assembly.

B. Lower Fan Pulley and Carrier Assembly

Remove three hexhead screws on carrier. Remove dust seal, carrier, lower pulley halves and V-belt.

C. Upper Fan Belt Pulley Assembly

To keep impeller from turning, insert a punch through the fan housing and into the impeller body. With a 17 mm. wrench, remove fan nut. Pull out the loosened assembly—nut, washer, spacers, and upper pulley halves.

D. Flywheel Magneto

Make sure spark plugs are tight. Working against engine compression, with a 27 mm. wrench, remove crankshaft nut by striking wrench a few sharp blows with a hammer. To pull flywheel, attach special puller to flywheel flange, using three of the recoil starter screws previously removed. Screw into the three holes on flange and tighten. Turn puller until bolt touches tip of crankshaft. With a 24 mm. socket wrench, turn puller bolt clockwise and extract flywheel. Note that key may come loose and adhere to the flywheel magnets.

E. Intake Manifold

Remove the four nuts holding manifold and the two lower coil cover screws. Take off manifold and coil cover. Remove screw holding spark plug wires to side of fan housing.

F. Fan Housing; Armature Plate

Disconnect solid blue and blue-yellow coil wires. With a metric Allen Head wrench, remove the 4 socket cap screw holding fan housing to crankcase. To loosen, place unit with fan housing protruding over end of workbench and, holding housing with one hand, hit light but sharp blows around edge of housing. Pull housing straight out past the crankshaft careful not to cut the oil seal on the keyway. From *front of fan housing*, drive out shaft and fan. The fan housing bearings may now be removed by punching out from the side opposite that from which they are normally inserted. Remove bearing spacer.

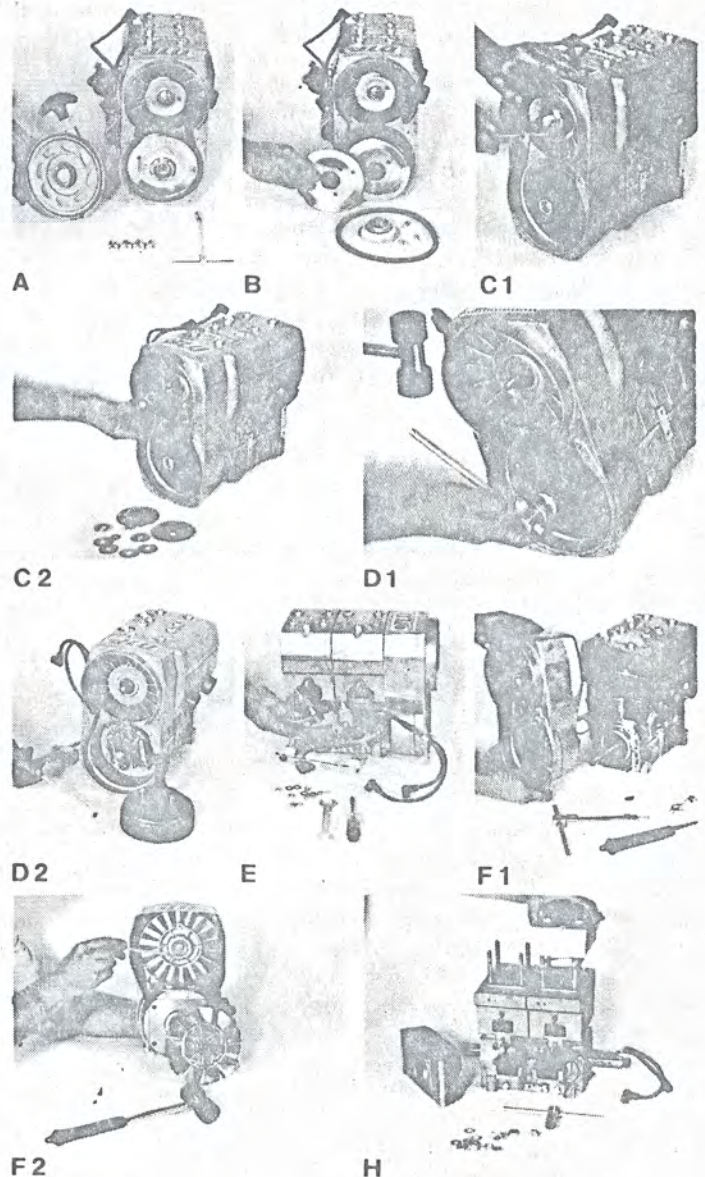
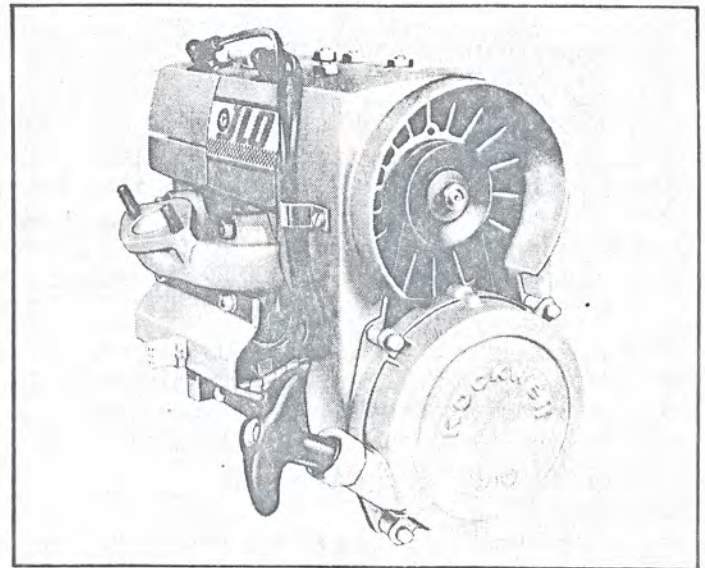
The armature plate is attached to the fan housing by two slotted screws and can be removed at this time. Scratch-mark its original position before removing to facilitate engine timing.

G. Spark Plugs

Remove with a socket wrench.

H. Cylinder Heads

With 17 mm. wrench remove head nuts and lift head and gasket from cylinder block. Mark cylinder head and corresponding cylinder in order to assure proper reassembly. (Cylinder closest to the P.T.O. end is always considered No. 1 cylinder). Repeat operation for second cylinder.



