STECS-AS-LA

AD NO. _____
TECOM PROJECT NO. 9-CO-150-000-216
REPORT NO. USACSTA-6125

FINAL REPORT

SPECIAL STUDY

OF

M16A1-TYPE RIFLE

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US ARMY COMBAT SYSTEMS TEST ACTIVITY
ABERDEEN PROVING GROUND, MD 21005-5059

MARCH 1985

Period Covered:
January 1984 to January 1985

Prepared for:
FOREIGN SCIENCE AND TECHNOLOGY CENTER
ABERDEEN PROVING GROUND, MD 21005-5001

US ARMY TEST AND EVALUATION COMMAND
ABERDEEN PROVING GROUND, MD 21005-5055

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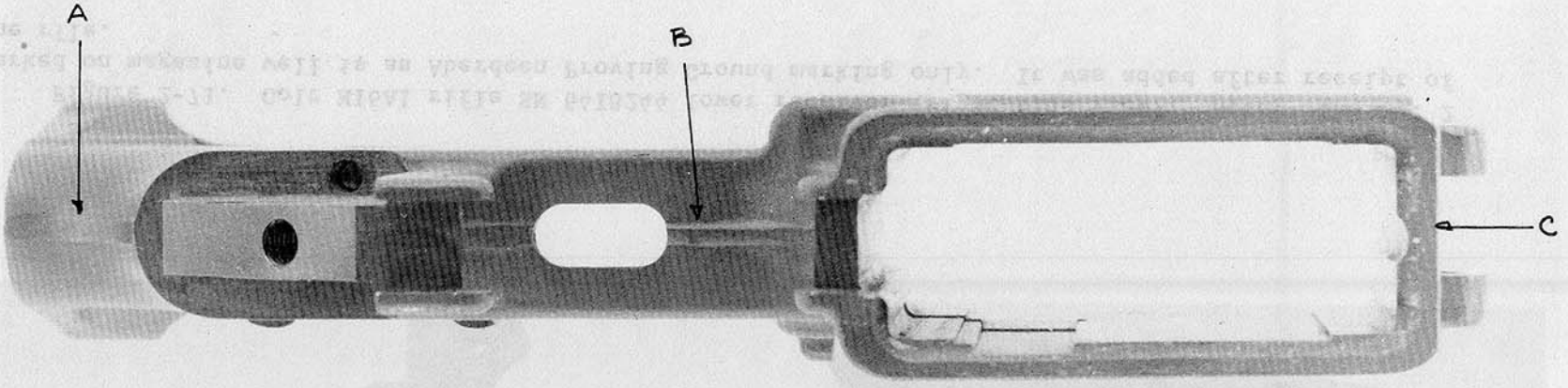
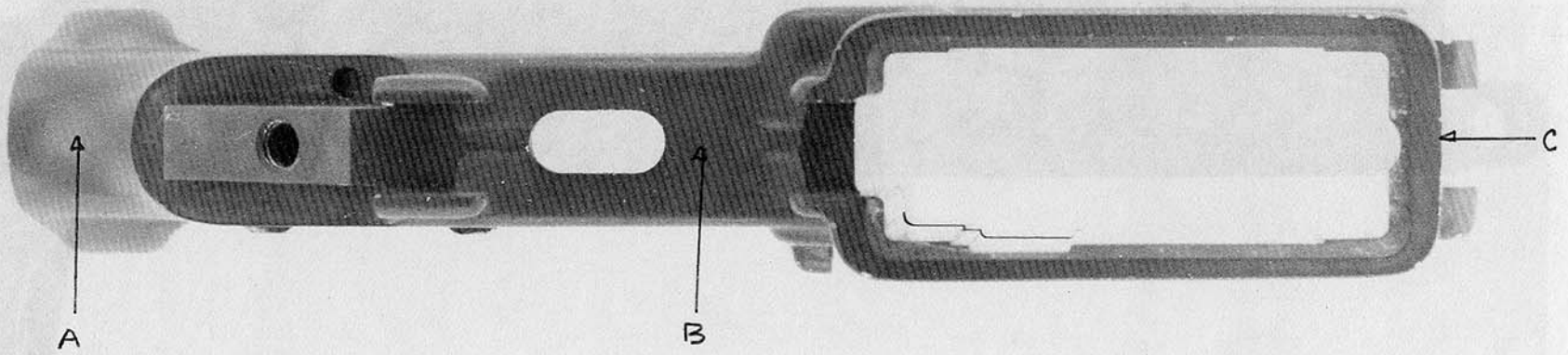
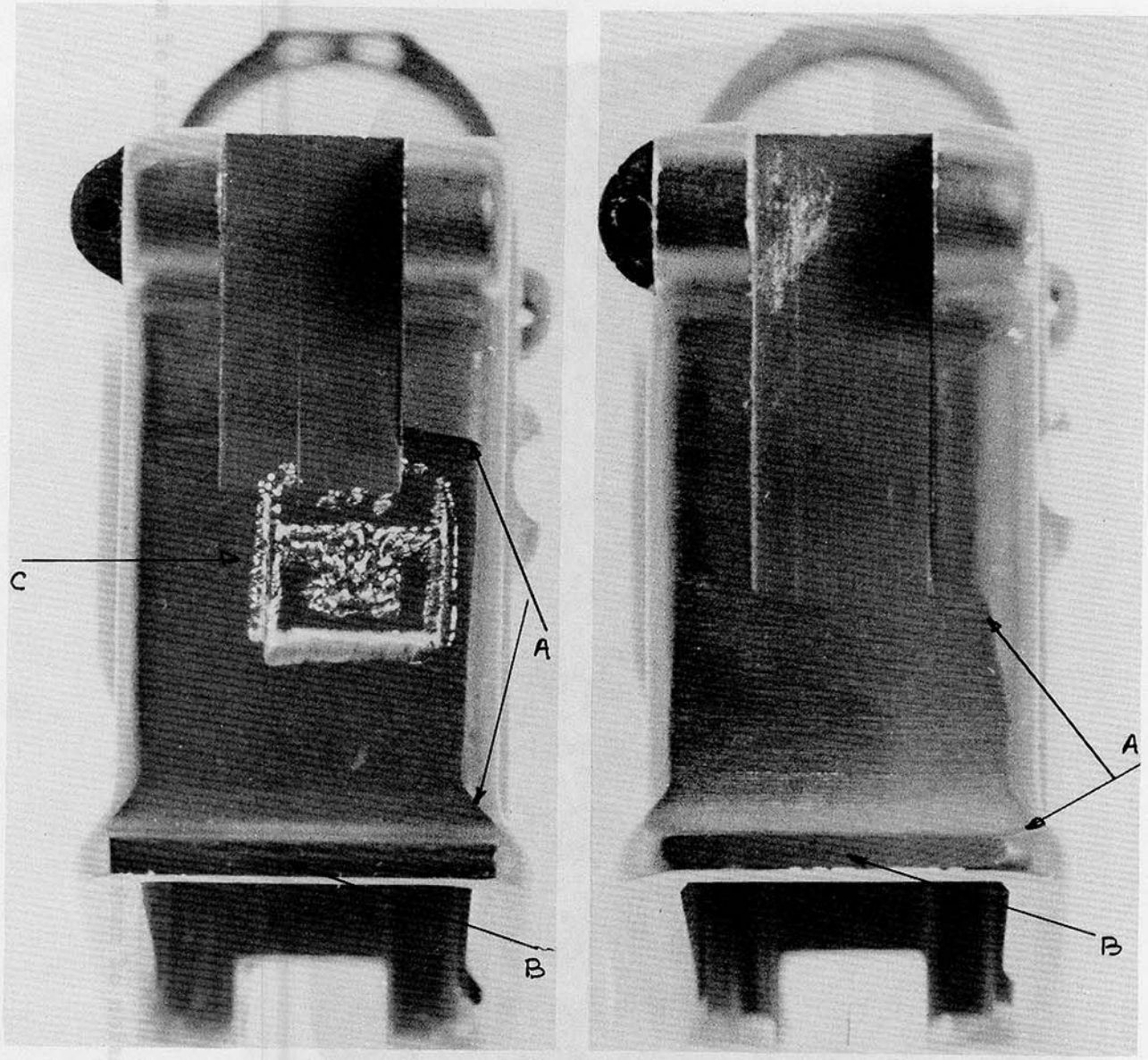


Colt M16A1 rifle SN 6418244



Test rifle

Figure 2-72. Bottom view of lower receivers.



Colt M16A1 rifle SN 6418244

Test rifle

Figure 2-73. Front view of lower receivers.

