ROUTINE

MWO effective date is 1 June 1997 and its completion date is 31 May 2001.

MWO 9-2350-314-20-8

MODIFICATION WORK ORDER

MODIFICATION OF HOWITZER, MEDIUM, SELF-PROPELLED: 155MM, M109A6 (NSN 2350-01-305-0028) (EIC: 3FC)

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

22 October 1997

REPORTING OF ERRORS AND RECOMMENDING IMPROVEMENTS

You can help improve this MWO. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028, Recommended Changes to Publications and Blank Forms, direct to Director, Armament and Chemical Acquisition and Logistics Activity, ATTN: AMSTA-AC-NMLI, Rock Island, IL 61299-7630. A reply will be provided to you.

1. PURPOSE. This MWO prescribes procedures for replacing bore evacuator, part number (PN) 11578385, with advanced bore evacuator assembly, PN 11580776. The advanced bore evacuator assembly will more efficiently evacuate fumes from the tube bore. The advanced bore evacuator also provides improved reliability and maintainability.

2. **PRIORITY.** This modification is classified ROUTINE.

3. **END ITEM(S) OR SYSTEM(S) TO BE MODIFIED.** See Table 1.

Table 1. End Item or System to be Modified.

NOMENCLATURE	NSN	PART NO.	MODEL	CAGEC	SERIAL NO. RANGE
Medium, Self-Propelled Howitzer, 155MM	2350-01-305-0028	12553195	M109A6	19200	1-376

4. **MODULE(S) (COMPONENTS, ASSEMBLIES, SUBASSEMBLIES, BOARDS, AND CARD(S) TO BE MODIFIED).** Not applicable.

5. **PARTS TO BE MODIFIED.** Not applicable.

6. **APPLICATION.**

a. Time Compliance Schedule: MWO effective date is 1 June 1997 and completion date is 31 May 2001.

b. Level of Maintenance: Unit maintenance is the lowest level of maintenance authorized to apply this MWO.

c. Work Force and Man-hour Requirements.

REQUIREMENTS

WORK FORCE/SKILLS	MAN-HOURS	MAN-HOUR W/O DISASSEMBLY
Armament Repairers (two) (MOS 45D)	3.0 hours	2.0 hours

d. MWOs to be Applied Prior to or Concurrently with this MWO. Not applicable.

e. Additional Information. None.

7. **TECHNICAL PUBLICATIONS AFFECTED/CHANGED.**
TM 9-2350-314-10
TM 9-2350-314-20-2-1
TM 9-2350-314-24P-2

8. **MWO KIT(S)/PART(S) AND THEIR DISPOSITION.**
a. Kit(s)/Part(s) Needed to Apply the MWO. See Table 2.

Table 2. Kits/Parts Required.

NOMENCLATURE	NSN	CAGEC	PART NO.
Advanced Bore Evacuator Assembly	1025-01-440-1297	19206	11580776

b. Contents of Advanced Bore Evacuator Assembly. See Table 3.

Table 3. Advanced Bore Evacuator Assembly.

NOMENCLATURE	NSN	CAGEC	PART NO.	QTY	ITEM NO.
Pre-reservoir	NA	19206	11580712	1	13
Main Reservoir	NA	19206	11580715	1	14
Collar, Thrust	NA	19206	11580718	1	17
O-Ring	5330-01-439-4077	19206	11580721	2	18
O-Ring	5330-01-439-4076	19206	11580722	1	19

c. Bulk and Expendable Material. See Table 4.

Table 4. Bulk and Expendable Material

NOMENCLATURE	NSN	CAGEC	PART NO.
Cleaner, Lubricant, Preservative	9150-01-053-6688	81349	MIL-L-63460
Grease, Molybdenum Disulfide	9150-00-754-2595	81349	MIL-G-21164

d. Parts Disposition. Parts no longer used on the M109A6 Self-Propelled Howitzer are listed in Table 5. The owning unit will initiate a Field Turn-in, Excess (FTE) action on check ball, part number (PN) 11578379. Dispose of bore evacuator, PN 11578385, and retaining ring, PN 11578378, locally.

Table 5. Parts Disposition.

NOMENCLATURE	NSN	CAGEC	PART NO.	QTY	ITEM NO.
Evacuator, Bore	1025-00-233-9045	19204	11578385	1	8
Ring, Retaining	5325-00-495-6526	19206	11578378	1	11
Ball. Check	4820-00-431-3442	19206	11578379	10	12

9. **SPECIAL TOOLS; TOOL KITS; JIGS; TEST, MEASUREMENT, AND DIAGNOSTIC EQUIPMENT. See** Table 6.