Disassembly and Assembly Procedure

Disassembly

I. Cylinders

Lay unit on its side and with a 13 mm. socket remove the 8 cylinder-base nuts. (Unless complete disassembly is required, remove one cylinder at a time so as to maintain crankcase alignment). Set unit upright again and lightly tap cylinder with a rubber hammer and lift gently until piston clears the skirt. Repeat operation for second cylinder.

J. Piston and Wrist Pin

Prior to removing mark each piston in relation to the cylinder with which it mates. Use needle-nose pliers or special screw driver and remove circlips—(one circlip on each side). Gently drive out wrist pin. Repeat operation for piston No. 2. Remove ignition coils and spark plug wires.

K. Crankcase

To separate crankcase halves, hold upper shell with left hand and "rock" slightly back and forth to break the sealing surfaces. If necessary, strike side of crankcase with rubber hammer to complete the separation. Remove crankshaft.

L. Crankshaft; Crankshaft Bearings

With crankshaft on work surface, remove oil seal and alignment washer from P.T.O. end. Remove bearings using puller. Use pressure piece on P.T.O. end to avoid damaging internal threads. Slide puller body over crankshaft and align bolt with crankshaft end. Slip puller half-shells around the bearing and engage them on puller grooves. Slide retaining ring over half-shells to keep them on the bearing. Using two 27 mm. wrenches, turn puller center bolt with one wrench while holding puller body with the other. Keep turning puller center bolt clockwise until it pulls the bearing to the end of the crankshaft.

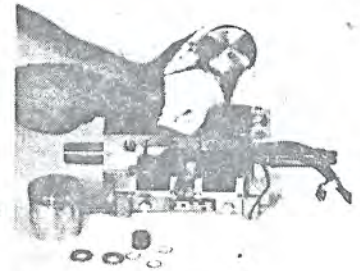
Assembly

1. Crankshaft

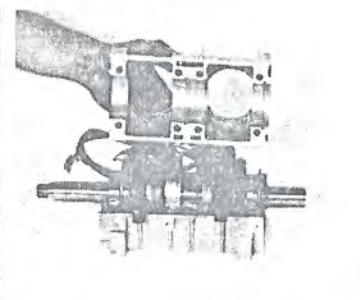
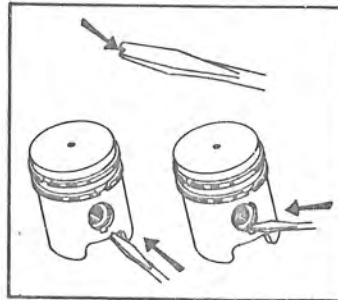
Heat crankshaft bearings in oil preheated to 215°F. After reaching temperature, quickly slip bearing over end of crankshaft; it should fall freely on the counterweight. Using a hollow pipe with a diameter approximately that of the inner bearing race, hit pipe with a rubber hammer and seat the bearing on the shaft. The bearing should now rest securely and turn freely. Repeat procedure for bearing on other end of crankshaft.

2. Crankcase

Inspect both halves of crankcase and clean carefully removing any left-over adhesive or burrs. Apply Permatex type sealing compound to lower crankcase shell sealing surfaces and a little bit on the bearing surfaces. (Note: no seal gaskets used). Place crankshaft in lower shell and align spacers with machined grooves. Place oil seal on P.T.O. end of shaft, flush with the casting. Turn crankshaft with your hand to check freedom of movement and make sure that the oil seal is seated. Install upper crankcase shell and seat by tapping it lightly.

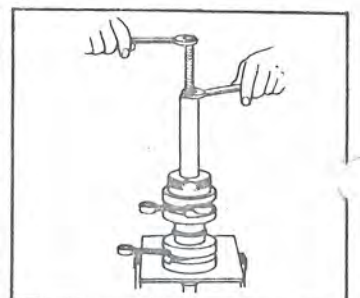
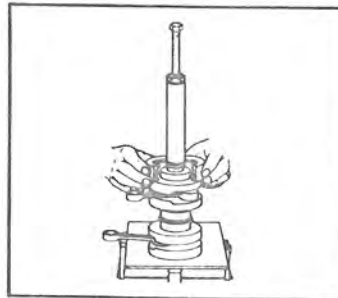


J 1



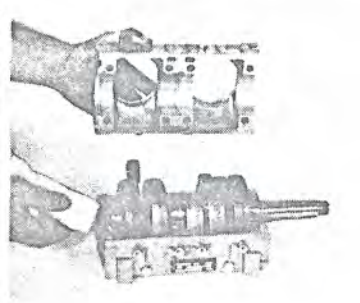
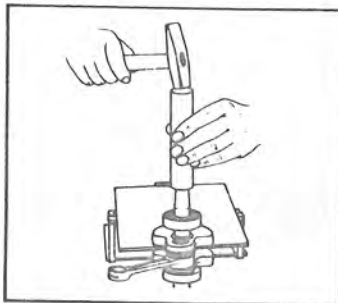
J 2

K



L-1

L-2



1

2

3. Piston and Cylinder

Clean carbon deposits from the piston. Check to see that rings move freely in their grooves. Mate piston with corresponding cylinder. The piston must be installed with the arrow pointing toward the exhaust port. Insert needle bearings into the connecting rod, then place a daub of grease on the connecting rod so that the spacers installed later will adhere to it. Gently guide the piston over the connecting rod and insert the wrist pin. Snap circlips into each side of the piston, open end towards the top of the piston, using a screwdriver or needle-nose pliers. Install cylinder base gasket. Place a V-shaped wood block under the piston, resting it on the crankcase. After lining up the rings with the locating pins on the piston, compress them with a ring compressor. Rest the piston on the wood block and carefully slide the cylinder over the piston until the rings disappear into the cylinder. Remove ring compressor and wood block. Repeat procedure for second cylinder. Turn the unit over

its side and install the cylinder base nuts and tighten lightly. Assemble the intake manifold and tighten the four nuts. Draw nuts tightly in order to evenly align both cylinders. Before tightening cylinder base nuts align crankcase halves by installing the fan housing or using a straight edge. Turn unit completely over and torque-down the cylinder base nuts to 16/18 ft. lbs., crosswise and then remove fan housing. Remove the manifold assembly previously installed only to align the cylinders.

