Master

PORTABLE HEATERS

MODEL BV-200C

Spec. No. 3122G01

INSTRUCTION MANUAL WITH PARTS LIST

Koehring
Master Division

TABLE I. SPECIFICATIONS

Input Rating, BTU/Hr.	140,000
Voltage, Nominal	115v 60 Hz
Amperage, Running	10
Fuel	Kerosene or No. 1 Fuel Oil
Fuel Tank Capacity (U.S. Gallons)	13
Fuel Pump Pressure, PSI	100
Nozzle	Standard Type "A" (Delavan) 100 PSI, 70° Discharge angle 1.0 GPH
Motor	1/3 HP, 115v 60 cycle 1725 rpm, reset thermal protector
Vent	4" standard

SECTION I
INTRODUCTION

A. GENERAL

The Model V-200 Series heater is designed for use where heated fresh air is needed, without contamination from products of combustion. It must be used where an adequate amount of air is available for combustion and ventilation and where a stack can be arranged to carry the products of combustion outside the heated area. Proper electrical power must be available for the heater.

This manual contains operating, maintenance and trouble-shooting instructions for the heater. A complete parts list is included at the end of the manual.

B. PRINCIPLES OF OPERATION.

Operation of the heater involves four simple systems.

1. Fuel System. A gear-type fuel pump attached to one end of the motor shaft delivers fuel at 100 PSI from the fuel tank through a filter and a solenoid valve to the nozzle, and forces it into the combustion chamber in a fine spray.

2. Air System. The air system is divided into two parts, both of which are supplied with air from a fan which is attached to the other end of the motor.

a. Part of the air from the fan enters the combustion chamber where it mixes with the atomized fuel to become a combustible mixture, and also mixes with the burning gases to complete the process of combustion.

b. The exhaust gases from the combustion chamber circulate within a heat exchanger, warming its inner surfaces. Then the gases are ducted out of the heater through the stack adapter on its top, and out of the heated space through a flue pipe which must be supplied by the user.

c. The rest of the air from the fan passes over and around the combustion chamber through the heat exchanger, where it is heated and emerges from the front of the heater as a powerful stream of heated fresh air, without being mixed with the products of combustion.

3. Ignition System. A transformer provides high voltage to a pair of electrodes which extend through the burner into the combustion chamber. A constantly-firing spark between the electrodes ignites the mixture of fuel and air.

4. Control System. The control system is actuated by a light-sensitive cell which "sees" the presence of flame in the combustion chamber. The control system will shut the heater off if it fails to ignite or, if it runs out of fuel. In addition, the control system provides a period of blower operation after normal shut-off for the purpose of purging and cooling the combustion chamber. A thermostat mounted on the heater operates it in response to ambient air temperature.

NOTE

These heaters are equipped with the Webster Series M fuel pump. To install this new pump on older models, refer to form No. 2463-1.

SECTION III

MAINTENANCE AND SERVICE

Maintenance consists of the operations the owner or user of the heater can perform to keep the heater operating properly. If routine maintenance fails to return a heater to top-operating condition, refer to the Trouble Shooting Table. Keep the heater clean to reduce the need for extensive maintenance or repair.

A. FUEL SYSTEM MAINTENANCE

1. Use the cleanest fuel available. Dirt and water in the fuel will clog the filter, and may cause the heater to burn with an odor. If there is excessive water in the fuel, the flame may go out. Check for water globules in the bottom of the tank. If found, drain the tank and rinse it with clean, "dry" fuel (having no water in it). Then refill with clean fuel.

2. Keep the filter clean. If water or too much dirt has appeared in the fuel, clean and dry the filter housing and replace the filter element.

3. Check the fuel line connections occasionally to be sure they are tight.

4. If the solenoid valve should begin to stick open or closed, replace it. (Don't be misled by the built-in time delay which keeps the solenoid valve closed for a short time before ignition.)

B. AIR SYSTEM MAINTENANCE

1. If the heater is used in dusty or dirty air, the fan blades may in time build up enough dirt to lower the over-all efficiency of the heater. Inspect them occasionally, and wipe off any loose dirt. Use a rag moistened with kerosene or non-flammable cleaning solvent such as trichlorethylene to get stubborn dirt off the blades.

