

DEPARTMENT OF THE ARMY TECHNICAL MANUAL

FIELD AND DEPOT MAINTENANCE MANUAL
CLEANING MACHINE, FUEL CAN AND DRUM
(BARNES MODELS 4310CA AND 15801CA)

Headquarters, Department of the Army, Washington 25, D. C.

2 February 1960

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CHAPTER 1

INTRODUCTION

1. Scope

This manual is published for use by personnel responsible for field maintenance (third and fourth echelon) and depot maintenance (fifth echelon) of the Cleaning Machine, Fuel Can and Drum (Barnes Models 4310CA and 15801CA). The maintenance allocation chart is published in TM 10-4940-201-20. The Repair parts and Special Tools List is published as TM 10-4940201-35P.

2. Appendix

The appendix contains current references.

3. Maintenance Forms and Records

Maintenance forms and records appropriate to field and depot maintenance are included in TM 10-4940-201-20.

4. Using Organizations

The cleaning machine is organic to the following organizations:

- a. Quartermaster Petroleum Supply Company, Mobile (TOE 10-77).
- b. Quartermaster Petroleum Depot Company (TOE 10-377).
- c. Quartermaster Service Organization (TOE 10-500).

*This manual, together with TM 10-4940-201-10, 28 January 1960, and TM 10-4940-201-20, 27 January 1960, supersedes TM 10-1140, 24 June 1952

CHAPTER 2

MAINTENANCE INSTRUCTIONS

5. Echelons and Categories of Maintenance

a. Organization Maintenance.

- (1) First echelon maintenance is that degree of maintenance performed by the user or operator in providing the proper care of the equipment as prescribed by pertinent publications and tools and parts lists.
- (2) Second echelon maintenance is that degree of maintenance, beyond the capabilities and facilities of first echelon, performed by specially trained personnel within the using organization, as authorized by pertinent technical publications.

b. Field Maintenance.

- (1) Third echelon maintenance is that degree of maintenance authorized by pertinent publications to be performed by specially trained units in direct support of one or more using organizations, and is limited by specified authorizations of tools, parts, and equipment. These units support the lower echelons by providing technical assistance and mobile repair crews, when necessary, or in repairing the overflow from lower echelons.
- (2) Fourth echelon maintenance is that degree of maintenance authorized by pertinent publications to be performed by units organized as semifixed or permanent shops to serve lower echelons within a geographic area, and may furnish mobile repair crews or reinforcing elements to lower echelons when required.

c. *Depot Maintenance.* Fifth echelon maintenance is that degree of maintenance authorized for overhauling major items, assemblies, parts, accessories, tools, and test equipment, and normally supplied on an overhaul-and-return-to-stock basis.

6. Cradle-Valve Assemblies

a. *Function.* The cradle-valve assembly is designed to cause a suction action when the valve is rotated to the OFF position and to cause pressure action when it is in the ON position. To understand the flow of liquid through the valve, study figure 1.

(1) *Suction.* The top portion of figure 1 illustrates the valve in the OFF position. The valve faceplate and the valve housing are bolted together and remain stationary when the valve is rotated. The faceplate is provided with a single inlet (pressure inlet) and a slot (slot P). When the valve is rotated to the OFF position, port E is open and port W is closed. Because of this alinement of ports, the incoming liquid is forced to enter the smaller opening in the venturi. The velocity of liquid passing port G is such that it creates sufficient suction at this point to evacuate, through the nozzle tip, the cleaning solvent that remained in the 5-gallon can after washing.

(2) *Flushing.* The bottom portion of figure 1 shows the flow of the liquid when the valve is in the flushing position. When the valve is rotated to the ON or flushing position, solvent is permitted to enter both port E and port W. It is then forced through the openings on the nozzle tip into the 5-gallon can. Since port F is closed there can be no suction action when the valve is in the flushing position.