4. Impeller; Fan Housing Bearings

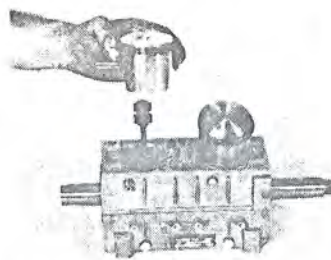
Install snap rings one on each side of housing. Install one bearing, making sure sealed surface faces outward. Pack fan bearing housing with grease. Install bearing spacer, then the second bearing. Slide shaft through impeller and install Nilos ring on the side of the impeller which faces the housing, and then through the bearings.

5. Fan Housing; Armature Plate

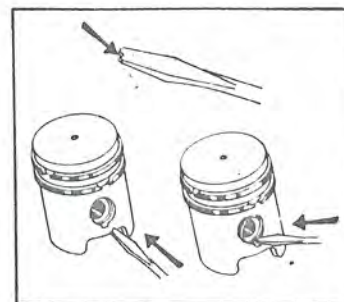
Install the armature plate aligning it with the scratch marks previously put on during disassembly. Tighten slotted screws. Check the wiring protruding from the fan housing to make sure that there are no broken wires. Slip the rubber grommet protecting the wires into the housing. Check the O-ring on the back side of the fan housing and the oil seal for cuts or other visible damage. Pass the fan housing over the crankshaft and avoid hitting the sharp edges of the keyway. Adjust the housing against the crankcase and insert the four screws with a metric Allen Head wrench. Tighten Allen Head Screws crosswise.

6. Intake Manifold; Coil Cover

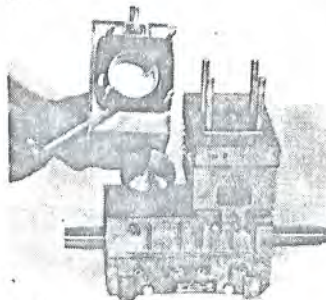
Install ignition coils, gaskets and intake manifold. Tighten the two upper manifold nuts. Connect the ignition coil wires to terminals. Replace coil cover making sure to reconnect the No. 2 cylinder ground wire (brown). Fasten spark plug wire clip to fan housing.



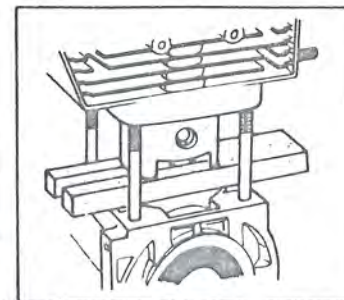
3A



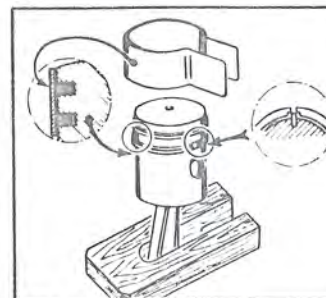
3B



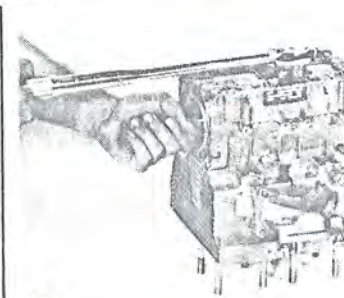
3C



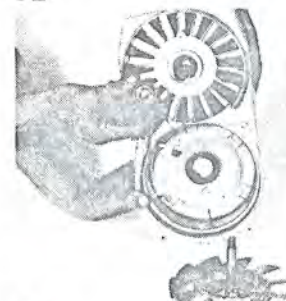
3D



3E



3F



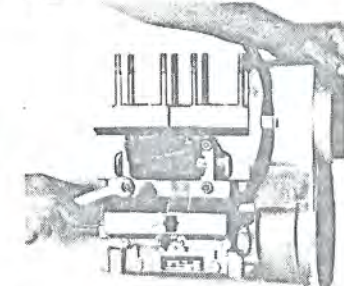
4A



4B



5



6

Disassembly and Assembly Procedure

Assembly

7. Upper Fan Belt Pulley Assembly

Insert Nilos ring, first tapered spacer (dished side towards fan), first pulley half, four adjustment shims, second pulley half, second tapered spacer (dished side facing outward), washer and nut. Note: block impeller with a punch when tightening nut.

8. Flywheel Magneto; Ignition Timing

Align magnetic flywheel with keyway, insert and tap key into position. Lightly tighten flywheel nut. For timing, refer to Timing Procedure.

9. Cylinder Heads

Install cylinder head gaskets with the wide side of the metal ring facing up. Assemble cylinder heads with corresponding cylinders and install washers and nuts. Tighten to 28/32 ft. lbs.

10. Spark Plugs

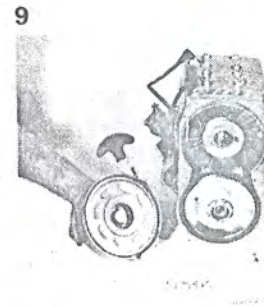
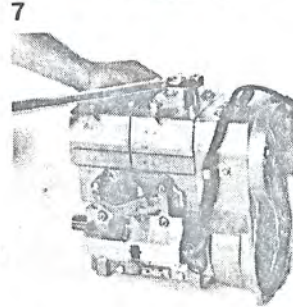
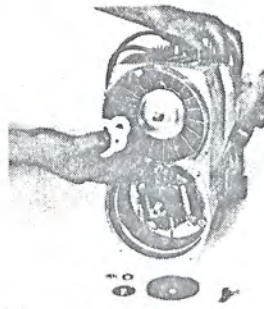
Install and tighten spark plugs. Complete tightening of flywheel nut (25/29 ft. lbs.).

11. Lower Fan Belt Pulley Assembly

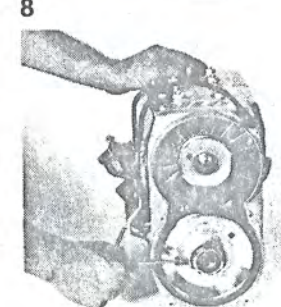
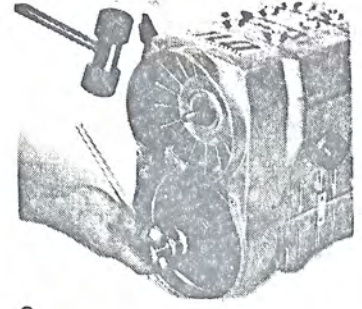
Install the first pulley half with dished side facing the housing, the fan belt, the second pulley half with the dished side facing out and the carrier assembly. Tighten carrier screws while slowly rotating the crankshaft with your hand to prevent squeezing the fan belt. Install dust seal.

