STONER 63A

WEAPON SYSTEM

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REPORT ON ENGINEERING DESIGN CHANGES TO STONER 63 WEAPON SYSTEM

I INTRODUCTION

This report is being published to familiarize all interested agencies and organizations with the engineering design changes made to the Stoner 63 Weapon System. Hereafter the new designation for the Stoner 63 Weapon System will be Stoner 63A Weapon System.

II BACKGROUND

The Stoner 63 Weapon System has been undergoing tests and evaluations since August 1963 when ARPA/AGILE evaluated the Stoner 63 Machine Gun, caliber .223 or 5.56mm. Approximately 2400 Stoner 63 Weapons of various configurations have been manufactured to date.

The United States Marine Corps, United States Army, and the United States Air Force have conducted Engineering, Service, and Troop tests to determine the Stoner 63 Weapon System's military potential. Test reports are presently

being processed relative to the results of the latest tests.

The results of these tests indicated that certain desirable characteristics were lacking in the Stoner 63 Weapon System, and certain deficiencies required correction. Modifications were made to the System to correct these deficiencies and further modifications were made to improve the Stoner 63 Weapon System's reliability as a function of normal product improvement.

III DISCUSSION OF MODIFICATIONS

a. Stoner 63A Rifle

Figures 1 and 2 illustrate the difference between the Stoner 63 Assault Rifle and the Stoner 63A Rifle. A small arrow points to each modification made. Close-up pictures of each modification are shown, and the modification is discussed below.

Figure 3 shows two types of buttstock pads, the two piece pad was replaced by a one piece pad

STONER 63A RIFLE

RIGHT SIDE VIEW

STONER 63
ASSAULT RIFLE

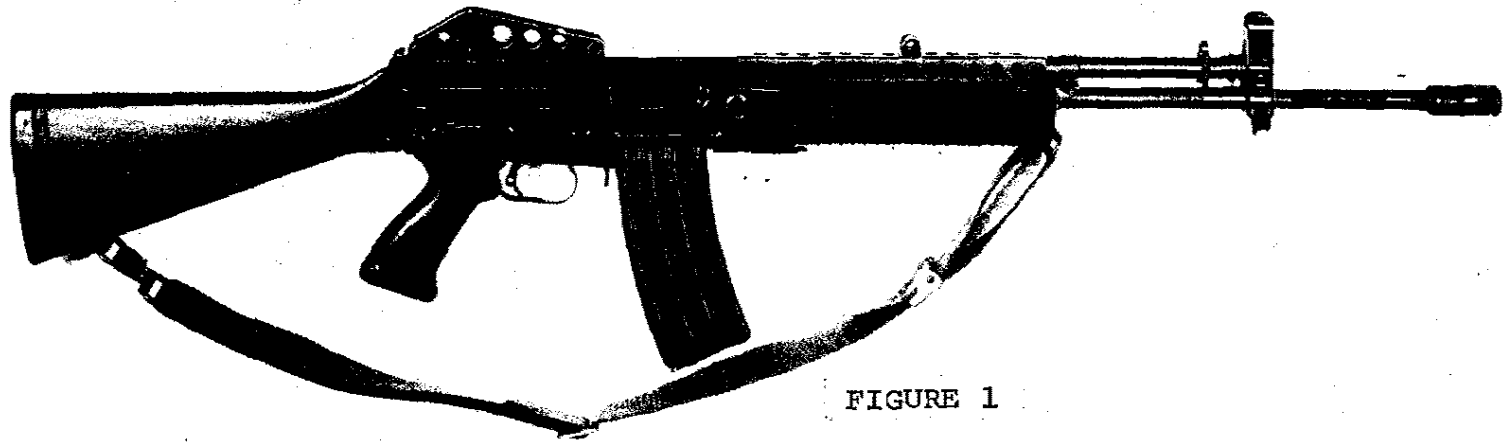


FIGURE 1

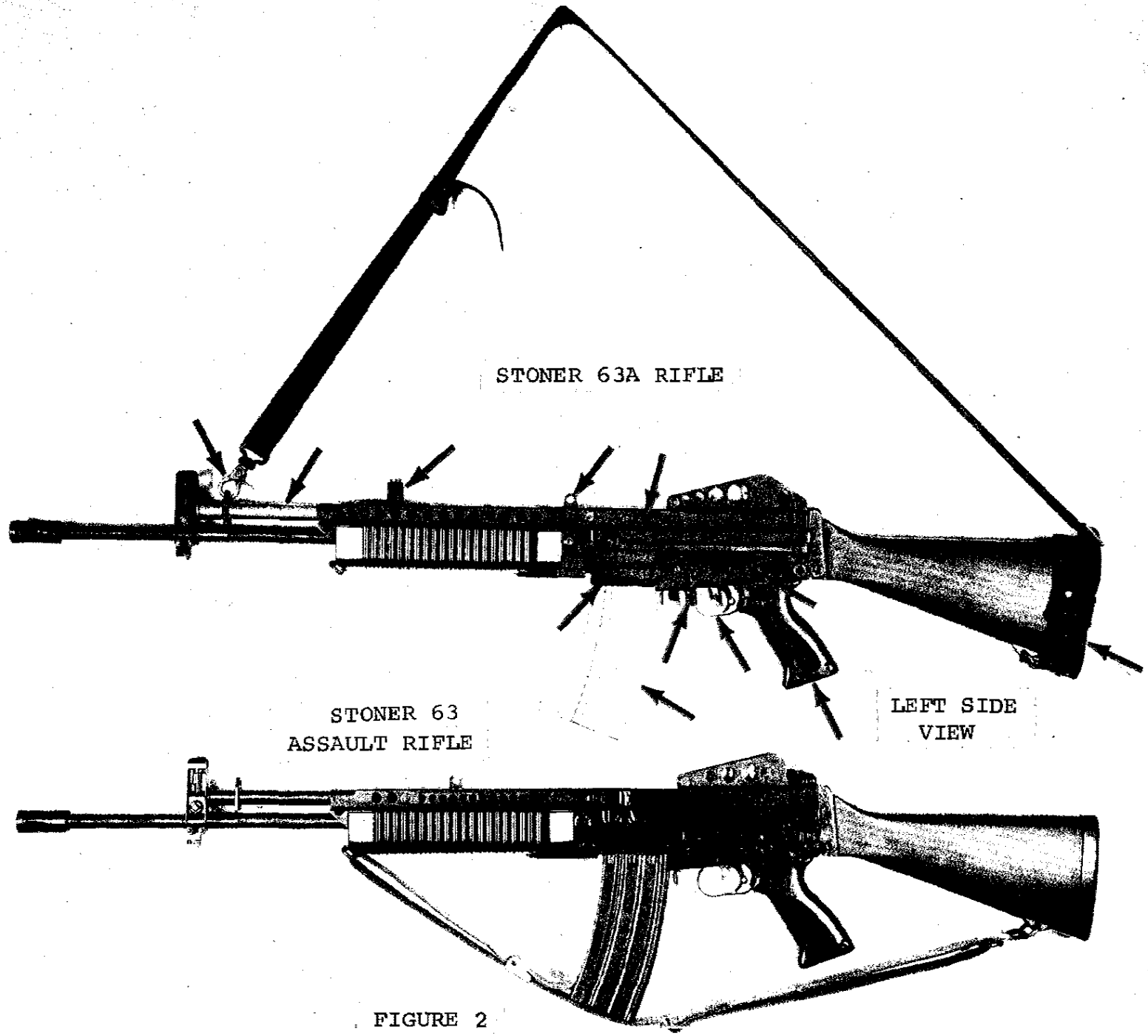
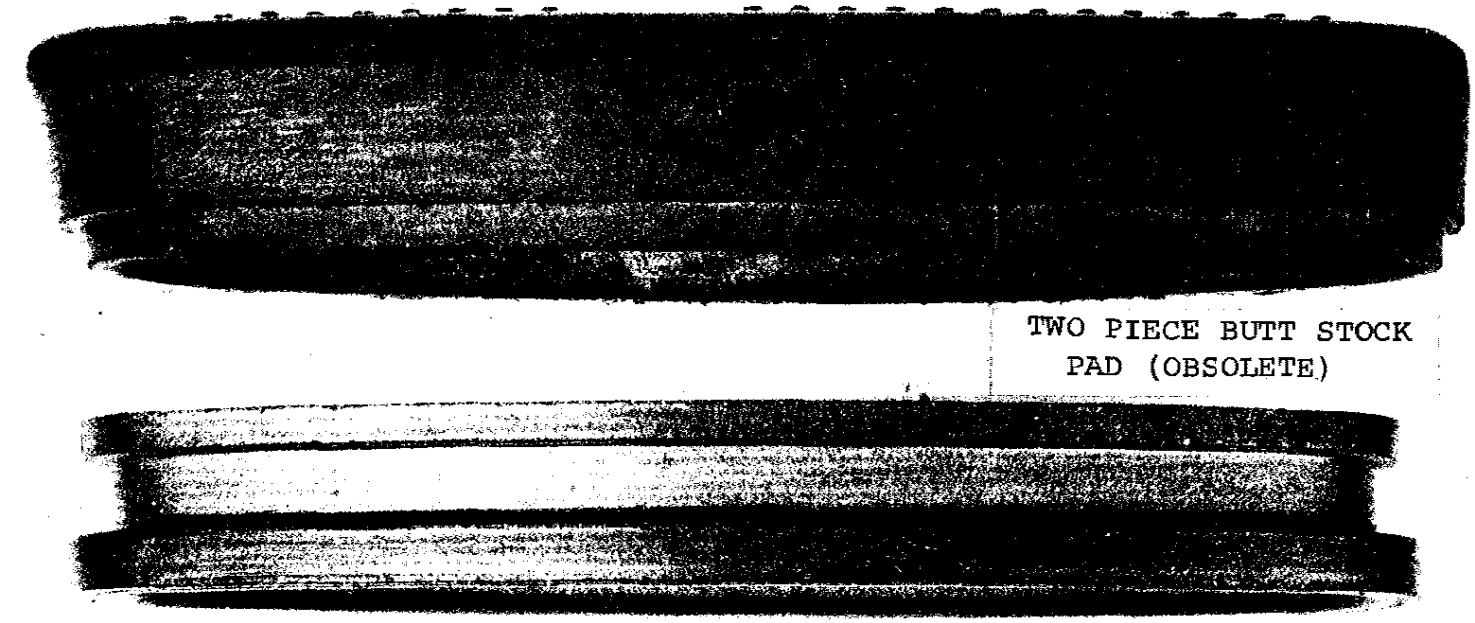
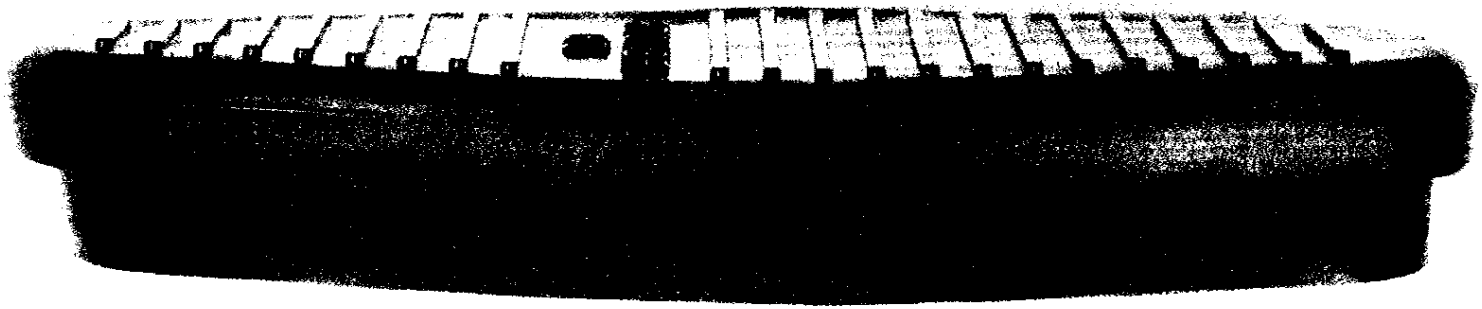


FIGURE 2

STONER 63 WEAPON SYSTEM
BUTT STOCK PAD



TWO PIECE BUTT STOCK
PAD (OBSOLETE)



ONE PIECE BUTT STOCK
PAD (STANDARD)

FIGURE 3

which, when attached to the buttstock, affords the System a buttstock pad that will not come off during use in the field or on the rifle range. This new one piece pad is made of harder material, and is capable of being bonded to the stock more securely than the two piece pad.

Figure 4 is a photograph of two trigger housing groups. The upper trigger group in the picture illustrates the new type which has two positions for the selector lever. "SEMI" and "AUTO". "SAFE" position has been removed and a new type safety lever added which functions much like the safety lever on the M-1 and M-14 rifles. The trigger housing group utilized heretofore is shown at the bottom of the picture. The selector lever had three positions, "SAFE", "SEMI", and "AUTO". The operator in most instances had to remove his finger from the trigger to move the selector lever to either "SEMI" or "AUTO" from "SAFE" in order to fire the weapon at a target. With the new safety lever, the operator needs only to push the safety lever forward with his trigger

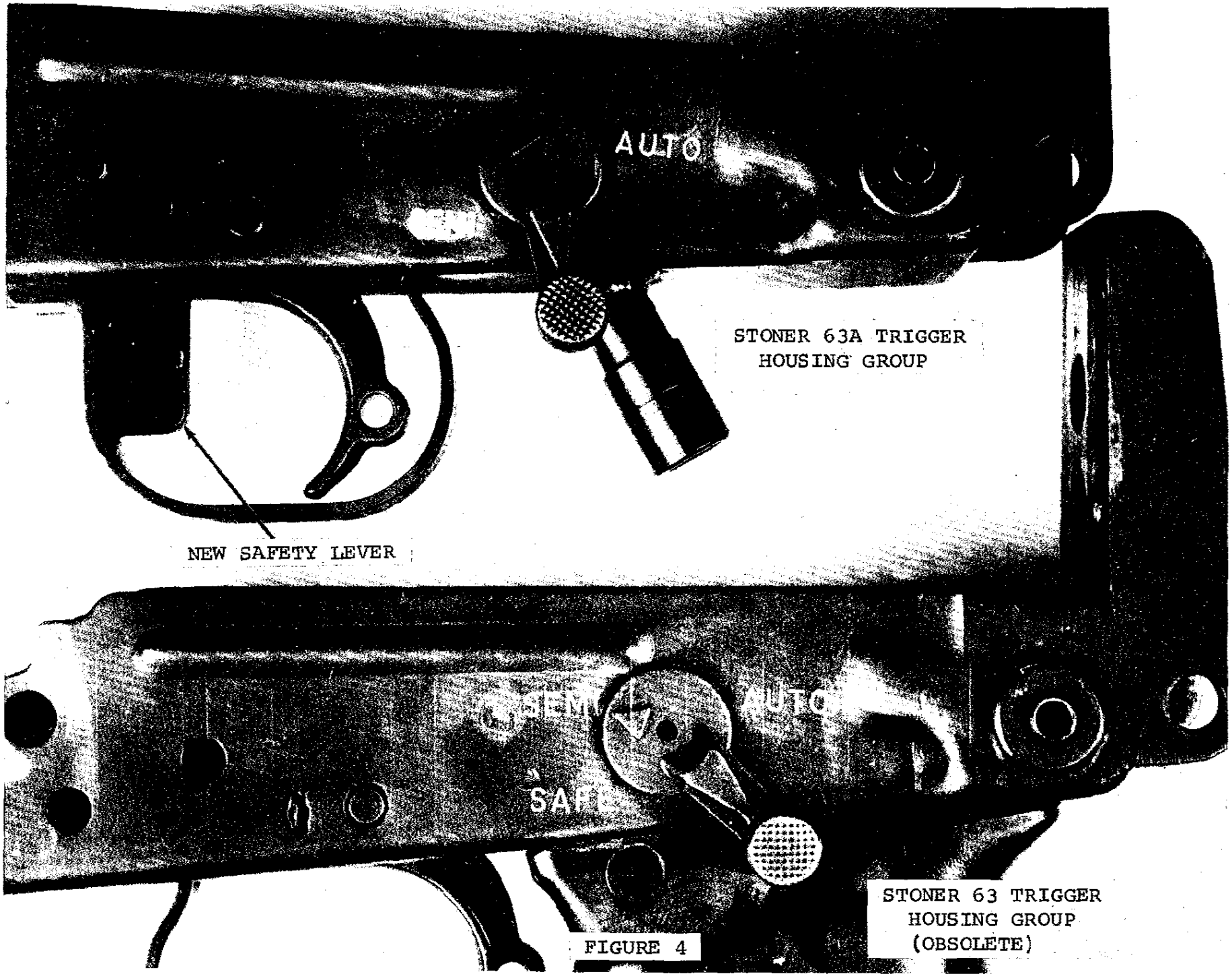

AUTO
STONER 63A TRIGGER
HOUSING GROUP
NEW SAFETY LEVER
STONER 63 TRIGGER
HOUSING GROUP
(OBSOLETE)

FIGURE 4

finger and be ready to fire immediately, should the situation demand it.

The two positions "SEMI" and "AUTO" are approximately 180° apart on the new trigger housing group which gives the operator a more positive picture of which setting he has and precludes any confusion on this vital point. Figure 5 is a close-up view of the new safety lever in the forward or "FIRE" position. Figure 6 shows this safety lever on "SAFE" or in the rearward position, back inside the trigger guard.

The difference between the new and old trigger guards is twofold. The new style trigger guard is slotted to permit the new safety lever to move back and forth, and is welded to the trigger housing. It cannot be detached, as it was possible to do with the old type trigger guard. Too many trigger guards were lost during tests, consequently a change was desirable on this feature. The detachable trigger guard was originally put on the Stoner 63 Weapon System to permit the operator to remove the trigger guard and

