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Aerospace Group
Conveyance Systems Division
Carter® Brand Ground Fueling Equipment

Maintenance & Repair Manual

Pressure Fueling Nozzle NSN 4930-00-544-3713 DLA700-88-C-2335

Model 6902

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MAINTENANCE, OPERATION, OVERHAUL & TEST INSTRUCTIONS
CARTER BRAND MODEL 6902
PRESSURE FUELING NOZZLE

1.0 INTRODUCTION

This manual furnishes detailed instructions covering the operation, maintenance and overhaul of Eaton's Carter brand Model 6902 Pressure Fueling Nozzle.

2.0 EQUIPMENT DESCRIPTION AND OPERATION

2.1 EQUIPMENT DESCRIPTION

Eaton's Carter brand Model 6902 is a 2 inch single point fueling nozzle that has been qualified to MIL-N-5877, rev. C.

2.2 EQUIPMENT OPERATION

2.2.1 SAFETY INTERLOCKS

It is vital that each nozzle operator understands that there are several safety interlock features designed into the Model 6902 nozzle that must be functioning to prevent an accident that would result in spill of flammable liquids with the consequential risk of fire, personal injury or death, and property damage. Refer to Tables 1.0 and 2.0 and Figures 1 to 3 to identify individual parts during the following discussion.

2.2.1.1 COLLAR LOCK AND INDEX PINS

Examination of the connection end of a disengaged nozzle discloses the three Collar Lock Pins (15) and three Index Pins installed as a part of the Seal (13).

The three spring loaded Collar Lock Pins (15) engage three cutouts in the flange of the Collar (14) when the Collar (14) is in the full dis-engaged position and these Collar Lock Pins (15) prevent accidental rotation of the Collar (14) of the disengaged nozzle.

With the Collar (14) locked in the disengaged position, the flat portion of a ramp integral to the Collar (14) is positioned over a flat area on the Handle (21) in a manner that prevents opening the Valve (9).

The three Index Pins (part of 13) mate with three slots in a serviceable MS24484 Adapter Flange to index the nozzle to the flange so the Collar (14) mates with the flange lugs during engagement and prevents disengagement of the Collar (14) from the flange without releasing the three spring loaded Collar Lock Pins (15) to the collar lock positions.

2.2.1.2 HANDLE/COLLAR INTERLOCK AND OVER CENTER LINKAGE

Examination of the center portion of the Handle (21) on a disengaged nozzle discloses the fact that a flat edge of the Handle (21) is beneath the flat portion of a ramp that is integral to the Collar (14). With the Collar (14) locked by the Collar Lock Pins (15), the Collar (14) ramp prevents rotation of the Handle (21) to the poppet open position.

Note: The Handle (21) on some nozzles are made of aluminum alloy. Latter handles are made of a much heavier and stronger alloy (ZA-12) (black in color) to improve its strength. The older handle part number is no longer available.

When the Collar (14) is fully engaged to a serviceable MS24484 Adapter, the Collar (14) ramp clears the Handle (21) and permits Handle (21) rotation to the open position.

With the Handle (21) full open, the round portion of the Handle (21) prevents rotation of the Collar (14) in the disengage direction until the Handle (21) has been fully closed.

These interlocks are designed to prevent accidental opening of the poppet of a disengaged nozzle or accidentally disengaging a nozzle with the poppet open.

The poppet operating internal linkage design is such that the linkage is over center at each extreme of travel (Handle full open against internal mechanical stop or full closed against internal mechanical stop).

Thus, internal pressure against a closed poppet, when the linkage is against the closed mechanical stop, provides a force only in the closed direction.

In a similar manner, with the Handle in the full open/mechanical stop position, the 50 lb. force applied by the MS24484 Adapter Poppet Spring provides a force only in the open direction.

2.2.2 OPERATION INSTRUCTIONS

2.2.2.1 SAFETY INSPECTIONS

Note: The frequencies recommended for the following inspections are our recommendations based on nozzles that have been in daily service for at least a year. The frequency that is required will depend upon the degree of maintenance extended to the equipment and to the age of the equipment. It is not possible for Carter to recommend other than the safest possible frequencies.