12. Recoil Starter

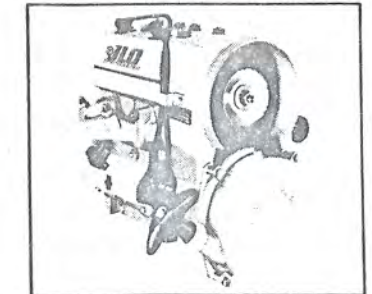
Install recoil starter assembly using the four hexhead screws, clamps and lockwashers. For detailed service instructions, refer to Recoil Starter, Disassembly and Assembly.



12



11



13

Timing Procedure

With the recoil starter, carrier assembly and lower pulley halves removed, proceed as follows:

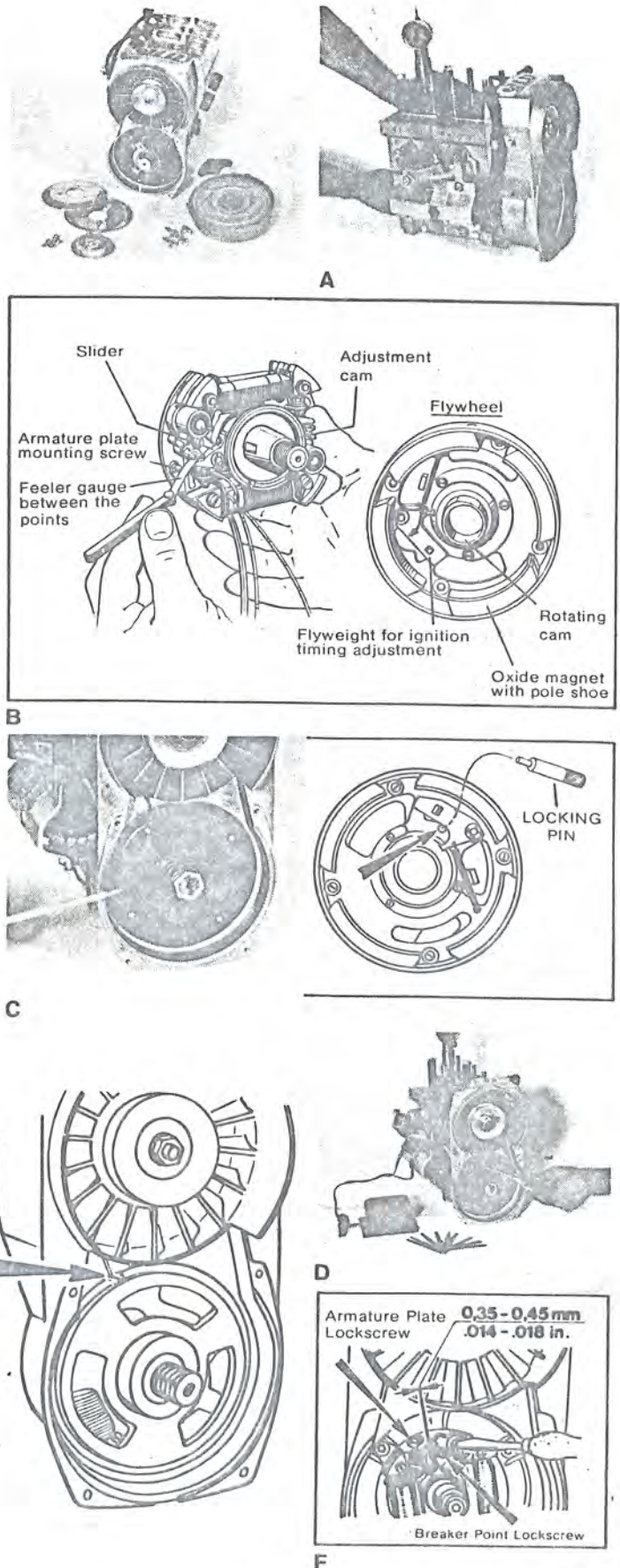
- A.** Remove cylinder heads and attach the dial indicator to cylinder No. 1.
- B.** Turn the flywheel clockwise towards TDC (top dead center) until breaker points are visible. Use a clean feeler gauge and adjust the gap. Note: if flywheel is removed, use an old cam and rotate until the points are at their largest opening. Check gap and adjust to specifications as necessary. Repeat procedure for the other set of points.
- C.** Advance the centrifugal weight. Hold in place using locking pin, (a tool specially designed for this purpose.)
- D.** Attach one lead of the ignition continuity light to terminal of No. 1 cylinder coil, the other to ground (engine casting). For the second cylinder, attach continuity light lead to No. 2 cylinder coil terminal, (solid blue wire is for No. 1 cylinder; blue-yellow wire is for No. 2 cylinder).
- E.** Bring piston of No. 1 cylinder to TDC and adjust dial to zero.
- F.** Turn flywheel counterclockwise (away from TDC), closely observing dial indicator and timing light. When piston reaches the timing point, the light will dim indicating the opening of the points. Now, check the dial indicator. If timing does not agree with specifications, do not change the breaker point gap; adjust by loosening and rotating armature plate assembly (Illus. F). Rotate assembly clockwise to retard, counterclockwise to advance the ignition. Correct breaker point gap will insure maximum ignition output. **Important: to time cylinder No. 2 repeat procedure for cylinder No. 1 except do not rotate armature plate.** If timing of No. 2 cylinder is required, adjust the breaker point gap only.