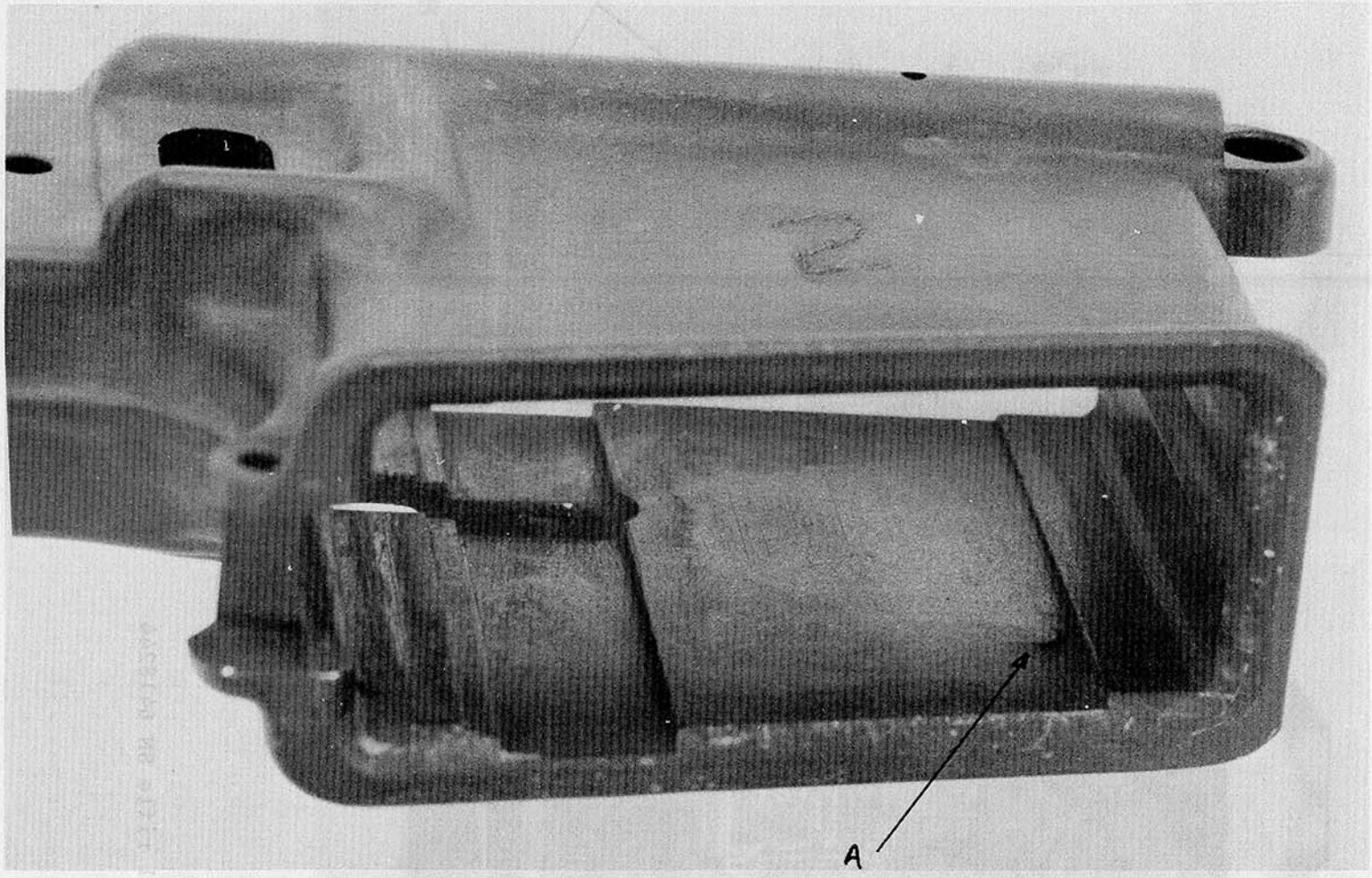
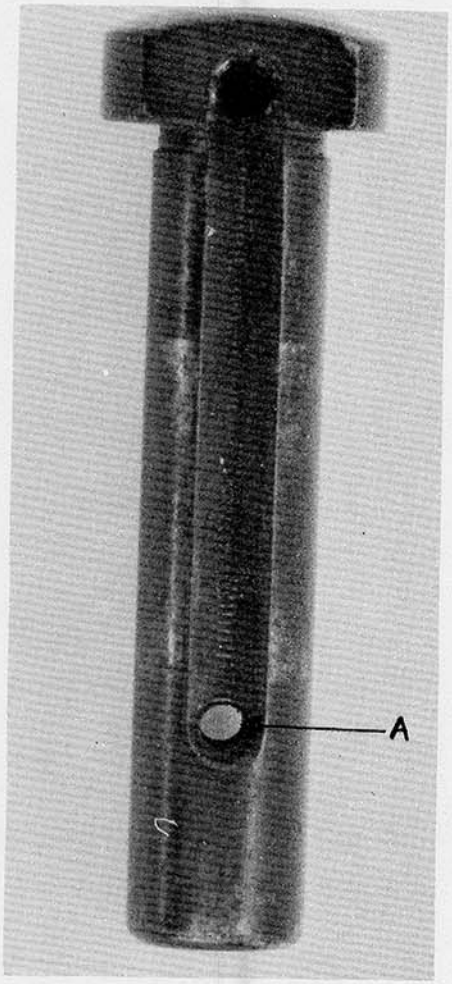


Figure 2-74. Colt M16A1 rifle SN 6418244 lower receiver showing interior of left side of magazine well with partial intrusion of marking (SN).

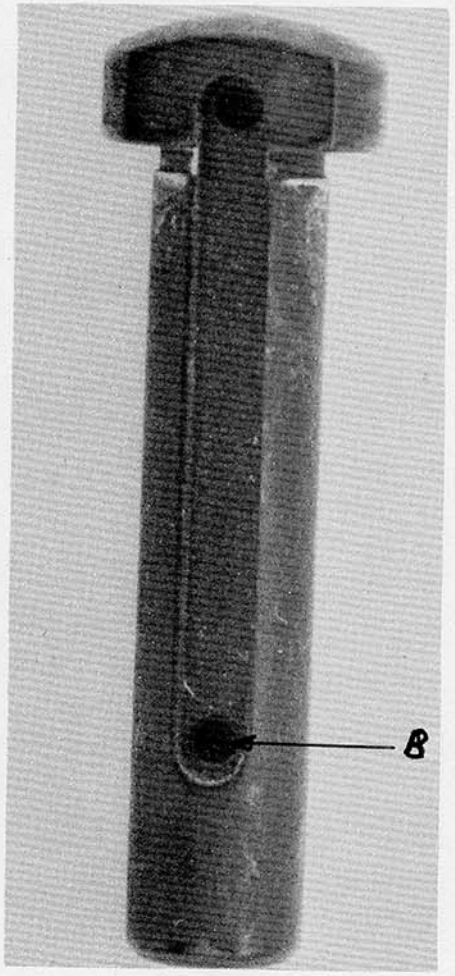
TABLE 2-21. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - FRONT PIVOT PIN

Figure No.	Description
2-75	The current production Colt rifle and the test rifle use a front pivot pin with the left hand detent hole drilled through the pin (A). This facilitates removal of the pin from the receiver. The originally designed pin was not drilled through (B).

Note: The letters in ( ) refer to the arrow indicators on the figures.



Test Rifle



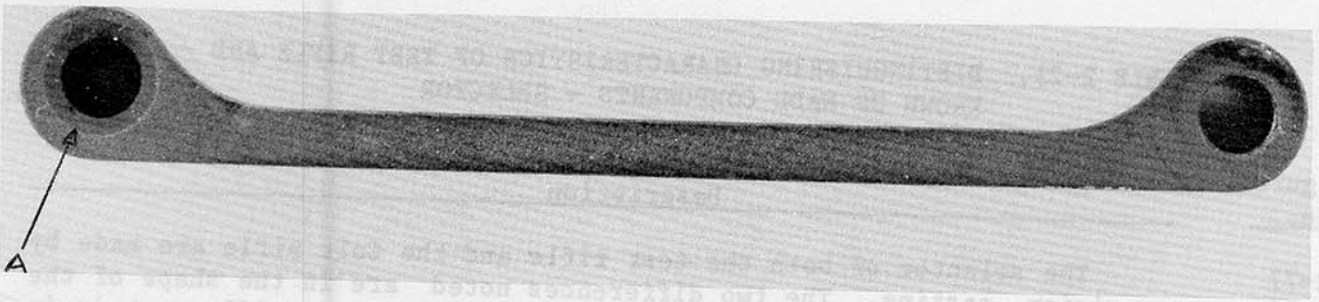
US Supply (Circa 1970)

Figure 2-75. Front pivot pin (rear view). Note: Colt M16A1 Rifle SN 6418244 is same as test rifle.

