

20-MM AUTOMATIC GUN M1 AND 20-MM AIRCRAFT AUTOMATIC GUN AN-M2

Prepared under the direction of the
Chief of Ordnance

(with the cooperation of the Chief of the Bureau of Ordnance, Navy Department)

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*This manual supersedes TM 9-227, 19 November 1942; TB 227-4, 6 November 1942; TB 227-5, 5 May 1943; TB 227-6, 12 May 1943; Ordnance School Manual (OS) No. 9-3, 15 August 1941; and Ordnance School Manual (OS) No. 9-45, December 1942.

20-MM AUTOMATIC GUN M1 AND
20-MM AIRCRAFT AUTOMATIC GUN AN-M2

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Section I

INTRODUCTION

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1. SCOPE.

a. This manual is published for the information and guidance of the using arms and services. It contains information of a technical nature required by the personnel of the Army and Navy for the identification, use, care, and preservation of the 20-mm Automatic Gun M1 and 20-mm Aircraft Automatic Gun AN-M2, and of the accessories and ammunition used therewith.

b. This manual differs from TM 9-227 of 19 November 1942 as follows:

- (1) The material has been arranged to conform with gun type designations.
- (2) The table of data has been enlarged.
- (3) The material has been enlarged to cover the adapters, chargers, and electric trigger.
- (4) Instructions for the disassembly and assembly of the 20-mm feed mechanism AN-M1 have been revised and simplified.

2. CHARACTERISTICS.

a. Description.

(1) The 20-mm Automatic Gun (figs. 1 and 2) is a combination blowback and gas-operated aircraft weapon. The gun is air-cooled and has a cyclic rate of fire of 600 to 700 rounds per minute. It is designed for mounting as a fixed gun in the wing or fuselage of an airplane. It may also be mounted to fire through the hub of the propeller, and may be mounted as a flexible gun in a turret. The gun cannot be synchronized to fire between the propeller blades of an airplane.



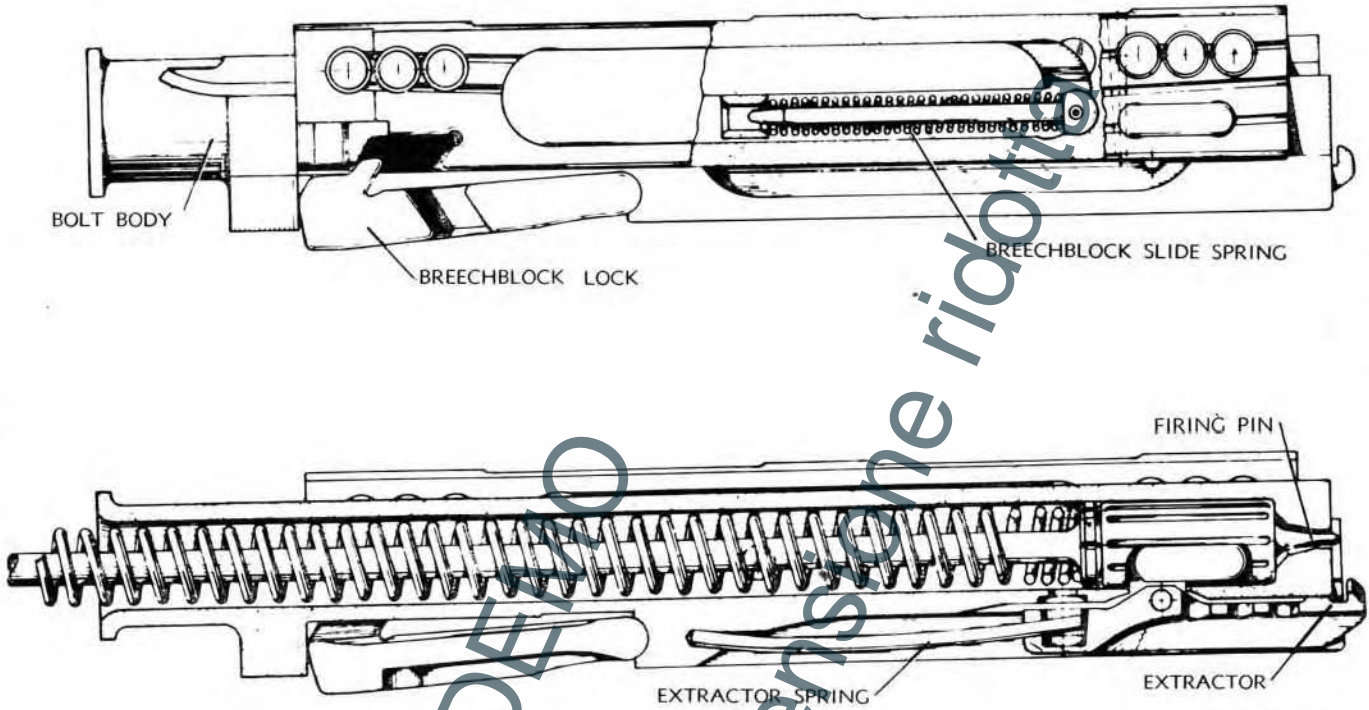
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Figure 1 — Basic Gun — Right Side