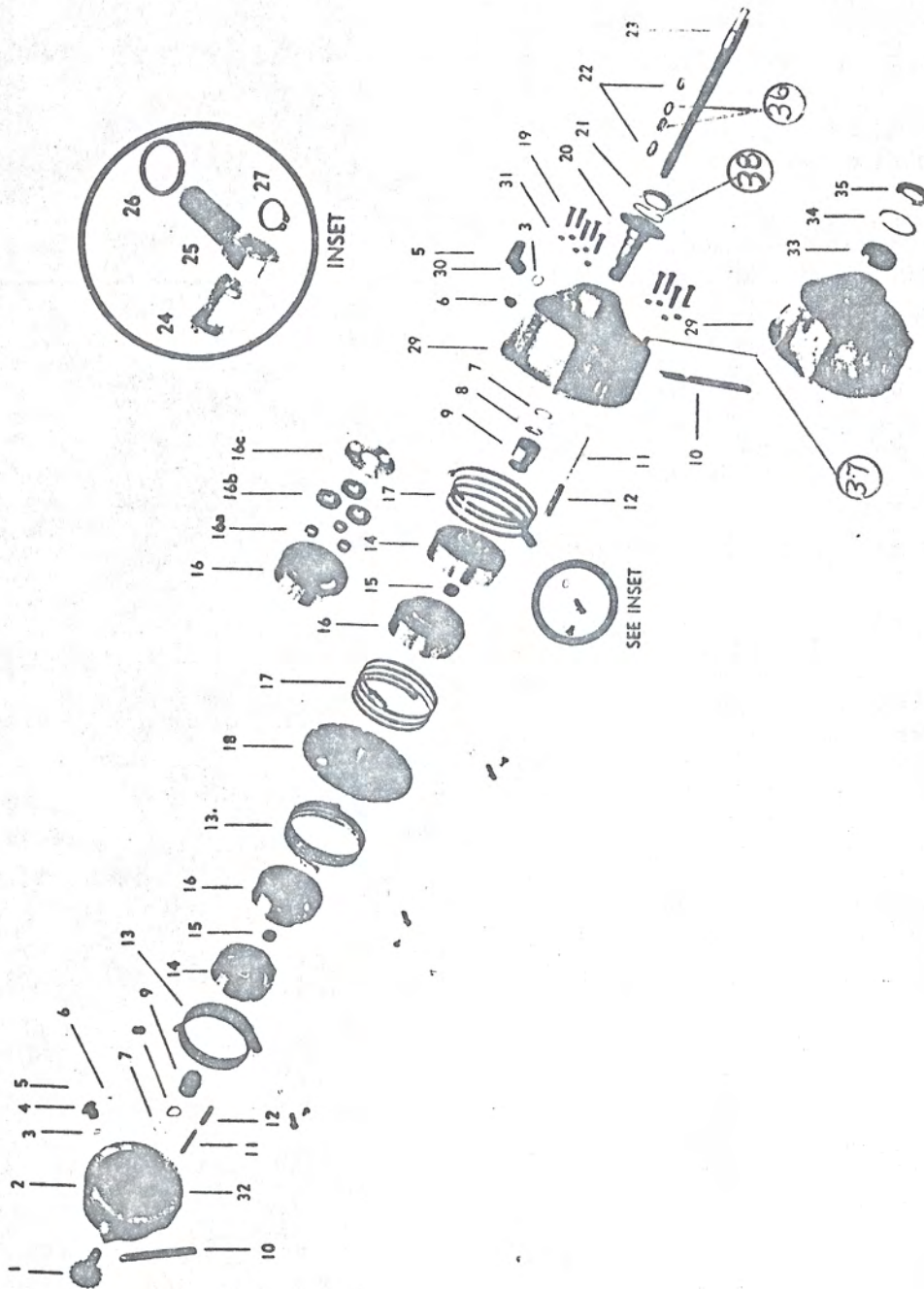
Contact Breaker Gap:	.014" to .018"
Ignition Setting Before T.D.C.	.083" to .102"*†
Spark Plug Gap:	.016" to .020"
Spark Plug:	Bosch Champion
	W-260-T-2 N-3

*Cam fully advanced. †Applies to all current axial-fan twin-cylinder models. However, on LR-340/2 models with serial numbers up to and including No. 14850, and on LR-399/2 models with serial numbers up to and including No. 30298, the ignition setting is .104" to .124" before T.D.C.

NOTE: Rockwell-Jlo axial-fan twin cylinder engines have timing marks cast on the fan housing. This makes it possible to check timing while the engine is running. Use an automotive type strobe light and aim at the timing mark on left. If the notches on the flywheel are not in alignment with the marks on the fan housing, the engine is out of time. Note that there are two notches on the flywheel—one for each cylinder. This permits instant timing check of both cylinders.

A quick timing check can also be performed with the engine not running. With centrifugal weight in retard position, attach the timing tester to the coil wire terminals and slowly turn the engine over by pulling on the recoil starter. Once the notch on the flywheel is aligned with the mark on the right, the timing tester light should dim. If the light does not dim when both timing marks are in alignment, the engine needs retiming.





TRANSMISSION DISASSEMBLY PROCEDURES

- 1 — Drain oil.
- 2 — Remove brake levers #10 and eye bolt assemblies #24, 25, 26, 27 and 28.
- 3 — Remove bolts #19 and nuts #31.
- 4 — Unit should be placed in clean area or on clean bench with input shaft end uppermost.
- 5 — Lift upper housing #29 and center plate #18 from lower housing half #2 and set aside.
- 6 — Remove carrier drum #16 and associated parts from assembly.
- 7 — Remove ring gear drum #14.
- 8 — Remove anchor pin #11 and sleeve #12.
- 9 — Remove brake bands #13 from inside of housing.
- 10 — Remove snap ring #5 and shift lever assembly #4.
- 11 — Remove shift collar #9 from output shaft #1 by quick jerk — hand operation only.
- 12 — Remove snap ring #7 from output shaft on inside housing. (Note: Care must be taken not to damage internal housing bushing.)
- 13 — Pull output shaft #1 out of bearing #33 by hand from outside of housing.
- 14 — Remove seal #35 from housing by means of large screw driver. (Note: Care must be taken not to damage housing.)
- 15 — Remove snap ring #34 from housing. (Note: EXTREME CARE MUST BE USED not to damage oil seal surface.)
- 16 — Bearing #33 can now be removed if necessary.
- 17 — Remove "C" ring #22 from small end of input shaft #23.
- 18 — Remove sun gear #15.
- 19 — Remove center plate #18.
- 20 — Remove carrier drum #16 and associated parts from assembly.
- 21 — Remove ring gear drum #14.
- 22 — Remove anchor pin #11 and sleeve #12.
- 23 — Remove brake bands #17 from inside of housing.
- 24 — Remove sun gear #15 from input shaft.
- 25 — Remove "C" ring #22 from input shaft.
- 26 — Remove input shaft #23 from outside of housing.
- 27 — Remove snap ring #5 and shift lever #30 from outside of housing.
- 28 — Remove shift collar #9 by quick jerk — hand operation only.
- 29 — Remove snap ring #7 from output shaft on inside of housing. (Note: Care must be used not to damage internal housing bushing.)
- 30 — Pull output shaft #20 out of bearing #33 by hand from outside of housing.
- 31 — Remove seal #35 from housing by means of large screw driver. (Note: Care must be taken not to damage housing.)
- 32 — Remove snap ring #34 from housing. (Note: EXTREME CARE MUST BE USED not to damage oil seal surface.)
- 33 — Bearing #33 can now be removed if necessary.