2. Keep the fan guard and the air passages around the combustion chamber free from dirt and trash.

3. Nozzle maintenance is covered under "Burner Maintenance".

C. IGNITION SYSTEM MAINTENANCE

1. Keep the electrodes in adjustment. This is explained under "Burner Maintenance".

2. Be sure the electrode leads are snapped tightly onto the electrodes and the transformer terminals.

D. CONTROL SYSTEM MAINTENANCE

1. The control system is designed for long trouble-free operation. Do not disturb it unless it is obvious that it requires attention.

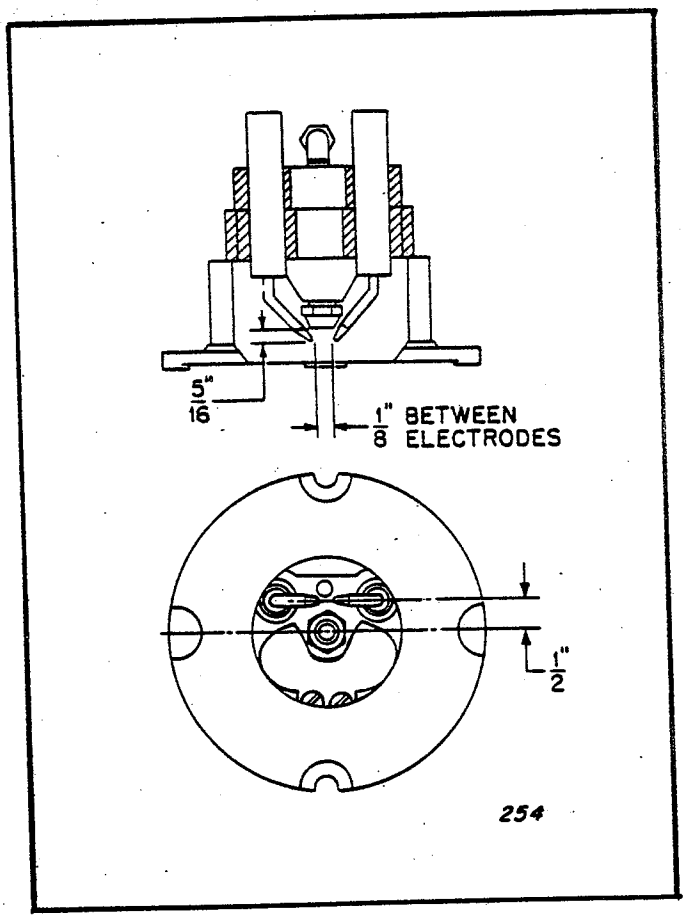

Figure 2. Electrode Setting

NOTE: The settings shown are for most conditions of fuel and climate. However, under certain rare conditions of fuel, humidity and temperature, you may find it necessary to increase the 1/8-inch setting to 3/16; and the 5/16-inch setting to 3/8, in order to achieve good ignition and burning. The 1/2-inch dimension must be kept.

2. Whenever you work inside the heater near the burner, be careful not to disturb the mounting angle of the light-sensing cell. If the mounting is disturbed, the cell may not be able to detect the presence of flame in the combustion chamber.

3. If a control system fault develops, check the light-sensing cell to be sure its face has not become sooty. Wipe off any dirt and reinstall the cell.

4. The light sensing cell and the control are replaceable independently of each other, if replacement is needed. Be sure to use only the parts listed in the parts list as replacements.

E. BURNER MAINTENANCE AND SERVICE

WARNING

Be sure the heater cord is unplugged before attempting burner servicing.

1. The burner is accessible for removal through the access door in the left side of the heater. To remove the burner for service, take out the top bolt which holds it to the combustion chamber and loosen the lower bolt.

2. Clean or replace a dirty nozzle. Never use a wire, a drill or any other hard object to clean out the nozzle passage, as any change in the size or shape of the orifice will damage the nozzle.

3. Reset the electrodes in accordance with Fig. 2. Replace electrodes if they cannot be cleaned with steel wool and cleaning solvent, or if the porcelains are cracked or broken.