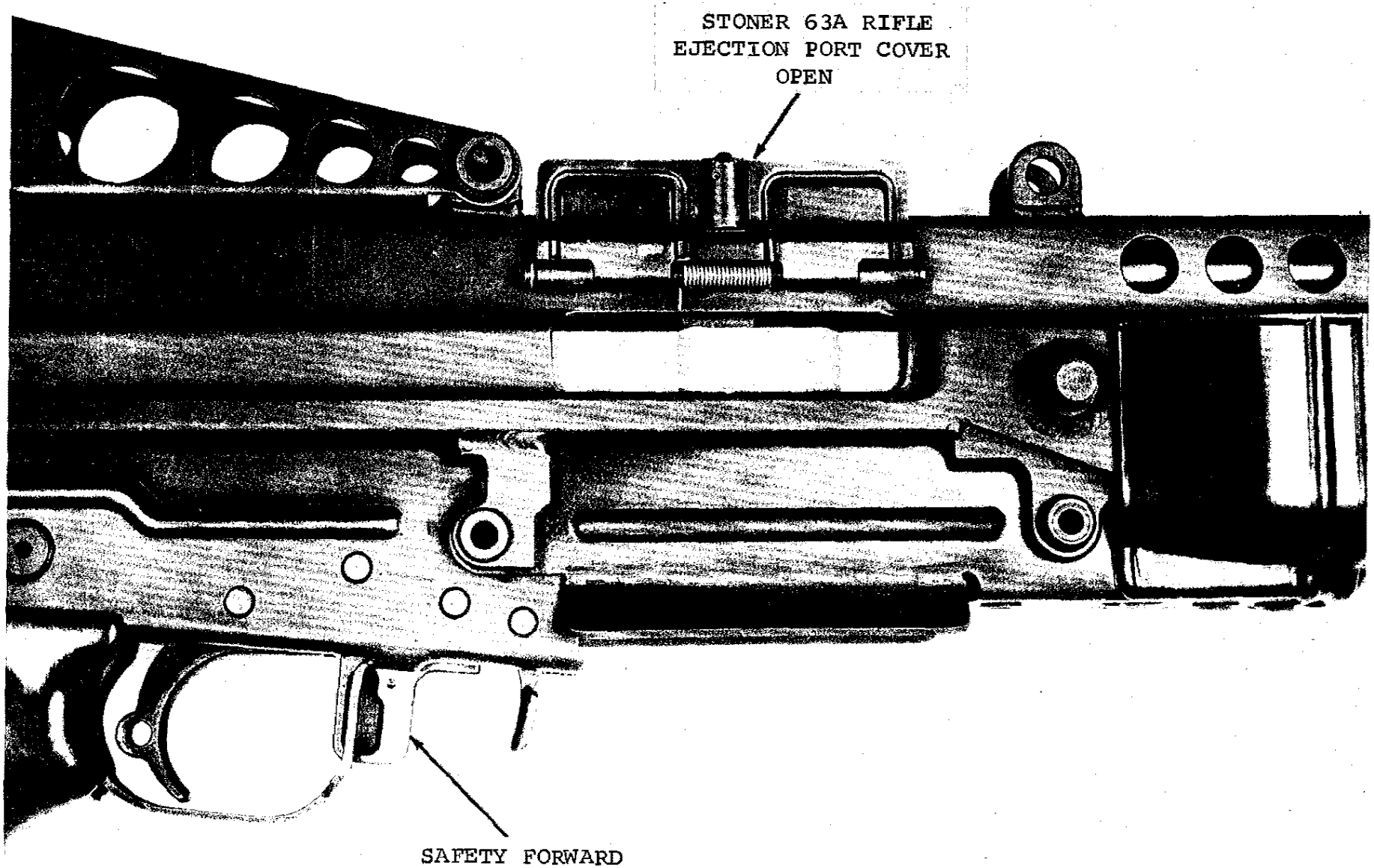

STONER 63A RIFLE
EJECTION PORT COVER
OPEN
SAFETY FORWARD
IN "FIRE" POSITION

FIGURE 5

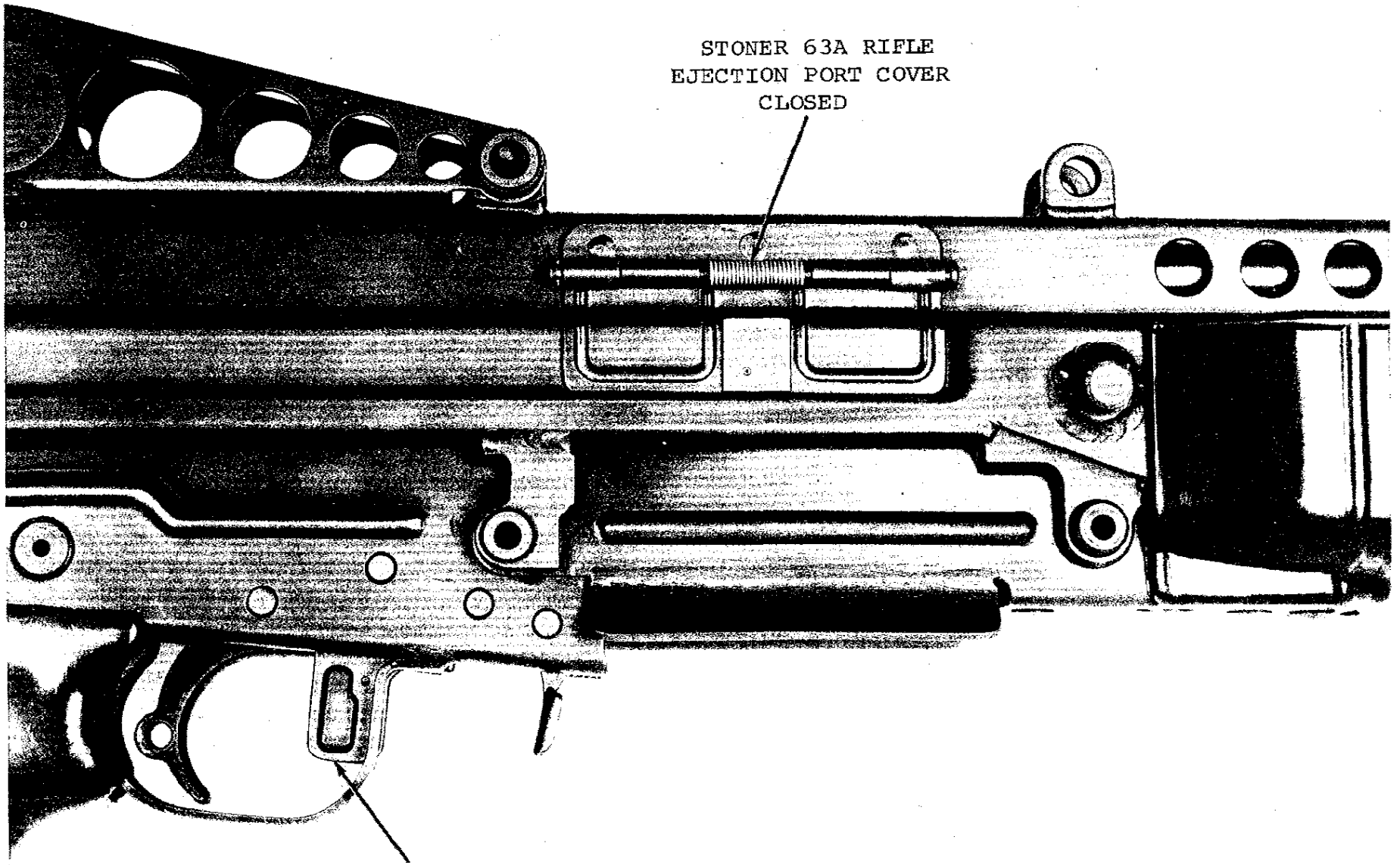

STONER 63A RIFLE
EJECTION PORT COVER
CLOSED
SAFETY TO REAR
IN "SAFE" POSITION

FIGURE 6

be able to fire the weapon with an arctic mitten on. The new type trigger guard cannot be removed, consequently a winter trigger attachment is necessary to provide the operator the same capability. Figure 7 shows one type of attachment that is being evaluated.

Figure 5 also shows the ejection port cover in the open position. This cover has been added to the Stoner 63A Weapon System to promote greater reliability during extended field operations where the operator cannot clean his weapon readily. This feature is especially helpful on the Machine Gun and Automatic Rifle versions due to the fact that the bolt is in the rearward position when ready to fire, consequently the ejection port is open permitting dirt and dust ready access to the inside parts of the weapon. The cover can be closed as illustrated in figure 6, during use in any situation. When the bolt goes forward it automatically opens the cover to permit ejection of the spent cartridge. The operator must manually close it to continue obtaining further benefits of this feature.

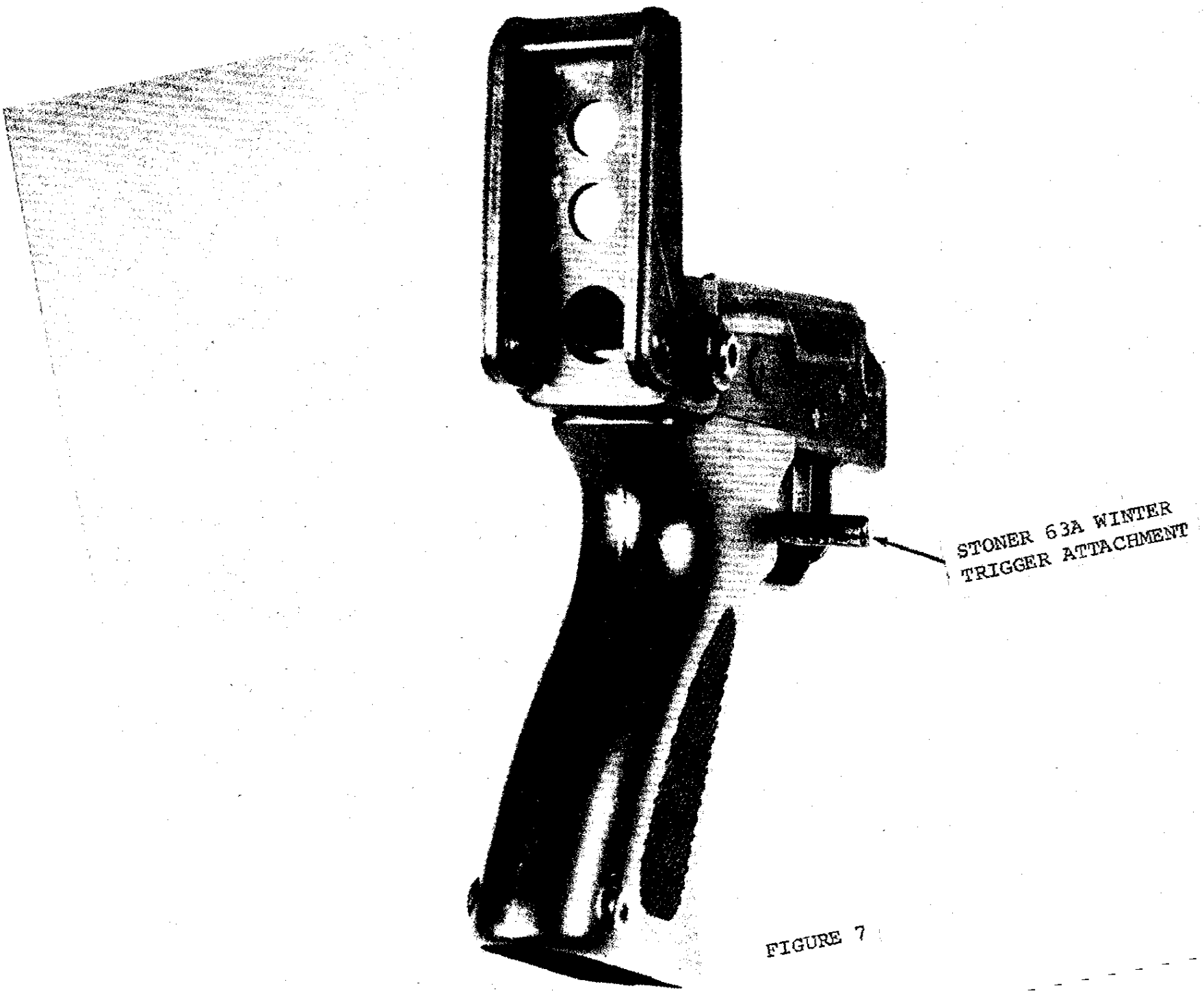


FIGURE 7

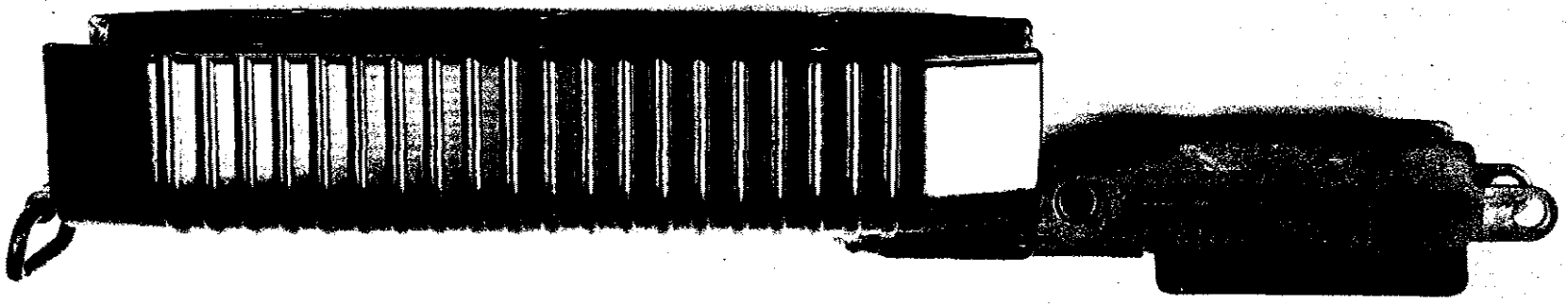
This ejection port cover is a result of this Company's product improvement effort, and is incorporated on all configurations of the Stoner 63A Weapon System.

During extended field exercises and tests, both at night and during the daytime, it was obvious that the insertion of the ammunition magazine into the weapon required some skill and training to accomplish quickly. Figure 8 depicts the new style magazine well that solves this problem. The magazine well is extended and flared to facilitate the insertion of the magazine into the weapon quickly. The flared portion acts as a guide for insertion of the magazine into its proper place.

Figure 9 illustrates the Stoner 63A and Stoner 63 Rifle and Carbine Cocking Handle. The new type cocking handle is located on top of the receiver which permits the operator to charge the weapon with either hand without undue effort. The new type Rifle and Carbine cocking handle has a feature incorporated in it, that

RIFLE FORESTOCK
ASSEMBLY

STONER 63 (OBSOLETE)



STONER 63A (STANDARD)

FIGURE 8

COCKING HANDLE FOR
RIFLE & CARBINE

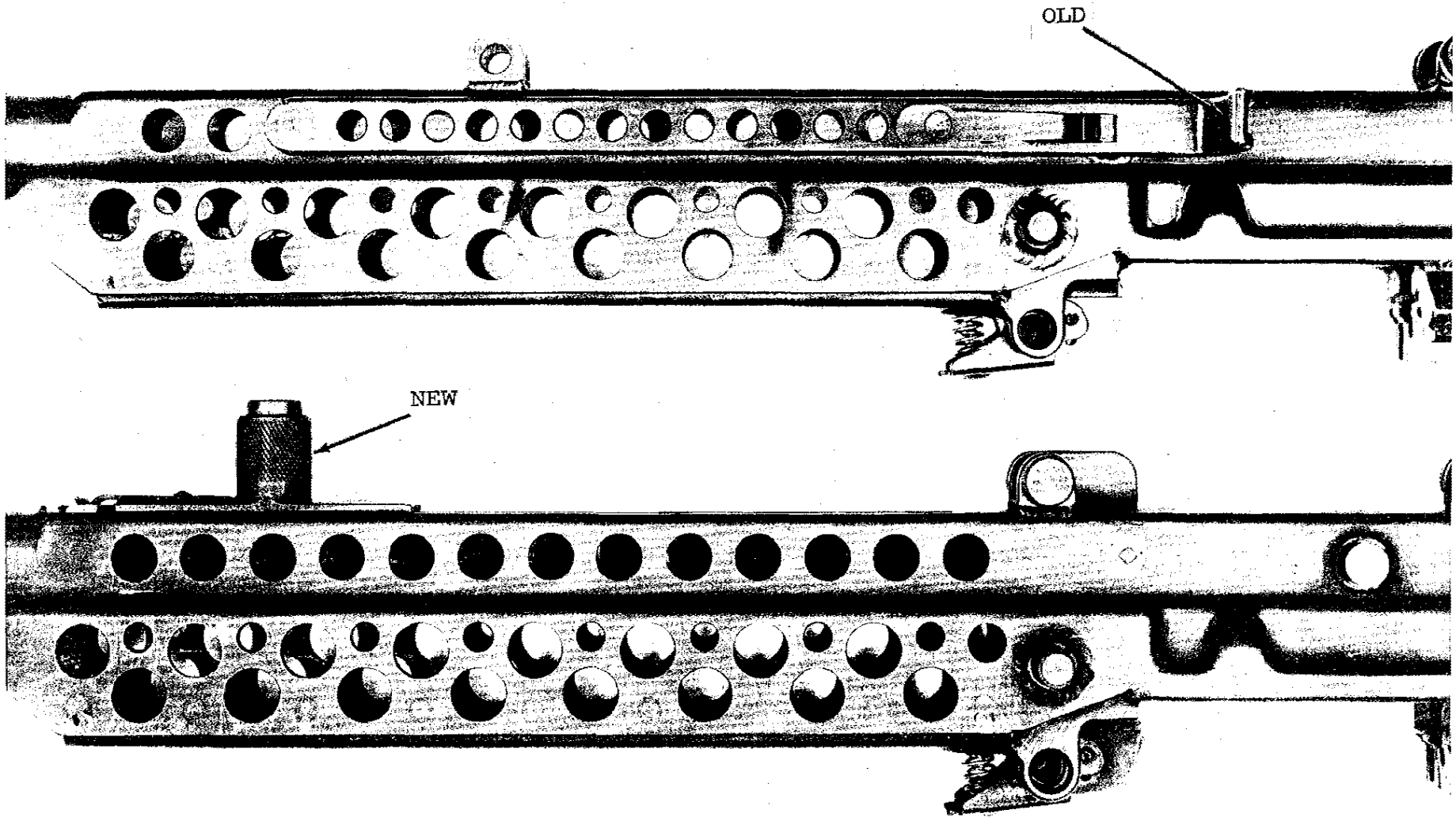


FIGURE 9

permits the operator to push the bolt forward if necessary. This is done by pulling back the handle to the point where it becomes engaged with the piston rod, and then pushing the plunger inside the cocking handle down. Then, while keeping it down, push forward to assist the bolt to close. Figure 10 shows a close-up view of this added feature.

Engagement contact area of the new type cocking handle with the piston rod has been increased. The old type cocking handle became disengaged from the piston rod on occasion due to the small contact area.

Figure 11 illustrates the changes made to the gas cylinder. To increase the service life of this critical item, the diameter of the gas cylinder forward of the barrel guide, was increased. The material was changed to 17-4 PH stainless steel.

During the extensive testing conducted in the field and laboratories, it became evident that the piston rod would "freeze up" in the gas cylinder when

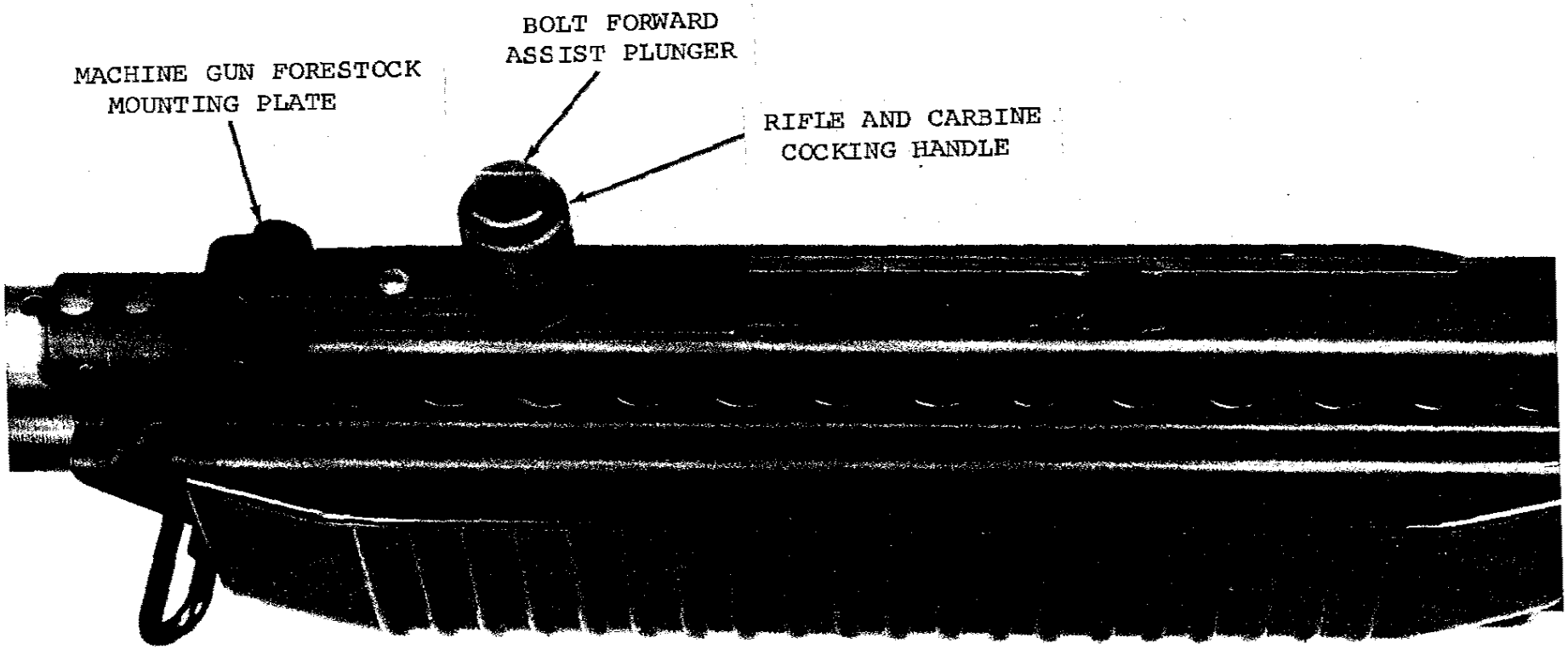
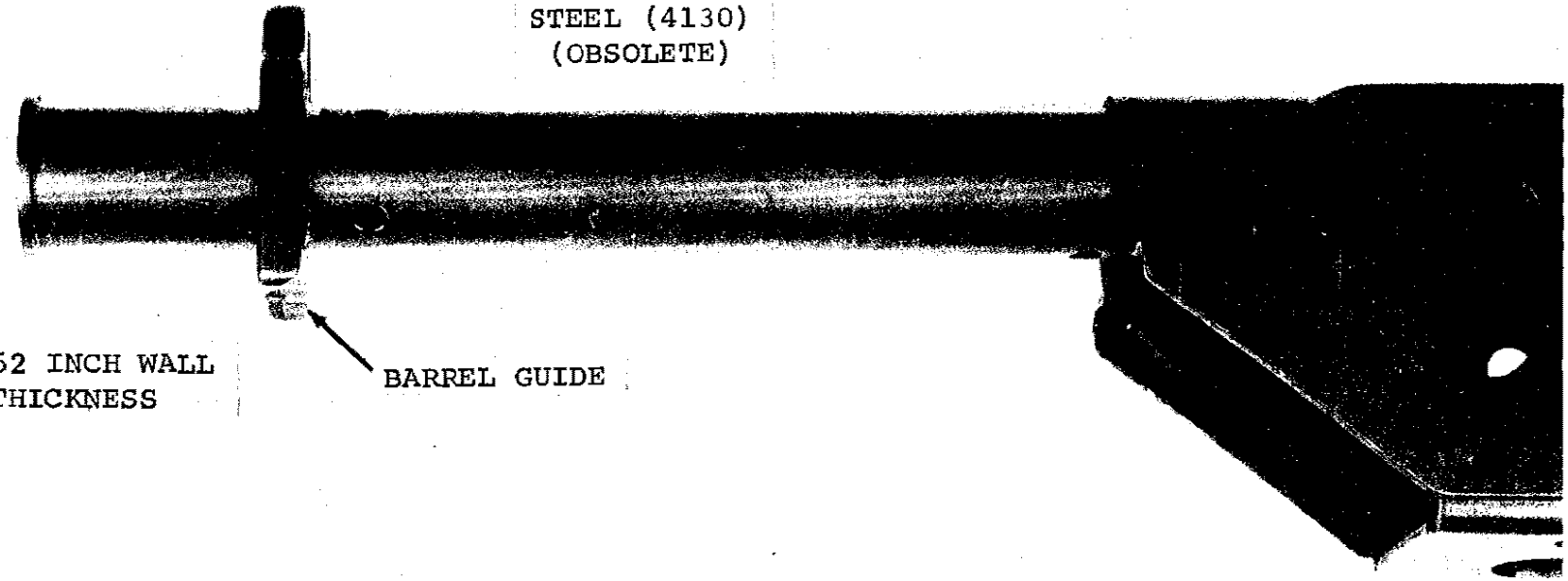