Table 6. Special Tools; Tool Kits; Jigs; Test, Measurement, and Diagnostic Equipment

NOMENCLATURE	NSN	CAGEC	PART NO.
Handle, Manual, T-handle	5340-01-318-0197	19200	9399097
Brush, Cleaning, Small Arms	1005-00-999-1435	19204	8432358
Brush. Cleaning, Small Arms	1005-00-903-1296	19204	11686340

10. **MODIFICATION PROCEDURES.**

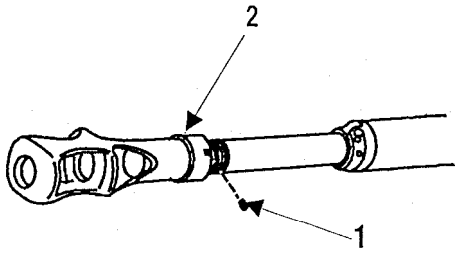
a. Removal of the Muzzle Brake.

WARNING

The muzzle brake weighs approximately 350 pounds (158.9 kg). Use caution when handling it. Use an appropriately rated hoist and sling when handling the muzzle brake. Check the inspection stamps on the sling and the hoist to ensure their certification is current. Failure to follow this warning may result in personal injury and equipment damage.

NOTE

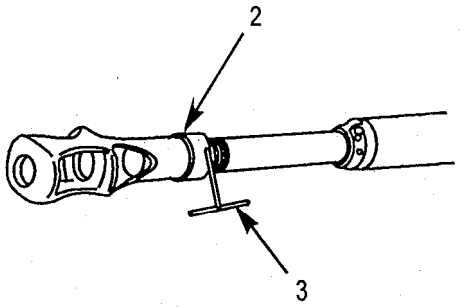
Visually inspect the muzzle brake for cracks. If any crack exceeds 1 inch (25.4 mm) in length, repair in accordance with (IAW) TM 9-2350-314-20-2.



NOTE

There are two setscrews on thrust collar (2). One is staked in place and should not be removed. It holds the ball lock device in place. The second is not staked. Removal of this setscrew allows access to release the ball lock.

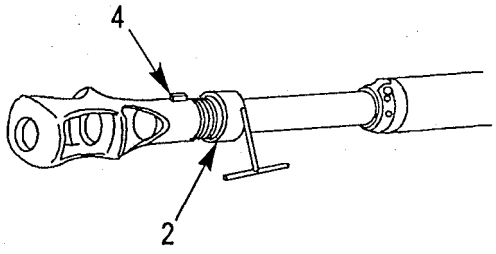
(1) Remove setscrew (1) from thrust collar (2).



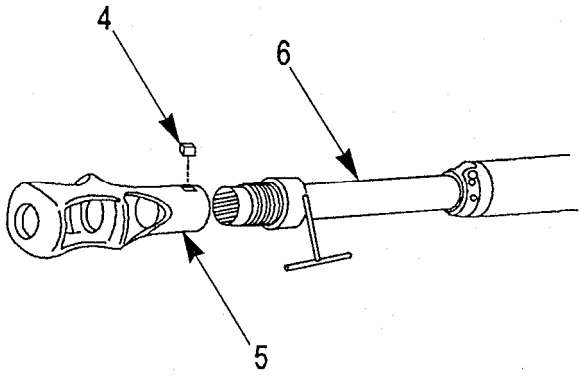
(2) Insert T-handle (3) into the setscrew hole in thrust collar (2). Turn the handle clockwise to engage the threads. Continue turning the handle to depress the ball and spring. If a T-handle is not available, a screwdriver can be used to depress the ball.

NOTE

If the ball is stuck or spring appears broken, repair IAW TM 9-2350-314-20-2.

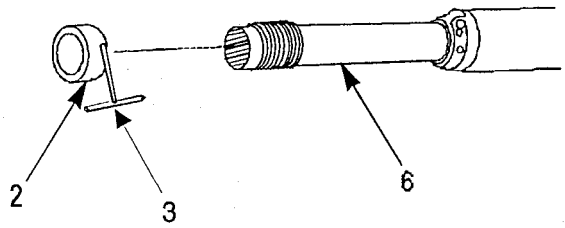


(3) With the ball depressed, screw thrust collar (2) rearward to uncover key (4).



(4) Remove key (4) from muzzle brake (5) and cannon tube (6).