4. When replacing the electrode in the burner head, be sure the split in the electrode bushing is located opposite (180° from) the clamping screw. Torque the clamping screws to 20 in. lbs. maximum; 15 in. lbs. minimum.

5. When replacing the burner in the combustion chamber, be sure it is positioned with the electrodes at the top to prevent fuel dripping on the tips.

F. FUEL PUMP MAINTENANCE AND SERVICE

1. The pump operates at 100 PSI. To check pressure, remove the hex head pipe plug from the top of the solenoid valve and install a pressure gage. (Pressure Gage, Part No. M4574 is available from Koehring, Master Division Distributors.)

2. If the pressure gage does not read 100 PSI, plus or minus 5 PSI, when the motor is running and pumping fuel, adjust the pump.

3. To adjust the pressure, swing filter upward to gain access to the adjusting port. Remove access plug on side of the pump body. Turn slotted screw inside port clockwise to increase pressure and counterclockwise to decrease pressure. After completion of adjustment, install plug and reposition filter.

4. If pressure cannot be adjusted, replace pump.

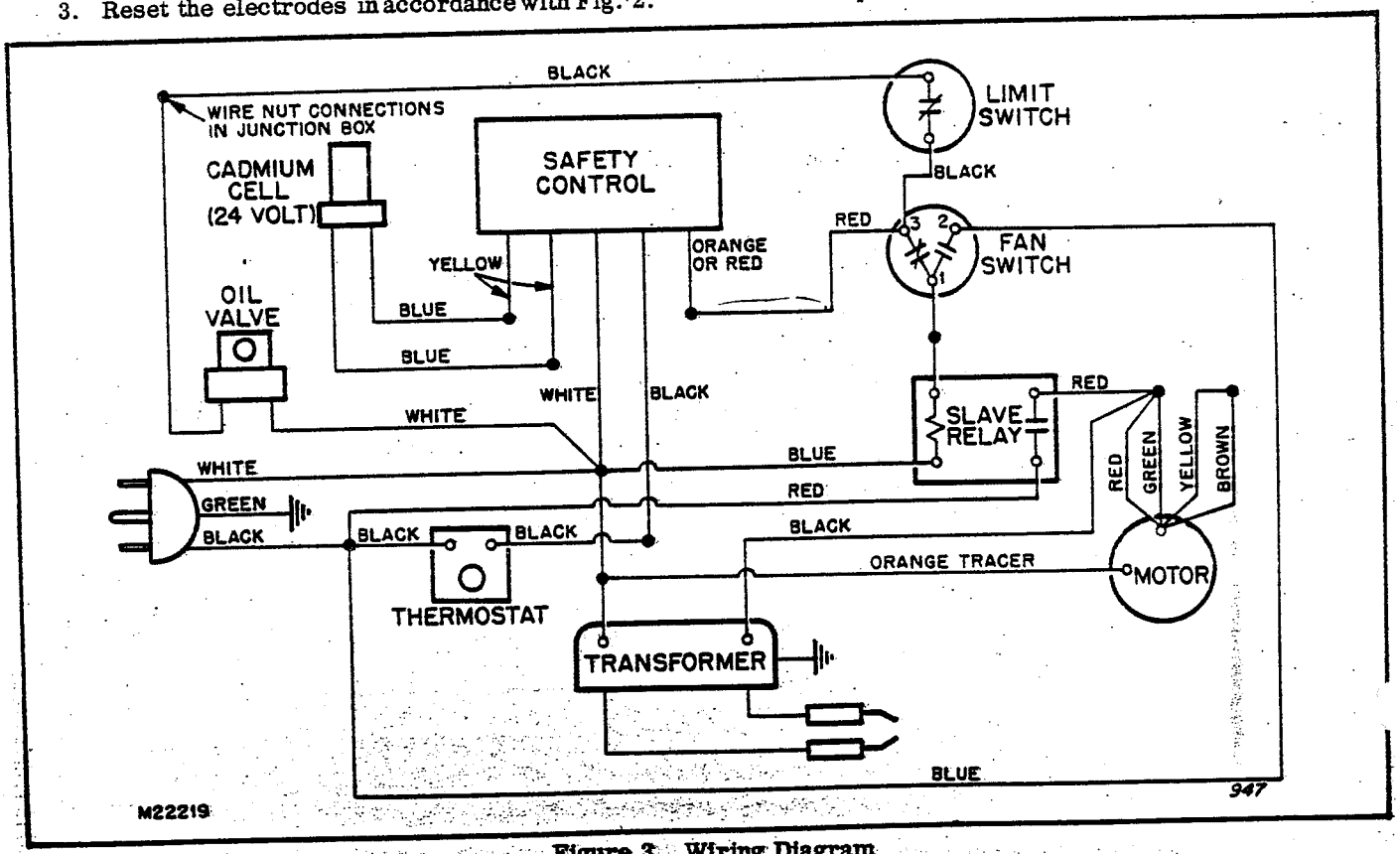

Figure 3. Wiring Diagram

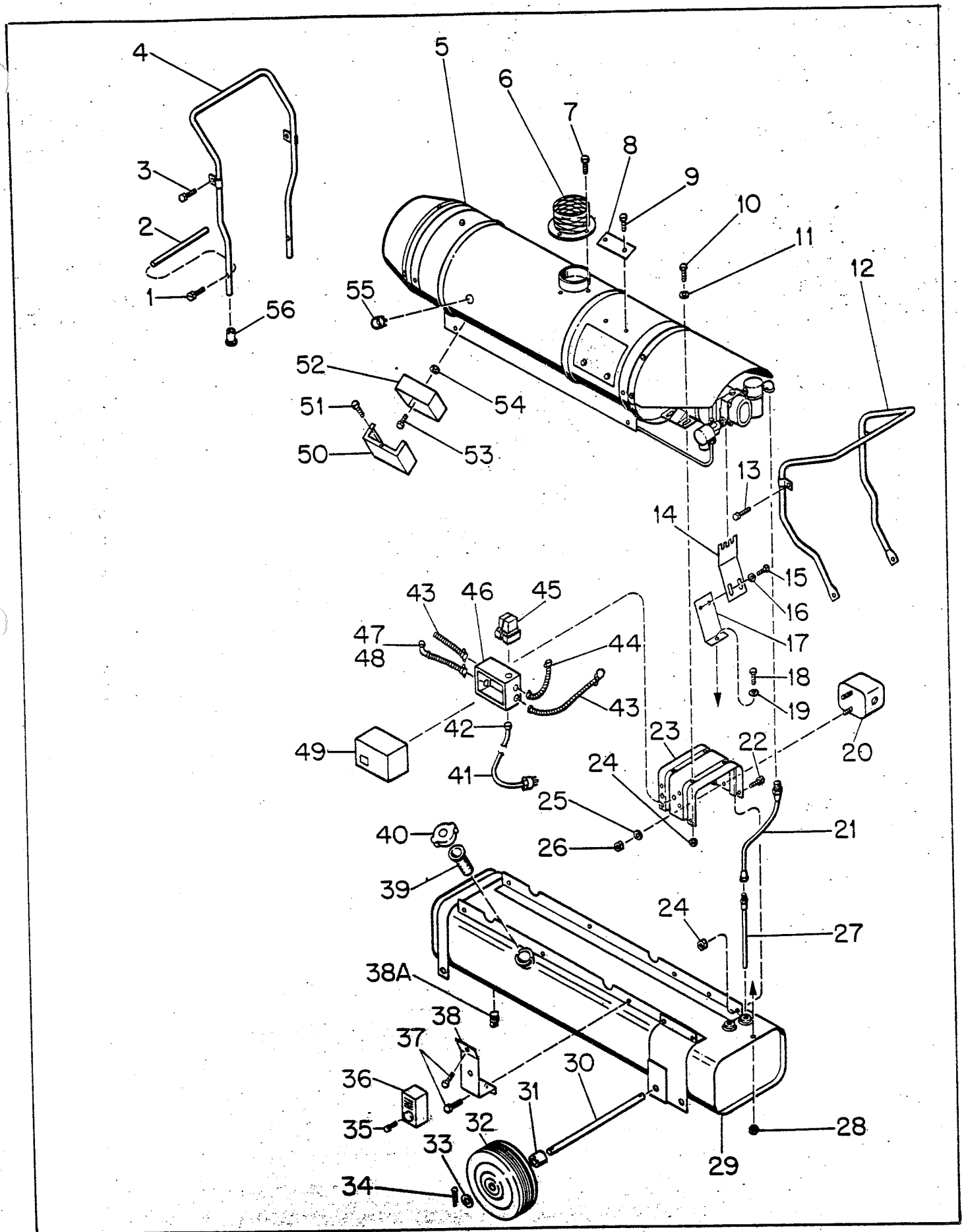