MACHINE GUN FORESTOCK
MOUNTING PLATE
BOLT FORWARD
ASSIST PLUNGER
RIFLE AND CARBINE
COCKING HANDLE

FIGURE 10

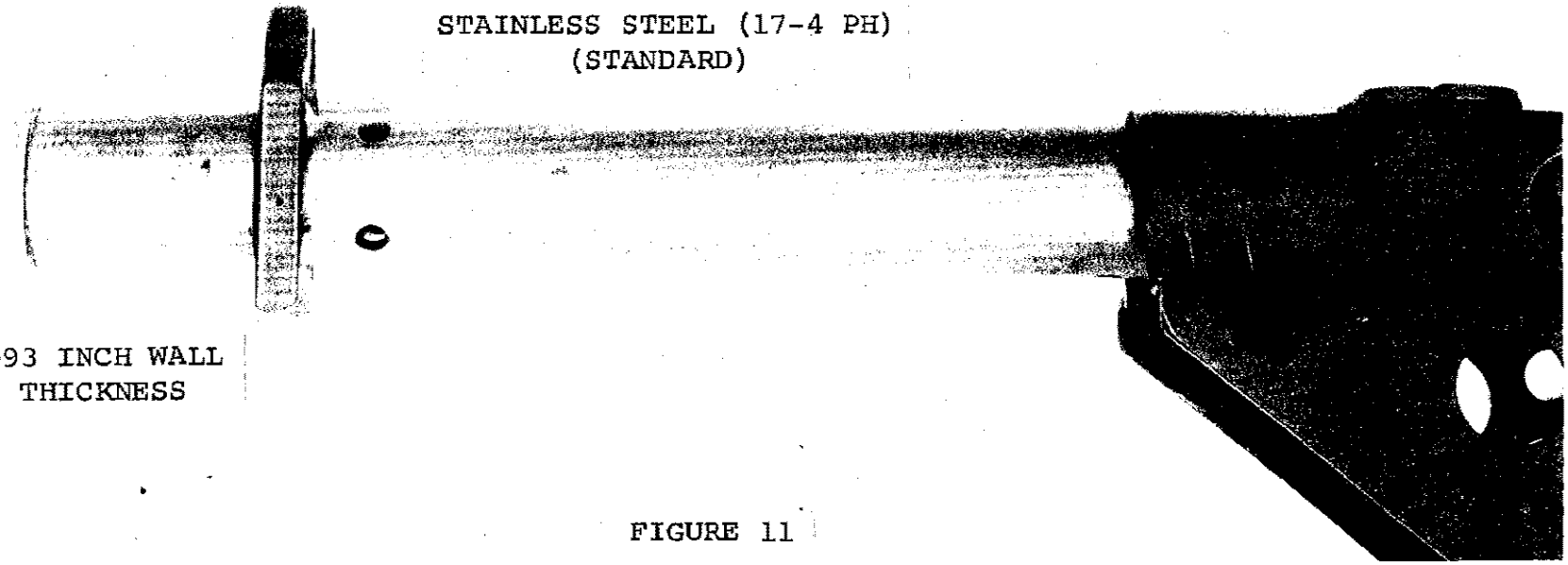
GAS CYLINDER
STEEL (4130)
(OBSOLETE)



.062 INCH WALL
THICKNESS

BARREL GUIDE

GAS CYLINDER
STAINLESS STEEL (17-4 PH)
(STANDARD)



.093 INCH WALL
THICKNESS

FIGURE 11

carbon build-up reduced the clearance between the piston head and the gas cylinder. Figure 12 shows the carbon relief groove inside the gas cylinder which eliminates this problem, and permits the weapon to be fired over a longer period of time without being cleaned.

The Stoner Weapon System barrels have been hardened by an additional manufacturing process which will provide the barrel with a harder chamber, bore, and outside surface. This prevents malfunctions due to the fact that sand and/or dirt entering the chamber will imbed itself in the cartridge case instead of the chamber walls. It prolongs the life of the barrel tremendously and retards corrosion throughout the outside and inside surfaces when utilized in a warm, high humidity environment.

Recent tests at Springfield Armory on two of the hardened Machine Gun barrels that were fired at a rate of 200 rounds per minute for three minutes without cooling, indicated ~~that~~ approximately 30,000 rounds

3-MINUTES OF FIRING PRODUCES 30,000 RDS LIFE HA!

FIGURE 12

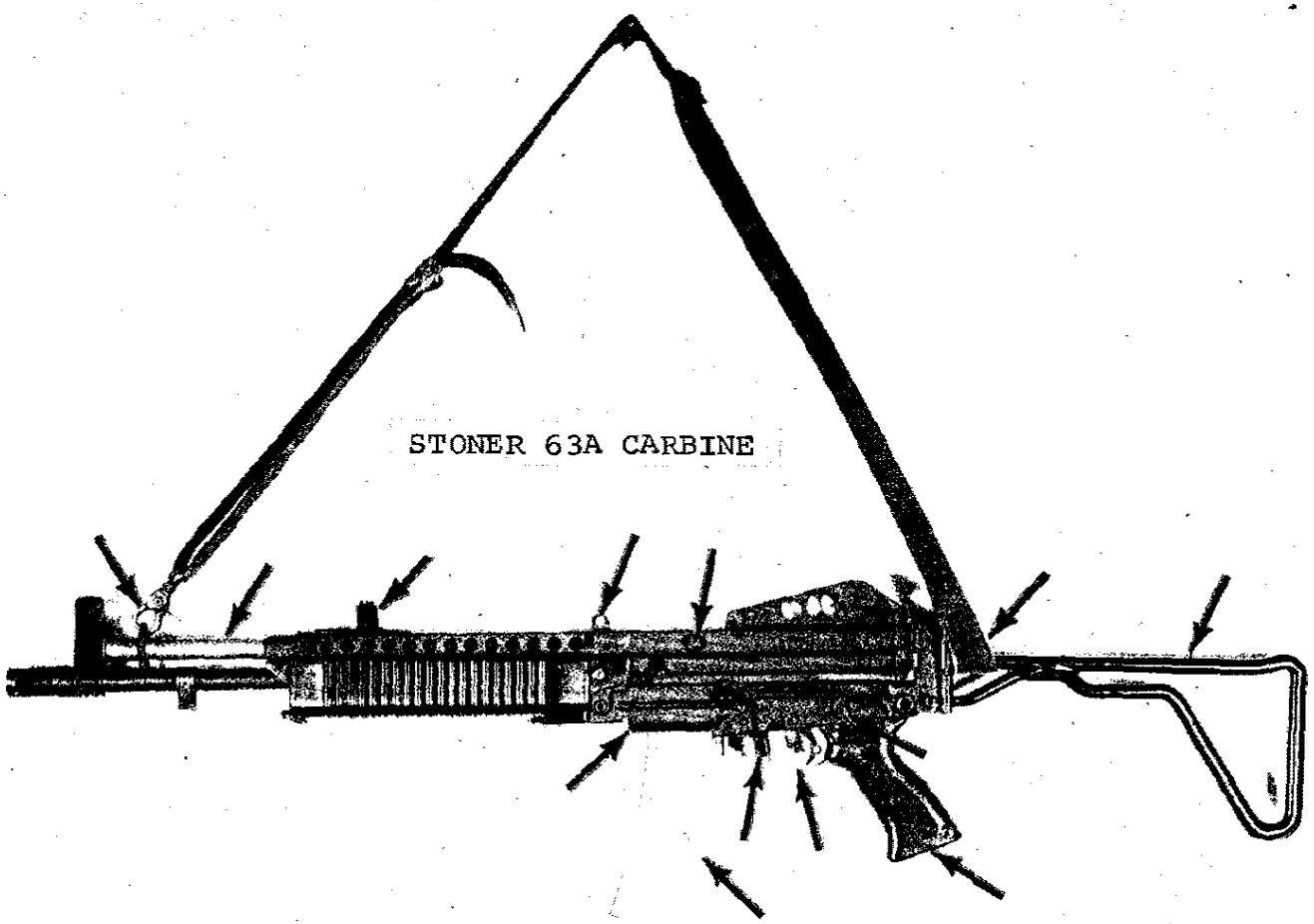
can be fired before the barrel becomes unserviceable. Under a less rigid schedule a longer life can be expected. The previous barrel became unserviceable, firing the same schedule, after approximately 8,000 rounds.

b. Stoner 63A Carbine

Figure 13 shows the Stoner 63 Carbine before and after modifications. All modifications discussed in paragraph a. above are applicable to this weapon with the addition of the folding stock which is discussed below.

Figure 14 illustrates the two folding stocks available. The standard folding stock is fabricated out of 22 parts. The wire folding stock consists of 14 parts and is flat against the receiver when folded. The polyvinyl chloride coating on the wire stock eliminates the cold metal contact with the operator's face and helps deaden noise during movement through underbrush.

STONER 63A CARBINE



STONER 63 CARBINE

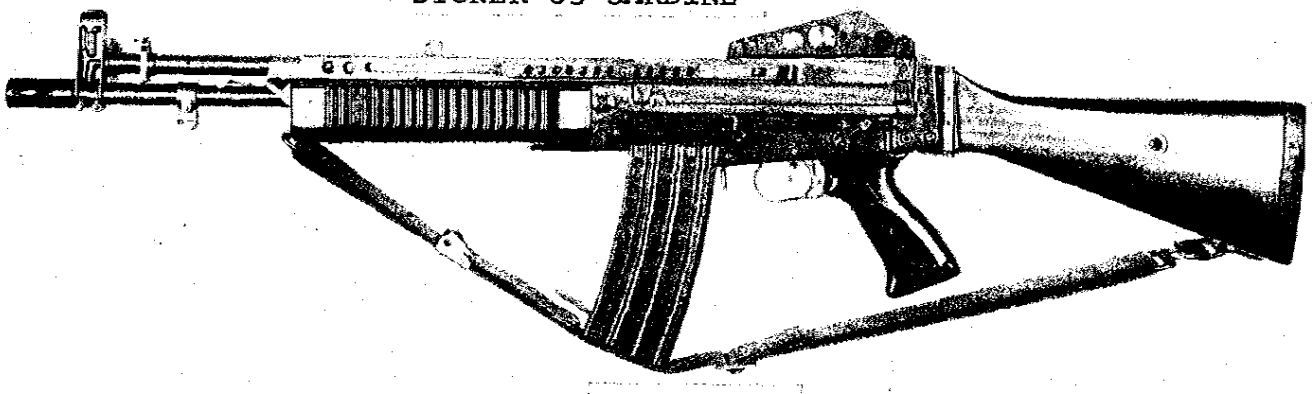
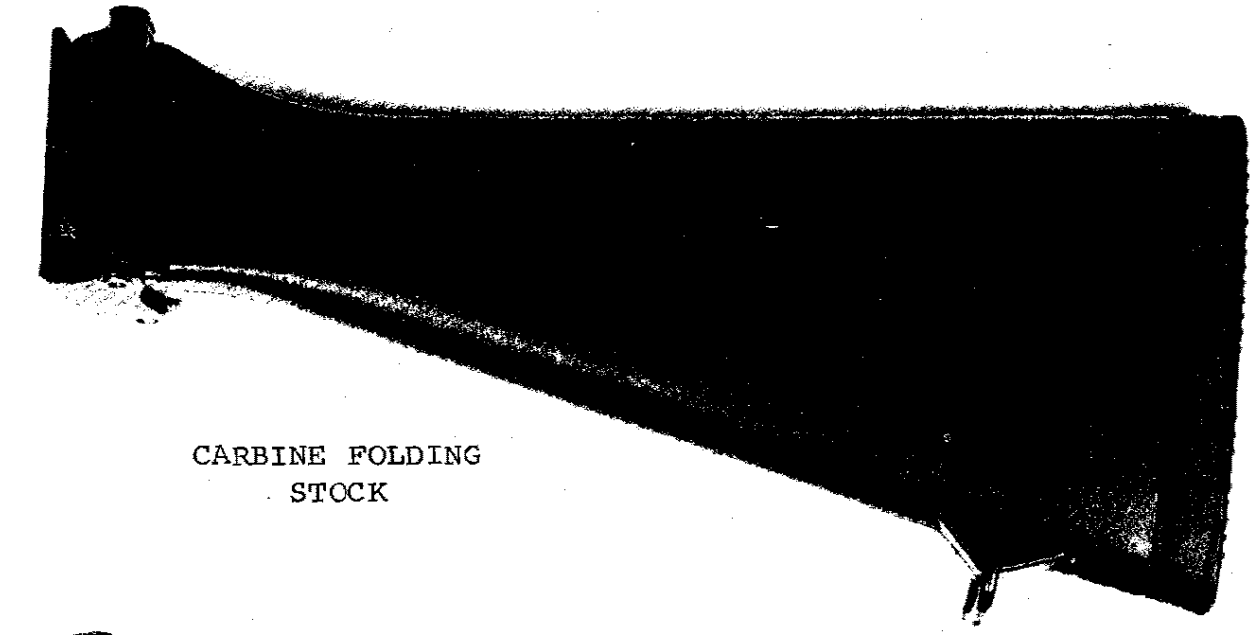
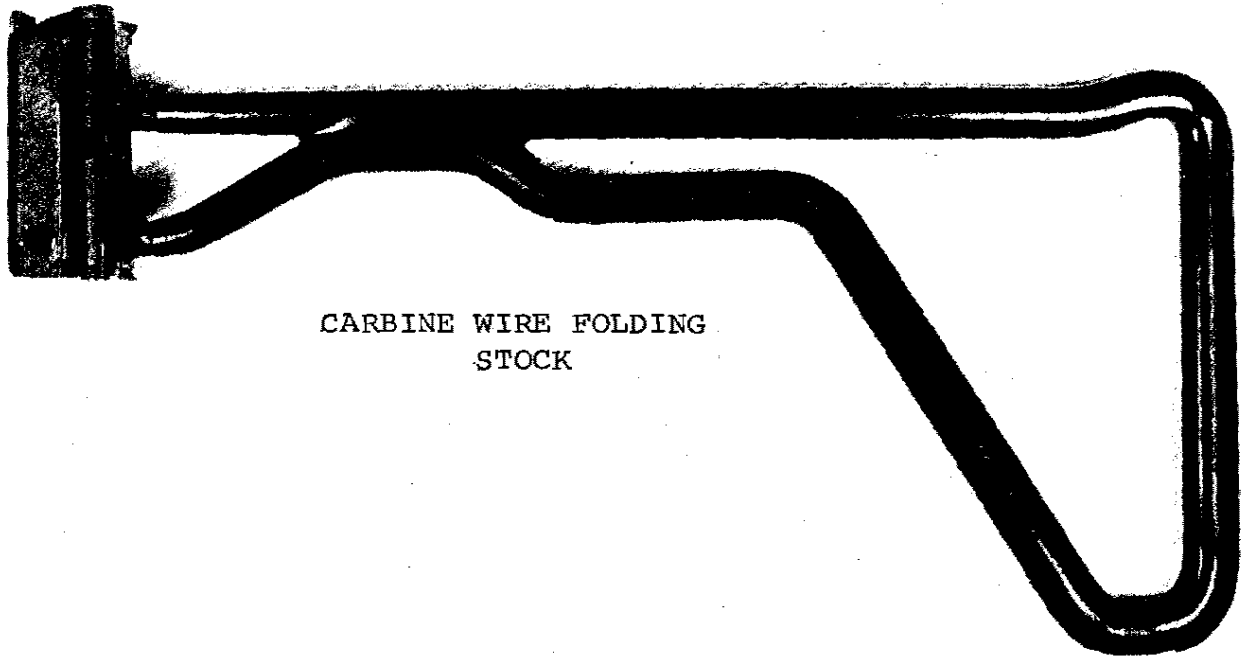


FIGURE 13



CARBINE FOLDING
STOCK



CARBINE WIRE FOLDING
STOCK

FIGURE 14

c. Stoner 63A Automatic Rifle

Figure 15 depicts the Stoner 63 Automatic Rifle before and after modifications. The modifications are pointed out by small arrows.

Figure 16 shows the old and new magazine adapter assembly. The new one is extended and flared to facilitate loading the magazine. The flared extension acts as a guide and permits rapid reloading day or night.

Figure 17 shows the new and old cocking handles. The new cocking handle has a more positive engagement with the piston rod than the old cocking handle. It also has its latch spring attached to the front end, which locks it in the forward position during firing. The new cocking handle can be disengaged from its locked position with approximately 10 to 12 pounds pull as compared to the old cocking handle which required approximately 25 pounds pull.

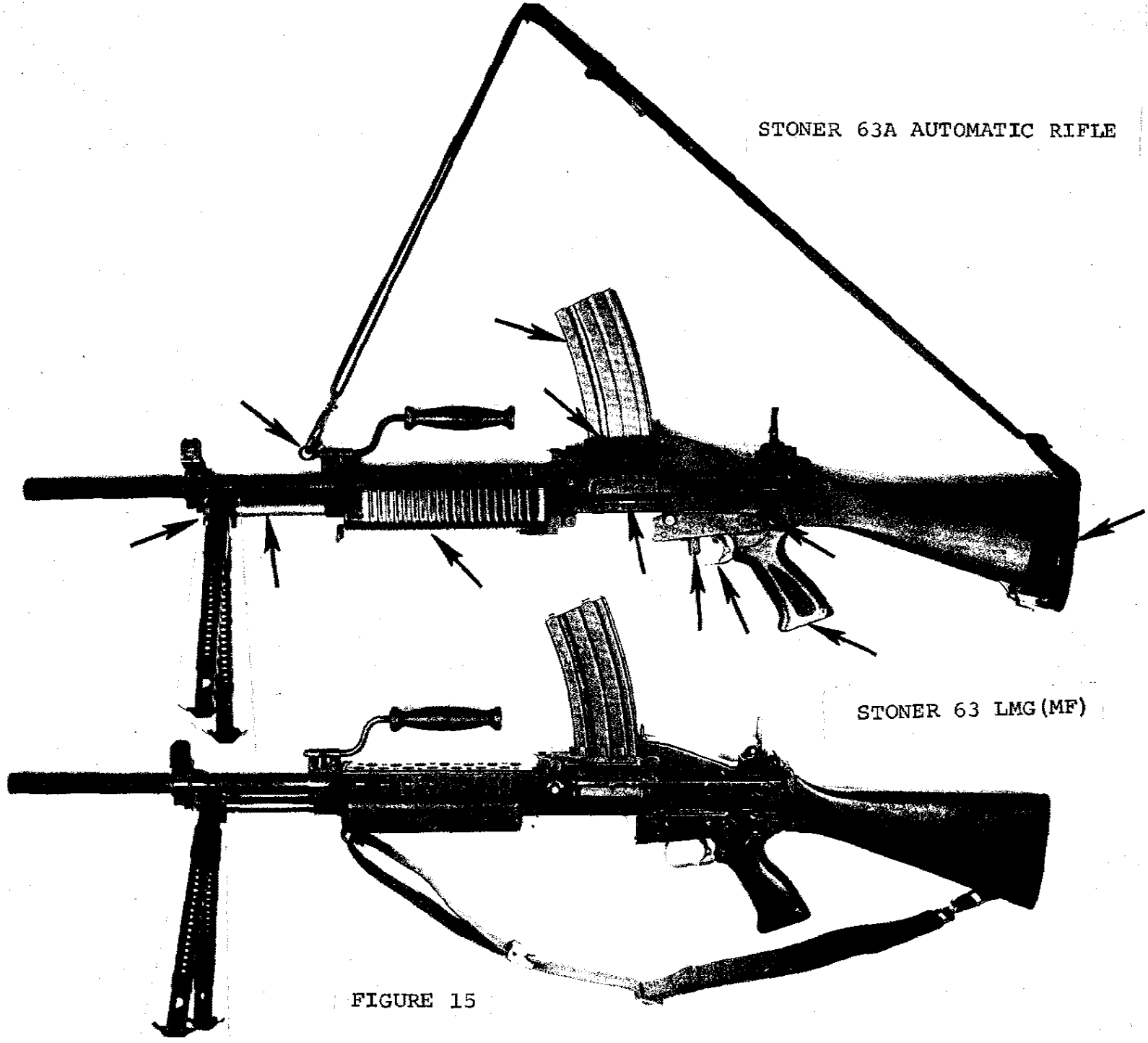
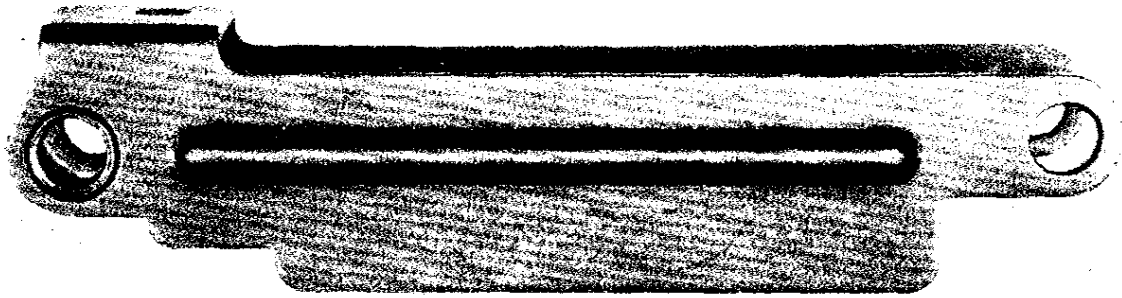