(5) Unscrew muzzle brake (5) until the threads in the muzzle brake just clear the threads on cannon tube (6). Attach the appropriate sling and hoist to the muzzle brake and remove the muzzle brake from the cannon tube.

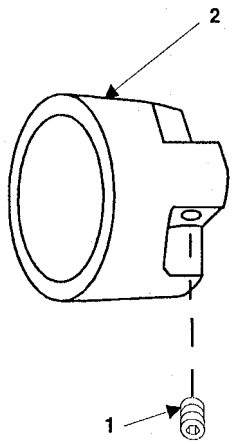


WARNING

Thrust collar (2) weighs approximately 40 pounds (18.2 kg). Use caution when handling the thrust collar. Failure to follow this warning may result in personal injury and equipment damage.

(6) Screw thrust collar (2) forward and remove it from cannon tube (6).

(7) Remove T-handle (3) from thrust collar (2).

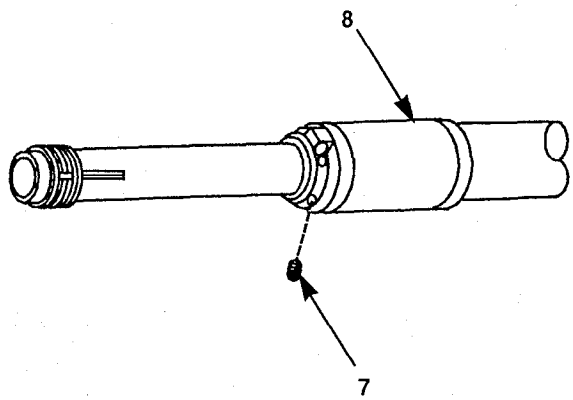


(8) To keep debris out, temporarily replace setscrew (1) in thrust collar (2).

b. Removal of the Bore Evacuator

WARNING

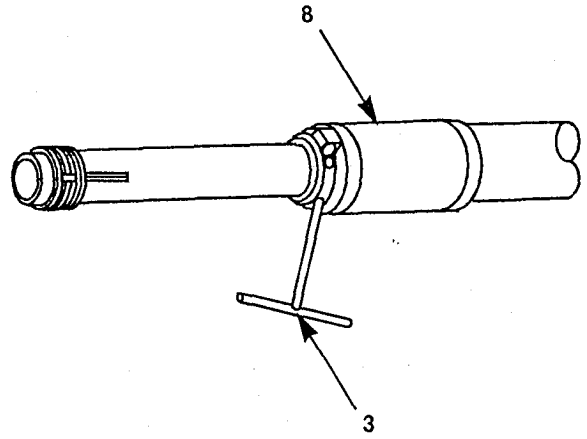
The bore evacuator weighs approximately 210 pounds (95.3 kg). Use caution when handling the bore evacuator. Use an appropriately rated hoist and sling when handling the bore evacuator. Failure to follow this warning may result in personal injury and equipment damage.



NOTE

There are two setscrews on bore evacuator (8). One is staked in place and should not be removed. It holds the ball lock device in place. The second is not staked. Removal of this setscrew allows access to release the ball lock.

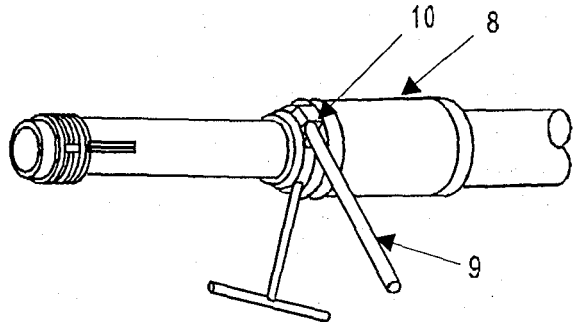
(1) Remove setscrew (7) from bore evacuator (8).



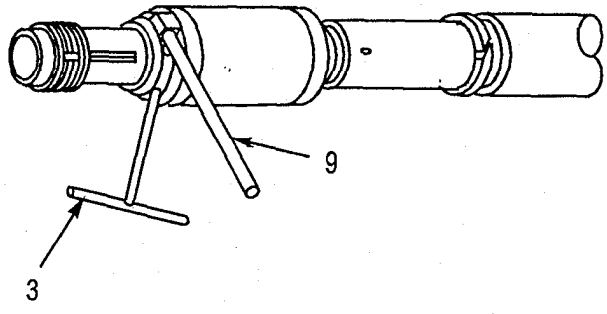
(2) Insert T-handle (3) into the setscrew hole in bore evacuator (8). Turn the handle clockwise to engage the threads. Continue turning the handle to depress the ball and spring.