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Figure 2 — Basic Gun — Left Side



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Figure 3 - Breechblock Modifications

INTRODUCTION

(2) The gun can be fed by a drum type magazine or a feed mechanism using a disintegrating link belt. The name and serial number of the gun and name of manufacturer are stamped on the top of the receiver just to the rear of the magazine slide. The serial number of the tube, name of gun, and name of manufacturer are stamped on the tube just ahead of the gas cylinder bracket. The serial numbers of the gun and of the tube will usually be different. The serial number on the receiver is the actual serial number of the gun. Any reports sent in should, however, give both serial numbers.

b. Current Modifications. Several modifications of the gun described in TM 9-227, 19 November 1942, have been adopted by the Army and Navy. These modifications (figs. 3, 11, and 12), which do not affect troop use, are as follows:

(1) The inertia blocks with plungers and springs have been replaced by solid inertia blocks which do not have oil grooves.

(2) The coil extractor spring has been replaced by a cantilever (pin) spring.

(3) The transverse slot in the firing pin has been elongated by about $\frac{1}{16}$ inch to permit movement of the firing pin on the breechblock slide key.

(4) The breechblock lock has been filleted on the sides.

(5) The breechblock slide springs are heavier than those of early manufacture.

3. MODEL OF GUN USED BY THE NAVY.

a. The Navy uses the AN-M2 model, type E only (fig. 24).

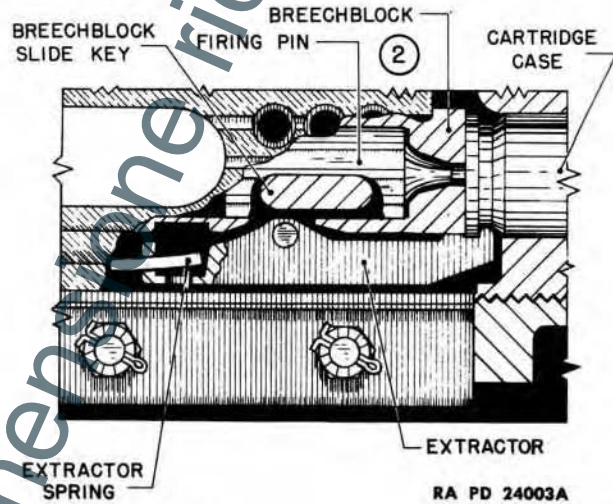
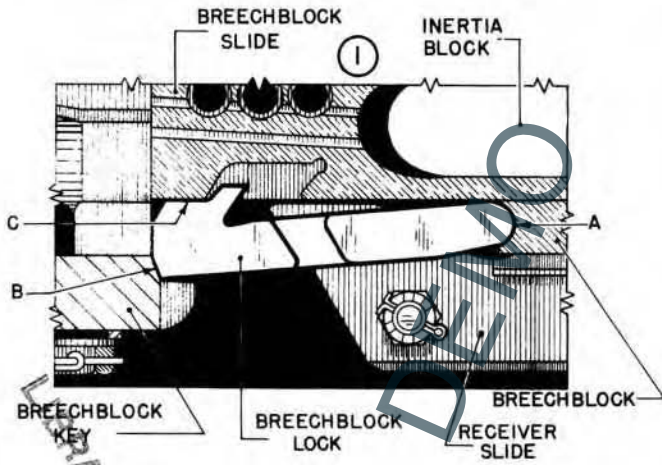
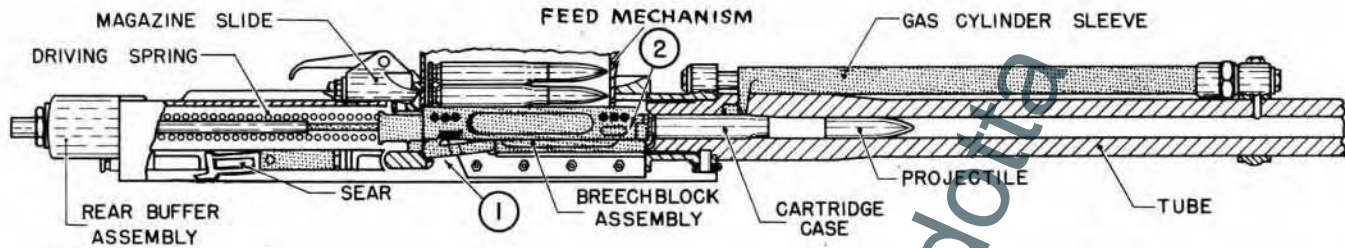
4. MODELS OF GUN USED BY THE ARMY.