FIGURE 15

MAGAZINE ADAPTER
ASSEMBLY



STONER 63 ASSEMBLY
(OBSOLETE)

STONER 63A ASSEMBLY
(STANDARD)

FIGURE 16

MACHINE GUN
COCKING HANDLE

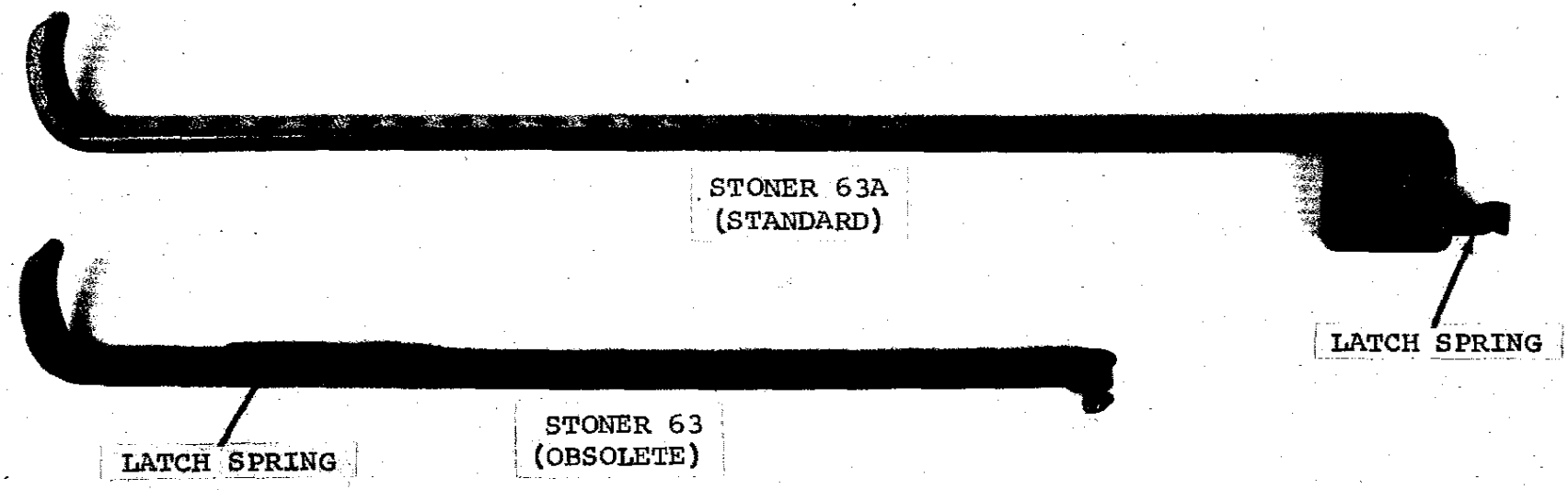


FIGURE 17

Figure 18 shows the Stoner 63A Machine Gun forestock assembly which is also utilized on the Stoner 63A Automatic Rifle. The new plastic forestock will do away with the wooden forestock which was not durable enough for rough field usage. In order to assemble this plastic forestock to the Automatic Rifle and the Machine Gun, the mounting bracket was relocated and a mounting plate was added. These modifications are shown in figure 19.

In order to sling the Stoner 63A Automatic Rifle over your shoulder and carry it at the "Ready" position, a top sling attaching ring was added to the front end of the carrying handle rod as shown in figure 20. All Stoner 63A Weapons can be carried by the firer in this manner.

The hardened barrel, new type butt stock pad, safety lever, and selector lever utilized by the Rifle and Carbine are also used on the Automatic Rifle.

MACHINE GUN FORESTOCK ASSEMBLY

STONER 63A
(STANDARD)

STONER 63
(OBSOLETE)

FIGURE 18

MACHINE GUN FORESTOCK
MOUNTING BRACKET

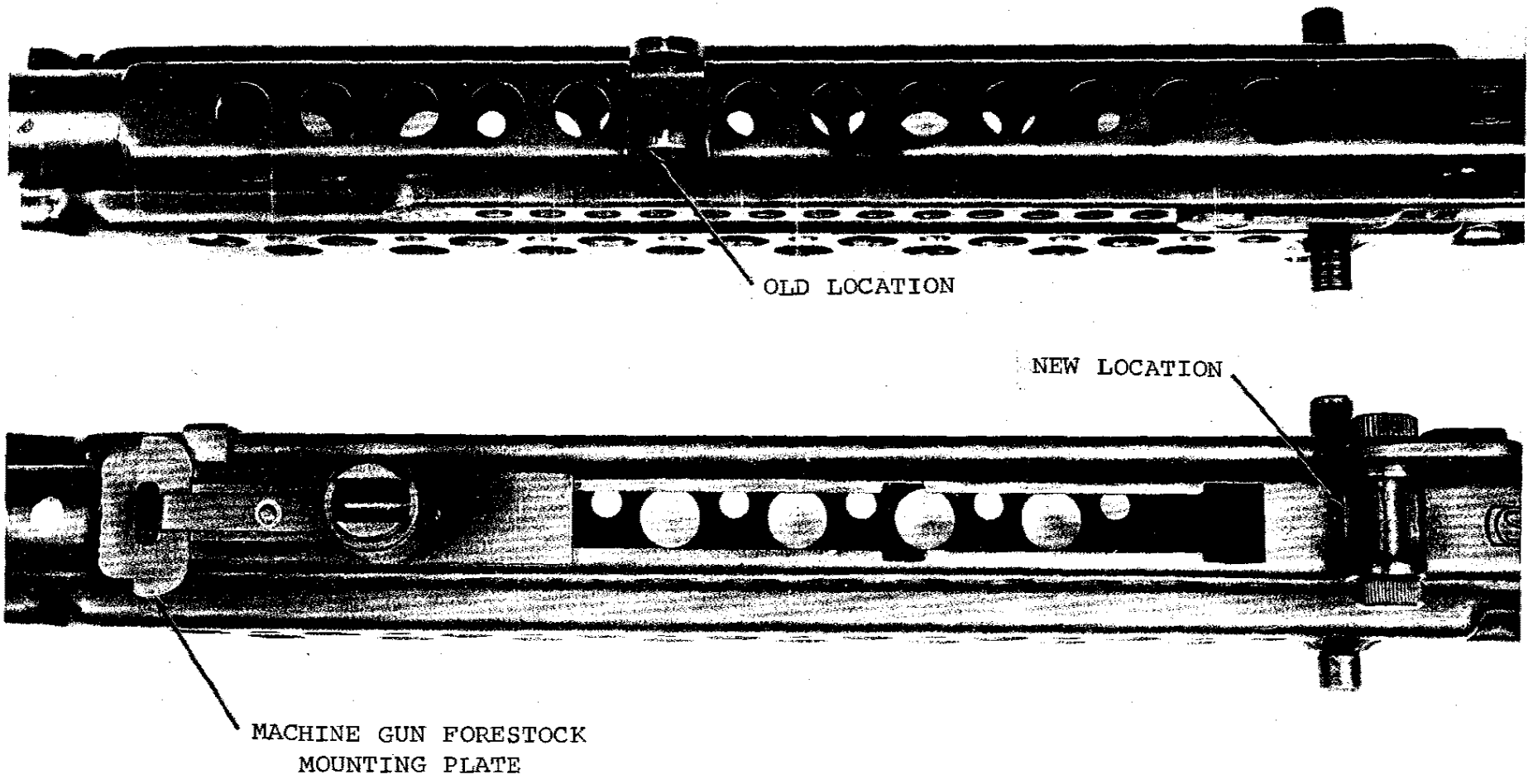


FIGURE 19

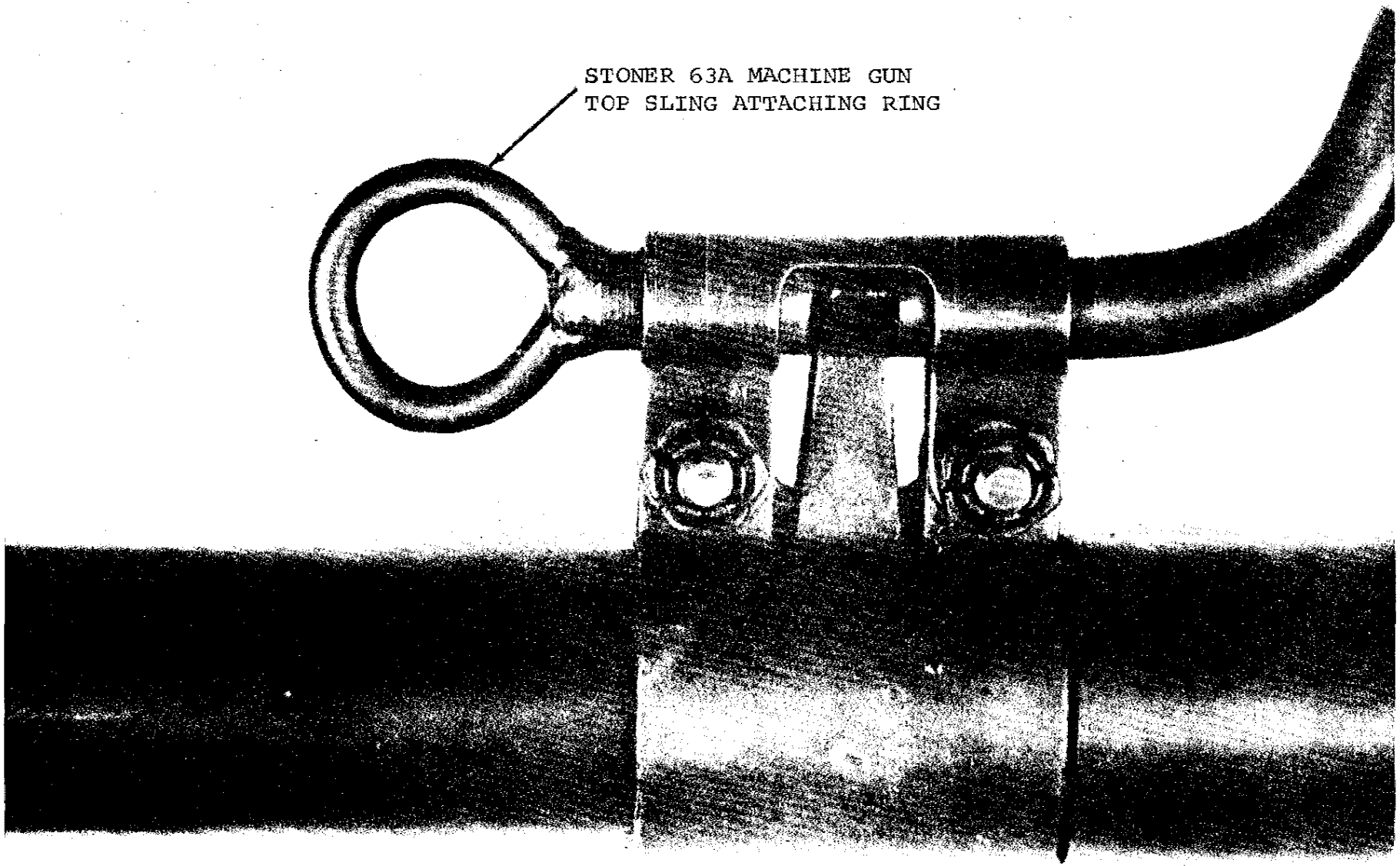


FIGURE 20

d. Stoner 63A Light Machine Gun

Figure 21 depicts the Stoner 63 Light Machine Guns before and after modifications. The modifications are pointed out by small arrows.

The feed tray manufactured to date utilized stamped parts which were welded together. Warping resulted which required extra processing to insure reliability of functioning. This tray was susceptible to damage in the field when not carefully handled. It had a link guide and a cartridge stop which were attached to the tray by two small screws and two small holding pawls. The two hinges were also welded to the tray.

The new feed tray illustrated in figures 22 and 23 is constructed in a solid steel investment casting in which the hinges and cartridge stop are an integral part. It has a wide single holding pawl and the link guide is riveted on. The projection that caused personnel to bark their knuckles when cocking the weapon has been eliminated.

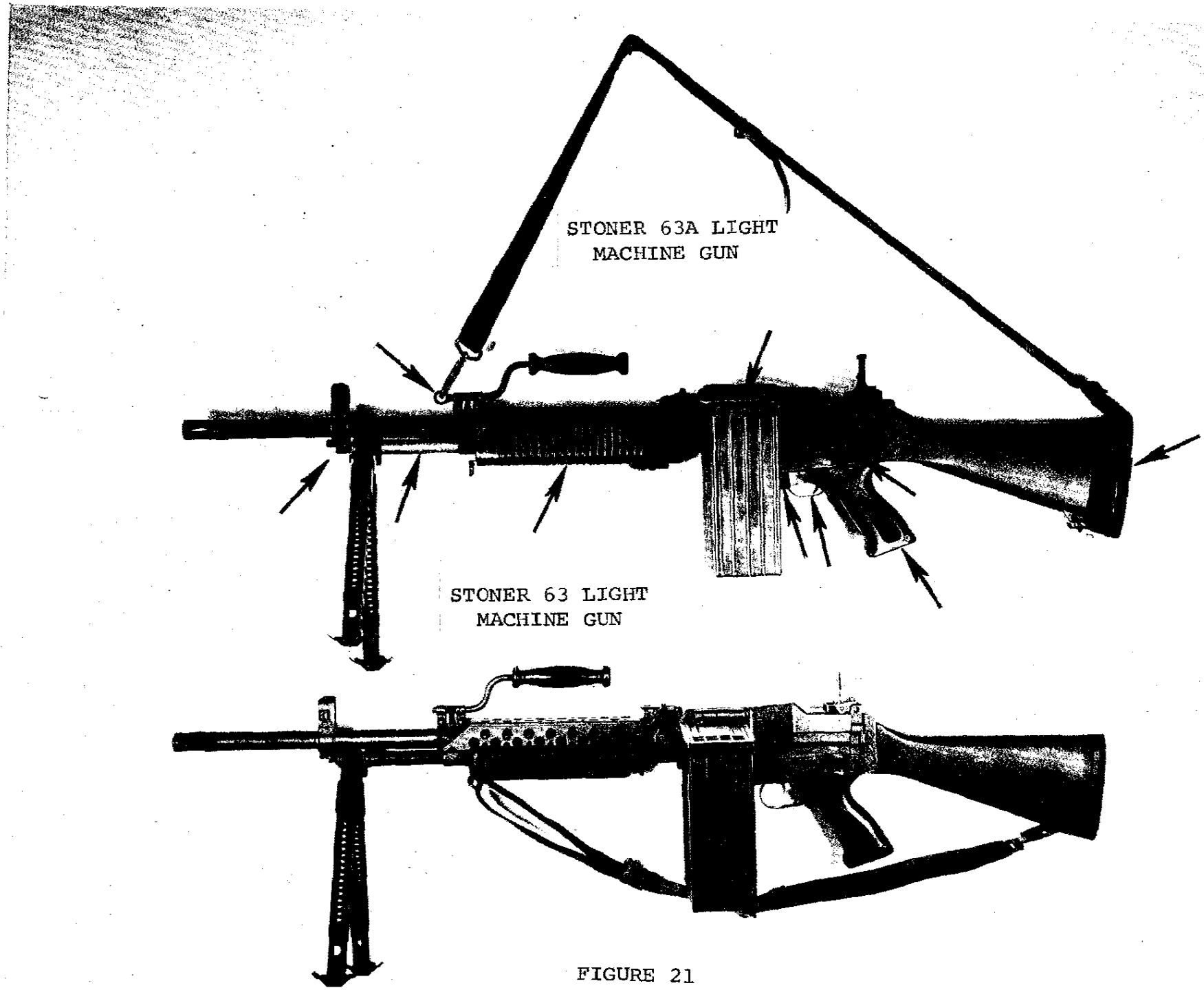
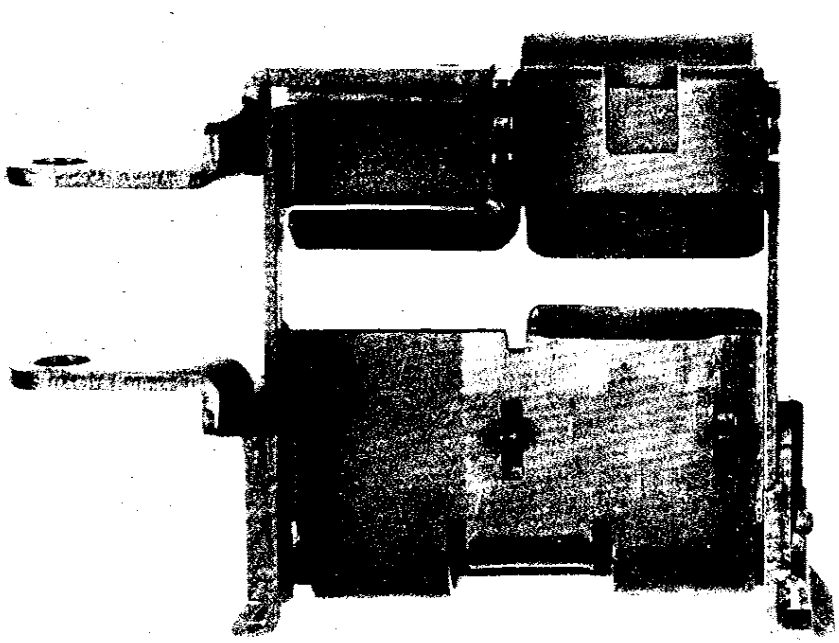
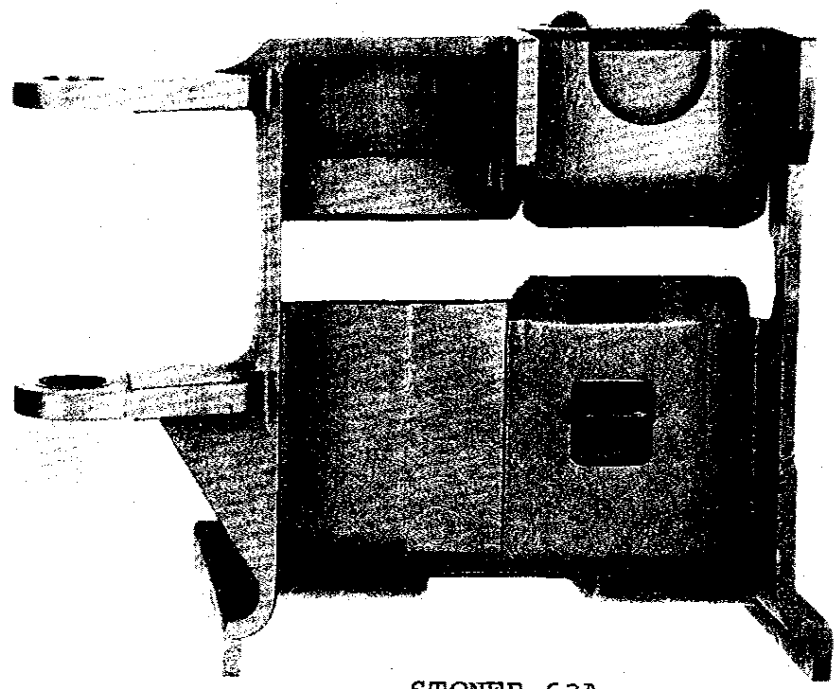