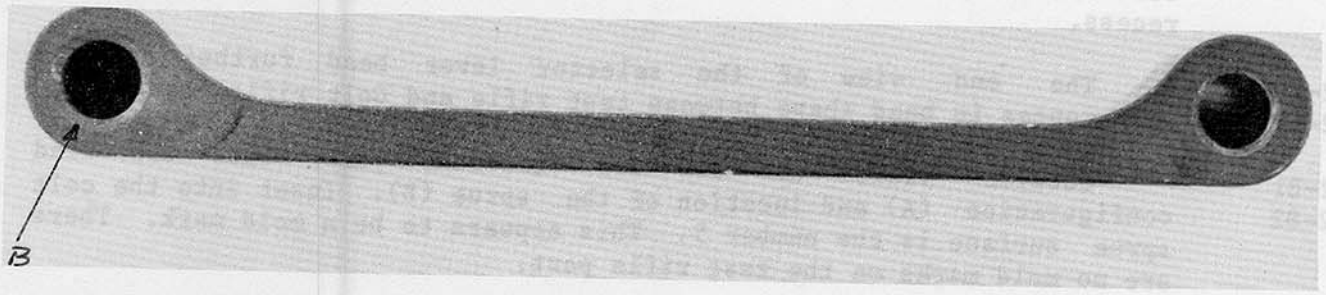
TABLE 2-22. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - TRIGGER GUARD

Figure No.	Description
2-76	The chamfer of the rear hole in the trigger guard is uniformly shallower on the test rifle (B) than in the Colt produced rifle (A).

Note: The letters in ( ) refer to the arrow indicators on the figures.

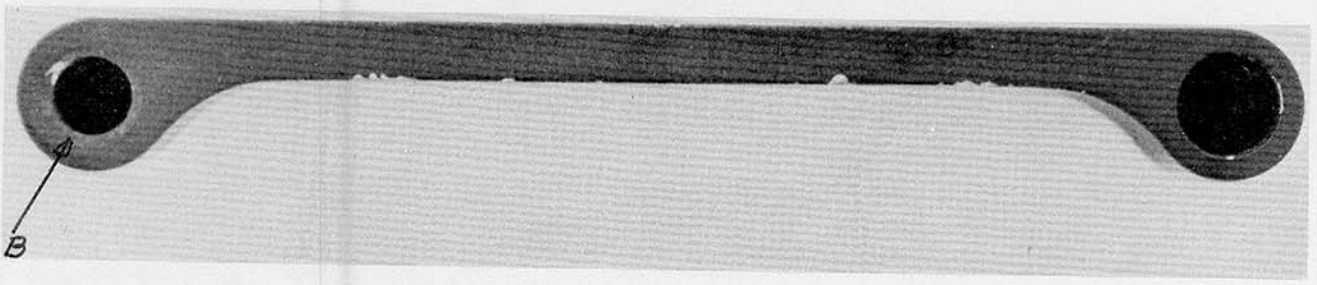


Colt M16A1 rifle SN 6418244 - right side view



Test rifle - right side view

Colt M16A1 rifle SN 6418224 - left side view (inverted)



Test rifle - left side view (inverted)

Figure 2-76. Trigger guard.

TABLE 2-23. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - SELECTOR

Figure No.	Description
2-77 2-78	The selector of both the test rifle and the Colt rifle are made by precision casting. The two differences noted are in the shape of the selector lever head (B) and the sprue (A). The test rifle part is in the shape of a stepped pyramid while the Colt rifle part is a stepped dome shape. The sprue is removed by a semicircular end mill cut on the test rifle part. The Colt rifle part is a wide, flat nonmachined recess.
2-79 2-80	The end view of the selector lever head further defines differences in head shape between test rifle and Colt rifle parts.
2-81 2-82	Outside views of the two different parts show the head configuration (A) and location of the sprue (B). Inset into the colt sprue surface is the number 5. This appears to be a mold mark. There are no mold marks on the test rifle part.

Note: The letters in ( ) refer to the arrow indicators on the figures.

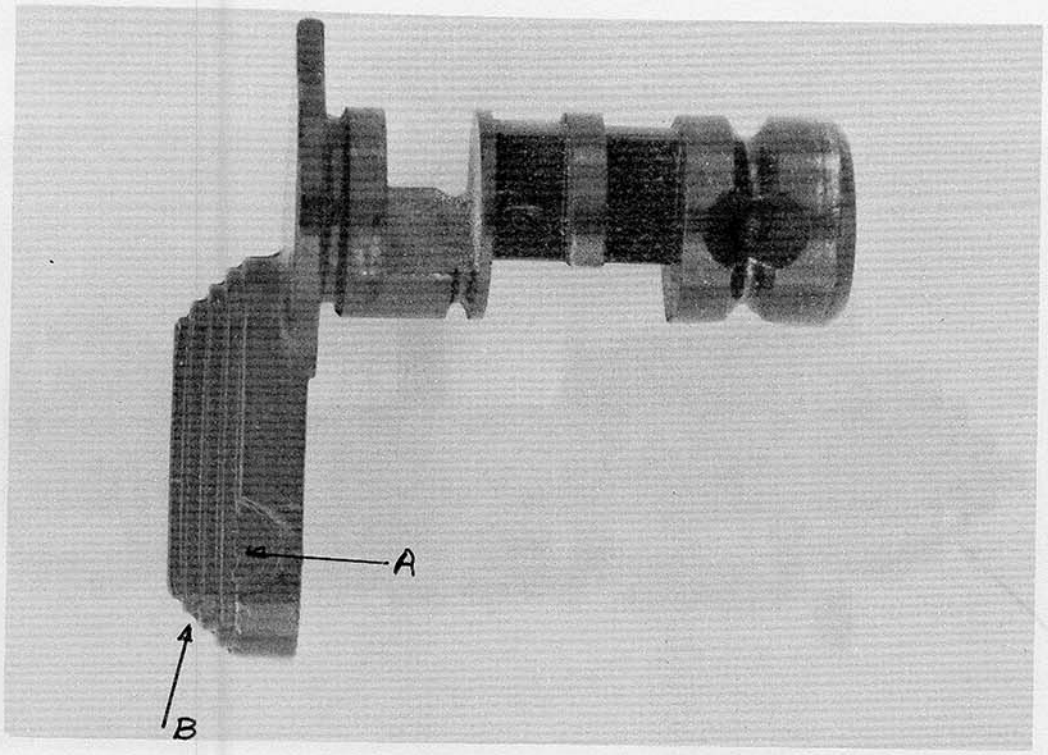


Figure 2-77. Test rifle selector side view.

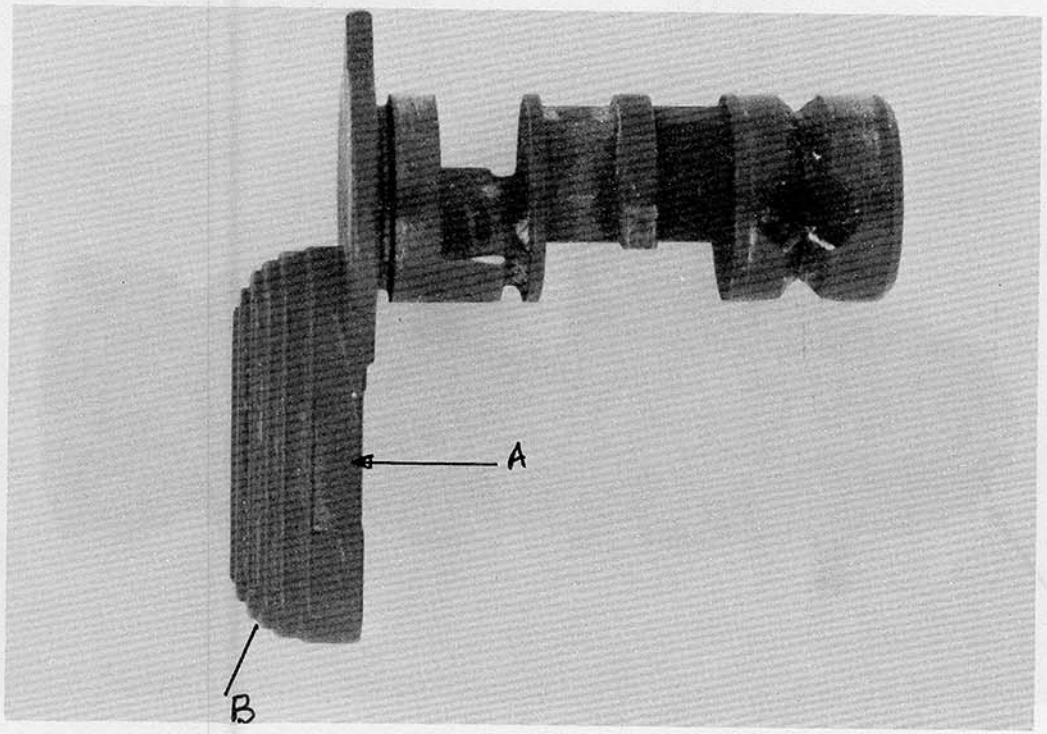


Figure 2-78. Colt M16A1 rifle SN 6418244 selector side view.