2.2.2.1.1 NOZZLE INSPECTIONS - AT EACH REFUELING OPERATION

The following inspections of the Nozzle are recommended at each refueling operation:

A. Inspect the connection end and verify that the Index Pins (part of 13) are intact, in place, and not excessively worn or damaged or the Seal (13) housing in which they are pressed is not damaged causing the pins to be loose. Verify that all three Collar Lock Pins (15) are intact, undamaged and are extended and engage all three cutouts in the Collar Assy (14) and physically prevent Collar Assy (14) rotation.

This inspection can be accomplished without interruption of the normal operating procedure and without adding appreciably to the operation time by training the operator to automatically observe the connection end of the nozzle upon disconnection from the aircraft. If the Collar Lock Pins (15) are not extended and engaged in all three cutouts in the Collar Assy (14), the operator should squeeze the Handle (21) and Handle Grip (3) together while observing the connecting end of the nozzle. This should cause the Collar Lock Pins (15) to "spring" into the cutouts in the Collar Assy (14). If not, then the nozzle should be taken out of service. Since the Collar Lock Pins (15) did not spring into their correct position, it could mean that the aircraft adapter (or storage adapter if used) is defective and should be inspected (see paragraph 2.2.2.1.3) and reported as possibly being defective.

B. Upon engagement to an aircraft and opening the nozzle, but before operating the deadman control, it is recommended that the operator attempt to remove the nozzle from the aircraft. This should not be possible. If it can be removed, either the nozzle was never fully engaged onto the aircraft or needs repair, or the aircraft adapter is in need of repair.

2.2.2.1.2 NOZZLES INSPECTIONS - MONTHLY BASIS

The following inspections of the Nozzle are recommended to be conducted on a monthly basis as a minimum:

A. Inspect the connection end and verify that the three Index Pins (part of 13) are intact and in place. Verify that the three Collar Lock Pins (15) are intact and in place and extended and engaging all three cutouts in the Collar (14) and physically preventing Collar (14) rotation. Check the Seal (13) containing the pins for possible cracks.

B. Hold the nozzle with the outlet or connecting end facing such that it can be observed. Apply pressure on the Collar (14) in the direction to connect the nozzle to the aircraft, clockwise, to take up the slack and inspect the relative location of the three Index Pins (15) with respect to the cutouts in the Collar (14). The two Index Pins (15) that are engaged in the normally narrower cutouts should be resting against the edge of their respective cutouts. If there is a space between the third Index Pin (15) and the edge of the normally larger cutout the collar is still in functional condition. If all three Index Pins (15) are resting against the edge of their respective cutouts (there is no space), the Collar (14) may no longer be in a functional

condition and should be replaced if it fails the next step.

C. With the nozzle being held in the position described above, attempt to open the nozzle with the Handle (21). The nozzle should be prevented from opening by the interference between the Collar (14) and the Handle (21). If the nozzle can be opened it should be removed from service and repaired.

D. Inspect the Handle (21) and the adjacent ramp surface of the Collar (14) and verify that neither part is damaged or has missing pieces that permit the Handle (21) to be rotated to the open position with the nozzle disengaged, or that will allow the Collar (14) to rotate to the disengaged position when the Handle (21) is open. Broken or missing parts can result in dangerous fuel spills while refueling aircraft.

E. Verify that the Handle (21) is in the fully closed (against internal mechanical stop) position. (This is necessary to assure that the linkage is over center so internal pressure can not force the poppet open during the Collar (14) engagement).

2.2.2.1.3 AIRCRAFT ADAPTER INSPECTIONS

The following inspections of the aircraft adapter are recommended to be carried out at each refueling operation to assure that one is connecting to a safe adapter:

A. Visually check for bent, broken, missing or excessively worn lugs or slots. Worn slots are easily detected. A normal slot will have a slight machine broken edge (chamfer of .030 inch (0.762 mm)). If the edge is worn such that the corner is badly distorted and enlarged it should be inspected more closely and accurately. Carter Adapter Wear Gauge, 61657-2, should be utilized to check the width and thickness of the lugs if they appear to be worn. Wear of the thickness dimension of the lug will promote premature nose seal leakage. Wear of the width of the lug combines with slot wear in defeating the nozzle interlock.