FIGURE 21

FEED TRAY ASSEMBLY
TOP VIEW



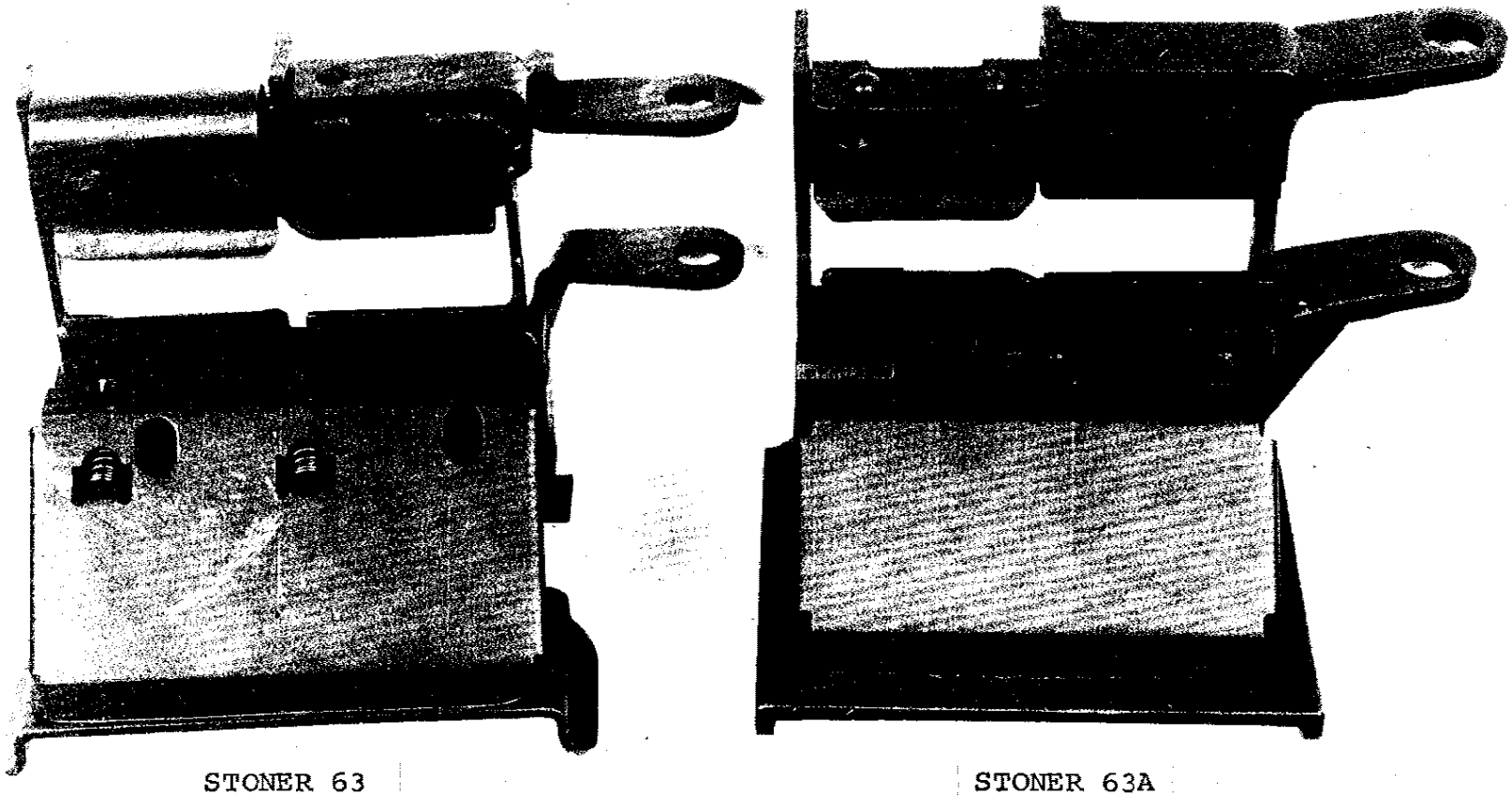
STONER 63
(OBSOLETE)



STONER 63A
(STANDARD)

FIGURE 22

FEED TRAY ASSEMBLY
UNDERSIDE VIEW



STONER 63
(OBSOLETE)

STONER 63A
(STANDARD)

FIGURE 23

The feed cover was made of stampings which were welded together. The stamped cover was functional, which required extreme flatness and squareness, and was readily susceptible to damage in the field. It had four hinges requiring extreme care in welding to prevent misalignment of the feed cover to the receiver. The cover was open in many areas, which permitted dirt and dust to enter the mechanism during exercises in the field. Closing this feed cover on the receiver when the bolt was forward caused distortion and bending, which in turn caused it to malfunction.

The new feed cover shown in figures 24 and 25 is an envelope for the rigid cast parts that include the front and rear rail for the feed pawl assembly and the hinges. This cover is so constructed that all possible entry areas for dirt and dust are closed off. There is a spring loaded cover over the link ejection port which opens under the force of the link being ejected, and closes automatically when firing ceases. Figure 26 shows the cover in its closed

FEED COVER ASSEMBLY
TOP VIEW

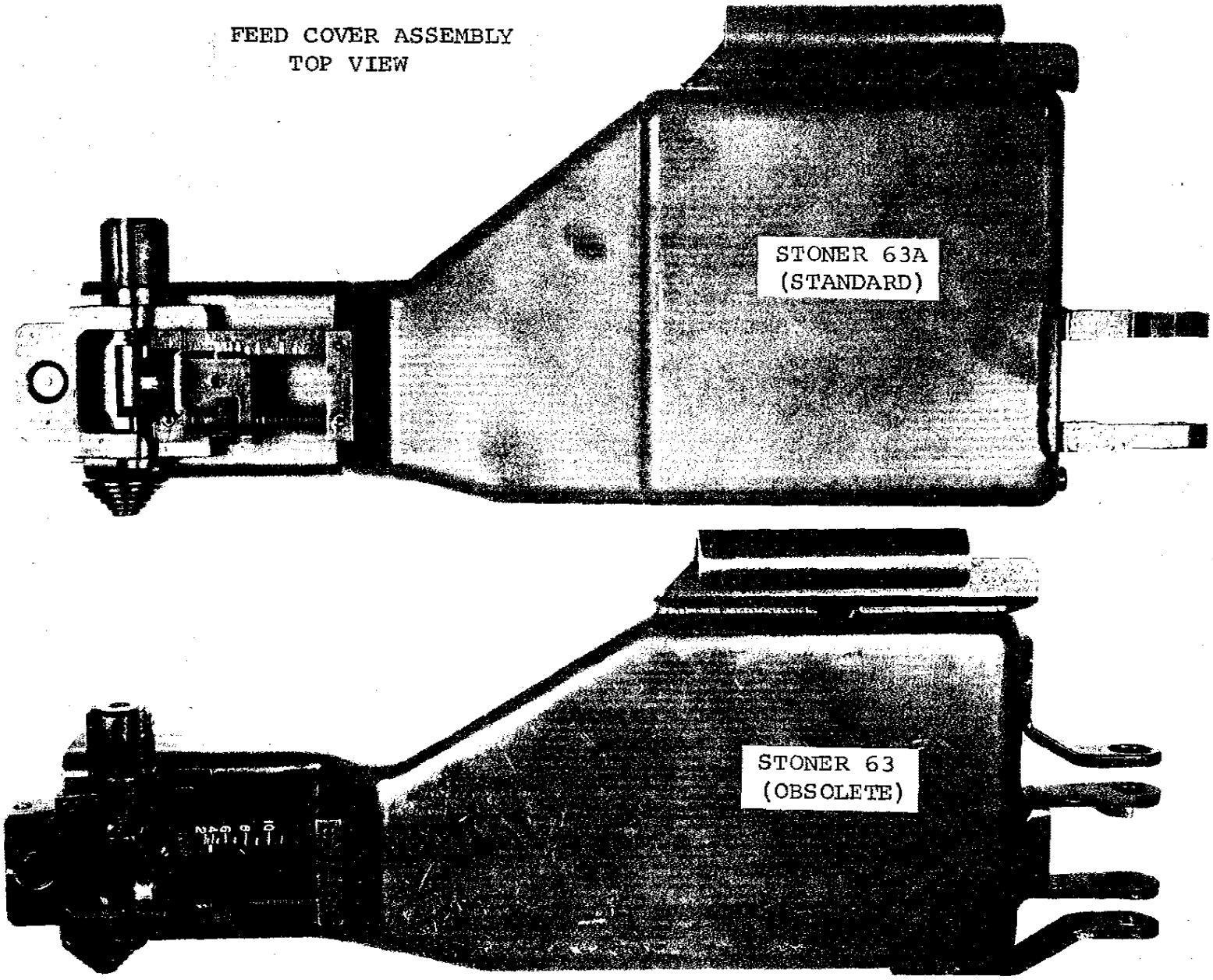
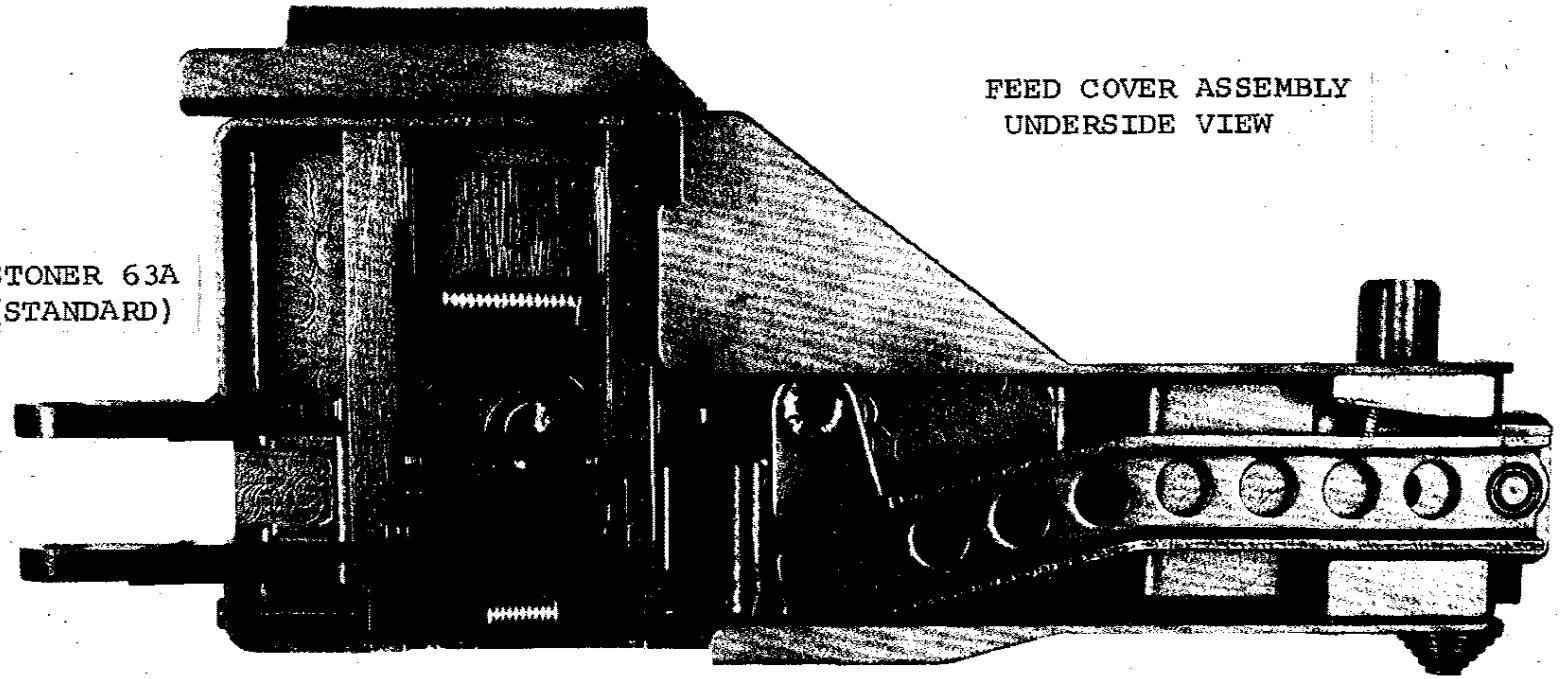


FIGURE 24

FEED COVER ASSEMBLY
UNDERSIDE VIEW

STONER 63A
(STANDARD)



STONER 63
(OBSOLETE)