Figure 4. Heater Exploded View

SECTION V
PARTS LIST

This list contains all replaceable parts used in the product covered by this manual, with index numbers for easy reference between the list and the exploded view.

When ordering parts, check the model decal for the correct model number and Spec. No. of the heater. INCLUDE THE MODEL AND SPEC. NUMBER WHEN ORDERING PARTS. Do not use the index numbers from the illustration when ordering parts. Specify color when ordering painted parts.

MODEL BV-200C HEATER

Fig. & Index No.	Part Number	Part Name	Qty. Req'd.
4-1	M12461-70	Screw, Hex hd	2
2	M12848	Tie Rod	1
3	M12461-62	Screw, Hex hd	2
4	M12855-1A	Handle Assembly, Front	1
5	NA	Outer Shell and Burner Group (See Figure 5 for details)	-
6	M11242-1A	Stack Guard Assembly	1
7	M10908-27	Screw	3
8	M4119	Plate, CSA Approval	1
9	ST1-1-1/2	Screw	2
10	HF5-7C	Screw	4
11	WP-4C	Washer	4
12	M12858-1A	Handle Assembly, Rear	1
13	M12461-62	Screw	2
14	M20894A	Bracket, Top Support	1
15	HF3-3C	Screw	2
16	WLM-3	Washer, Lock	2
17	M20892-1A	Bracket Assembly, Support	1
18	M12461-16	Screw	1
19	WLI-2	Washer, Internal Lock	1
20	M21957-1	Transformer	1
21	M3334-14	Line Assembly, Fuel (Intake)	1
	M3334-15	Line Assembly, Fuel (Return)	1