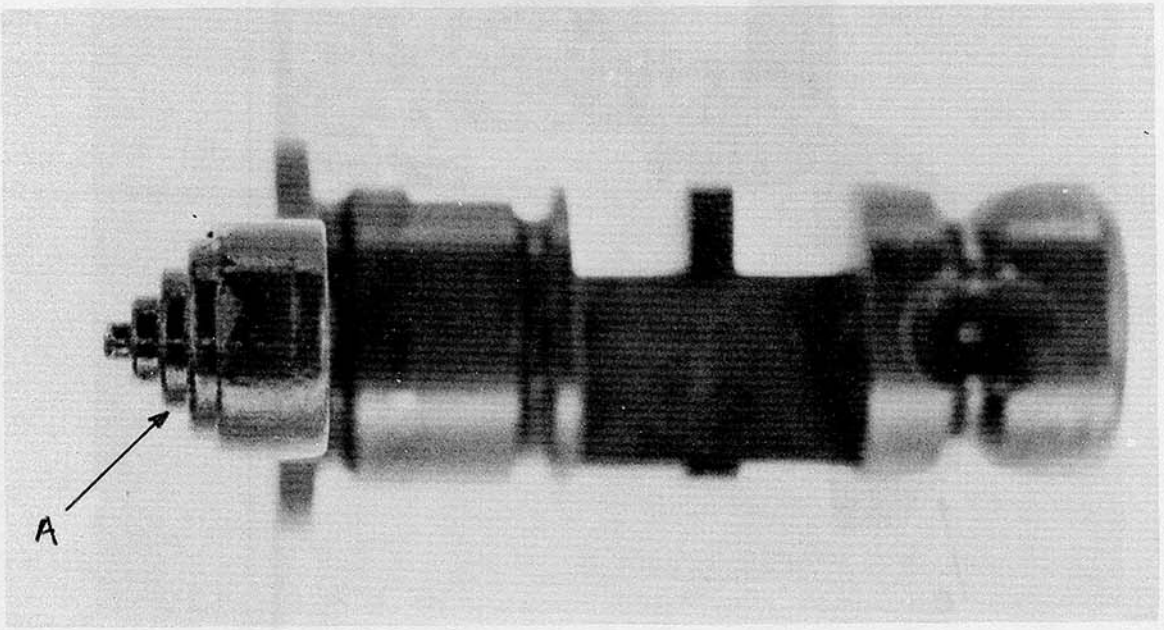


Figure 2-79. Test rifle selector end view.

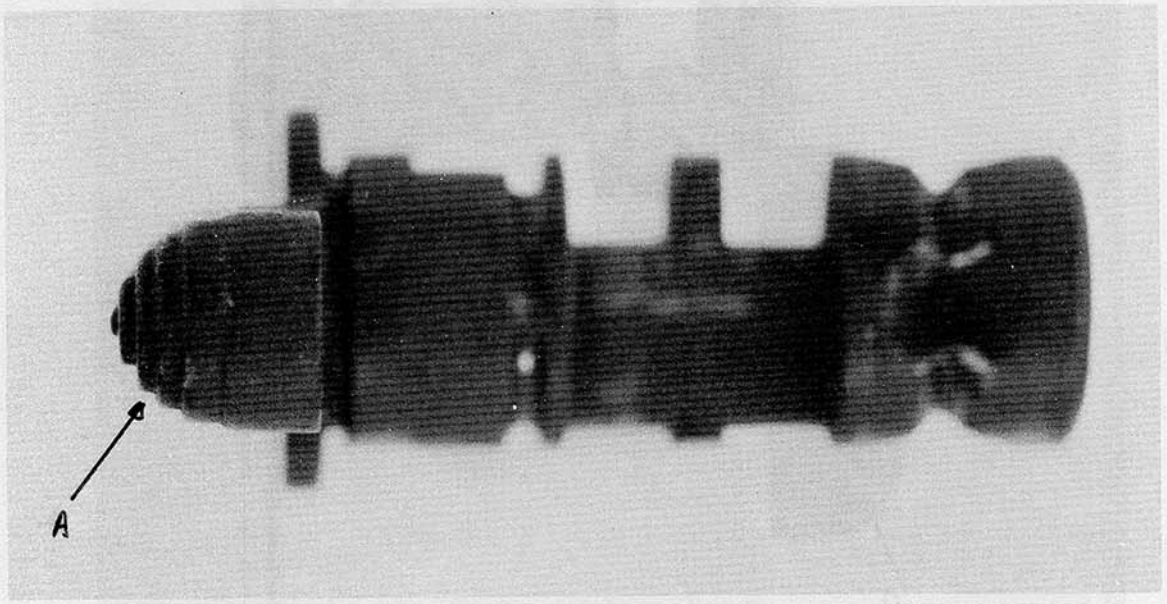
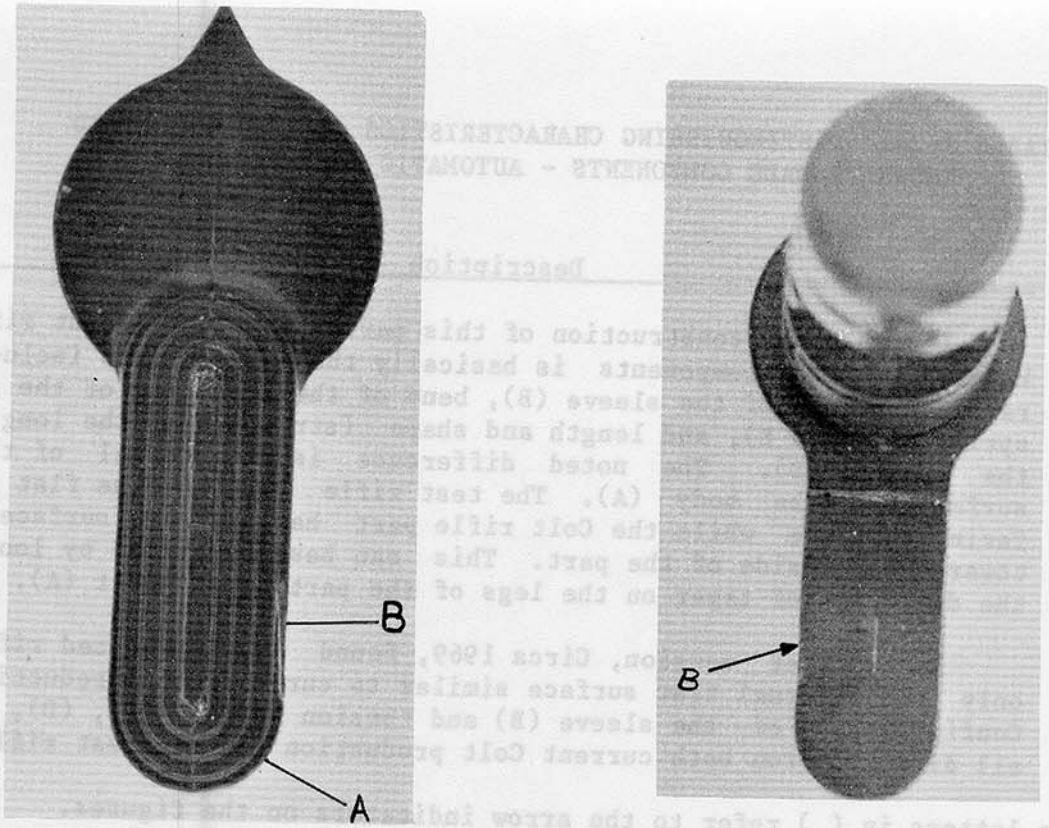