B. Visually check the three slots for excessive wear. Excessive wear can permit disengagement of a nozzle without release of the three Collar Lock Pins (15) and may permit accidental poppet opening on the disconnected nozzle. The use of Carter Gauge 61657-2 will provide a "no-go" check for the slots.

C. If any of the above conditions are observed, and or the gauge proves the adapter to be defective, the refueling operation should be continued only with extreme caution. The nozzle, upon disconnection, should be checked in accordance with paragraph 2.2.2.1.1.A. The suspected defective adapter should also be reported to the appropriate personnel.

2.2.2.2 NOZZLE CONNECTION

After completion of the Safety Inspections of 2.2.2.1, connect the nozzle as follows:

A. With the Cover (1) removed, grasp the nozzle by the Collar (14) Handle Grip (3) and align the connection end with the aircraft adapter.

B. Press the nozzle against the adapter while slightly rotating the nozzle (if necessary) to align the Nozzle Index Pins (part of 13) with the adapter slots.

C. With the nozzle aligned, press the nozzle against the adapter flange until the Collar Lock Pins (15) are depressed sufficiently to permit rotation of the Collar (14) in the clockwise direction until the Collar (14) is fully engaged against a mechanical stop (approximately 30-35 degrees of Collar rotation).

D. With the Collar (14) fully engaged and stopped, rotate the Handle (21) in the open direction to the full open linkage over center position against the internal mechanical stop (approximately 200 degrees) of the Handle (21) rotation.

CAUTION: If the Handle (21) is not rotated against the full open stop, the 50 pound adapter poppet spring force may move the nozzle poppet to a partially closed position which will unnecessarily increase the time required to refuel the aircraft and cause unnecessary wear of both the nozzle and the aircraft adapter. (If Handle (21) movement is observed during fuel flow, the Handle (21) was not in the full open over center position).

Handle rotation to an intermediate position is unsafe and can result in a flowing disconnect and dangerous fuel spill.

E. Prior to commencing fuel flow, verify that the round portion of the Handle (21) prevents rotation of the Collar (14) to the disengaged position.

2.2.2.3 NOZZLE DISCONNECTION

Upon completion of refueling operations, disconnect the nozzle as follows:

A. Rotate the Handle (21) in the closed direction until it is against the internal mechanical stop (approximately 200-210 degrees).

CAUTION: If the Handle (21) is not against the internal closed stop, the linkage is not over center and internal pressure will force the poppet in the open direction.

B. With the Handle (21) full closed, grasp the Grips (3) and rotate the Collar (14) counter-clockwise until the nozzle is released from the adapter (approximately 30-35 degrees).

C. Examine the connection end of the nozzle and verify that all three Collar Lock Pins (15) have been released into the cutouts in the Collar (14) flange to securely lock the Collar (14).

CAUTION: If a worn adapter has allowed disengagement of the nozzle without release of all three Pins (15), rotate the collar in the disengage direction until all pins are released to lock the collar. (This condition caused by a damaged adapter on one aircraft resulted in a dangerous fuel spill during attempted refuel of a second aircraft). Reinspect the adapter of the serviced aircraft and replace if worn.

D. Replace the Cover (1) and return the nozzle to the normal storage location.

3.0 DISASSEMBLY

3.1 Remove nozzle from end of hose.

3.2 To assist in disassembly, the flange from an MS24484 adapter or Carter part number S204451, is required.

3.2.1 Disconnect chain from Body (32) and remove Cover Assembly (1).

3.2.2 Remove collar Bumper (2).

3.3.3 Remove Bolts (4), Washers (5 and 6) and Handle Assemblies (7). Remove Handle Grips (3) from Handle Assemblies (7), if replacement is necessary.

3.2.4 Remove collar Bearing (12) by pushing at one end of the Bearing (12) to cause the other end to protrude from groove. Using pliers, pull the collar Bearing (12) out of groove and remove Collar (14).

Note: Remove Collar (14) by aligning the groove in the collar with the tab on the Body (32).