a. The army uses both the M1 and AN-M2 models, types A, B, C, and D (figs. 23 and 24).

b. Differences Between Models. The differences between the AN-M2 and M1 Guns are in manufacture only; these do not affect troop use or care, but are useful as means of identifying the different models. The guns are identical with respect to the construction of the tube and the working parts, the only differences being in the dimensions of some of the receiver parts. The AN-M2 receiver is 0.2 inch longer. Each receiver slide of the AN-M2 Gun has a projection which fits into a slot in the side of the receiver, and the receiver slide bolts are locked by cotter pins (fig. 4). In the M1 Guns, the receiver slides have no flanges and are riveted instead of bolted to the receiver. The shoulders on the bottom faces of the receiver sides serve as further

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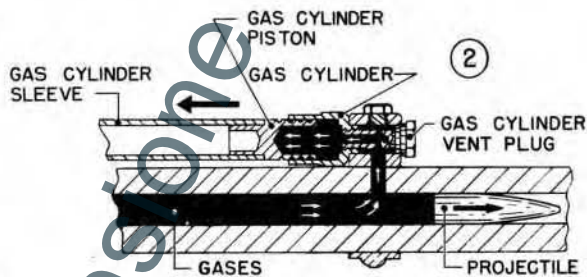
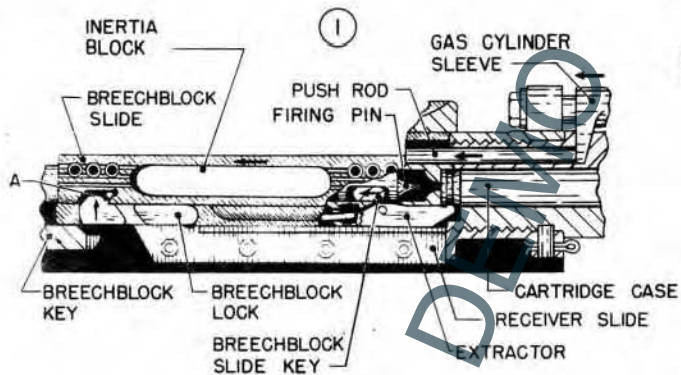
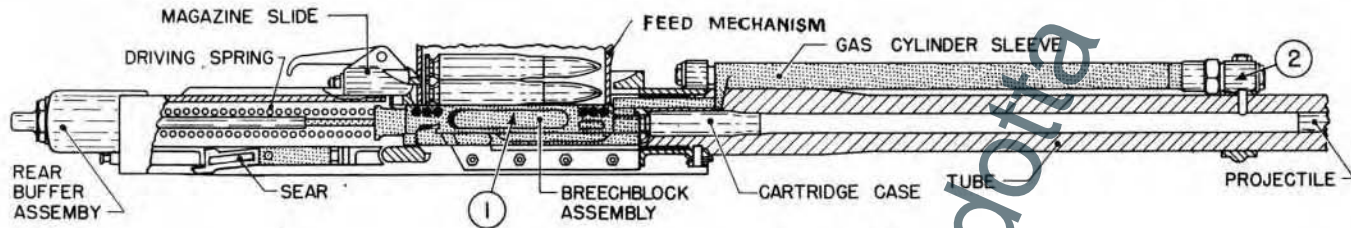
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Figure 16 - Gun Mechanism Shortly After Firing