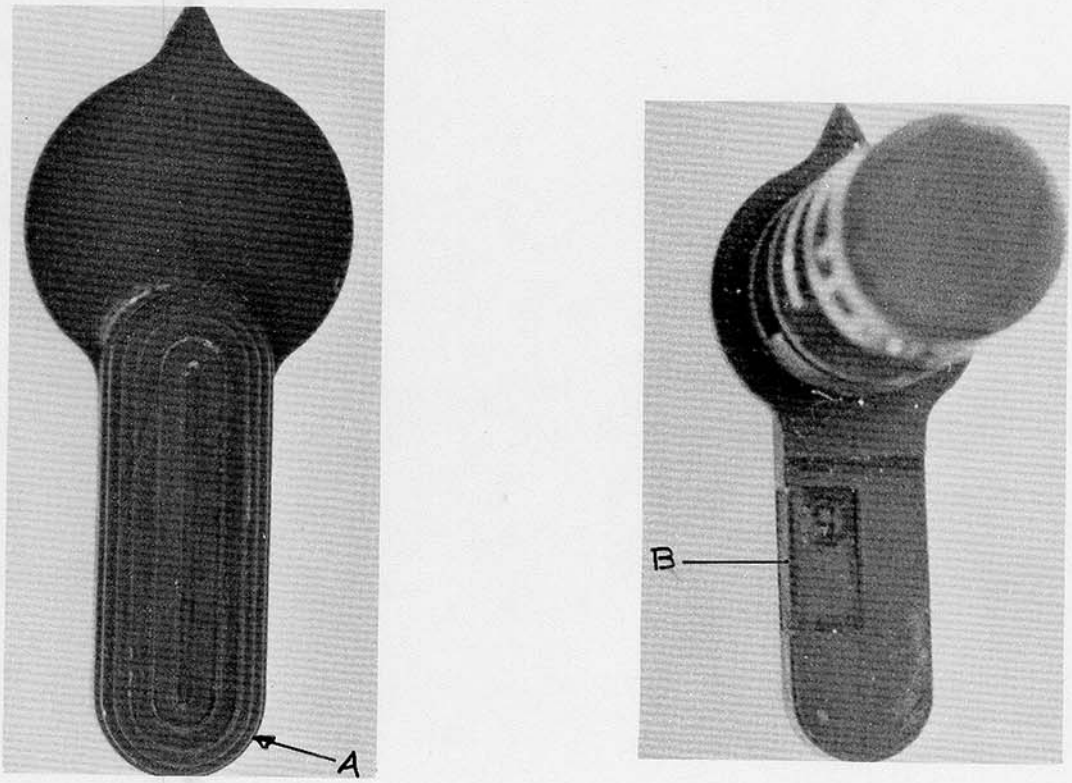
Figure 2-80. Colt M16A1 rifle SN 6418244 selector end view.



Left side

Right side

Figure 2-81. Test rifle selector side views.



Left side

Right side

Figure 2-82. Colt M16A1 rifle SN 6418244 selector side views.

TABLE 2-24. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - AUTOMATIC SEAR ASSEMBLY

Figure No.	Description
2-83 2-84 2-85 2-86	Design and construction of this part between the test rifle and known US made components is basically the same. This includes the raised surface of the sleeve (B), bend of the short leg of the torsion spring (C and E), and length and shape (straight) of the long leg of the spring (D). The noted difference is in reversal of the flat surface of the body (A). The test rifle part has the flat surface facing outside while the Colt rifle part has the same surface facing toward the inside of the part. This can best be viewed by looking at the direction of taper on the legs of the part as shown at (A).
2-87 2-88	An earlier version, Circa 1969, found in US produced rifles had only the internal flat surface similar to current Colt production (A). Configuration of the sleeve (B) and torsion spring (C), (D), and (E) all differed from both current Colt production and the test rifle.

Note: The letters in ( ) refer to the arrow indicators on the figures.

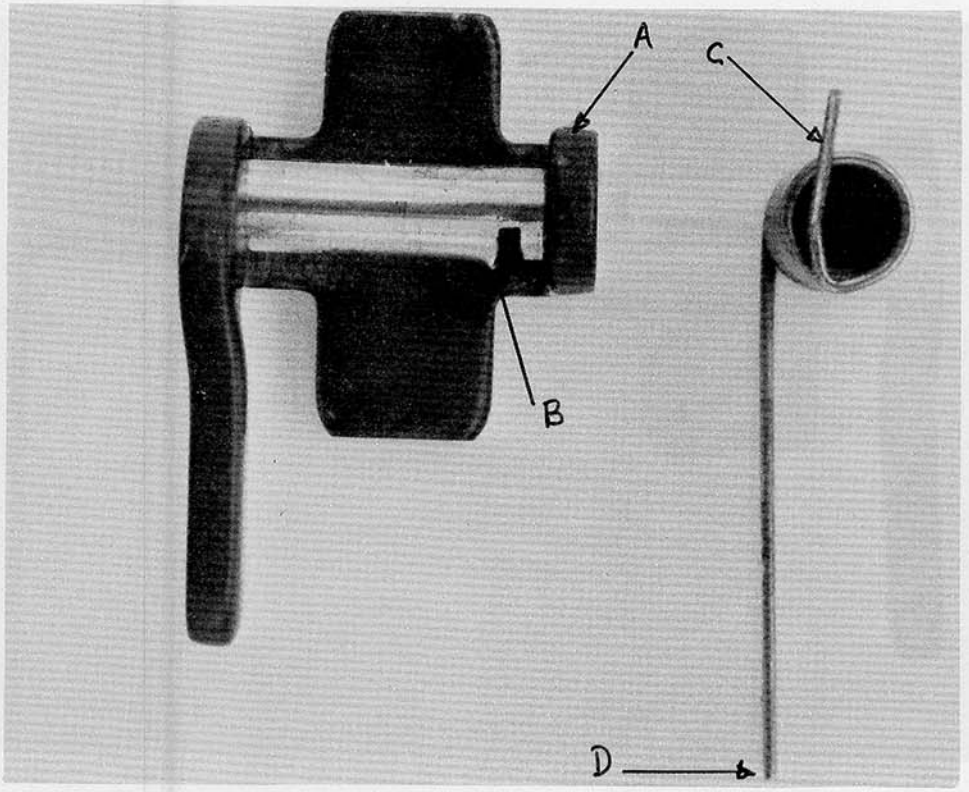


Figure 2-83. Test rifle automatic sear assembly partially disassembled.

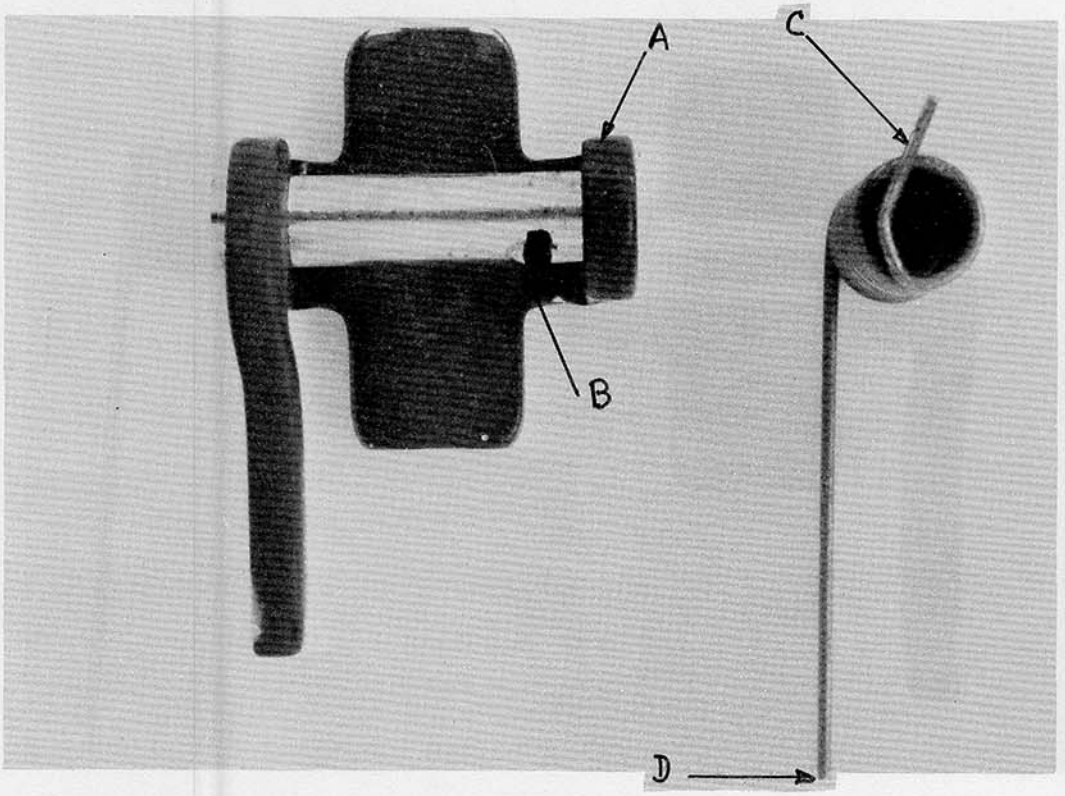


Figure 2-84. Colt M16A1 rifle SN 6418244 automatic sear assembly partially disassembled.