3.2.5 Turn Crank Handle (21) to open Valve (9). Remove pin (8) and unscrew Valve (9) from Shaft Assembly (18).

3.2.6 Remove eight Screws (10) and Washers (11). Remove Seal Assembly (13) and three Collar Lock Pins (15) and Springs (16).

3.2.7 Remove Screw (19) and Washer (20). Remove Crank Handle (21), Washer (22), Spacer (23), Packing (24), Washers (25), and Wave Washers (26) from Valve Crank (29).

3.2.8 Remove Hairpin (17) that secures Shaft Assembly (18) to Valve Crank (29).

3.2.9 Cut lockwire and remove Crank Bushing (27) and Gasket (28). Remove Valve Crank (29) from Body (32). Note method of lockwiring so that it may be duplicated on reassembly.

3.2.10 Remove Shaft Assembly (18) from Body (32).

3.2.11 Remove Plug (30) and Gasket (31), if neccesary to replace.

4.0 INSPECTION

Replace the following items with new parts from kit KD6902 during maintenance:

ITEM NO.	PART NO.	NAME	QUANTITY
1	40409	Cover Assy, Nozzle	1
2	23622	Bumper, Collar	1
8	GF24665-302	Pin, Cotter	1
10	MS16997-32	Screw	8
11	MS35338-42	Washer	8
12	23620	Bearing, Collar	1
13	4879	Seal Assy, Nozzle	1
15	20912	Pin, Collar Lock	3
16	20909	Spring, Lock Pin	3
19	220004	Screw	1
22	21706	Washer	1
23	20910	Spacer, Packing	1
24	M25988/1-014	Packing	1
28	MS29512-10	Gasket	1
31	MS29512-04	Gasket	1

Inspect all metal parts for dings, gouges, abrasions, damaged threads, etc. Use 320 grit paper to smooth and remove sharp edges. Replace any part with damage exceeding 15% of local wall thickness. Use alodine 1200 to touch up bared aluminum.

Precisely measure the following items. Replace any part that exceeds the identified maximum or minimum wear limits:

- Diameter of link joural on valve crank (29, figure 1 (0.291 inch min)
- Inside diameter of hole in link of Shaft Assembly(18, figure 1) (0.319 inch max)

5.0 SPECIAL TOOLS

The following special tools are recommended for proper repair and or overhaul of the nozzle:

- S204451 - Standard three lug bayonet adapter flange or MS24484.
- 6958CG or 6958CH Adapter or MS24484 equivalent.
- 61657-2 Adapter Wear Gauge
- 41625-ST1 Poppet Adjustment Gauge

6.0 REASSEMBLY

6.1 Reassemble in reverse order of disassembly, observing the following:

6.1.1 Make certain all components are clean and free from oil, grease, or any other corrosion resistant compound on all interior or exterior surfaces. Wash all parts with cleaning solvent, Federal Specification P-D-680, and dry thoroughly with a clean, lint-free cloth or compressed air.

WARNING

Use cleaning solvent in a well-ventilated area. Avoid breathing of fumes and excessive solvent contact with skin. Keep away from open flame.

NOTE: A light coat of petrolatum, Federal Specification VV-P-236 or equivalent commercial quality, can be applied to all o-rings, springs, and screws for ease of installation.

6.2 Reassemble in reverse order of disassembly, observing the following:

6.2.1 Install Plug (30) and Gasket (31), if previously removed.

6.2.2 Install Gasket (28) on crank Bushing (27).

6.2.3 Install Shaft Assembly (18) in Body (32).

6.2.4 Install Valve Crank (29) in Body (32) and connect to Shaft Assembly (18). Install and tighten crank Bushing (27).

6.2.5 Secure Shaft Assembly (18) to Valve Crank (29) with Hairpin (17).

6.2.6 Lockwire crank Bushing (27) with MS20995C32 lockwire.

6.2.7 Install following on Valve Crank (29): Wave Washers (26) and Washers (25), alternating one each, Packing (24), Spacer (23), Washer (22), and Crank Handle (21). Secure Crank Handle (21) with Screw (19) and Washer (20).