NOTE

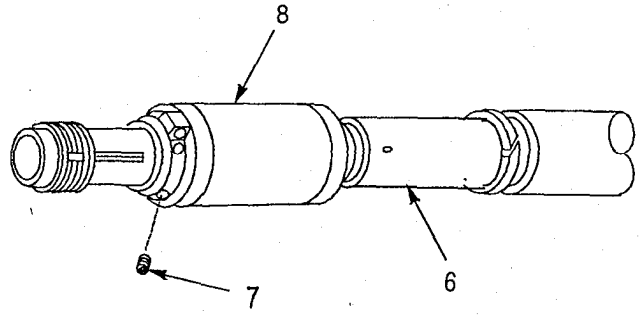
If the ball is stuck or the spring appears broken, repair IAW TM 9-2350-314-20-2.



(3) Insert pry bar (9) into hole (10) and, with the ball depressed, unscrew bore evacuator (8) until it clears the threads.

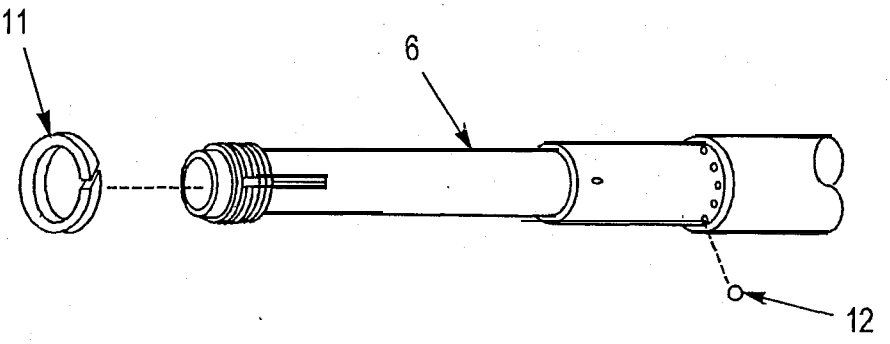


(4) Remove T-handle (3) from the setscrew hole. Remove pry bar (9).



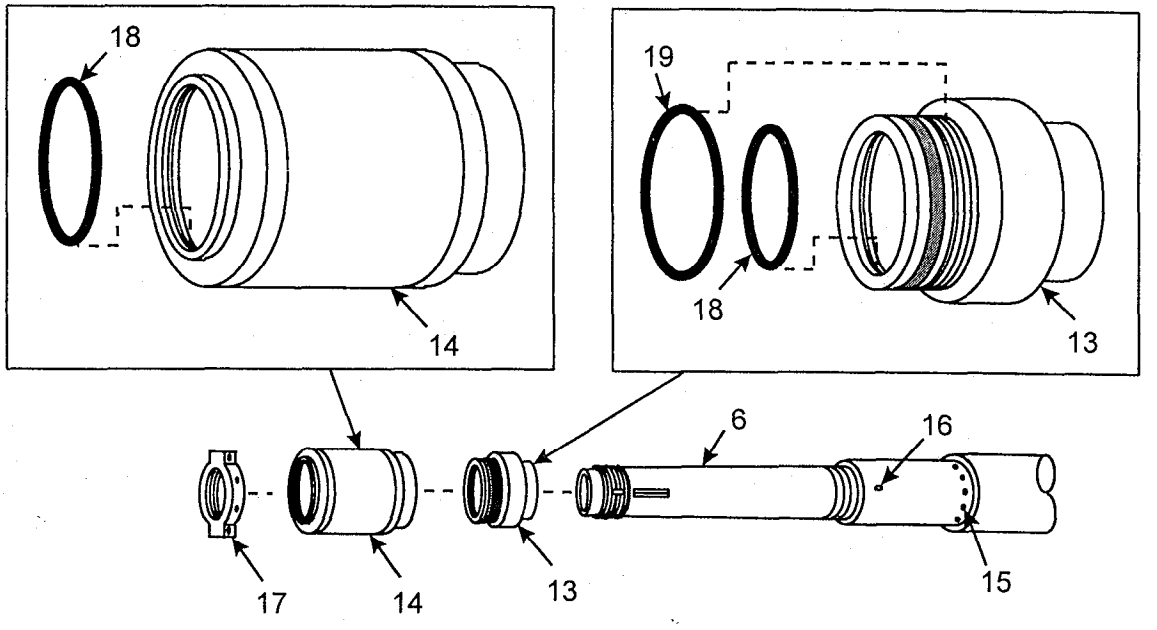
(5) Replace setscrew (7) in bore evacuator (8).