DESCRIPTION, FUNCTIONING, AND INSTALLATION

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Figure 17 - Gun Mechanism During Breechblock Unlocking

DESCRIPTION, FUNCTIONING, AND INSTALLATION

block assembly on its forward movement. This action, plus the action of the driving spring, accelerates the breechblock assembly rapidly on the start of its forward motion, and thus maintains firing speed. The rear buffer houses a spring which is placed under initial compression by screwing the rear buffer threaded sleeve into the housing until it bottoms. Between the spring and flange of the sleeve is a washer which transmits the shock of recoil to the spring when the breechblock is driven to the rear on the recoil stroke. The rear face of the buffer housing is threaded to receive the driving spring guide head.

(2) The rear buffer is provided with a retainer assembly which prevents the driving spring guide head from unscrewing. The assembly is a washer with a flange and a pin projecting from the face. The pin engages a hole in rear buffer housing and the flange engages a recess on the housing. In assembling, the rim of the washer is bent over a flat of the driving spring guide head to lock it.

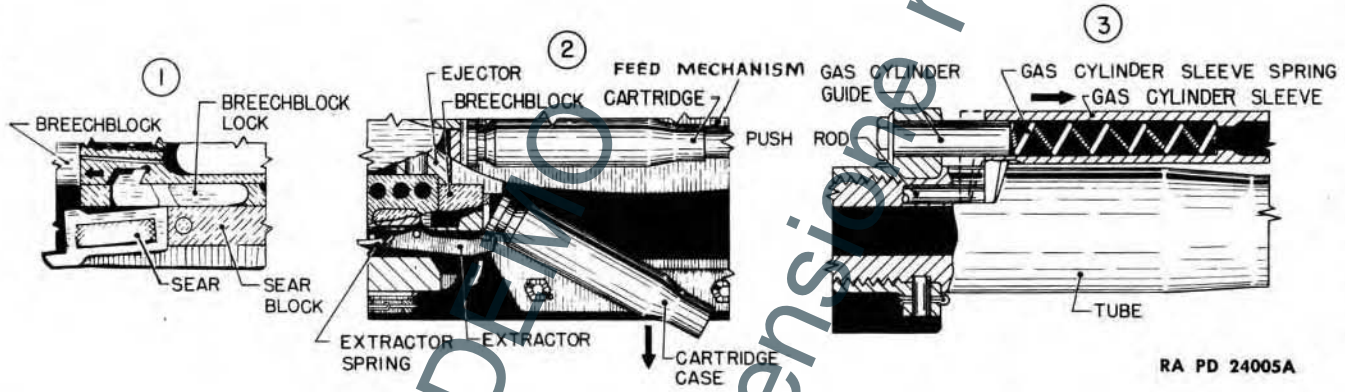
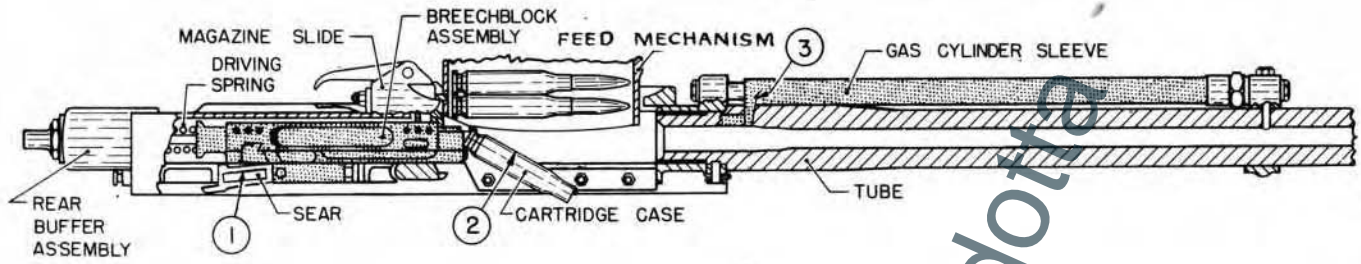
i. **Driving Spring Guide Group** (fig. 15). The driving spring guide group consists of the driving spring, guide, and plunger. The plunger fits into the interior of the bolt and the head rests against the back of the firing pin while the rear end slides in the driving spring guide tube. The driving spring is positioned between the head of the plunger and the head of the driving spring guide. The function of the driving spring is to drive the breechblock group forward to fire an initial round and assist in firing all rounds. It also retards the rearward motion of the bolt.