22	M12461-64	Screw, Hex head	4
23	M11450-1A	Bracket Assembly, Motor	1
24	NTF-5C	Nut	8
25	WP-4C	Washer	2
26	NPC-4C	Nut	2
27	M10923-1	Tube Assembly, Intake and Return	2
28	NTC-2C	Nut	1
29	M18390-2A	Tank Assembly, Fuel	1
30	M12818	Axle	1
31	M10911	Spacer	2
32	M10909	Wheel	2

Fig. & Index No.	Part Number	Part Name	Qty. Req'd.
33	WP-10C	Washer, Plain	2
34	C5-10	Cotter Pin	2
35	M10908-1	Screw	2
36	M21963-2	Thermostat Assembly	1
-	M15454	Insulator	1
-	M15140	Connector	1
37	M12461-27	Screw	2
38	M12790A	Bracket, Thermostat	1
38A	M8257	Plug, Pipe	1
39	M18053	Screen, Filler	1
40	M23248	Cap, Filler	1
41	M10813-42	Cord Assembly, Extension	1
42	M6082	Connector	1
43	M15141-1	Conduit, Transformer and Electrode Leads	2
-	M15140	Connector	1
-	M15454	Insulator	4
-	56022	Connector	2
44	M15141-3	Conduit, Solenoid Valve	1
	M15140	Connector	2
45	M21686	Relay, Lead Alteration	1
46	M3011	Box, Utility	1
	NTC-3C	Nut	2
	M12461-27	Screw	2
	M15714-2	Connector, Wire	9
47	M15141-16	Conduit	1
48	M21962-1	Harness Assembly, Wire	1
49	M22012	Control, Safety	1
	M12461-27	Screw	2
	M15454	Insulator	2
50	M12661A	Cover, Control Box	1
51	M10908-1	Screw	1
52	M12656-1A	Box Assembly, Control	1
53	M10908-27	Screw	2
54	M13042	Spacer	2
55	M12662	Spacer	2
56	M3304-2	Tip, Rubber	2