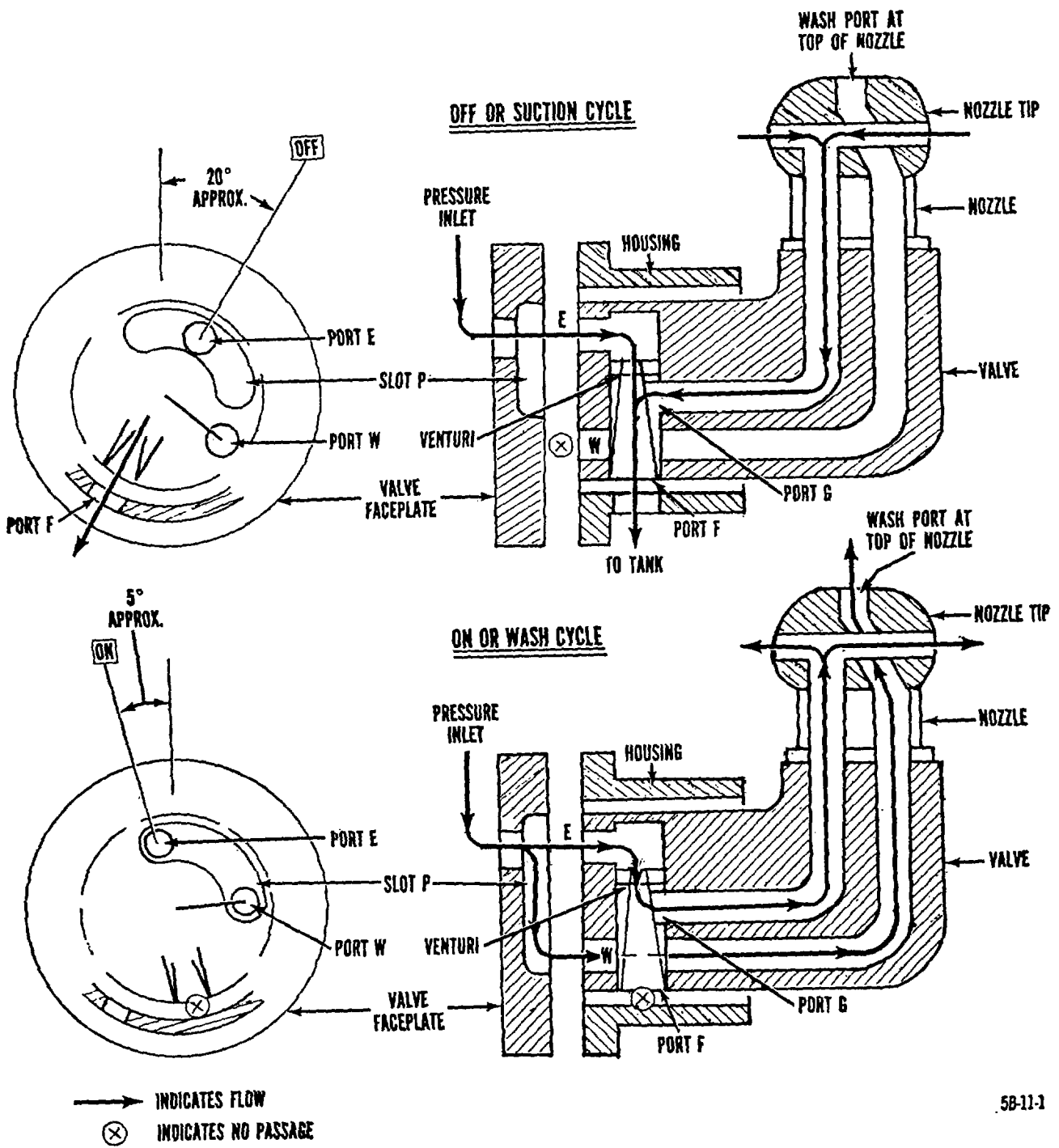
b. Maintenance.

(1) *Disassembly.* The same procedure as outlined in TM 10-4940-201-20 should be followed in disassembly and reassembly of the cradle valves.