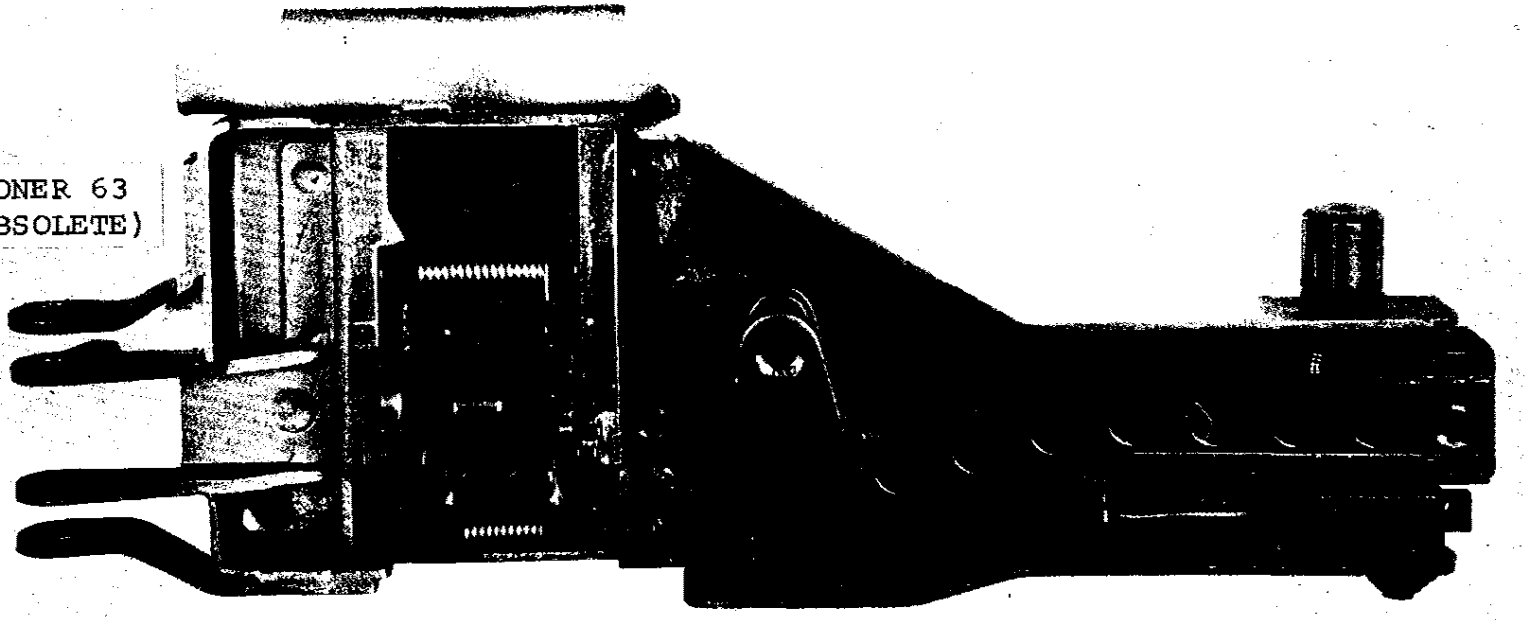


FIGURE 25

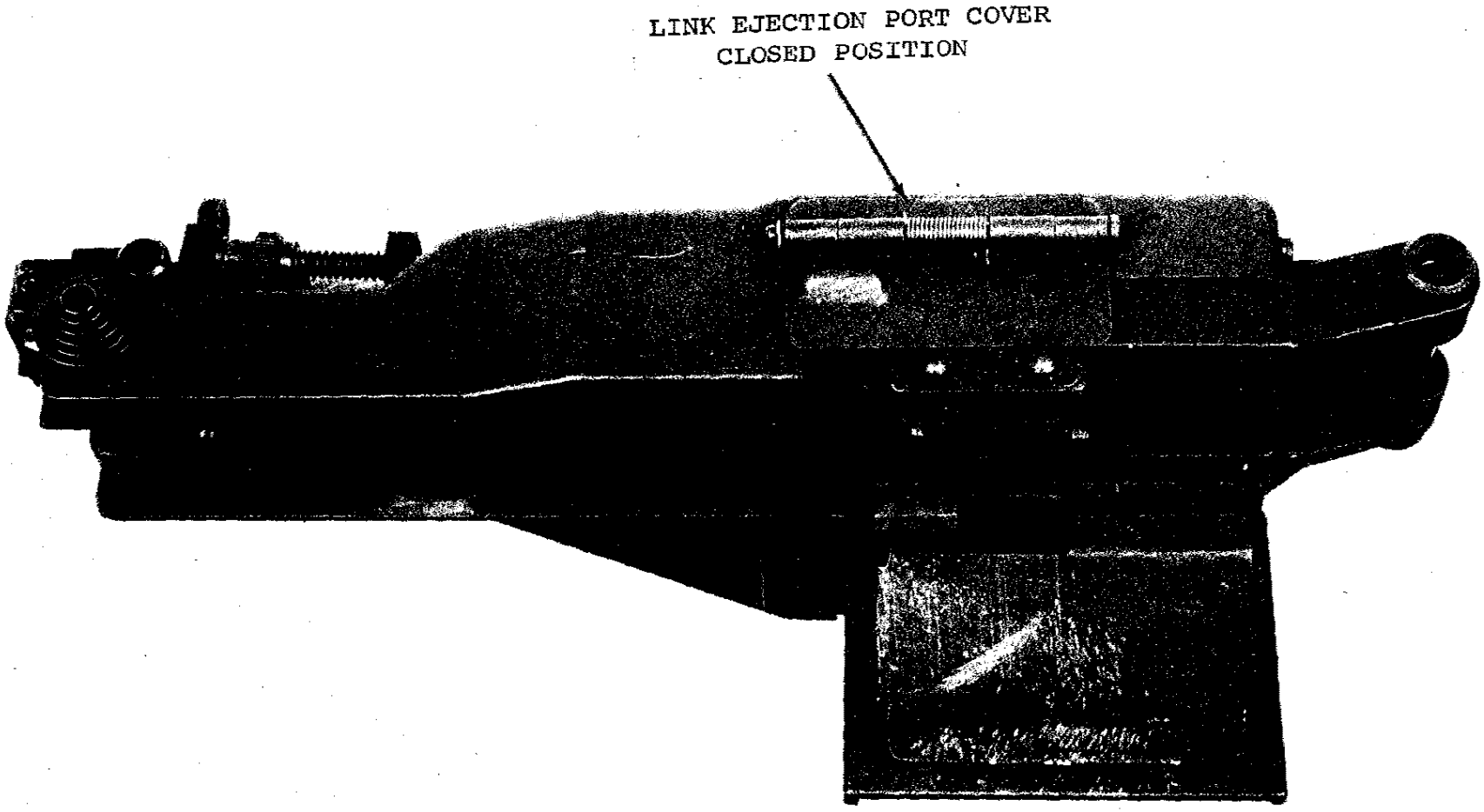


FIGURE 26

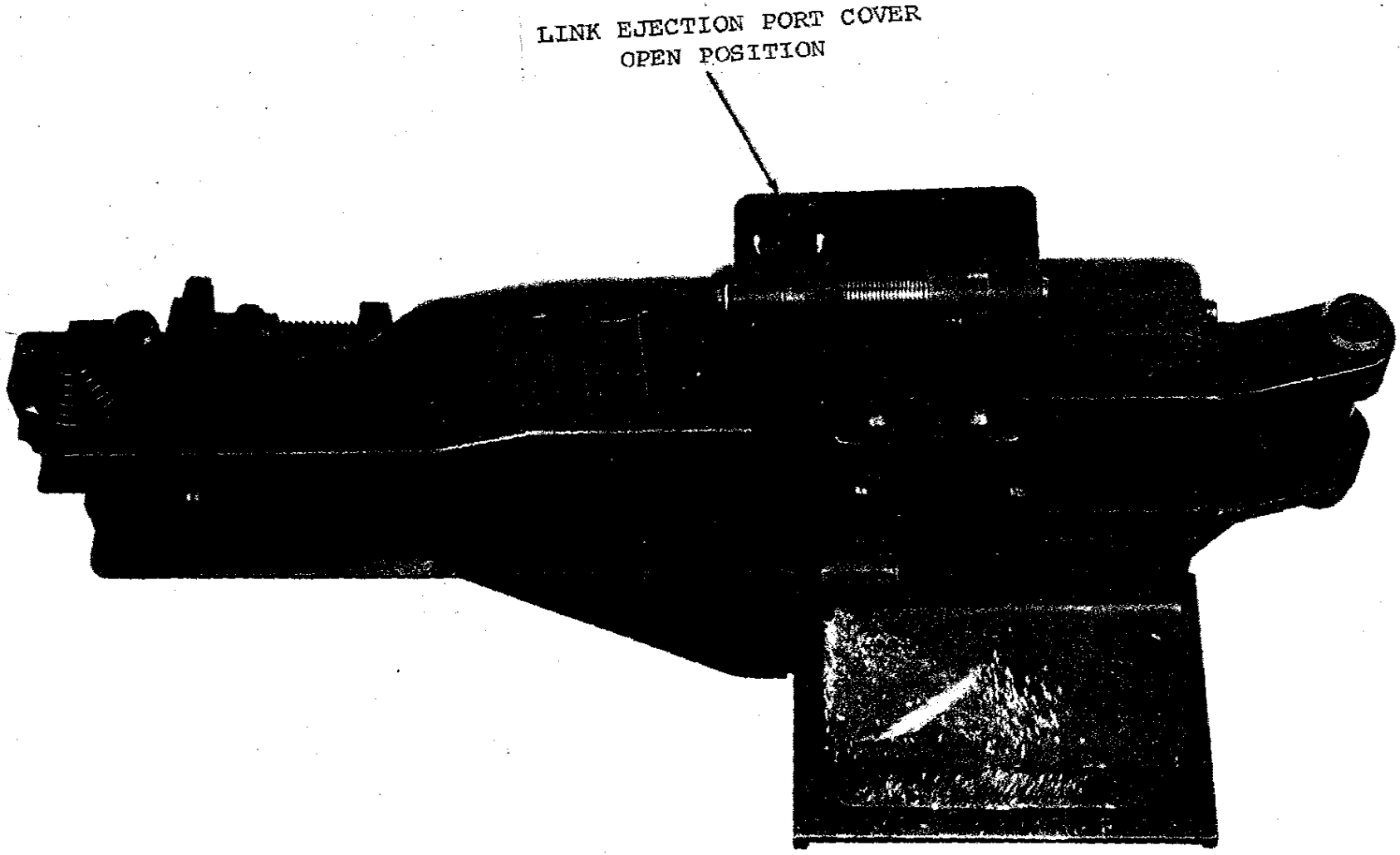


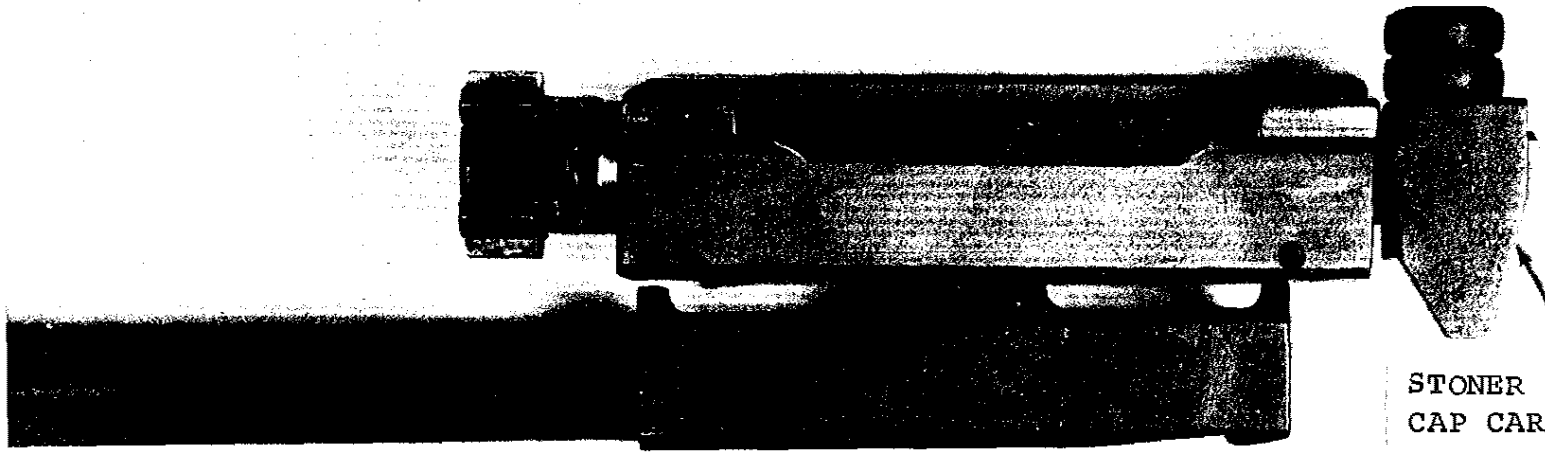
FIGURE 27

position and figure 27 shows it open.

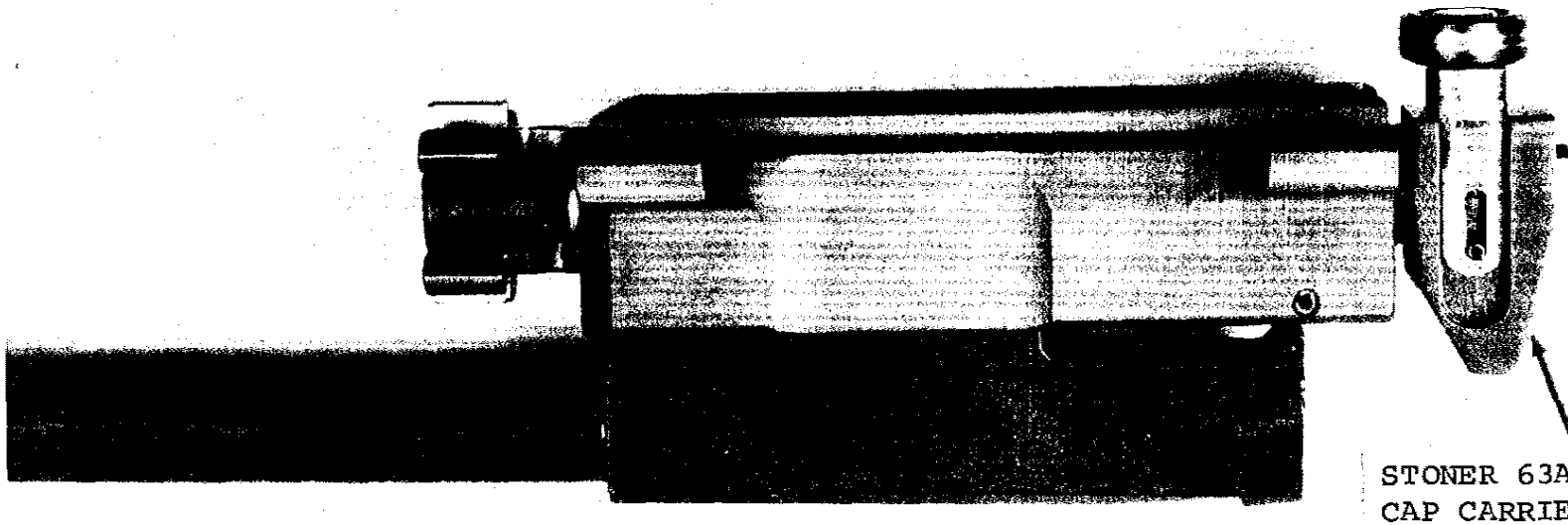
Figure 28 depicts the new and old cap carrier assemblies which afford the Stoner 63A Machine Gun with the capability of closing the feed cover regardless of where the bolt is. The roller is mounted on a frame that is spring loaded and dove-tailed into the cap carrier to permit vertical movement. When the cover is closed with the bolt in the forward position, the roller assembly moves down into the cap carrier slots, and upon the rearward action of the bolt, it comes up into the feed lever automatically.

This modification was necessary to prevent damage to the feed lever and feed cover during field use. Personnel insisted on closing the cover regardless of the bolt's position unless they were well trained in the use of the Machine Gun. This modification will reduce the training time requirement and prevent damage to the feed cover.

CARRIER, PISTON AND BOLT
ASSEMBLY



STONER 63 (OBSOLETE)
CAP CARRIER ASSEMBLY



STONER 63A (STANDARD)
CAP CARRIER ASSEMBLY

FIGURE 28

During the extensive tests conducted by the United States Army and the United States Marine Corps, personnel continually barked their knuckles on a projection on the feed tray when charging the Machine Gun. To prevent this, the charging handle was made longer, which required a relocation of the cocking handle guide as shown in Figure 29. The man's knuckle is now to the rear of the slight projection on the feed tray which caused the problem. This projection has been eliminated on the new tray which further alleviates this problem.

Figure 30 shows the old and new front sight bases. The new base has been modified by adding a variable gas port. This variable gas port affords the operator the capability of decreasing or increasing the rate of fire, where previously it was not possible to do this. This modification was necessary to compensate for the mismatch existing between the standard 5.56mm ball cartridge M193, and the 5.56mm tracer cartridge M196.

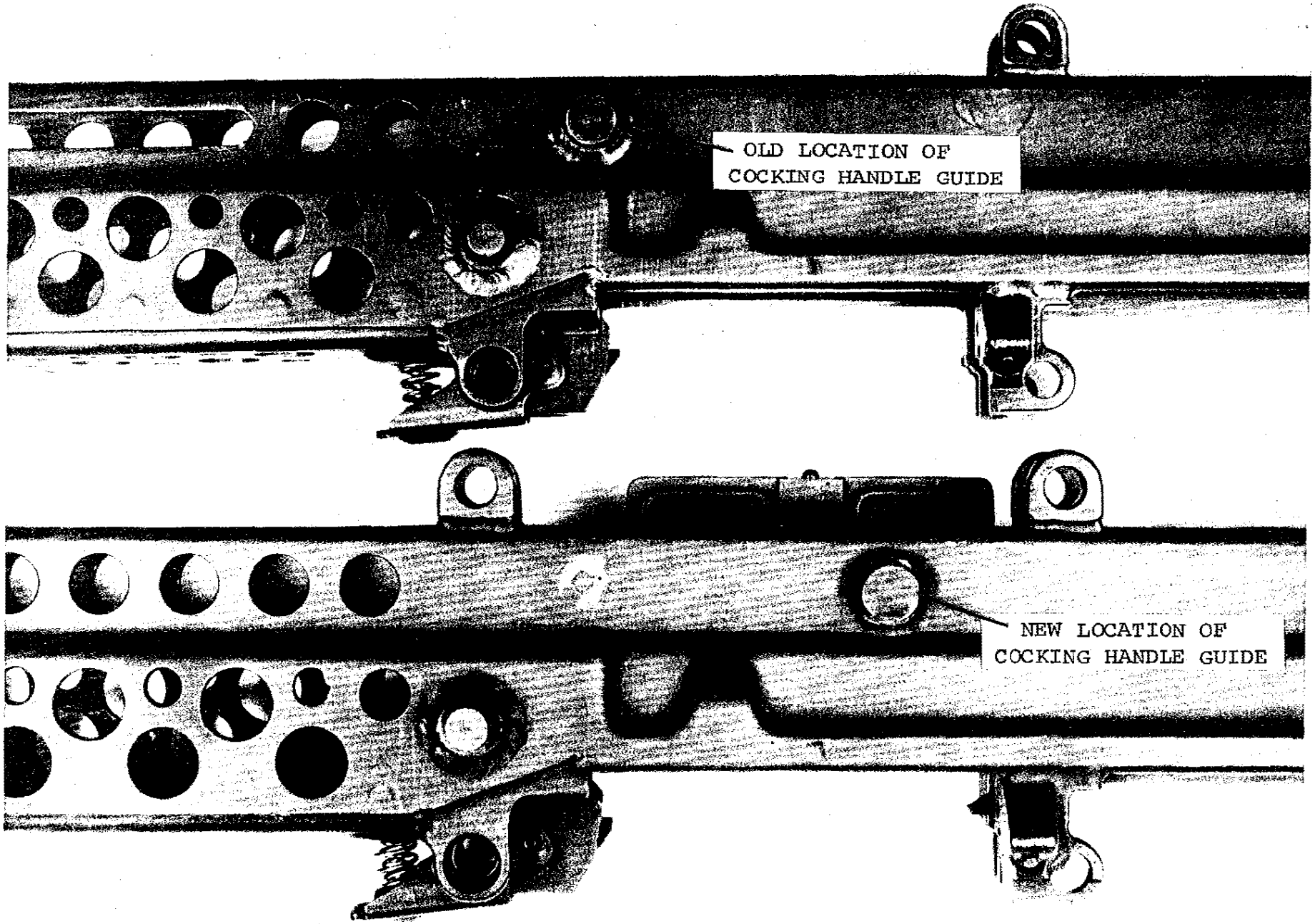
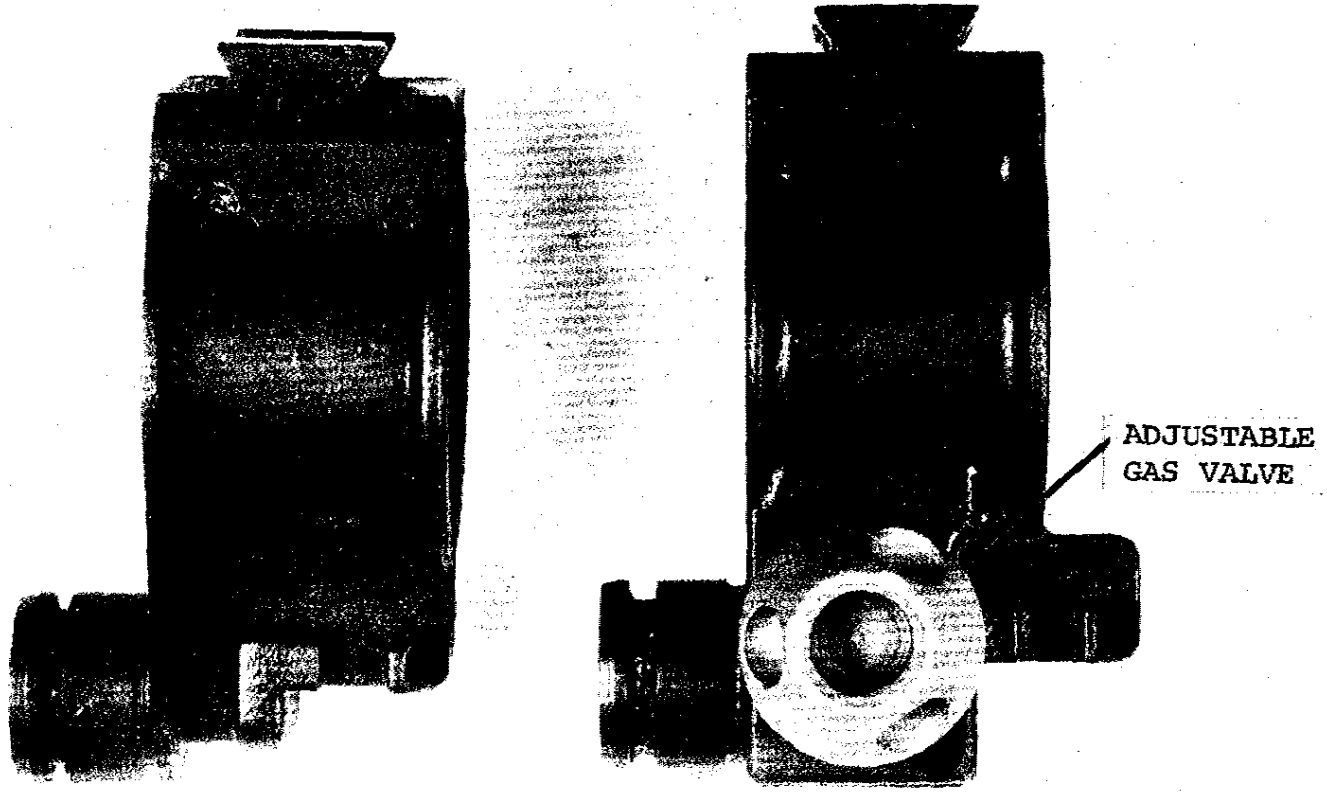

OLD LOCATION OF
COCKING HANDLE GUIDE
NEW LOCATION OF
COCKING HANDLE GUIDE

FIGURE 29

MACHINE GUN FRONT SIGHT BASE



STONER 63
(OBSOLETE)

STONER 63A
(STANDARD)

FIGURE 30

The same cocking handle, forestock assembly, top sling attaching ring, butt stock pad, selector lever, safety lever, and hardened barrel utilized by the Automatic Rifle are used by the Stoner 63A Light Machine Gun.

e. Stoner 63A Medium Machine Gun

All modifications made on the Stoner 63A Light Machine Gun and discussed in paragraph d. above, are applicable to this weapon.

f. Stoner 63A Fixed Machine Gun

All modifications made on the Stoner 63A Light Machine Gun and discussed in paragraph c. above are applicable to the Stoner Fixed Machine Gun where appropriate.

Figure 31 shows the old and new remote control assemblies. A modified bell crank assembled to the new remote control assembly affords the Fixed Machine Gun with a less sensitive remote control assembly than that previously provided.

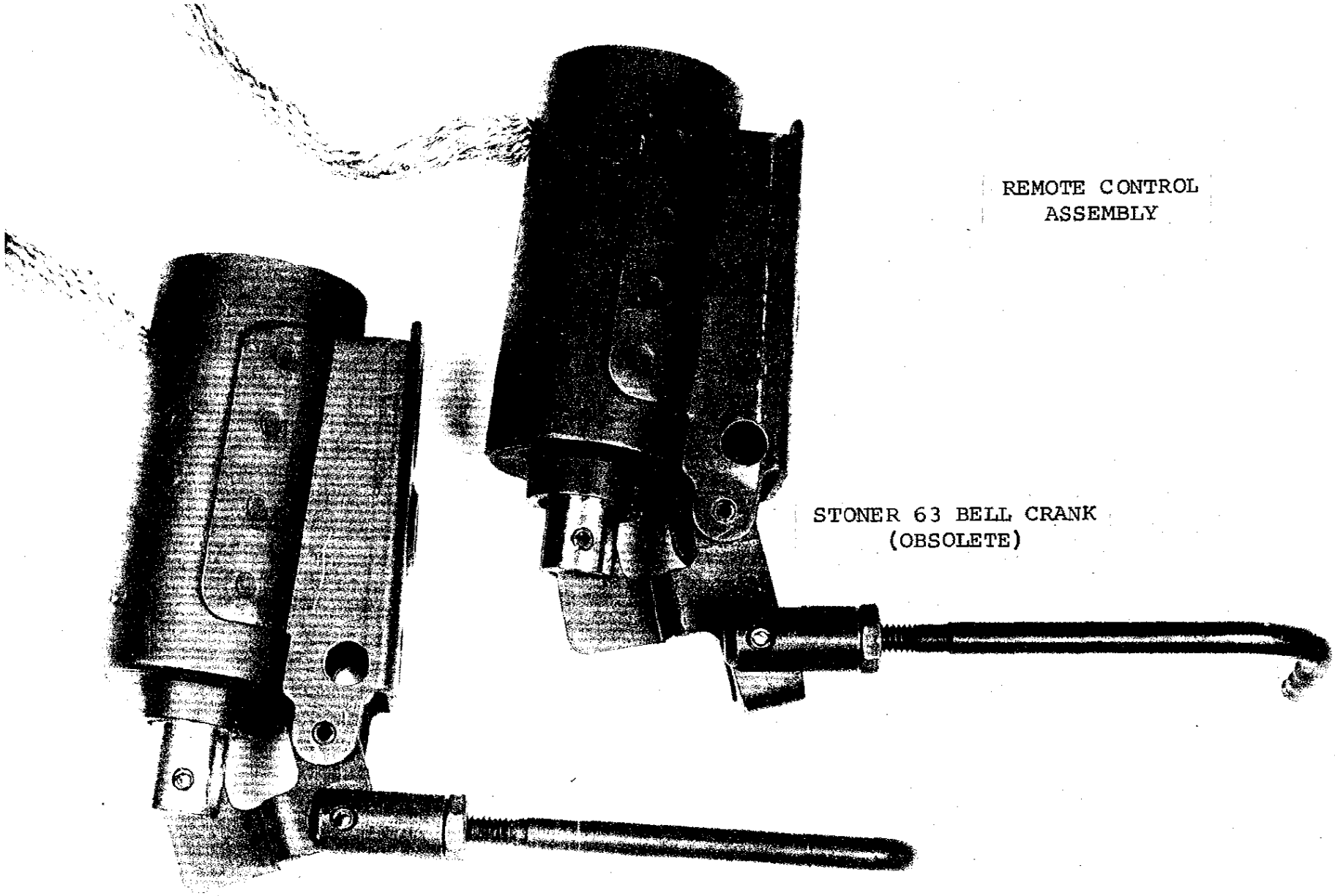

REMOTE CONTROL
ASSEMBLY
STONER 63 BELL CRANK
(OBSOLETE)
STONER 63A BELL CRANK
(STANDARD)

FIGURE 31

g. Accessories for Stoner 63A Weapon System

Bipod

The bipod has been modified by adding a spring locking feature that permits the operator to lock the bipod to the weapon so it cannot become accidently disengaged during movement through underbrush. Figure 32 shows the old and new bipod with the new bipod locked in the carrying position. Figure 33 shows the new and old bipod in the open position.

Plastic Ammunition Bandoleer

Figure 34 shows the old and new bandoleer. The new bandoleer is modified by the addition of the metal reinforced top strip shown in the photograph.