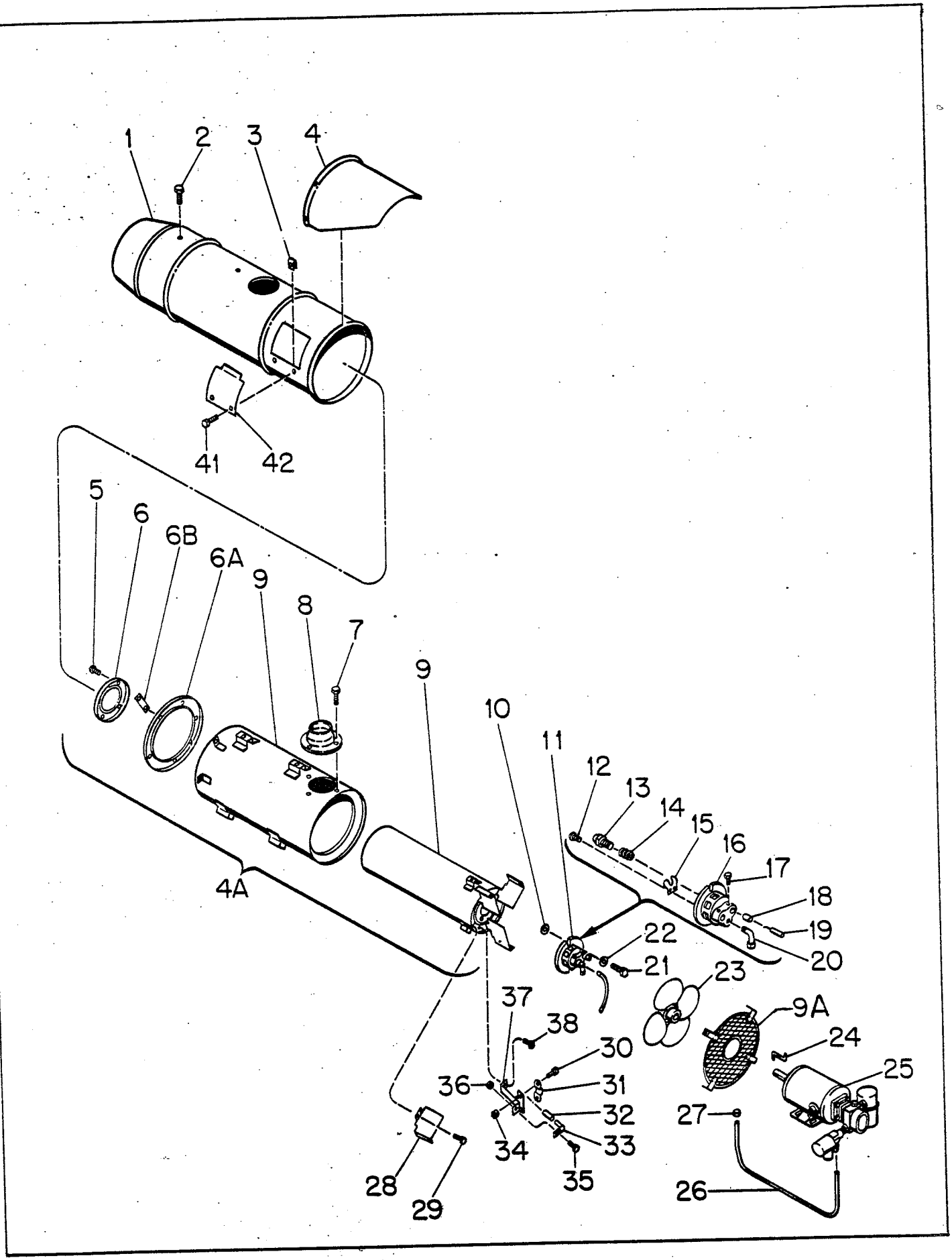

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Figure 5. Outer Shell and Burner Group

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OUTER SHELL AND BURNER GROUP