(2) *Gaskets and washers.* Gaskets and washers that are warped, cracked, or do not seal properly should be replaced. O-rings, which serve a purpose similar to gaskets and washers, should be given the same attention.

(3) *Venturi.* The venturi should be examined very closely and if damaged or worn in any way should be replaced.

(4) *Nozzle.* The nozzle is of lighter material than the other principal parts of the cradle-valve assembly and more subject to dents which are apt to reduce the effectiveness of pressure and suction. Nozzles in such condition should be



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Figure 1. Cradle-valve flow chart.

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replaced. The orifices of the nozzles should be checked for any foreign matter that may be lodged within.

- (5) *Other metal parts.* The valve body, the valve housing, the faceplate and the support plate, if cracked or broken to such an extent that welding is not practicable, should be replaced. Threaded parts should accommodate bolts and nuts without applying undue force. If such is not the case the part should be rethreaded or replaced.

7. Drum-Washer Nozzle

The housing of the trigger nozzle contains a spring, plunger, and neoprene disks, which move upward and downward within the trigger housing as the nozzle is opened and closed. The parts are made accessible by unscrewing the plug on the top of the nozzle. Parts that are defective should be replaced.

8. Manifold Assemblies

The manifold assembly or any broken parts should be repaired by welding, or should be replaced. The assembly is mounted on five support brackets, which in turn are bolted to the sedimentation tank. Remove the manifold assembly for repair or replacement as follows: Disengage the support brackets; disconnect the flare units on the five connecting pipes (copper tubes) leading to the cradle valves; and, using a pipe wrench, unscrew the manifold assembly from gate valve No. 1, which controls flow into the pipe. If a support bracket needs to be repaired or replaced, remove bolts attaching bracket to the tank; otherwise, remove only the top portion of the bracket. If the pipe should be clogged, remove the plug from the end of the assembly and run a stiff wire through the pipe to clear it. Reassemble in reverse order, using pipe compound to seal threads which engage the gate valve.

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APPENDIX

REFERENCES

-
- TM 10-4940-201-10Operator Manual Cleaning Machine, Fuel Can and Drum (Barnes Models 4310CA and 158010A).
TM 10-4940-201-20.....Organizational Maintenance Manual Cleaning Machine, Fuel Can and Drum (Barnes Models 4310CA and 15801CA).
TM 10-1125Pumping Assembly, Flammable Liquid Bulk-Transfer, Gasoline-Engine-Driven 50 GPM, Barnes Model.

By Order of *Wilber M. Brucker*, Secretary of the Army:

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Units organized under following
TOE's:
10-127 (2)
10-237 (2)
10-367 (2)
10-427 (2)
10-500 (2)

NG: Stage AG (3); units--same as Active Army except allowance is one copy to each unit.


USAR: None.

For explanation of abbreviations used, see AR 320-50.

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
 1 decimeter = 10 centimeters = 3.94 inches
 1 meter = 10 decimeters = 39.37 inches
 1 dekameter = 10 meters = 32.8 feet
 1 hectometer = 10 dekameters = 328.08 feet
 1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
 1 decigram = 10 centigrams = 1.54 grains
 1 gram = 10 decigrams = .035 ounce
 1 decagram = 10 grams = .35 ounce
 1 hectogram = 10 decagrams = 3.52 ounces
 1 kilogram = 10 hectograms = 2.2 pounds
 1 quintal = 100 kilograms = 220.46 pounds
 1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliliters = .34 fl. ounce
 1 deciliter = 10 centiliters = 3.38 fl. ounces
 1 liter = 10 deciliters = 33.81 fl. ounces
 1 dekaliter = 10 liters = 2.64 gallons
 1 hectoliter = 10 dekaliters = 26.42 gallons
 1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
 1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
 1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
 1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
 1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
 1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
 1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
 1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

<i>To change</i>	<i>To</i>	<i>Multiply by</i>	<i>To change</i>	<i>To</i>	<i>Multiply by</i>
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29.573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C
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