8. FUNCTIONING OF THE GUN AS A WHOLE.

a. The following is an account of a complete firing cycle from the explosion of one propelling charge to the next.

(1) At the moment of firing, the projectile starts down the tube, propelled by the expanding gases. The firing pin is in its forward position, having struck the primer of the cartridge. The breechblock is held in its forward position by the action of the breechblock lock. The lock engages the breechblock at point "A," figure 16, and bears against surface "B," figure 16, of the breechblock key. The breechblock slide engages the lock at point "C," figure 16, preventing the lock from being forced upward prematurely.

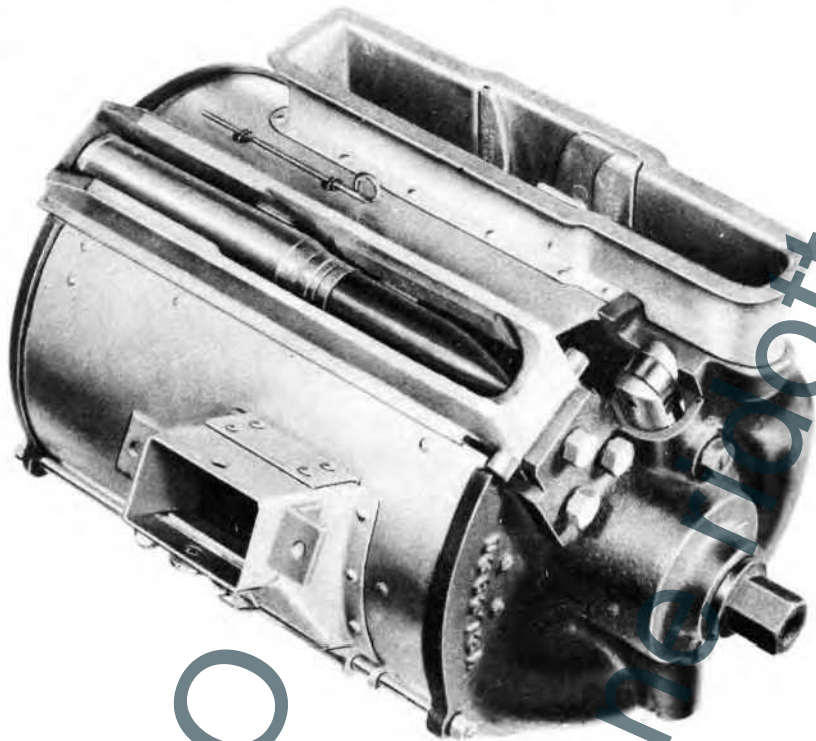
(2) As the projectile moves forward, it passes the gas port (fig. 17). A portion of the expanding gases enters the gas port, passes through the gas cylinder vent plug, enters the gas cylinder, and exerts pressure on the gas cylinder piston. This piston moves rearward, carrying with it the gas cylinder sleeve. The yoke on the rear end of the gas cylinder sleeve engages the push rods and carries them rearward. The push rods, in turn, contact the breechblock slides. The slides are connected



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Figure 18 - Gun Mechanism - Cartridge Being Ejected

DESCRIPTION, FUNCTIONING, AND INSTALLATION



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**Figure 50 — 20-MM Feed Mechanism AN-M1 —
Last Round Held by Retainer**

leaves the mouth, the driving spring acts in the driving spring case to rotate the shaft and the feed sprockets, thereby feeding another round into the mouth.

(e) After the last round but one has been pushed out of the mouth by the breechblock, the last round begins to move downward. This permits the two feed levers to move to their maximum extent through the action of the springs so that the rear feed lever abuts its stop on the rear cover while the last round retainer projects into the mouth and prevents the last round from reaching the loading position (fig. 50). If a fresh belt is fed into the mechanism while the last round of the previous belt is still in the mouth, the first round of the fresh belt becomes the second round in the mouth and the last round of the previous belt can be fired in the normal manner.

- (3) **HAND-LOADING OF BELTS FOR RIGHT-HAND FEED** (fig. 51).
- (a) Inspect all links for rust, dirt, or deformed links.