Fig. & Index No.	Part Number	Part Name	Qty. Req'd.
5-1	M12860-2A	Outer Shell Assembly	1
2	M12461-27	Screw, Hex hd	4
3	M11271-5	Nut, Tinnerman	2
4	M10871A	Cowl	1
-	M10908-27	Screw	4
4A	M15049-2	Combustion Chamber and Heat Exchanger	1
5	M11523-51	Screw, Rd hd	4
6	M12789	Combustion Chamber Front Head	1
6A	M12356G1	End Cover Assembly	1
6B	M12355	Strap	6
-	M10908-30	Screw, Hex hd	12
7	M10908-27	Screw, Hex hd	3
8	M10851A	Casting, Exhaust	1
9	15050-2	Combustion Chamber and Inner Shell Assy	1
9A	M20422-1A	Guard Assembly, Fan	1
-	M11084-28	Screw	4
-	M11271-6	Nut, Tinnerman	4
10	M13222	Washer	2
11	M9107-4	Burner Head Assy	1
12	RC1-2	. Screw, Rd hd.	2
13	M3107	. Nozzle	1
14	M4274	. Spring	1
15	M3978	. Air Deflector	1
16	M3853G1	. Burner Body and Bushing Assembly	1
17	HF3-3	. Screw, Hex hd, 10-32 x 3/8	2
18	M16712	. Electrode Bushing	2
19	M3981	. Electrode	2
20	M2294	. Fitting, Compression	1
21	M12461-16	Screw, Hex hd, No. 8-32 x 5/8 in.	3
22	WP-2C	Washer, Plain	3
23	M11230-1	Fan	1
24	M18025	Key, Fan	1

Fig. & Index No.	Part Number	Part Name	Qty Req'd.
25	M23667-1	Motor and Pump Assembly (For details, see Figure 6)	1
26	M18466	Fuel Line	1
27	M3530	Grommet	1
28	M11239	Fin Deflector	1
29	M10908-27	Screw	2
30	FHC1-4C	Screw, Fillister hd., No. 6-32 x 1/2 in.	2
31	M13963A	Clamp	1
32	M13962A	Tube	1
33	M23802-2	Photo Cell	1
34	NTC-2C	Nut, Torque lock, No. 8-32	2
35	RC2-3C	Screw, Rd hd No. 8-32 x 3/8	1
36	NTC-1C	Nut, Torque lock, No. 6-32	1
37	M21865-1A	Bracket Assembly	1
38	M11084-38	Screw	1
39		Not Used	
40	M8633-3A	Door, Access	1
41	M11084-40	Screw	1
	M20532-1	Decal, Pump Pressure	1
	M18196	Decal, Mfg. by	1
	M4950	Decal, Caution	1
	M16739	Decal, Operating Instructions	1
	M13337	Decal, Caution	1
	M22219	Decal, Wiring Diagram	1
	M22743	Decal, Caution	1
	M23666	Decal, Nameplate	1
	M11276	Decal, Trade Name	1
		TOUCH-UP PAINT	
	M23353-6	Paint, Yellow, Aerosol Can	
	M23353-10	Paint, Black, Aerosol Can	