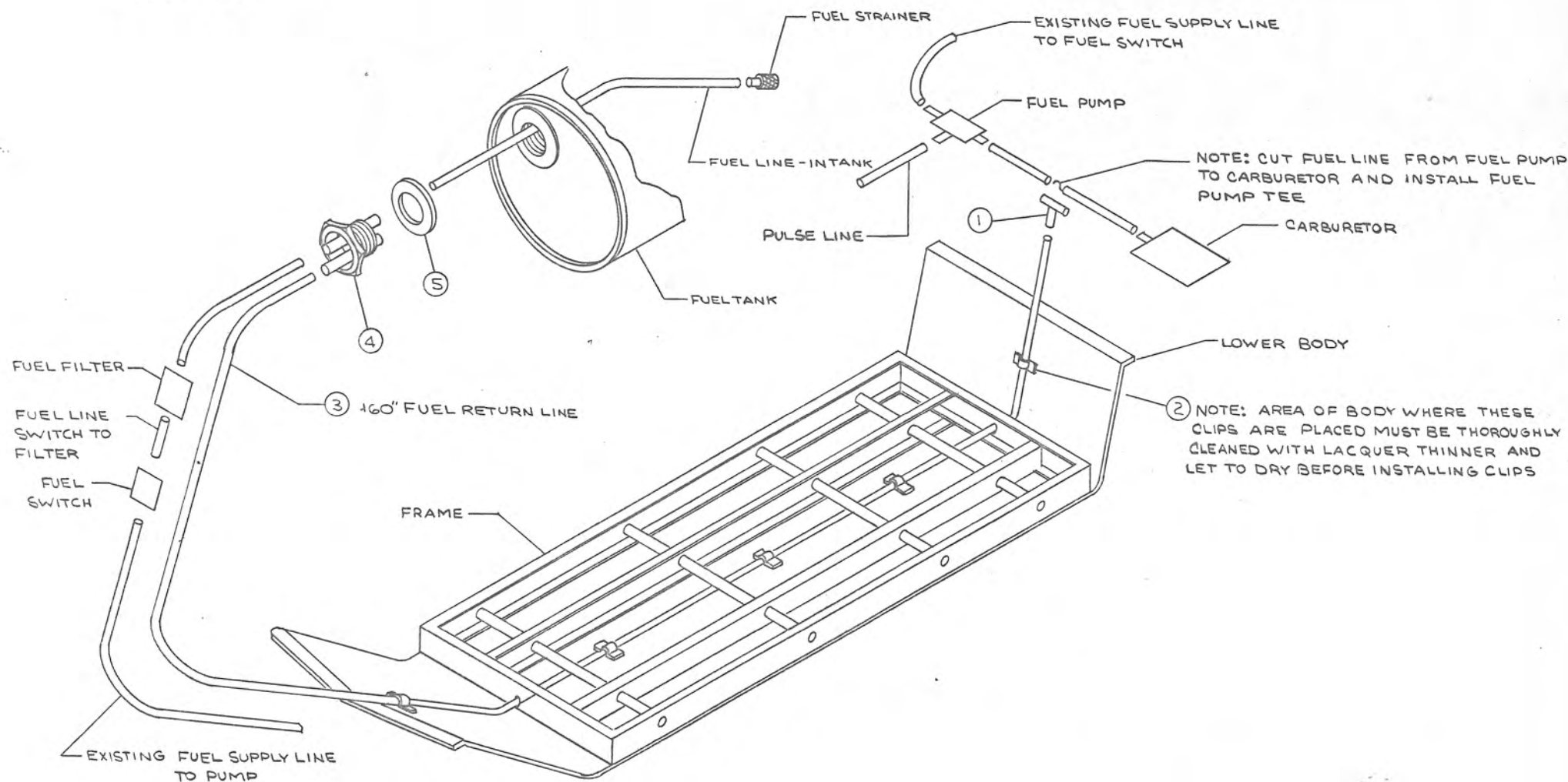
REASSEMBLY PROCEDURES

Prior to reassembly, all parts should be visually inspected and cleaned. All bearing surfaces should be lightly coated with lubriplate. Replace all seals, "O" rings and gaskets.

To reassemble unit, reverse steps for disassembly above. Fill with one quart of recommended fluid. Adjust unit in accordance with specifications shown on back cover under "Adjustment Procedures".