20-MM AUTOMATIC GUN M1 AND
20-MM AIRCRAFT AUTOMATIC GUN AN-M2



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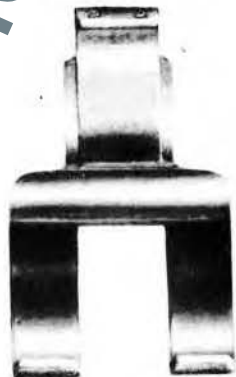
Figure 51 — 20-MM Round in Links for R.H. Feed

(b) Dip all links in OIL, lubricating, preservative, special, and drain off excess oil just before using.

(c) Dip a clean lintless cloth in OIL, lubricating, preservative, special, wring it out, and oil the cartridge cases with it, being careful not to oil the primers of the joint where the case is cramped to the projectile.

(d) Lay the links along the bench, with their open sides up, double loops to the right, and single loops positioned between the double loops.

(e) Insert a round into each loop, including the leading double loop, and push it forward.



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Figure 52 — End Link

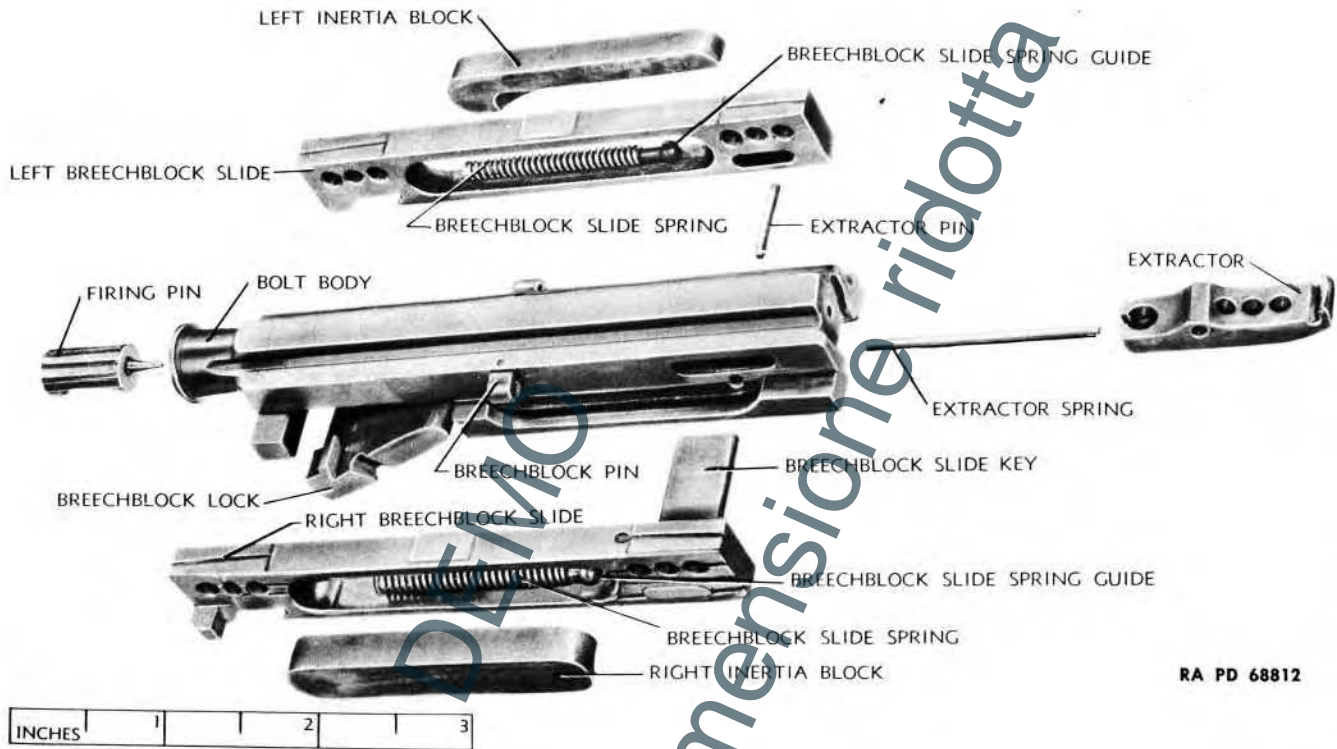
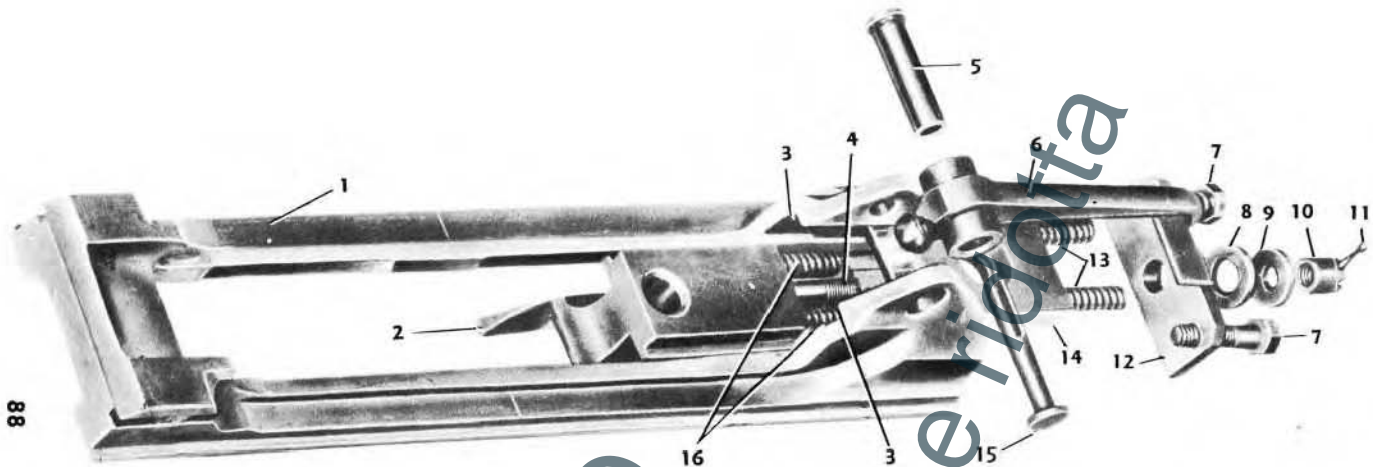