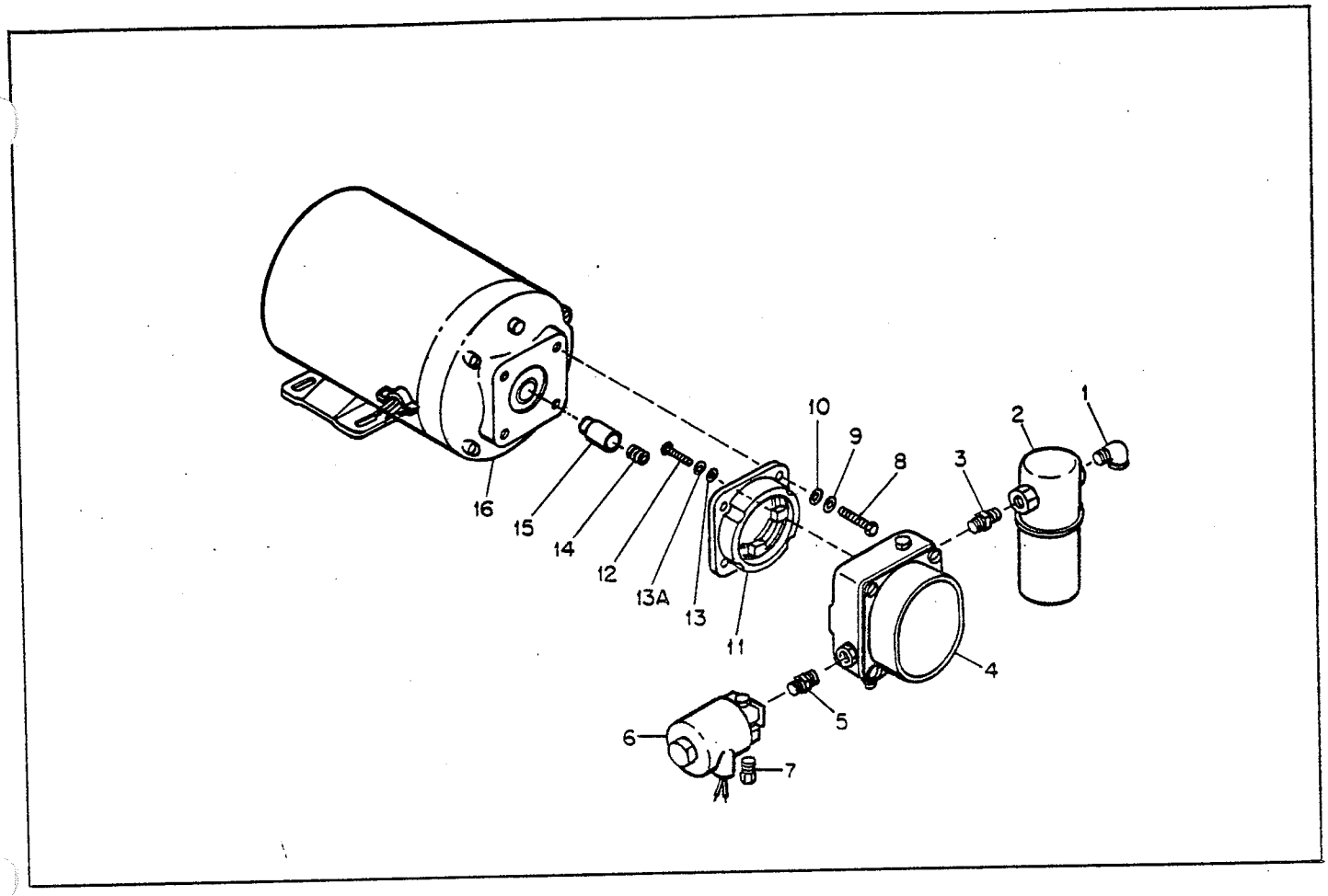

Figure 6. Motor and Pump Assembly

Fig. & Index No.	Part Number	Part Name	Qty. Req'd.
6-		Motor and Pump Assy	N/A
1	57413	. Elbow, Street 1/4 in.	1
2	M3973	. Filter, Fuel	1
	M4307	. . Filter Can	1
	M3301-2	. . Filter Gasket	1
	M3301	. . Filter Element	1
3	M3463	. Nipple	1
4	M22872-1 ♣	. Pump, Fuel	1
5	69246	. Nipple, Pipe 1/8 in.	1
6	M3974-7	. Valve, Solenoid	1
7	1000513	. Connector, Male	1
8	*HC5-7C	. Screw, Hex hd., 5/16-18 x 3/4 in.	4
9	*WLM-5C	. Lockwasher 5/16 in.	4
10	*WP-5C	. Washer, Plain 5/16 in.	4
11	M22348	. Adaptor	1
12	*RF3-6C	. Screw, Rd. hd., No. 10-32 x 3/4 in.	3
13	WP-3C	. Washer, Plain	3
14	M18436	. Spring	1
15	M22873	. Coupling	1
16	M21984-2	. Motor	1
	M3486-3	Tubing, Varnish, Solenoid leads	1

N/A Not available as a service part. Order individual parts.
* Standard Hardware. Procure locally.