(6) Using the appropriate sling and hoist, remove bore evacuator (8) from cannon tube (6). Set aside the bore evacuator for disposition per para 8.



(7) Remove ring valve (11) and ten valve balls (12) from cannon tube (6). Set aside the ring valve and ten valve balls for disposition per para 8.

c. Installation of the Advanced Bore Evacuator.



WARNING

Pre-reservoir (13) weighs 52 pounds (23.6 kg), main reservoir (14) weighs 102 pounds (46.3 kg), and thrust collar (17) weighs 46 pounds (20.9 kg). Use caution when handling the pre-reservoir, main reservoir, and thrust collar. Use an appropriately rated hoist and sling when handling the main reservoir. Failure to follow this warning may result in personal injury and equipment damage.

(1) Thoroughly clean and lubricate unpainted cannon tube (6) surfaces, ten evacuator orifices (15), three metering holes (16), the inside of pre-reservoir (13), the inside of main reservoir (14), the threads of advanced bore evacuator thrust collar (17) and the threads of muzzle brake thrust collar (2). Refer to Lubrication Instructions, TM 9-2350-314-10, Appendix I.

NOTE

The modification kit comes with extra O-rings. Only two O-rings, PN 11580721, (18) and one O-ring, PN 11580722, (19) are required for this installation. The remaining O-rings are spares.

(2) The exterior surface of pre-reservoir (13) has three grooves. The ring valve has already been installed in the widest groove. Install O-ring, PN 11580722, (19) in the wider of the two remaining grooves. Do not install an O-ring in the narrowest groove.

(3) Install one O-ring, PN 11580721, (18) inside pre-reservoir (13). Install another O-ring, PN 11580721, (18) inside main reservoir (14).

(4) Pack O-rings (18) (19) with molybdenum disulfide grease. Apply a thick coating of molybdenum disulfide grease over the cannon tube threads.

NOTE

The pre-reservoir (13) should be centered around the cannon tube (6) during installation to prevent the cannon tube threads from pulling O-ring (18) out of the groove in the pre-reservoir.

(5) Install pre-reservoir (13) on cannon tube (6).

NOTE

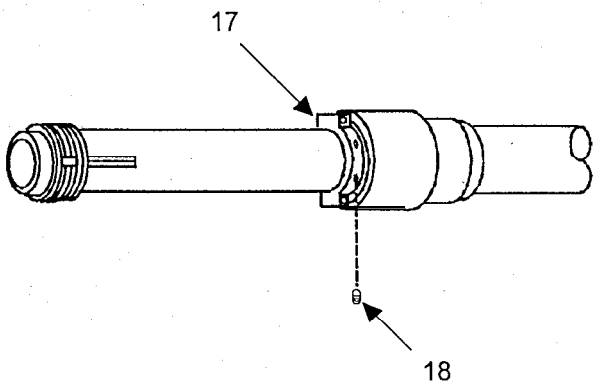
The main reservoir (14) should be centered around the cannon tube (6) during installation to prevent the cannon tube threads from pulling O-ring (18) out of the groove in the main reservoir.

(6) Using the appropriate sling and hoist, raise the main reservoir (14) into position and install it on cannon tube (6).

NOTE

A ¼ inch gap between the main reservoir (14) and pre-reservoir (13) is normal at this point. It will close up during thrust collar installation, step 10.

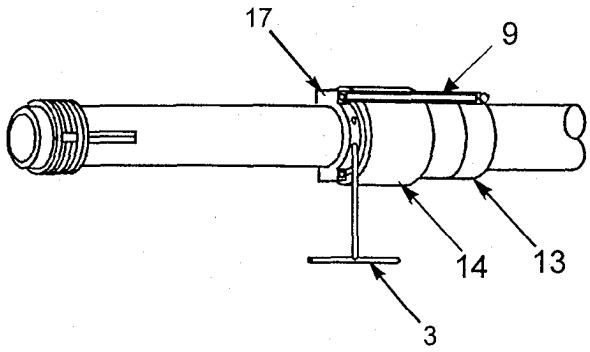
(7) Slide advanced bore evacuator thrust collar (17) onto cannon tube (6).