Round Ammunition Drum Container

Figure 35 depicts a 100 round ammunition container that is hinged and opens by unlatching two snap type locks. This is quickly detached by removal of two receiver pins that hold it on the receiver. Figure 36 shows a 150 round ammunition container that opens by

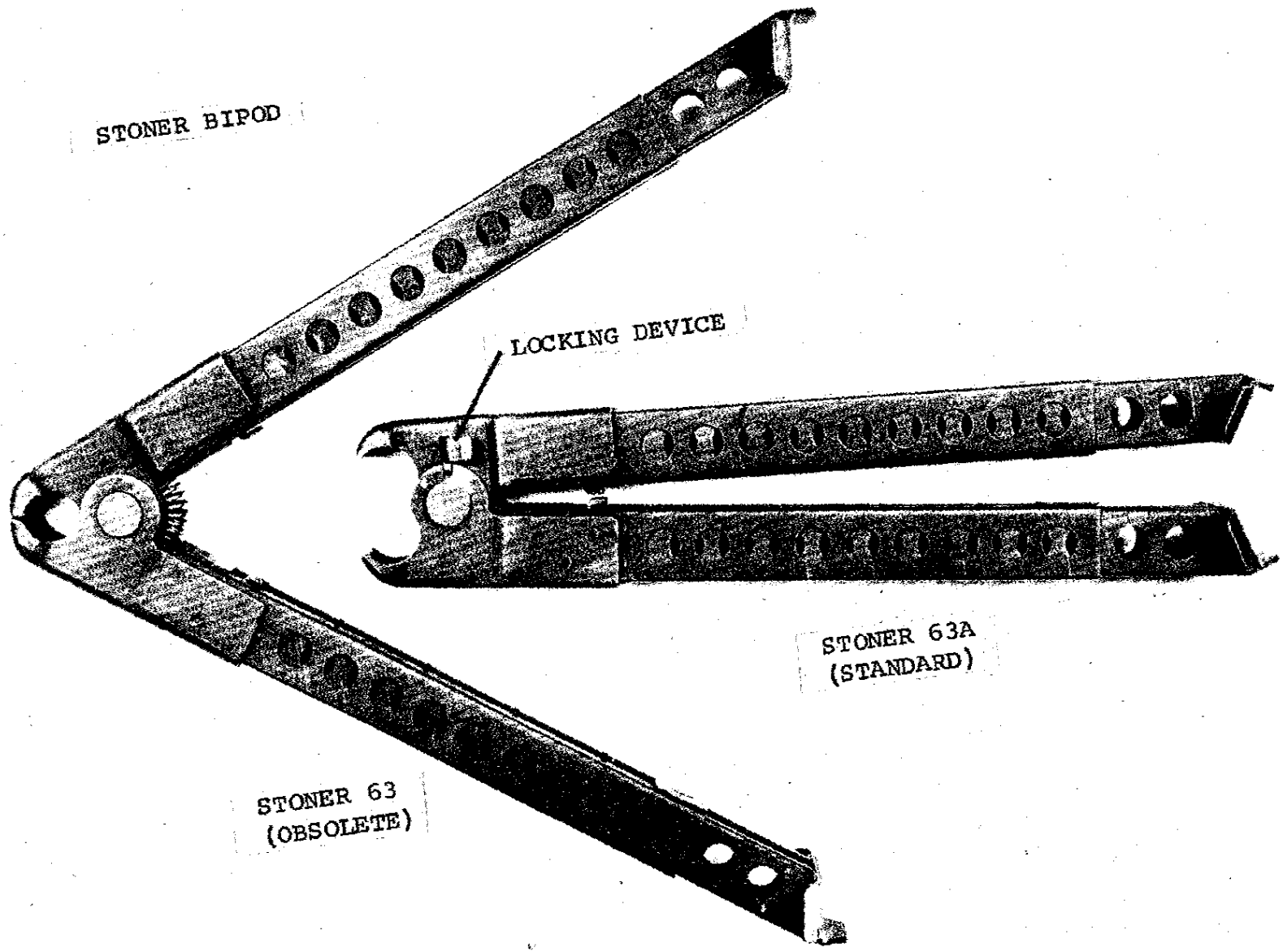

STONER BIPOD
LOCKING DEVICE
STONER 63A
(STANDARD)
STONER 63
(OBSOLETE)

FIGURE 32

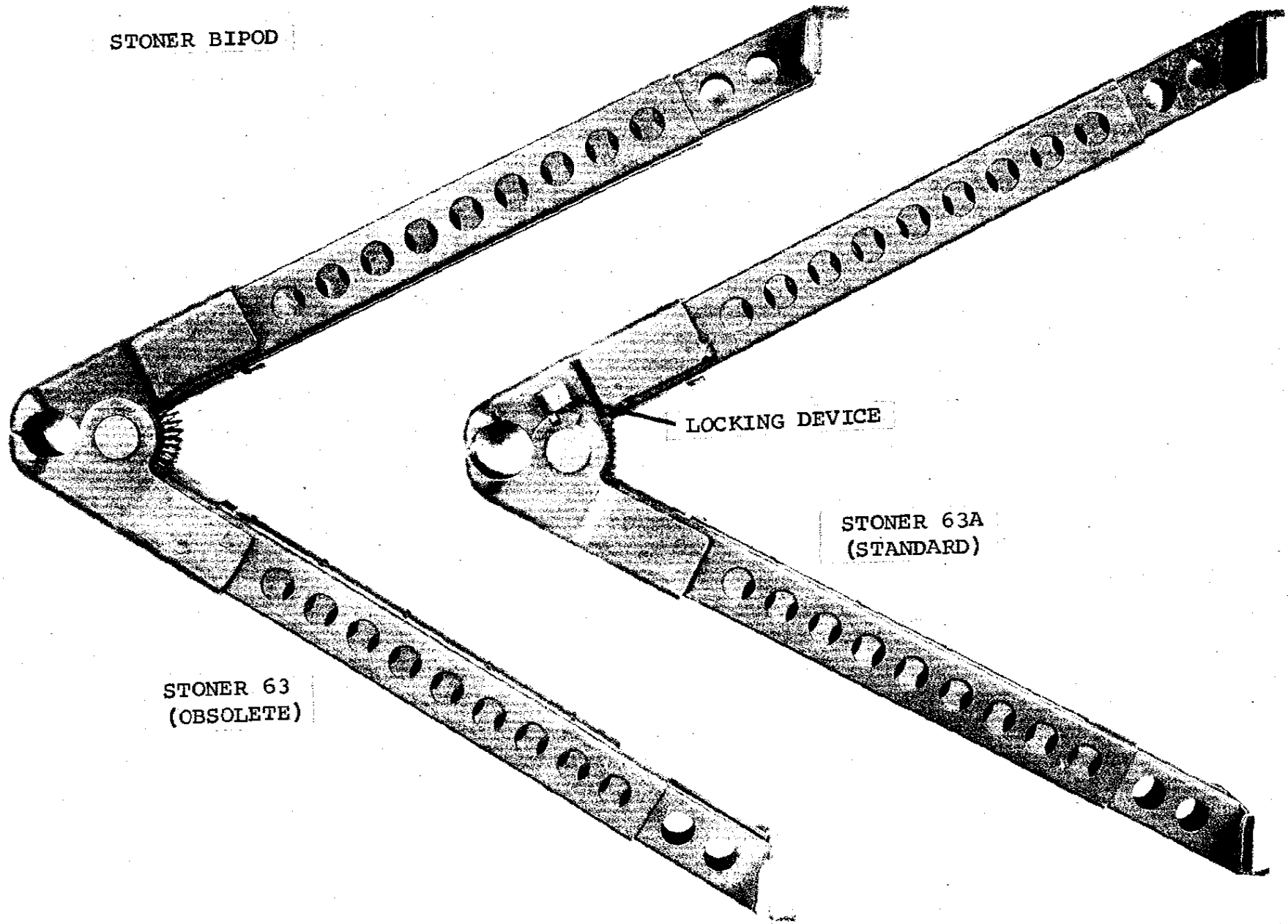
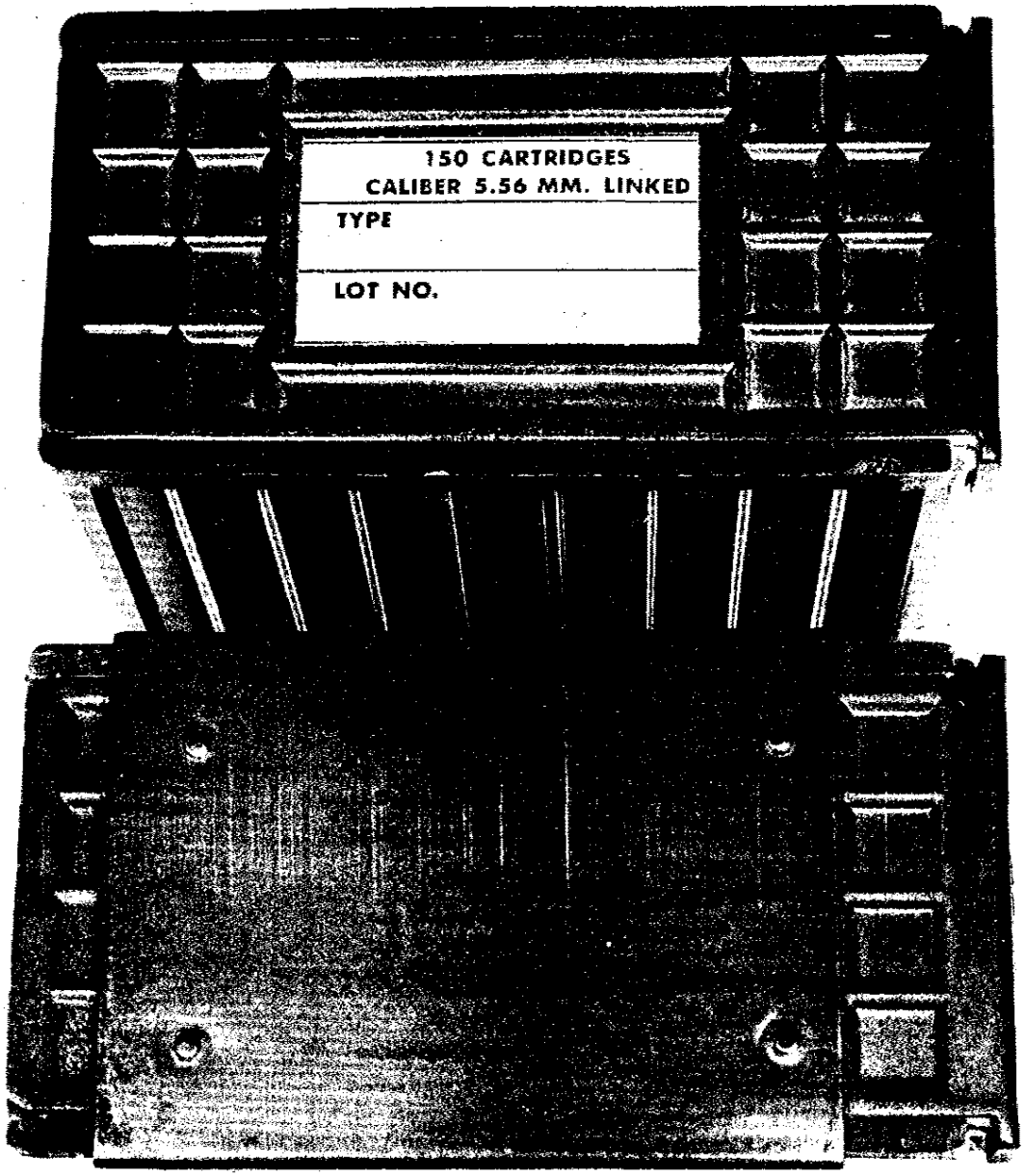

STONER BIPOD
LOCKING DEVICE
STONER 63A
(STANDARD)
STONER 63
(OBSOLETE)

FIGURE 33



OLD

NEW

FIGURE 34

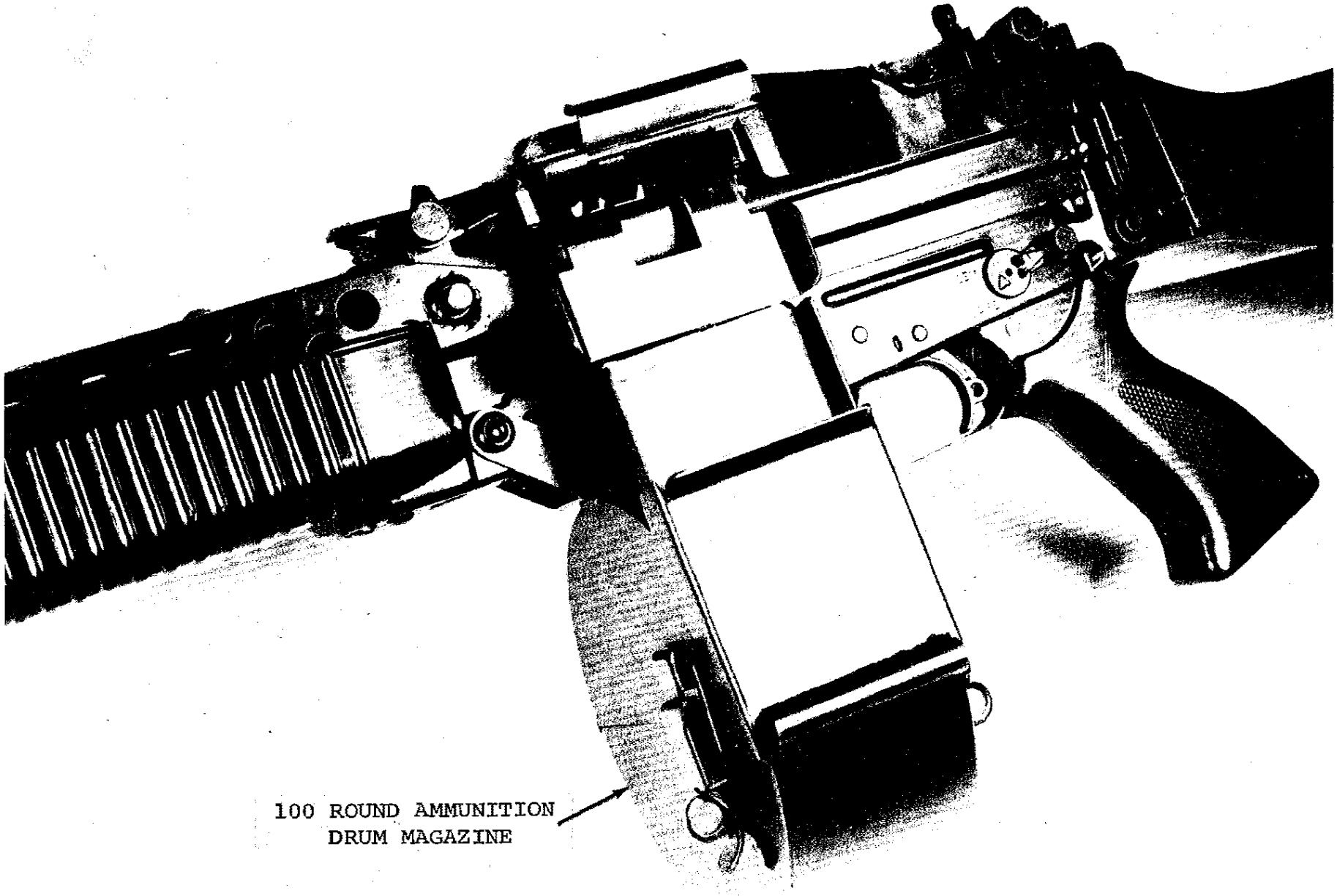


FIGURE 35

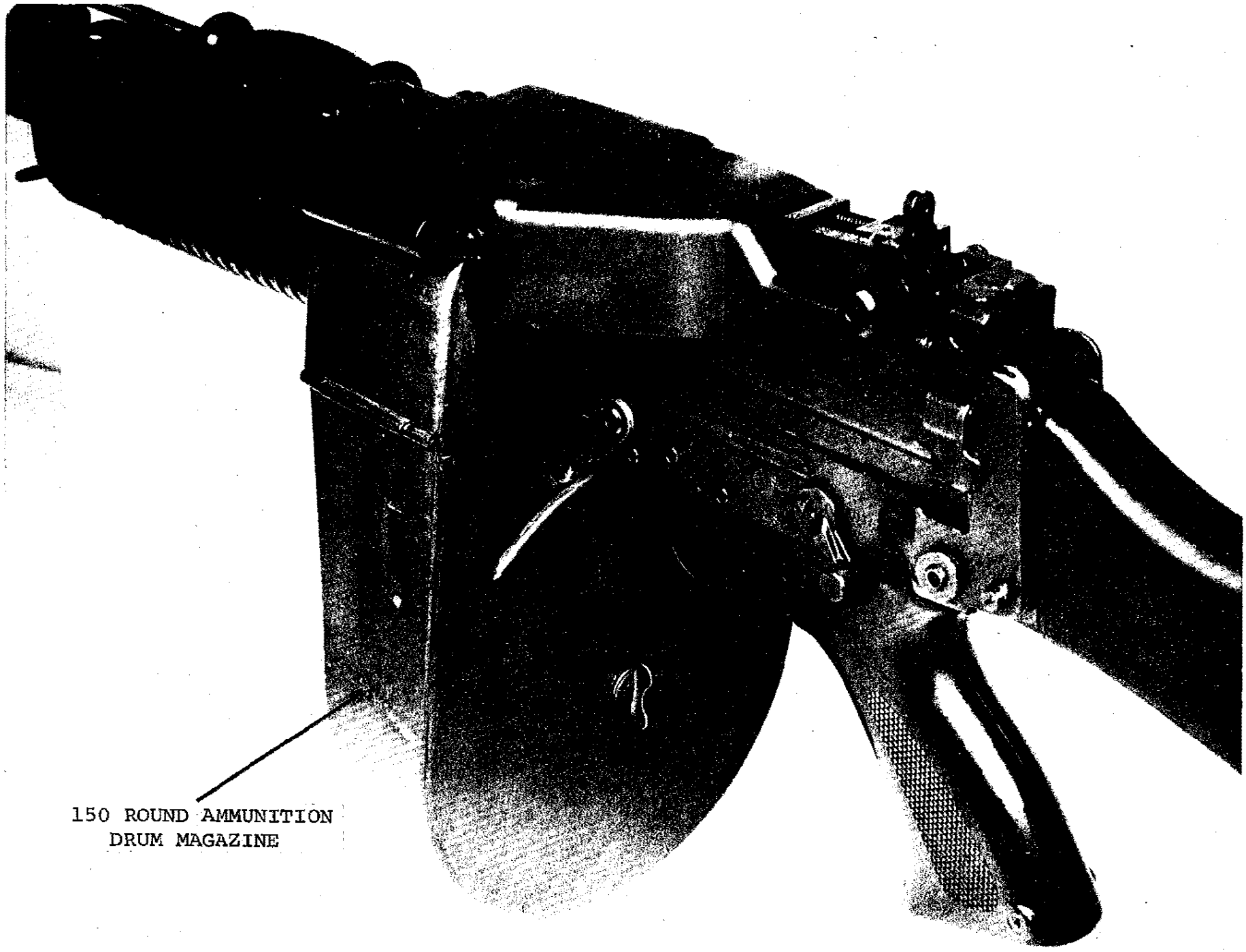


FIGURE 36

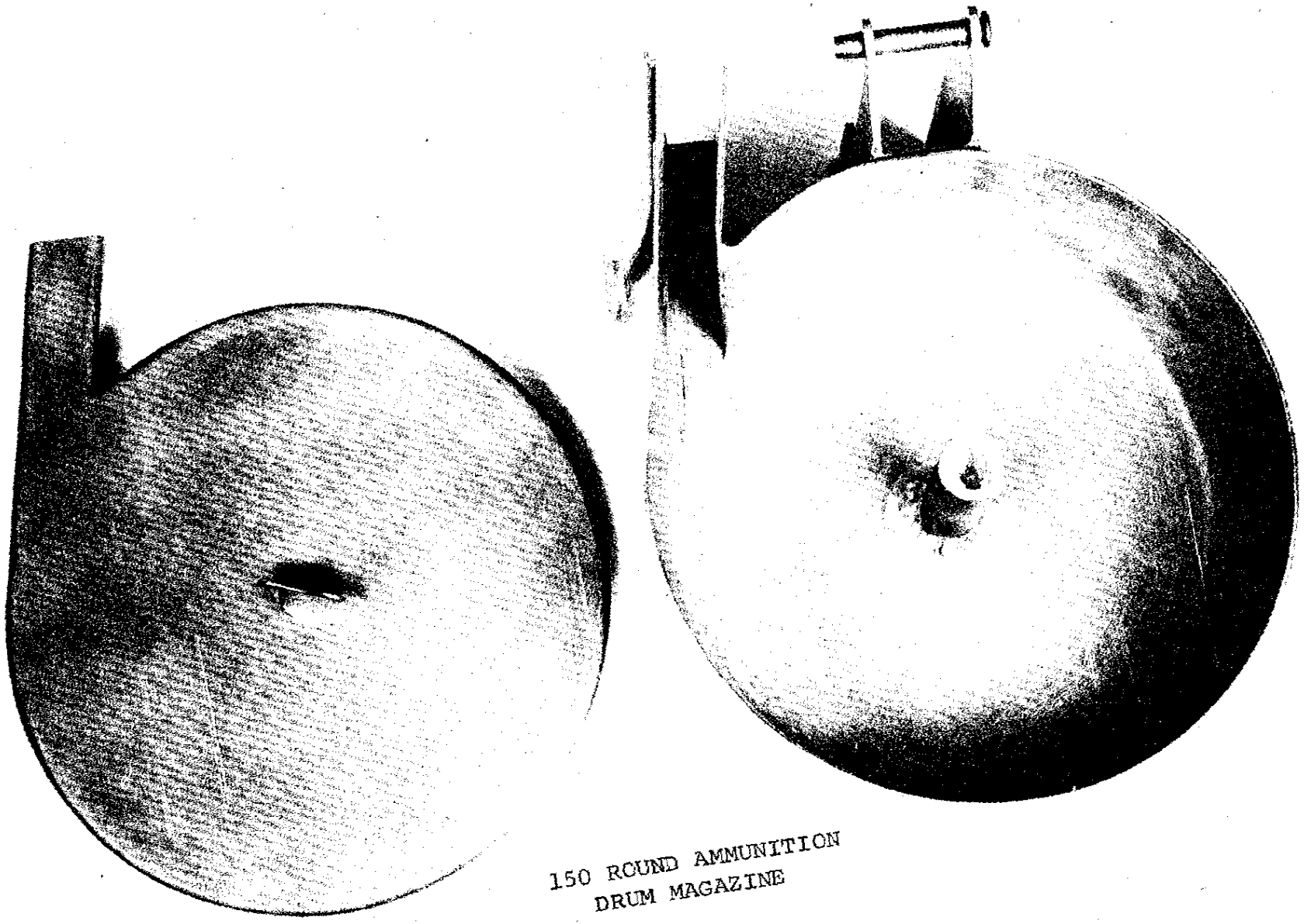
turning the latch in the center 90° counterclockwise and removing the back plate. Figure 37 depicts this container with the plate removed.