MODIFICATION KITS

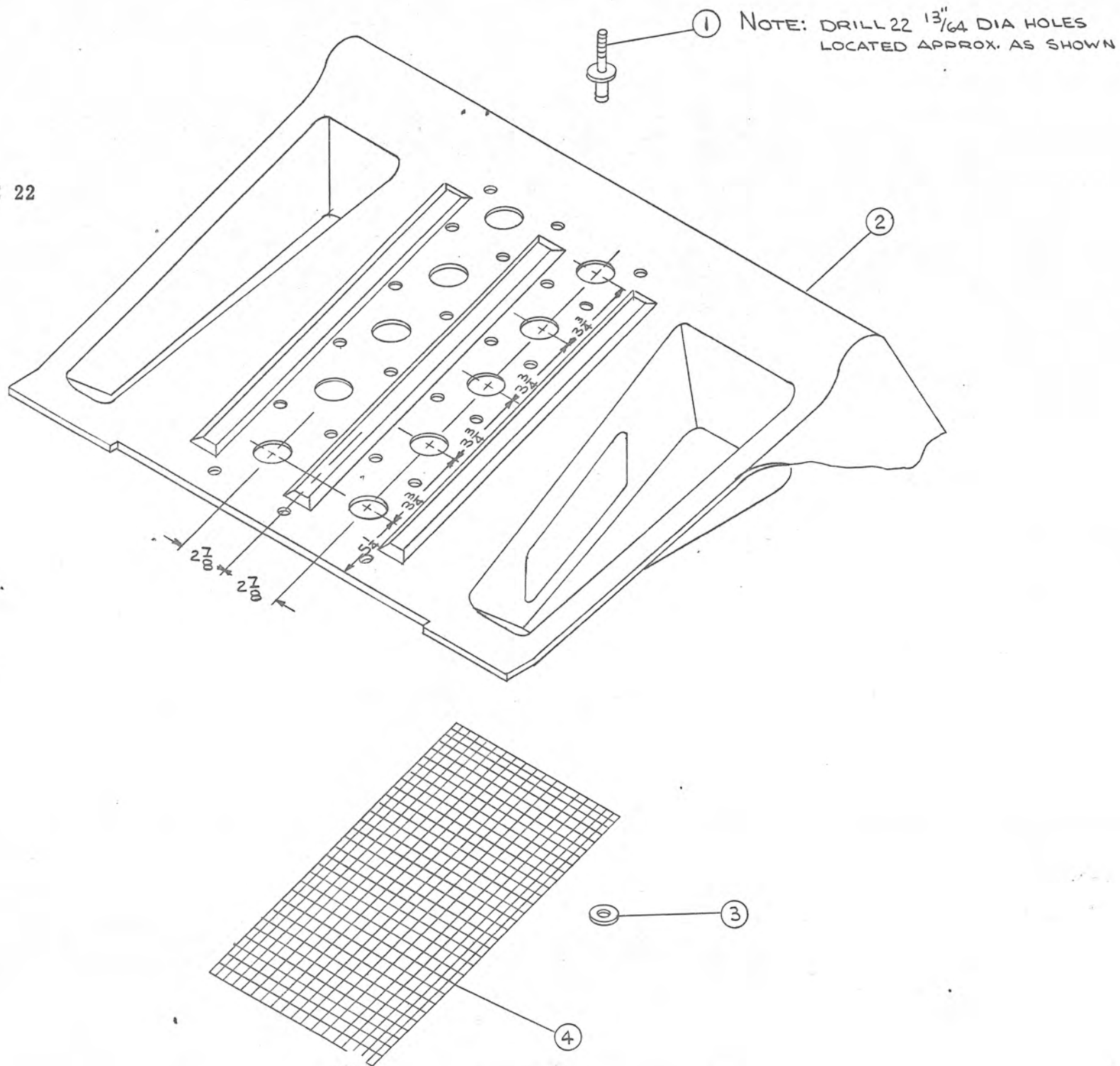
FIGURE 21



MODIFICATION NO. 408-1

ITEM	PART NO.	DESCRIPTION	QUA.
1	440-11-002	Fuel Pump Tee	1
2	252-11-056	Fuel Line Clip	5
3	408-11-006	Fuel Return Line	1
4	252-11-061	Fuel Tank Hose Fitting	1
5	295-11-016	Fuel Tank Hose Fitting Gasket	1

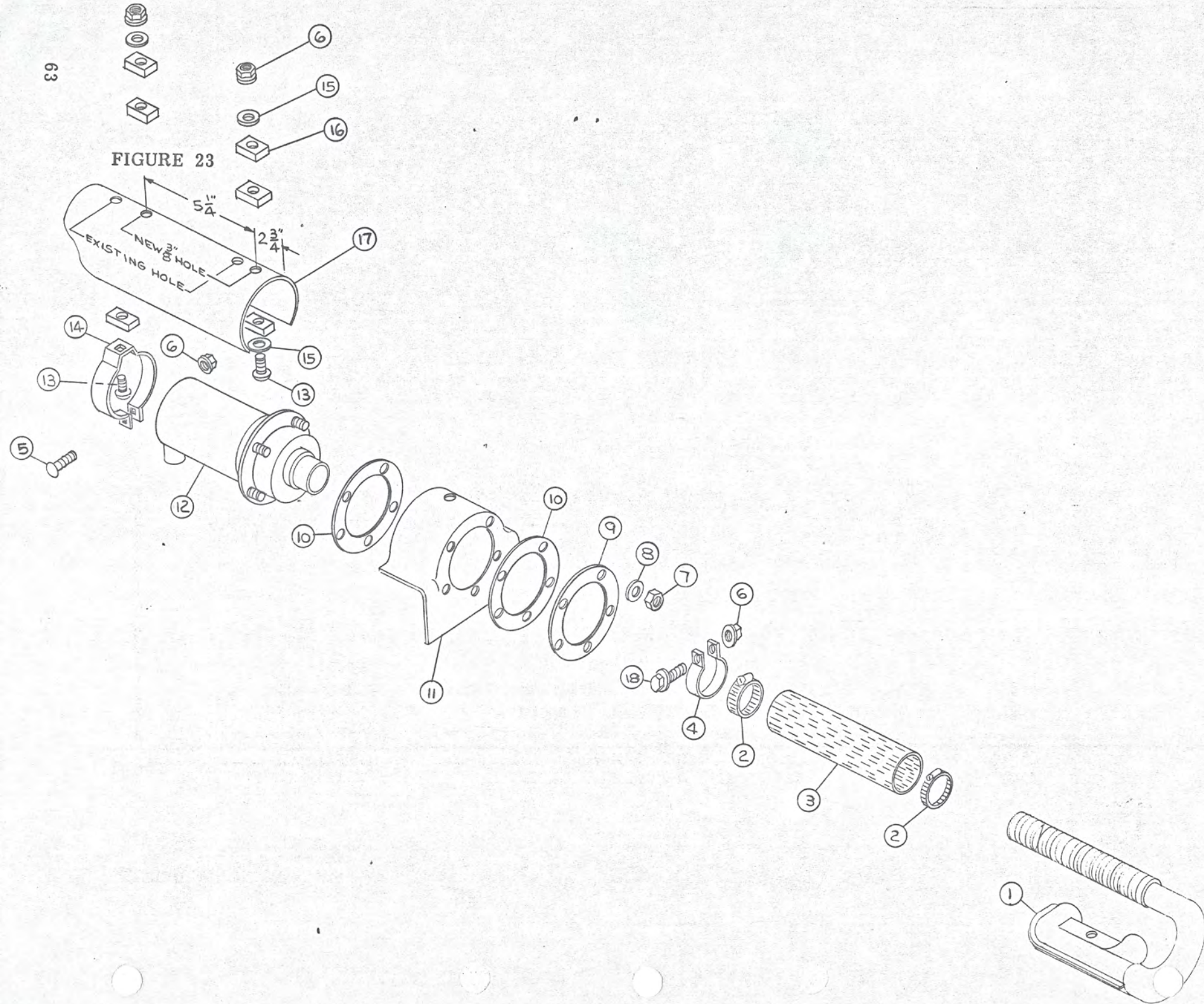
FIGURE 22



MODIFICATION NO. 408-3

ITEM	PART NO.	DESCRIPTION	QUA.
1	100-33-006	Rivet - Olympic 6-4	22
3	100-32-002	#12 Flat Washer	22
4	408-12-525	Top Vent Screen	1