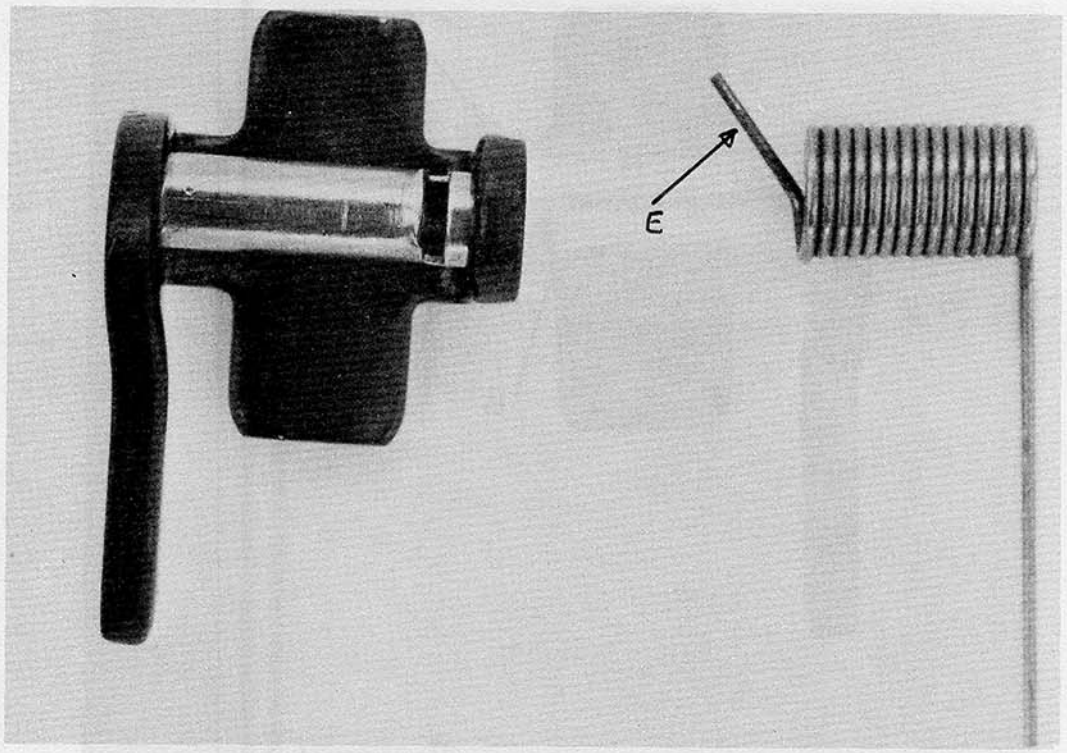


Figure 2-85. Test rifle automatic sear assembly partially disassembled.

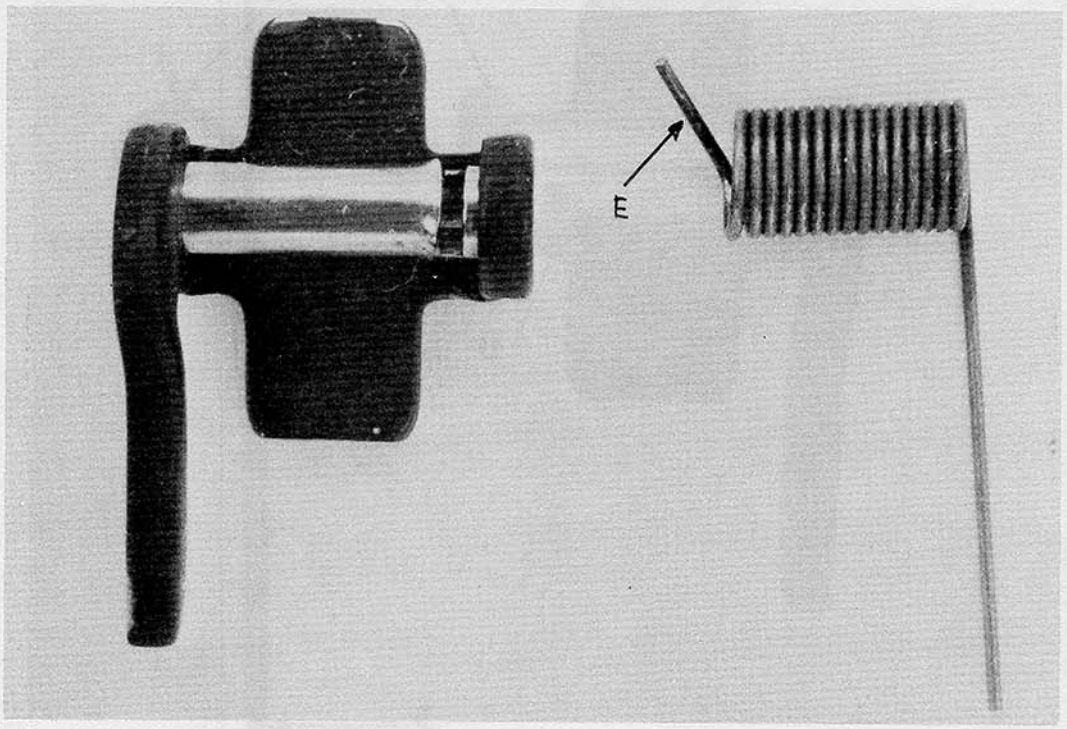


Figure 2-86. Colt M16A1 rifle SN 6418244 automatic sear assembly partially disassembled.

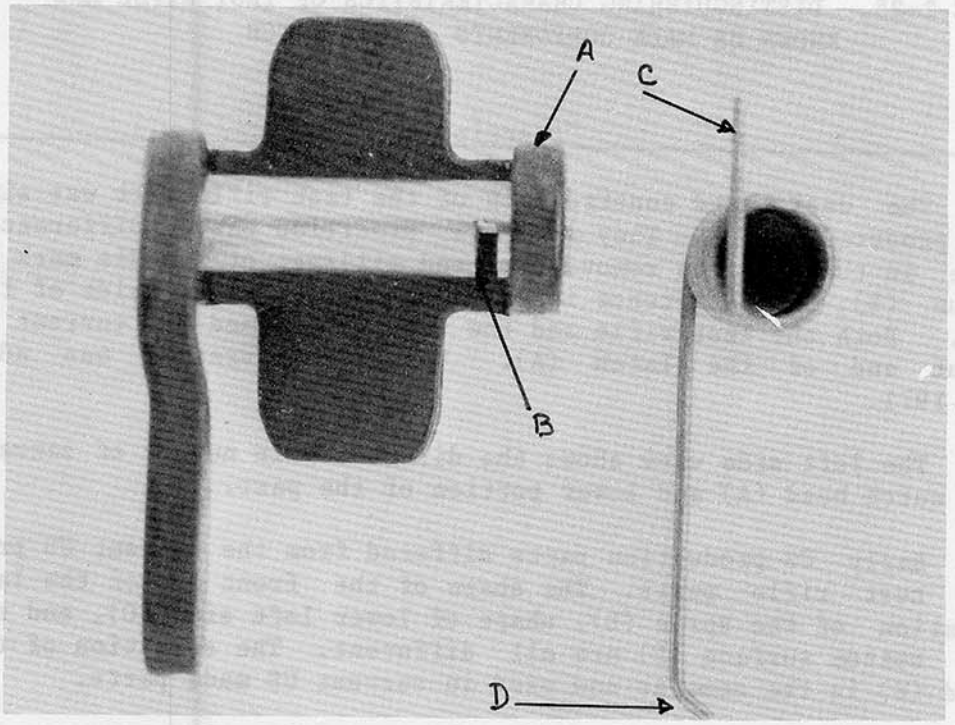


Figure 2-87. US supply automatic sear assembly partially disassembled (packaging marked A-1-69-BK4).