Figure 77 - Breechblock Group - Parts



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|--------------------------------------|--------------------------------|
| 1 — MAGAZINE SLIDE | 9 — EJECTOR STUD NUT WASHER |
| 2 — EJECTOR | 10 — EJECTOR STUD NUT |
| 3 — MAGAZINE LATCH GROOVES | 11 — COTTER PIN |
| 4 — EJECTOR STUD | 12 — MAGAZINE SLIDE BACK PLATE |
| 5 — MAGAZINE SLIDE LEVER PIN BUSHING | 13 — MAGAZINE LATCH SPRING |
| 6 — MAGAZINE SLIDE LEVER | 14 — MAGAZINE LATCH |
| 7 — MAGAZINE SLIDE BACK PLATE SCREW | 15 — MAGAZINE SLIDE LEVER PIN |
| 8 — EJECTOR STUD WASHER | 16 — EJECTOR SPRING |

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Figure 78 — Magazine Slide Group

20-MM AUTOMATIC GUN M1 AND
20-MM AIRCRAFT AUTOMATIC GUN AN-M2

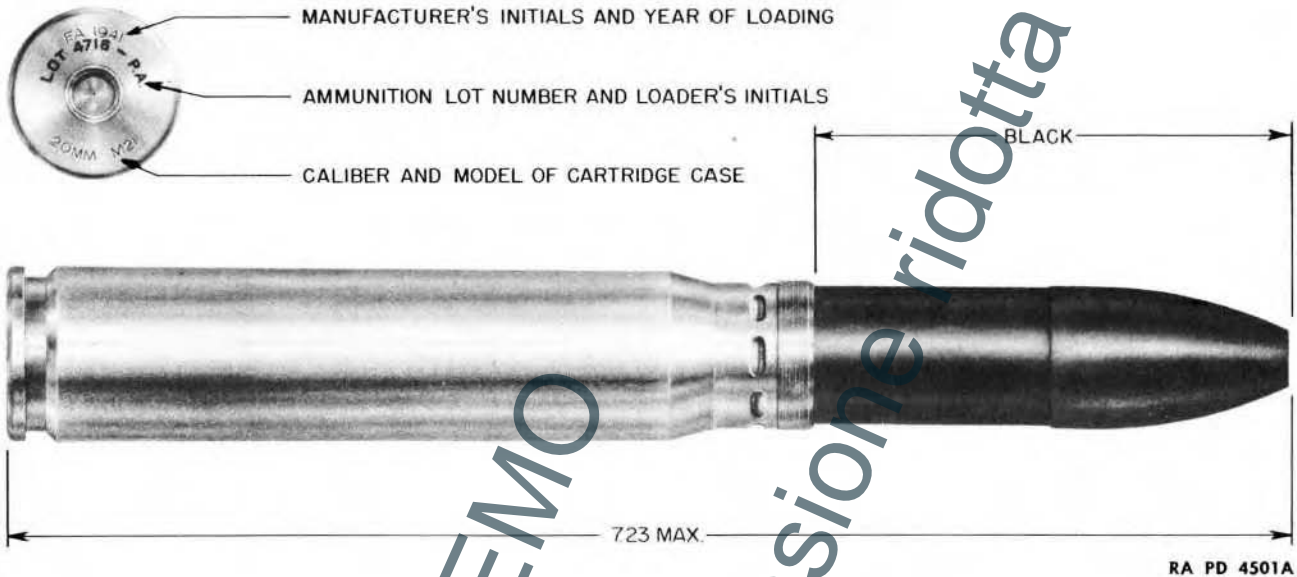


Figure 96 — Cartridge, Ball, 20-MM Guns, M1, AN-M2, and Br. H.S. /A/

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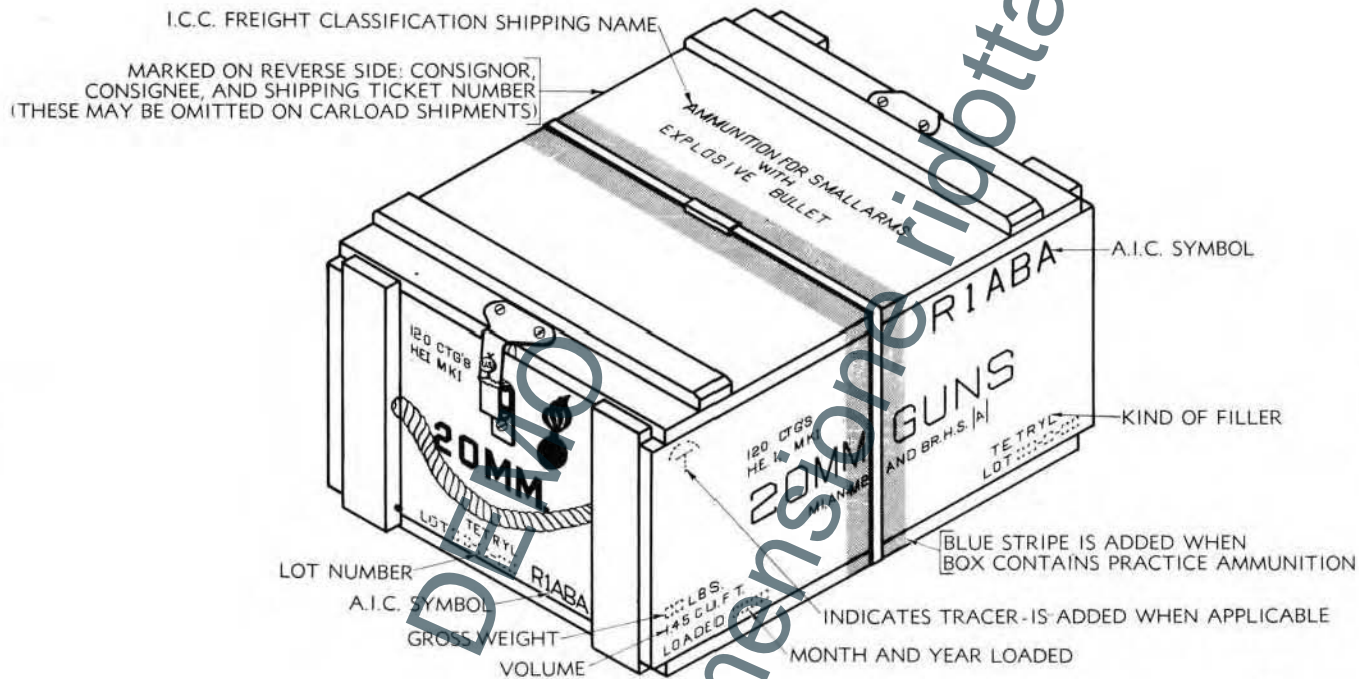


Figure 97 — Packing Box for Ammunition for 20-MM Guns M1, AN-M2, and Br. H.S. /A/