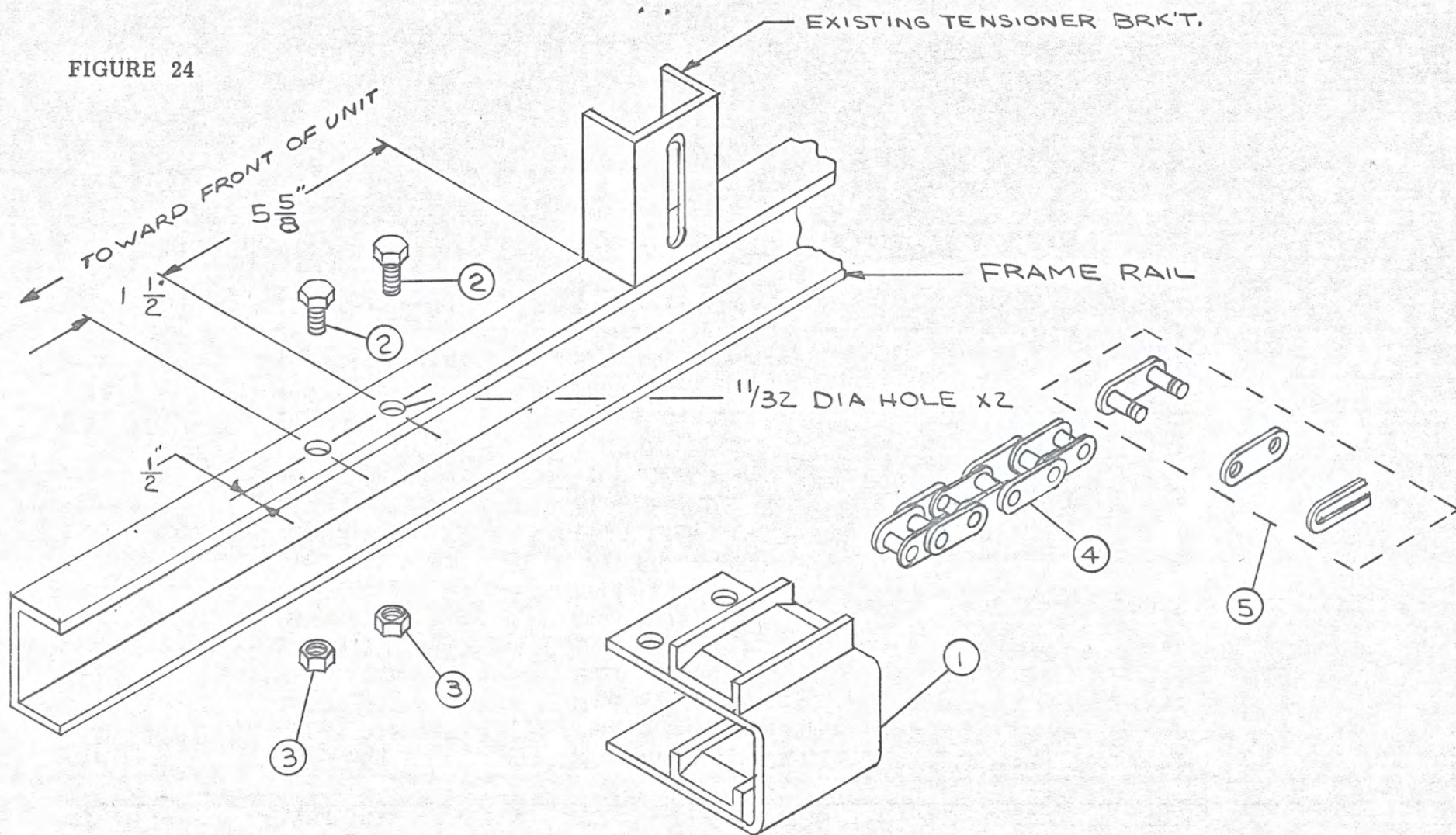
FIGURE 23



MODIFICATION NO. 408-2

ITEM	PART NO.	DESCRIPTION	QUA.
1	408-18-500	Manifold Assembly	1
2	252-11-013	Heat Shield Clamp	2
3	408-18-003	Heat Shield Sock	1
4	252-18-022	Exhaust Clamp	1
5	100-30-310	$\frac{1}{4}$ -20 x $1\frac{1}{2}$ Carr. Bolt	1
6	100-31-405	$\frac{1}{4}$ -20 Whiz. Nut	4
7	100-31-402	5/16-18 Lock Nut	5
8	100-32-015	5/16 Flat Washer	5
9	400-18-502	Inner Ring	1
10	400-18-027	Asbestos Ring	2
11	252-11-021	Fiberglass Heat Shield	1
12	400-18-506	Muffler Assembly	1
13	100-30-311	$\frac{1}{4}$ -20 x $2\frac{1}{2}$ Carr. Bolt	2
14	400-18-501	Muffler Clamp	1
15	100-32-007	5/16 Flat Washer	3
16	297-18-009	Asbestos Spacer	6
18	100-30-371	$\frac{1}{4}$ -20 x $1\frac{1}{2}$ Whd. Bolt	1

FIGURE 24



MODIFICATION NO. 408-4

ITEM	PART NO.	DESCRIPTION	QUA.
1	408-22-511	Idler Bracket	2
2	100-30-305	5/16-24 x 3/4 Hex. Hd. Gr. 5 Bolt	4
3	100-31-406	5/16-24 Lock Nut Plated	4
4	408-22-013	Secondary Chain	2
5	295-22-002	Chain Master Link	2

CVS

U.S. ARMY

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