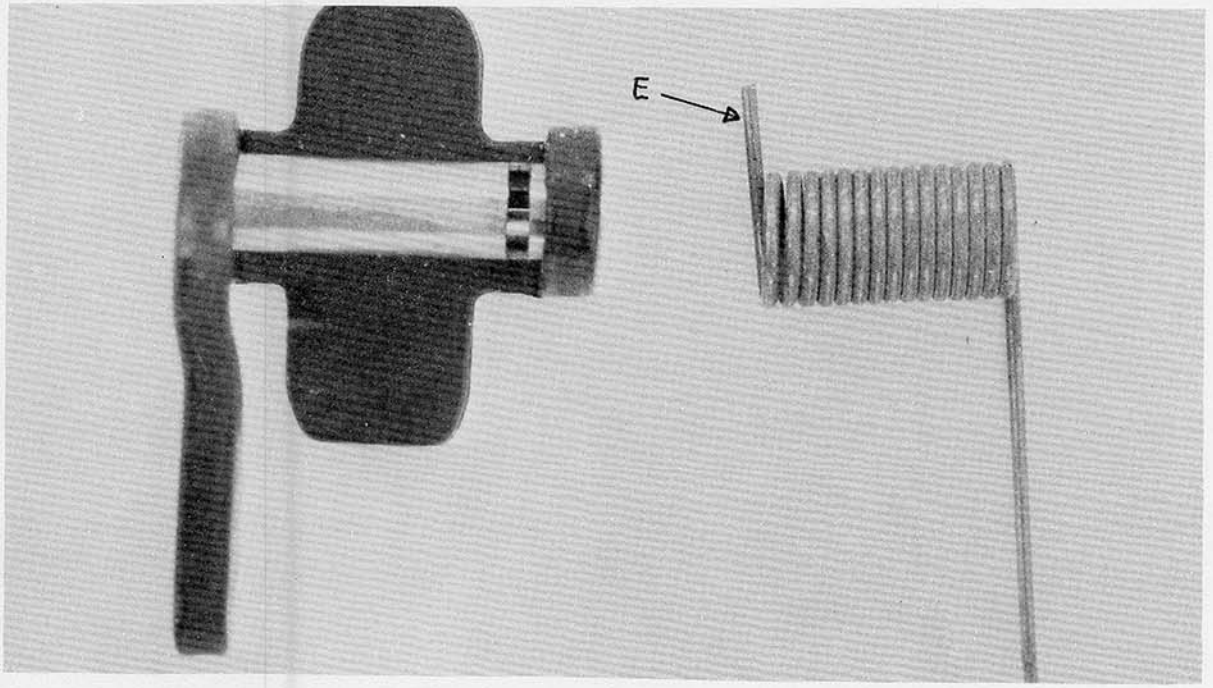


Figure 2-88. US supply automatic sear assembly partially disassembled (packaging marked A-1-69-BK4).

TABLE 2-25. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - BOLT LATCH

Figure No.	Description
2-89 2-90	The design and construction of the test rifle part was similar to US produced parts. They were all precision cast. Differences noted were in the possible removal, by end milling, of the die mark from the sprue (B); and difference in shape of the lower left side of the catch (C). Both the test rifle and the Colt rifle used the current shape of front end of the latch (A). This configuration was adopted in May 1971.
2-91 2-92	The left side view shows the difference in number of serrations of the catch head (A) and lower portion of the part.
2-93 2-94	Early US production parts differed from the current US production and test rifle parts. The shape of the front end of the latch (A). location of the sprue (B), shape of lower left side (C), and radius of the bottom surface (D) are all different. The serration of the catch head (E) is the same as now used in current US made parts.

Note: The letters in ( ) refer to the arrow indicators on the figures.

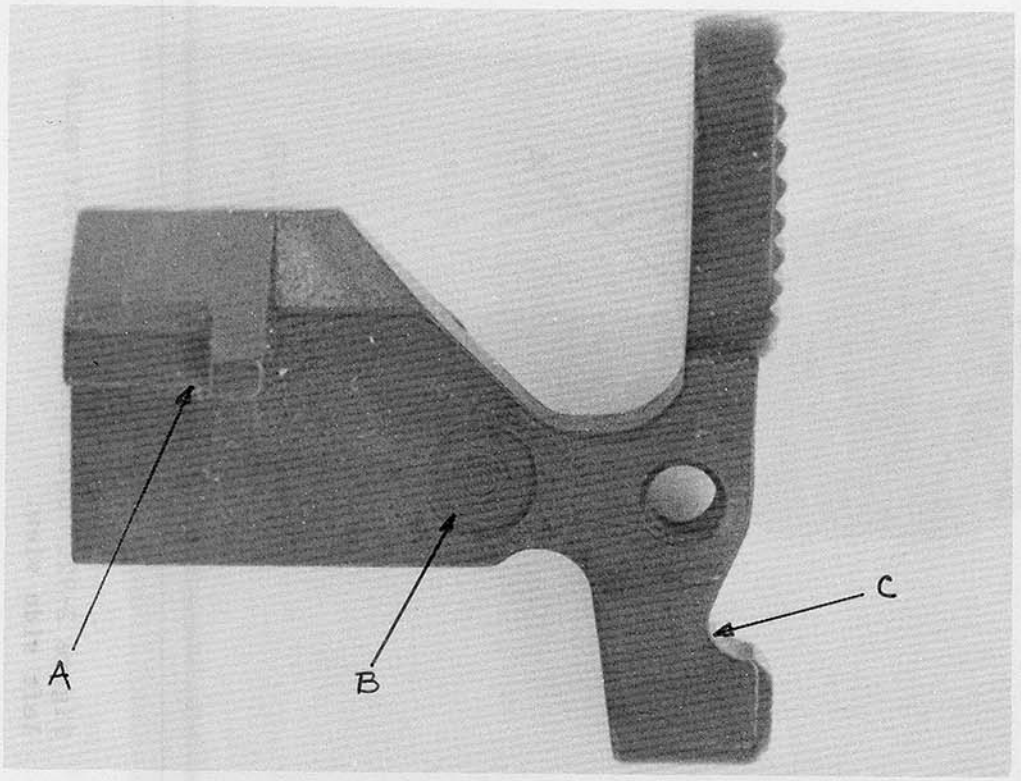


Figure 2-89. Test rifle bolt catch front view.

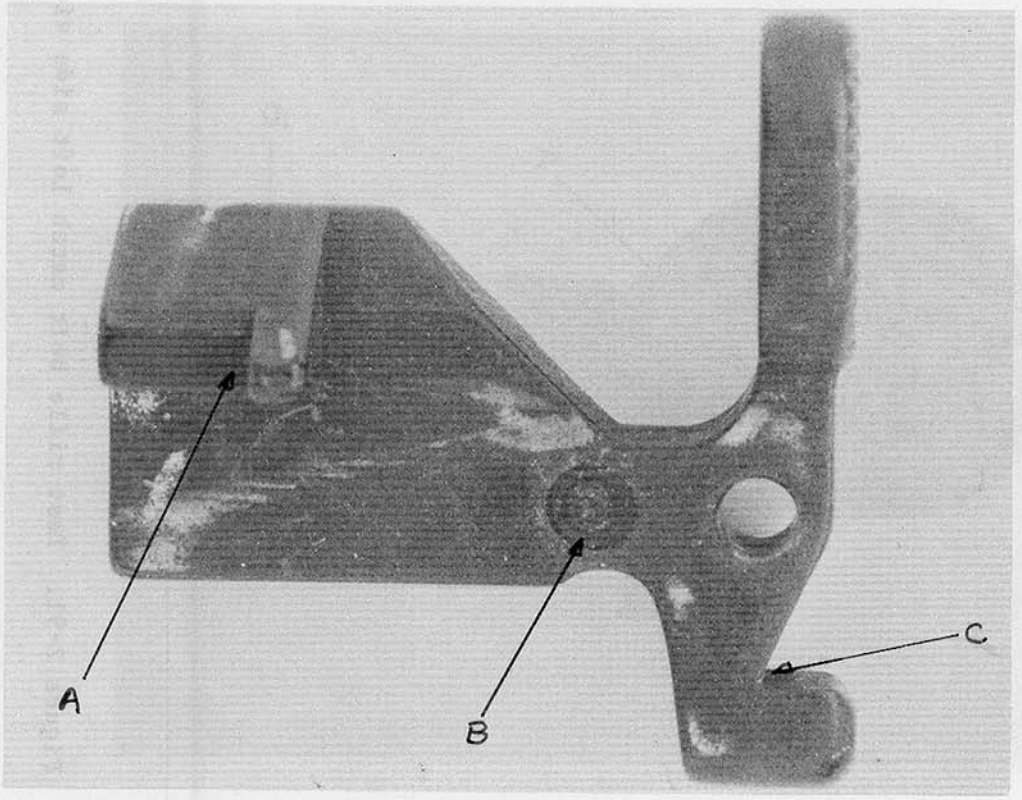


Figure 2-90. Colt M16A1 rifle SN 6418244 bolt catch front view.