NOTE

There are two setscrews on thrust collar (17). One is staked in place and should not be removed. It holds the ball lock device in place. The second is not staked. Removal of this setscrew allows access to release the ball lock.

(8) Remove setscrew (18) from thrust collar (17).



(9) Insert T-handle (3) into the setscrew hole in thrust collar (17). Turn the T-handle clockwise to engage the threads. Continue turning the handle to depress the ball and spring.

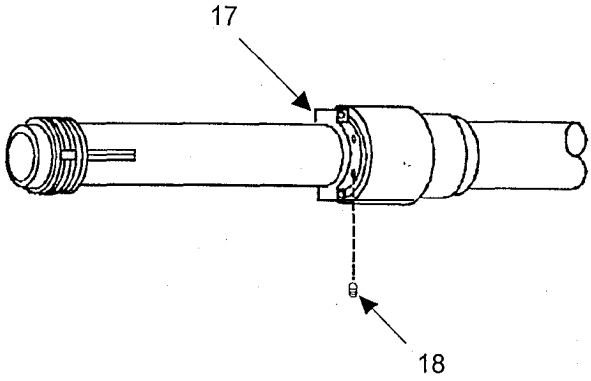
(10) Screw thrust collar (17) into position. Use pry bar (9) to tighten the thrust collar.

NOTE

After tightening thrust collar (17), the gap between main reservoir (14) and pre- reservoir (13) should be completely closed up.

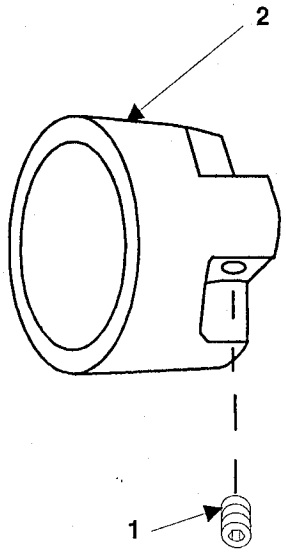
(11) Remove T-handle (3) from the setscrew hole. Remove pry bar (9).

(12) Attempt to screw thrust collar (17) forward to ensure the ball lock device is functioning properly. If the thrust collar turns, repair the ball lock device IAW TM 9-2350-314-20-2.

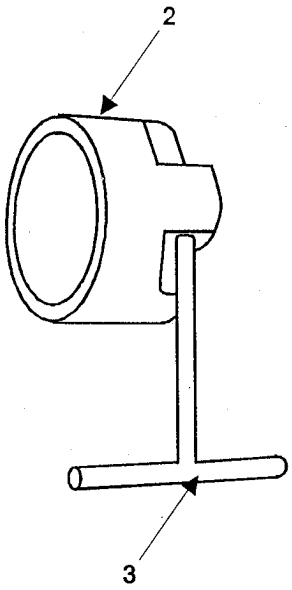


(13) Install setscrew (18) in thrust collar (17). Torque setscrew to 30-35 ft-lb (41-47 N m).

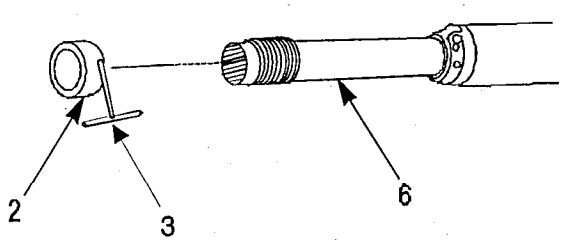
d. Installation of the Muzzle Brake.



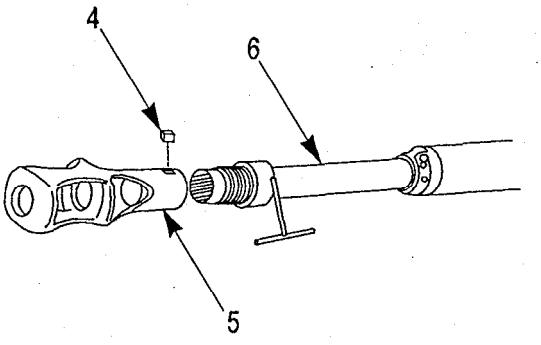
(1) Remove setscrew (1) from muzzle brake thrust collar (2).



(2) Insert T-handle (3) into the setscrew hole in thrust collar (2). Turn the handle clockwise to engage the threads. Continue turning the handle to depress the ball and spring.