6.2.8 Install three Springs (16) and Collar Lock Pins (15), and Seal Assembly (13) on Body (32). Secure with eight Screws (10) and Washers (11). Torque Screws (10) to 15-20 inch-pounds.

6.2.9 Install Valve (9) on Shaft Assembly (18). With Crank Handle (21) in fully closed position, screw Valve (9) onto Shaft Assembly (18) until seated on Seal Assembly (13).

6.2.10 Measure distance from top surface (face) of Valve (9) to top of surface (face) on seal assembly shoulder of the Body (32). This dimension shall be .840 to .860 inch. If it is not, calculate the required poppet dimension as follows: (one quarter (1/4) turn of the Valve (9) axially displaces the Valve (9) face about .010 inch).

6.2.11 After .840 to .860 inch dimension is obtained, turn Crank Handle (21) to open Valve (9) and install pin (8).

6.2.12 Install Collar (14) and Collar Bearing (12).

6.2.13 Install Handle Grips (3), if removed, on Handle Assemblies (7). Install Handle Assemblies (7) with Bolts (4) and Washers (5 and 6).

6.2.14 Install collar Bumper (2).

6.2.15 Install Cover Assembly (1), securing chain to Body (32).

7.0 TEST

7.1 The following test procedures will be accomplished after overhaul:

7.2 Test conditions

Test media shall be Stoddard Solvent (Federal Specification P-D-680), JP-4 per MIL-J-5624D at 75o + 15oF, Jet A or equivalent.

7.3 Functional Test

7.3.1 The nozzle shall be inserted and locked into a test adapter, Carter 6958CG or CH or equivalent MS24484 type unit, and the nozzle valve actuated by use of the Crank Handle (21) from the fully closed to the fully open position a minimum of five times. There shall be no evidence of binding or excessive force required for valve actuation.

7.4 Leakage Test

7.4.1 With the nozzle outlet in the normal open position, and the test adapter outlet closed,

pressurize the inlet to five PSIG and hold for one minute minimum. There shall be no evidence of

7.4.2 Repeat the leakage test at 60 PSIG and 120 PSIG.

7.4.3 Close and disengage the nozzle and repeat 7.4.1 and 7.4.2.

7.4.4 Continuity Test

With the nozzle still in the functional test set up of 7.3.1 measure the resistance (Ohms) between the adapter mounting flange and the inlet flange of the nozzle. The resistance from the nozzle inlet flange to the adapter mounting flange shall be less than 10 Ohms.

8.0 ILLUSTRATED PARTS CATALOG

The parts and sub-Assemblies comprising the 6902, Pressure Fueling Nozzle are listed in the following parts lists. The index numbers in the parts lists correspond to the numbers identifying the parts in the exploded view illustrations, Figures 2 and 3.

TABLE 1.0

6902 Nozzle less Screen & Quick Disconnect

Item	Part Number	Description	Units Per Assembly
1	40409	Cover Assy, Nozzle	1
2	23622	Bumper, Collar	1
3	23623	Grip, Handle	2
4	AN7-7A	Bolt	2
5	MS35338-47	Washer	2
6	AN960-716	Washer	2
7	40495	Handle Assy, Collar	2
8	GF24665-302	Pin, Cotter	1
9	26866	Valve, Nozzle	1
10	MS16997-32	Screw	8
11	MS35338-42	Washer	8
12	23620	Bearing, Collar	1
13	4879	Seal Assy, Nozzle	1
14	23621	Collar Assy, Nozzle	1
15	20912	Pin, Collar Lock	3
16	20909	Spring, Collar Lock Pin	3
17	22096	Hairpin	1
18	40006	Shaft Assy, Valve	1
19	220004	Screw	1
20	MS35338-43	Washer	1
21	210089	Handle, Crank	1
22	21706	Washer	1
23	20910	Spacer, Packing	1
24	M25988/1-014	Packing	1
25	22290	Washer	2
26	22291	Washer, Wave	2
27	20914	Bushing, Crank	1
28	MS29512-10	Gasket	1
29	20916	Crank, Valve	1
30	AN814-4D	Plug	1
31	MS29512-04	Gasket	1
32	20922	Body, Nozzle	1
	KD6902	Overhaul Kit - Consists of items 1, 2, 8,10-13, 15, 16, 19, 22-24, 28, & 31.	