20 Round Magazine

Figure 38 shows a 30 round magazine and a 20 round magazine. The magazine can be made for any reasonable number of rounds desired. Figure 39 depicts the steel 30 round magazine on a scale indicating an 8 ounce weight while empty. Figure 40 shows the aluminum 30 round magazine on a scale indicating a weight of 4 ounces, a saving of 4 ounces per magazine.

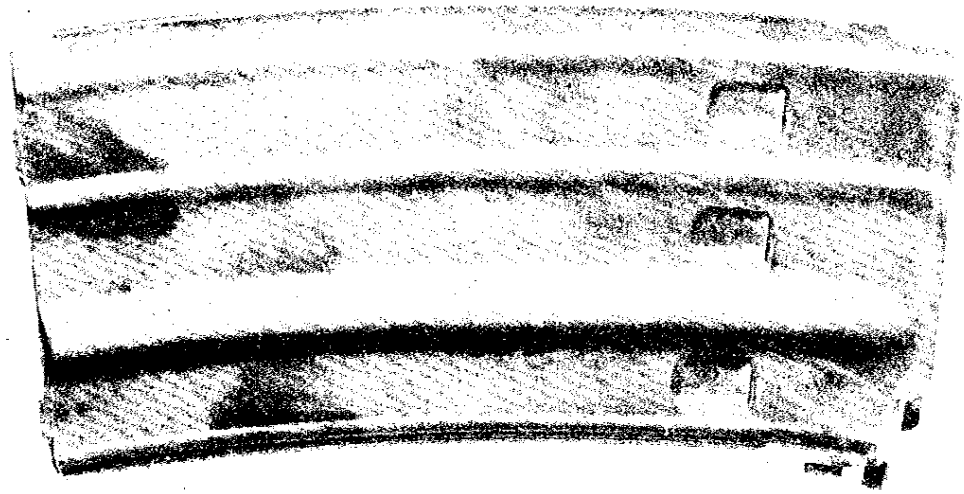
Cleaning Rod Retaining Bracket

Figure 41 shows the cleaning rod retaining bracket dismounted and Figure 42 shows it attached to the weapon. The three sections of the cleaning rod are easily removed for use in the field. The attachment is removed from the receiver when configured as a Machine Gun or Automatic Rifle.

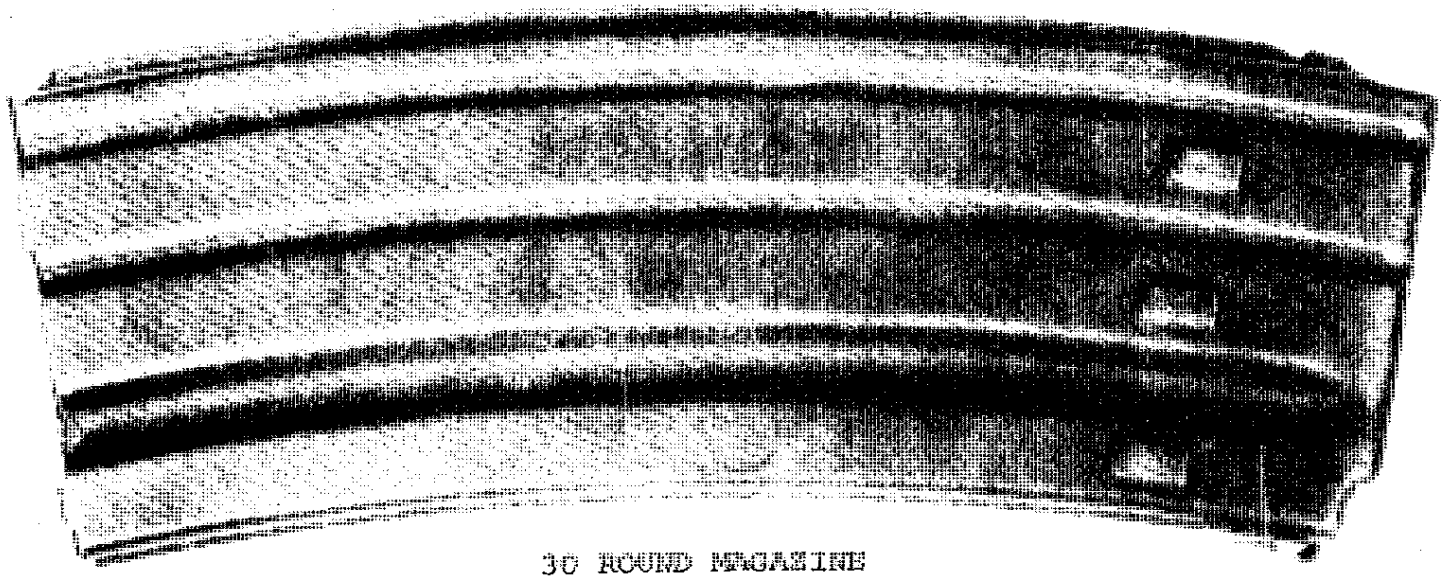


150 ROUND AMMUNITION
DRUM MAGAZINE

FIGURE 37



20 ROUND MAGAZINE



30 ROUND MAGAZINE

FIGURE 38

30 ROUND (STEEL)
MAGAZINE WEIGHT - 8 OZ.

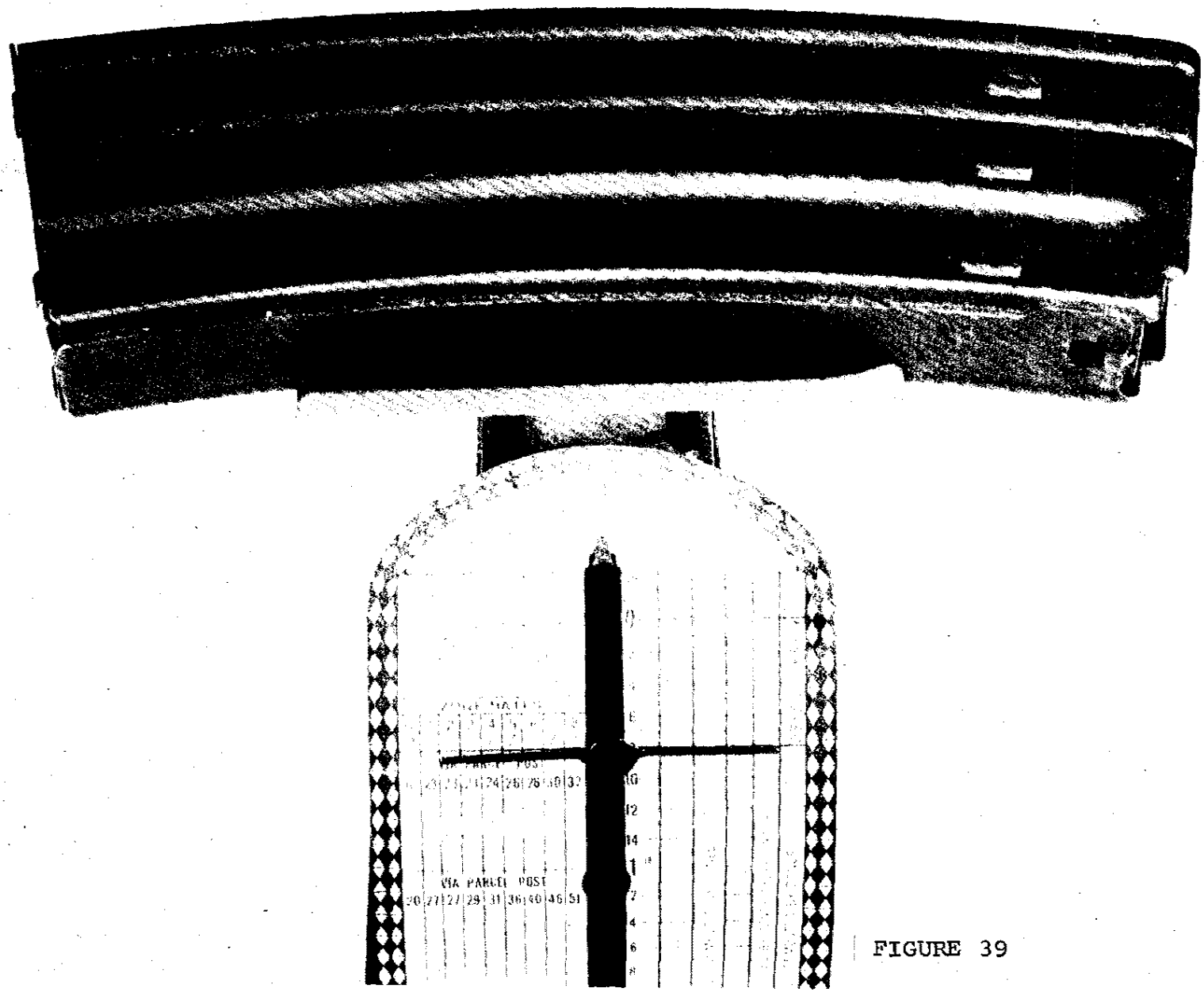


FIGURE 39

30 ROUND (ALUMINUM)
MAGAZINE WEIGHT 4 OZ.

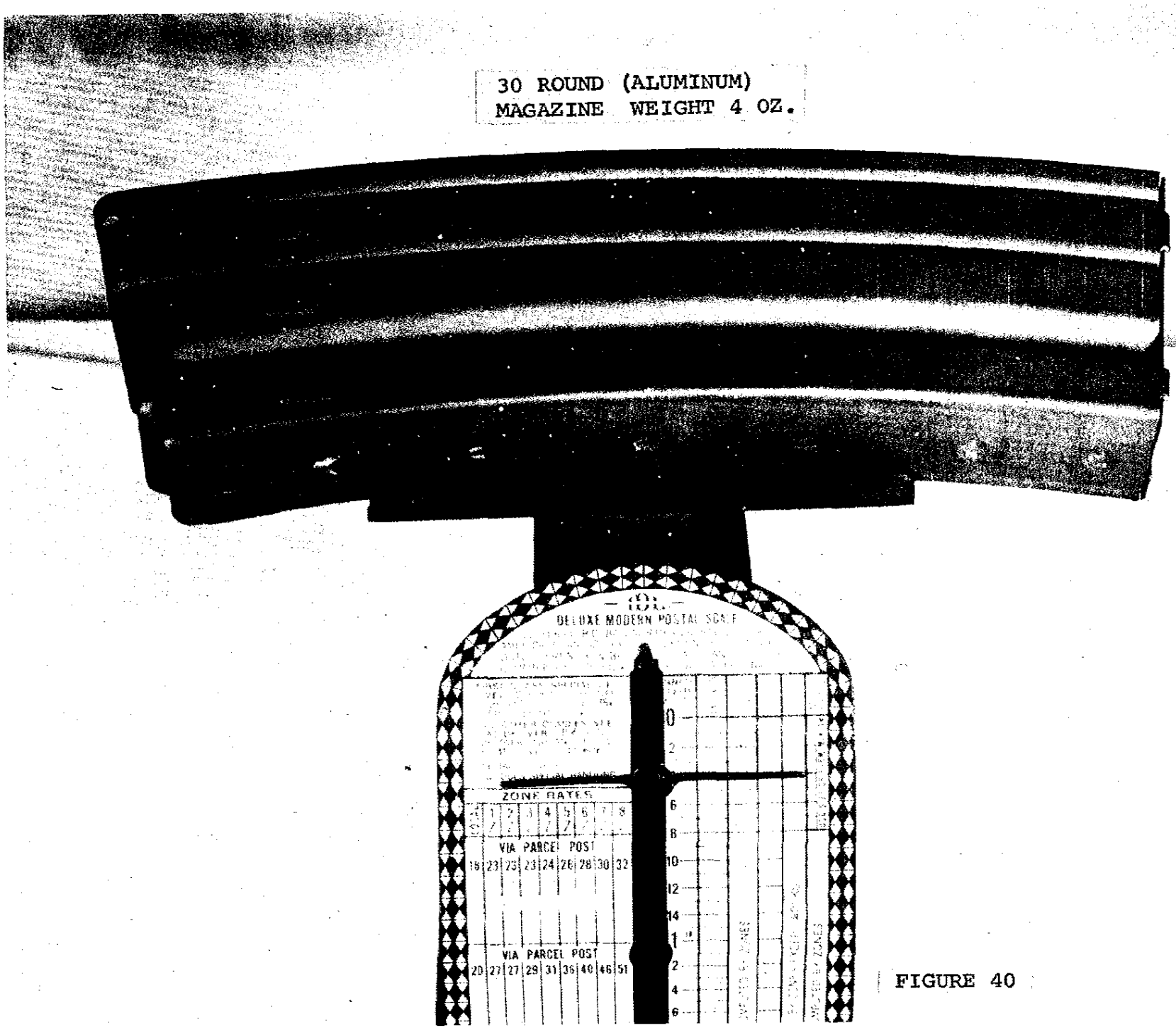


FIGURE 40

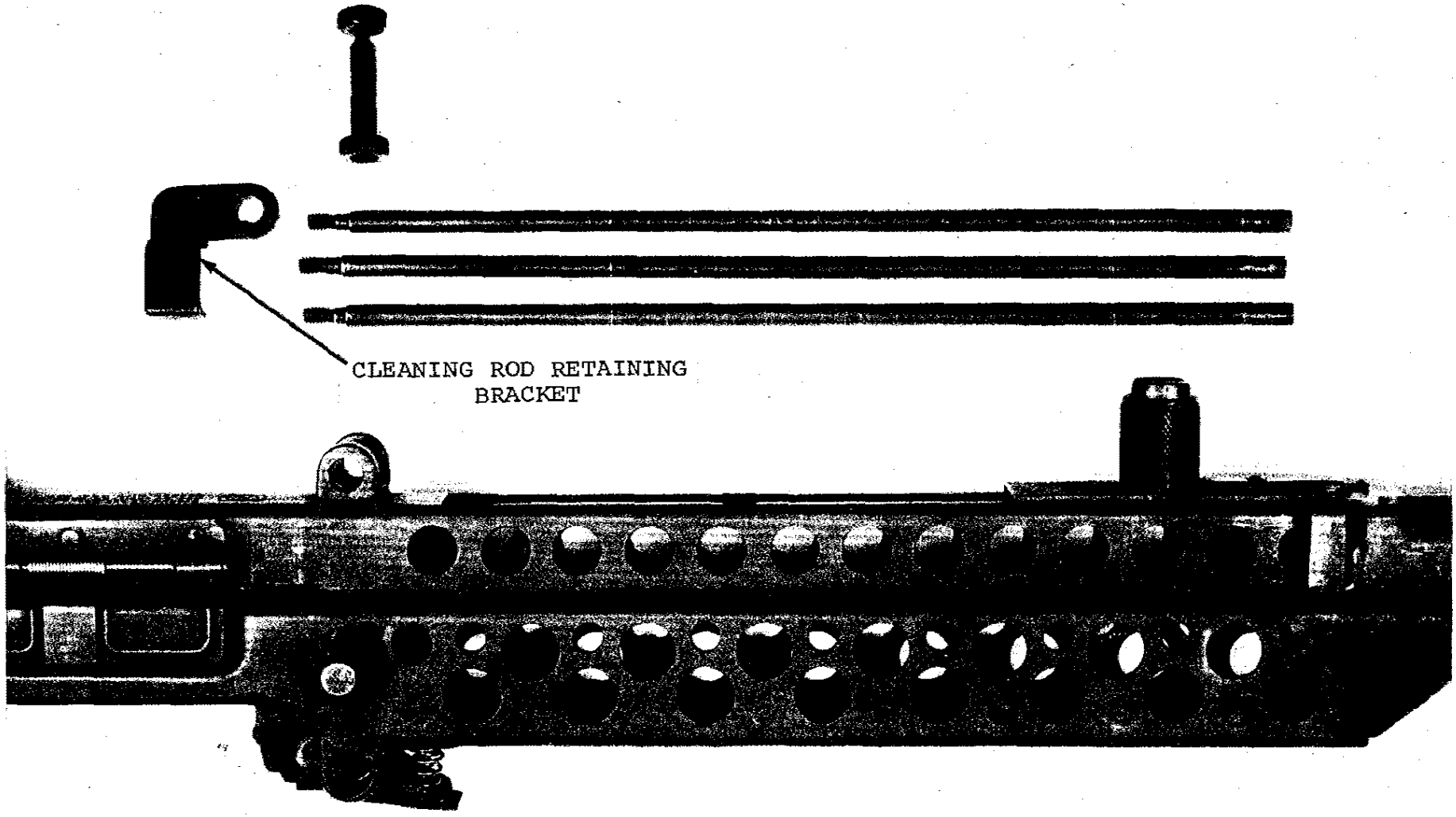


FIGURE 41

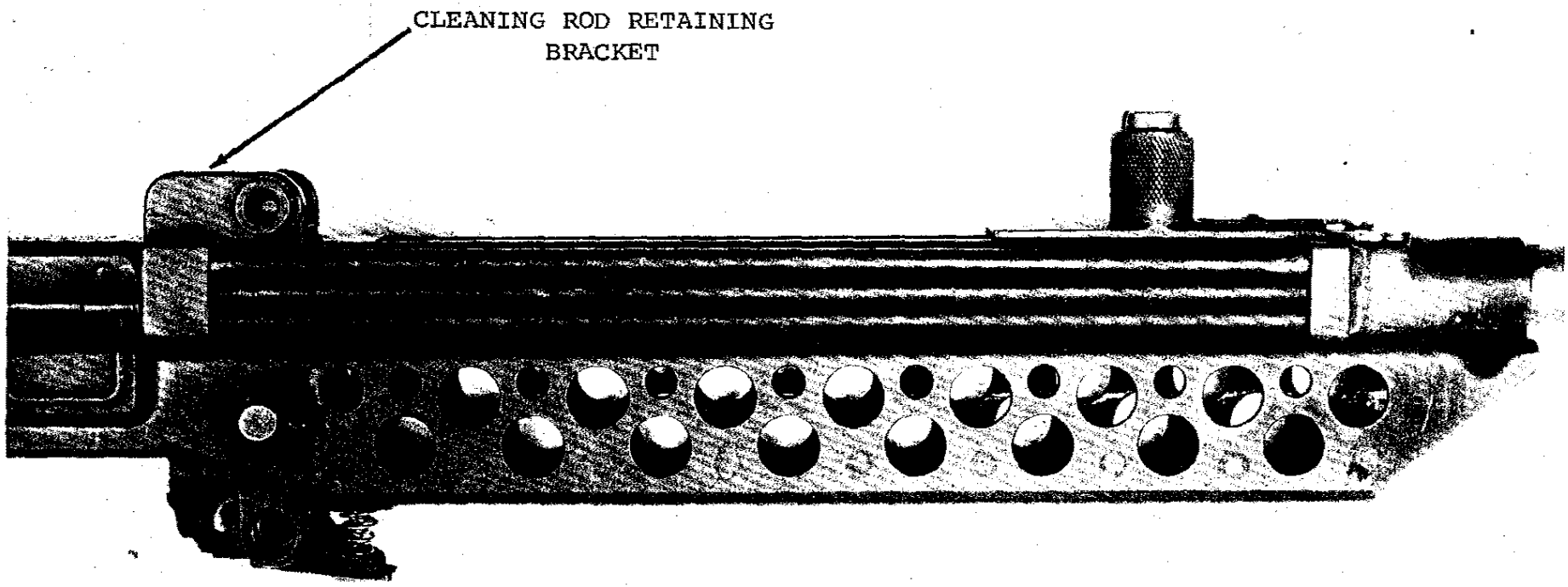


FIGURE 42

Oiler, Patch and Brush Stowage

The pistol grip will be modified with the addition of a door so as to make the stowage of the cleaning gear possible. The door will be hinged and when open or closed will be retained by its construction. This feature will offer the individual a means of carrying the bore brush, bore brush adapter, cleaning rod tip, combination tool, oiler and cleaning patches on the weapon for ready access during field operations.