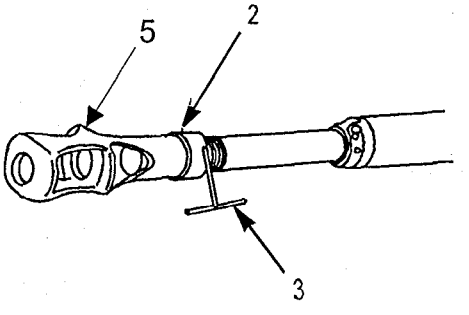
(3) Position thrust collar (2) on cannon tube (6). Screw the thrust collar rearward past the key slot in the cannon tube.



(4) Clean and lubricate muzzle brake (5) IAW Lubrication Instructions, TM 9-2350-314-10, Appendix I.

(5) Using the appropriate sling and hoist, raise muzzle brake (5) into position and slide it onto cannon tube. (6). Screw the muzzle brake into position.

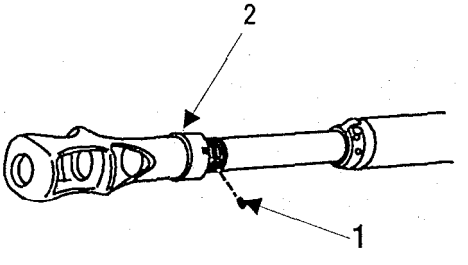
(6) Install key (4) in muzzle brake (5) and cannon tube (6).



(7) Screw thrust collar (2) forward until it stops against muzzle brake (5).

(8) Remove T-handle (3) from the setscrew hole.

(9) Attempt to screw the thrust collar rearward to ensure the ball lock device is functioning properly. If the thrust collar turns, repair the ball lock device IAW TM 9-2350-314-20-2.



(10) Install setscrew (1) into thrust collar (2). Torque the setscrew to 30-35 lb-in (41-47 N m).

11. **CALIBRATION REQUIREMENTS.** Not applicable.

12. **WEIGHT AND BALANCE DATA.** Weight and balance are not significantly affected.

13. **QUALITY ASSURANCE REQUIREMENTS.**

a. Inspect for conformance to the MWO.

14. **RECORDING AND REPORTING OF THE MODIFICATION.**

a. Records and Reports

(1) Record the modification on DA Form 2408-5, Equipment Modification Record, IAW DA Pamphlet 738-750, The Army Maintenance Management System (TAMMS).

(2) Complete DA Form 2407, Maintenance Request, IAW DA Pamphlet 738-750, TAMMS. Forward the NMP copy to: Director, Armament and Chemical Acquisition and Logistics Activity, ATTN: AMSTA-AC-NMR, Rock Island, IL 61299-7630. Forward the organizational copy as directed by the local commander.

b. Marking Equipment. Not applicable.

c. Identification Data. Not applicable.

15. **MATERIEL CHANGE (MC) NUMBER.** This MWO is authorized by MC Number 1-81-05-1002.

16. **MODIFICATION IDENTIFICATION.** This modification has been performed if the bore evacuator is held in place by a thrust collar.

By Order of the Secretary of the Army:

DENNIS J. REIMER
General, United States Army
Chief of Staff

Official:

JOEL B. HUDSON
Administrative Assistant to the Secretary of the Army
03961

DISTRIBUTION: To be distributed in accordance with the initial distribution number (IDN) 372476 requirements for MWO 9-2350-314-20-8.

*U.S. GOVERNMENT PRINTING OFFICE: 1997-545-039/60019

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DATE SENT

PUBLICATION NUMBER	PUBLICATION DATE	PUBLICATION TITLE

BE EXACT PIN-POINT WHERE IT IS

PAGE NO.	PARA-GRAPH	FIGURE NO.	TABLE NO.

IN THIS SPACE, TELL WHAT IS WRONG AND WHAT SHOULD BE DONE ABOUT IT.

PRINTED NAME, GRADE OR TITLE AND TELEPHONE NUMBER	SIGN HERE

TEAR ALONG PERFORATED LINE

DA FORM 1 JUL 79 2028-2

PREVIOUS EDITIONS ARE OBSOLETE.

P.S.--IF YOUR OUTFIT WANTS TO KNOW ABOUT YOUR RECOMMENDATION MAKE A CARBON COPY OF THIS AND GIVE IT TO YOUR HEADQUARTERS.