Spare parts kits, KD6902, should be available from the supply system. If not, or individual parts are required, they can be procured from any Carter distributor.

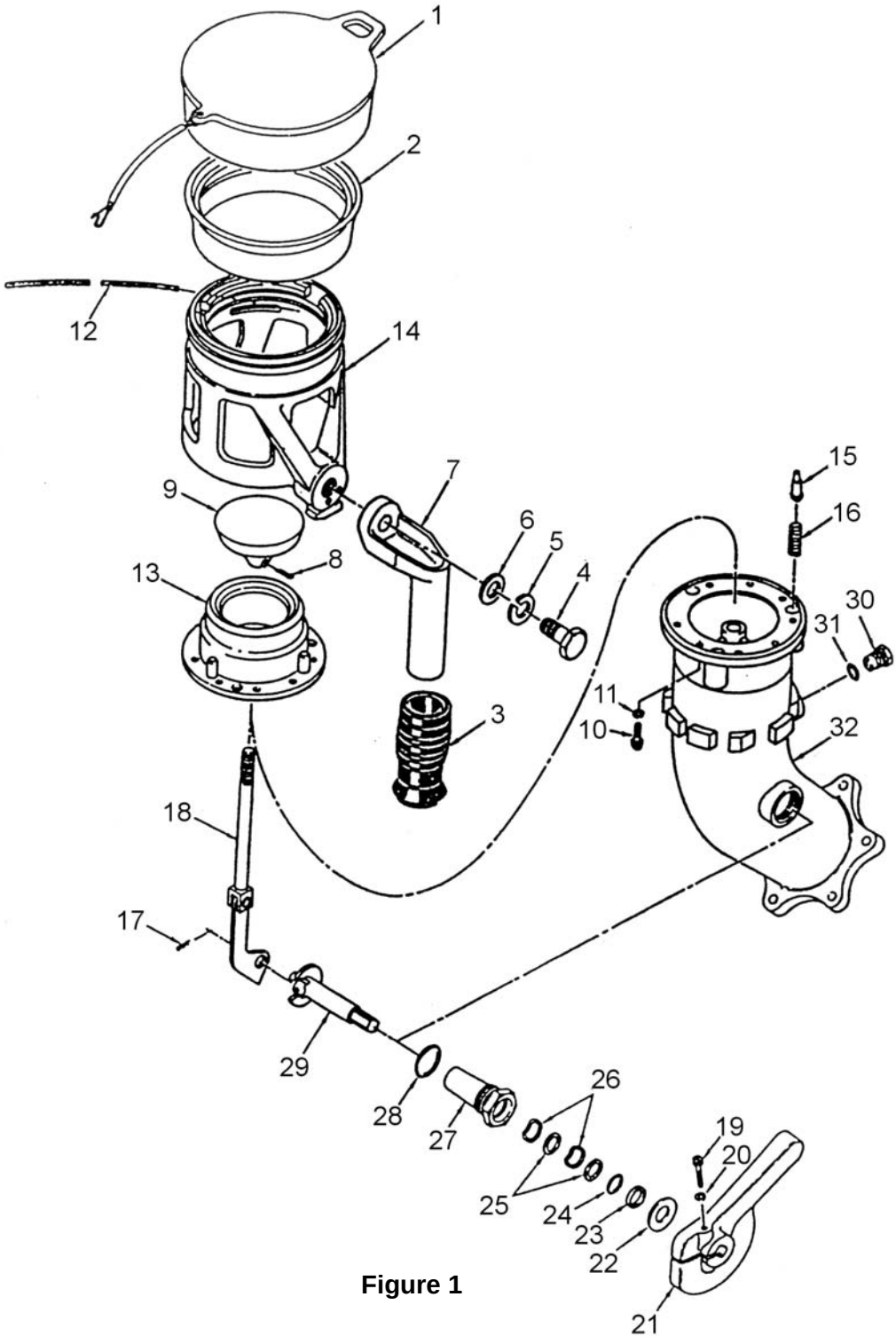

Figure 1

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