THE METRIC SYSTEM AND EQUIVALENTS

'NEAR MEASURE

. Centimeter = 10 Millimeters = 0.01 Meters = 0.3937 Inches
1 Meter = 100 Centimeters = 1000 Millimeters = 39.37 Inches
1 Kilometer = 1000 Meters = 0.621 Miles

'VEIGHTS

Gram = 0.001 Kilograms = 1000 Milligrams = 0.035 Ounces
1 Kilogram = 1000 Grams = 2.2 lb.
1 Metric Ton = 1000 Kilograms = 1 Megagram = 1.1 Short Tons

LIQUID MEASURE

1 Milliliter = 0.001 Liters = 0.0338 Fluid Ounces
1 Liter = 1000 Milliliters = 33.82 Fluid Ounces

SQUARE MEASURE

1 Sq. Centimeter = 100 Sq. Millimeters = 0.155 Sq. Inches
1 Sq. Meter = 10,000 Sq. Centimeters = 10.76 Sq. Feet
1 Sq. Kilometer = 1,000,000 Sq. Meters = 0.386 Sq. Miles

CUBIC MEASURE

1 Cu. Centimeter = 1000 Cu. Millimeters = 0.06 Cu. Inches
1 Cu. Meter = 1,000,000 Cu. Centimeters = 35.31 Cu. Feet

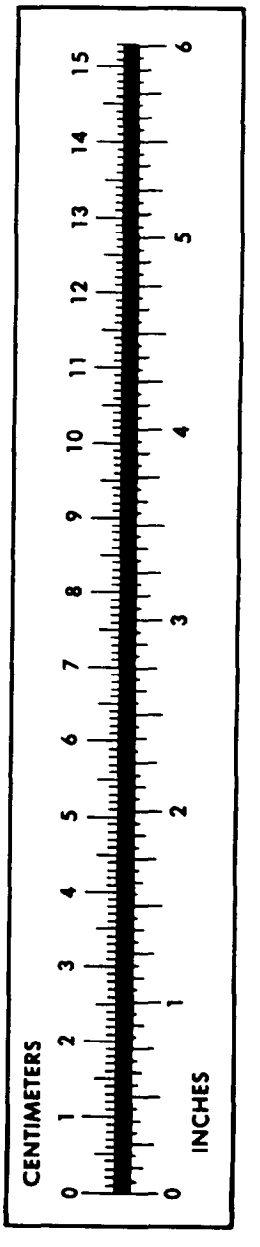
TEMPERATURE

5/9(°F - 32) = °C
212° Fahrenheit is evuivalent to 100° Celsius
90° Fahrenheit is equivalent to 32.2° Celsius
32° Fahrenheit is equivalent to 0° Celsius
9/5C° + 32 =°F

APPROXIMATE CONVERSION FACTORS

TO CHANGE	TO	MULTIPLY BY
Inches	Centimeters	2.540
Feet	Meters	0.305
Yards	Meters	0.914
Miles	Kilometers	1.609
Square Inches	Square Centimeters	6.451
Square Feet	Square Meters	0.093
Square Yards	Square Meters	0.836
Square Miles	Square Kilometers	2.590
Acres	Square Hectometers	0.405
Cubic Feet	Cubic Meters	0.028
Cubic Yards	Cubic Meters	0.765
Fluid Ounces	Milliliters	29.573
ıts	Liters	0.473
arts	Liters	0.946
allons	Liters	3.785
Ounces	Grams	28.349
Pounds	Kilograms	0.454
Short Tons	Metric Tons	0.907
Pound-Feet	Newton-Meters	1.356
Pounds per Square Inch	Kilopascals	6.895
Miles per Gallon	Kilometers per Liter	0.425
Miles per Hour	Kilometers per Hour	1.609

TO CHANGE	TO	MULTIPLY BY
Centimeters	Inches	0.394
Meters	Feet	3.280
Meters	Yards	1.094
Kilometers	Miles	0.621
Square Centimeters	Square Inches	0.155
Square Meters	Square Feet	10.764
Square Meters	Square Yards	1.196
Square Kilometers	Square Miles	0.386
Square Hectometers	Acres	2.471
Cubic Meters	Cubic Feet	35.315
Cubic Meters	Cubic Yards	1.308
Milliliters	Fluid Ounces	0.034
Liters	Pints	2.113
Liters	Quarts	1.057
ers	Gallons	0.264
ms	Ounces	0.035
ograms	Pounds	2.205
Metric Tons	Short Tons	1.102
Newton-Meters	Pounds-Feet	0.738
Kilopascals	Pounds per Square Inch	0.145
lometers per Liter	Miles per Gallon	2.354
meters per Hour	Miles per Hour	0.621



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