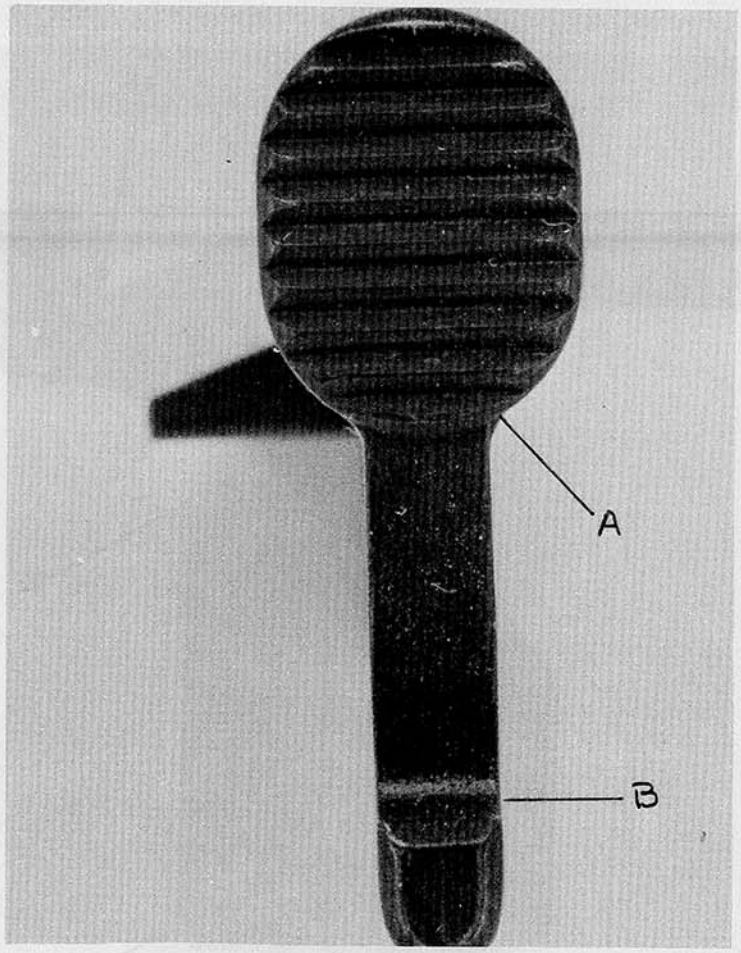


Figure 2-91. Test rifle bolt catch left side view.

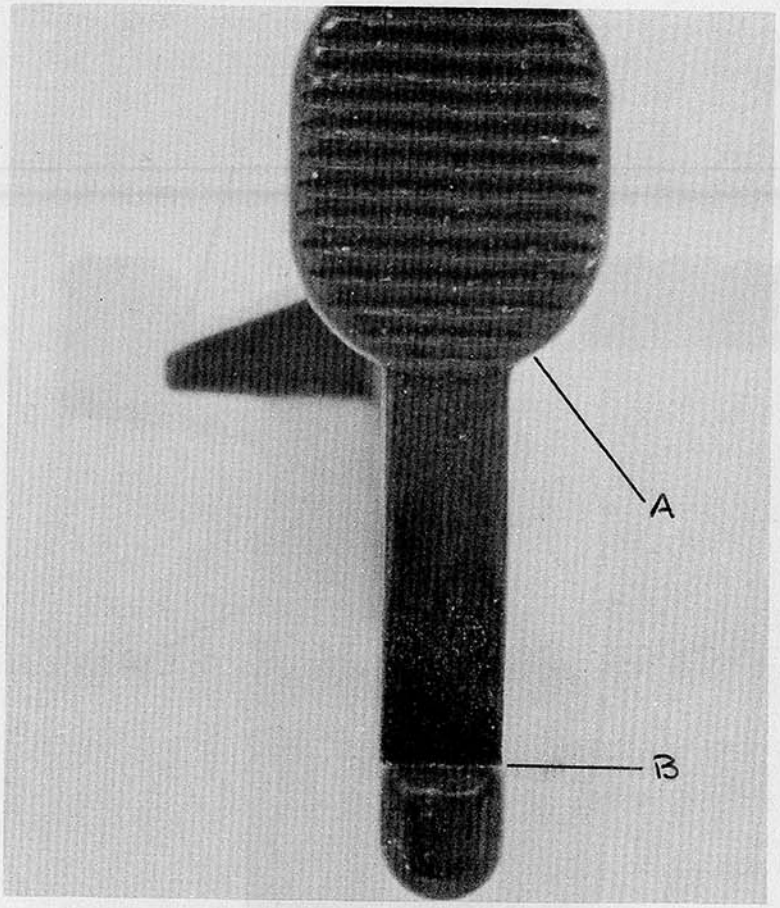


Figure 2-92. Colt M16A1 rifle bolt catch left side view.

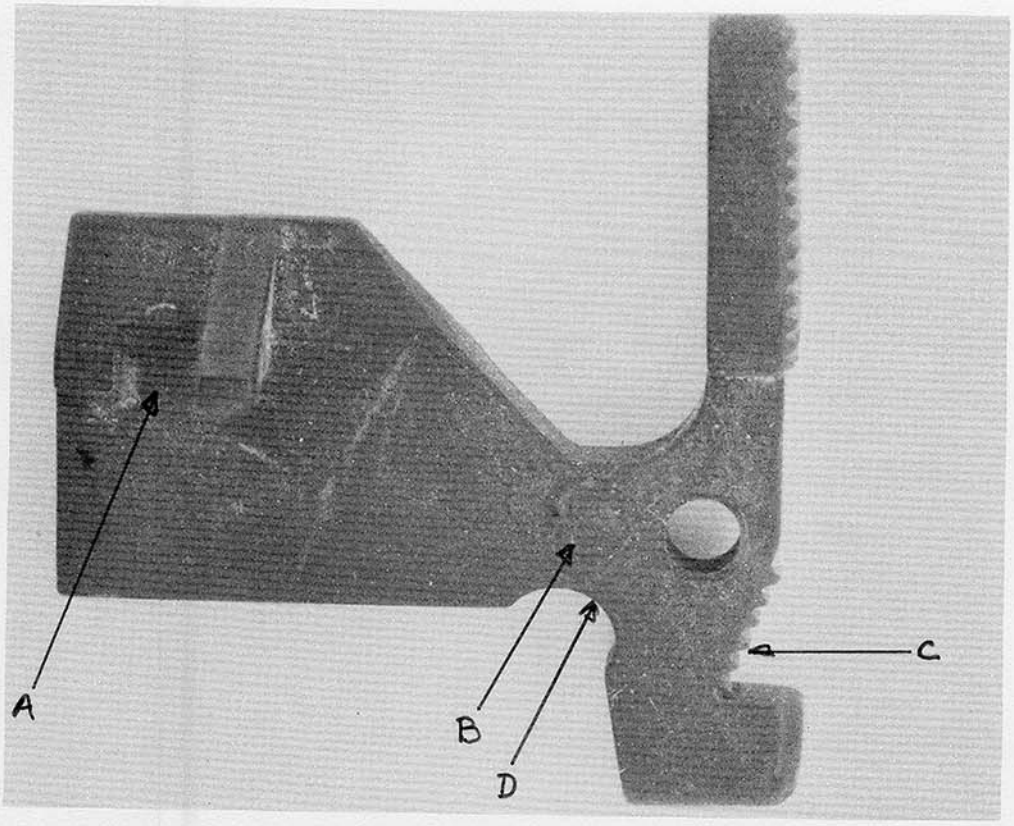


Figure 2-93. US supply bolt catch front view. Contract DAAF03-67-M-0073 (8/67).

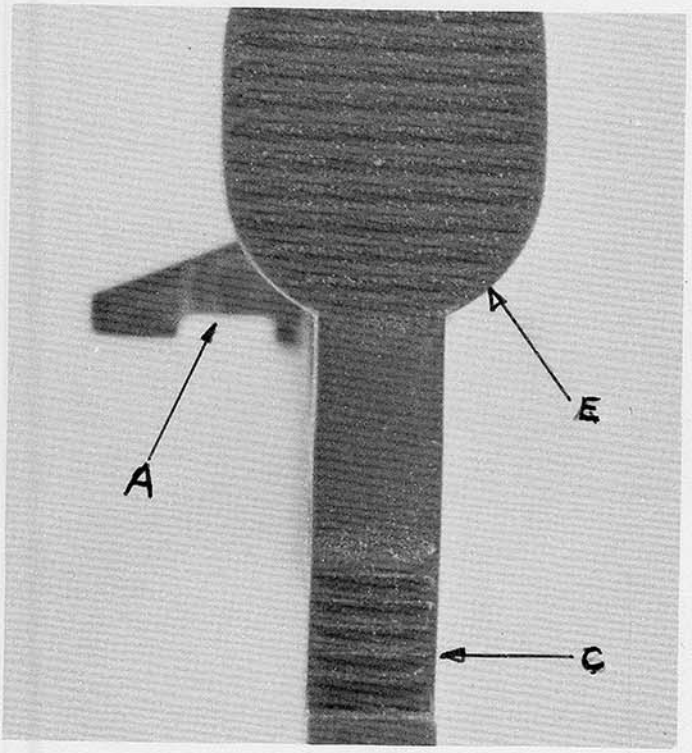


Figure 2-94. US supply bolt catch left side view. Contract DAAF03-67-M-0073 (8/67).

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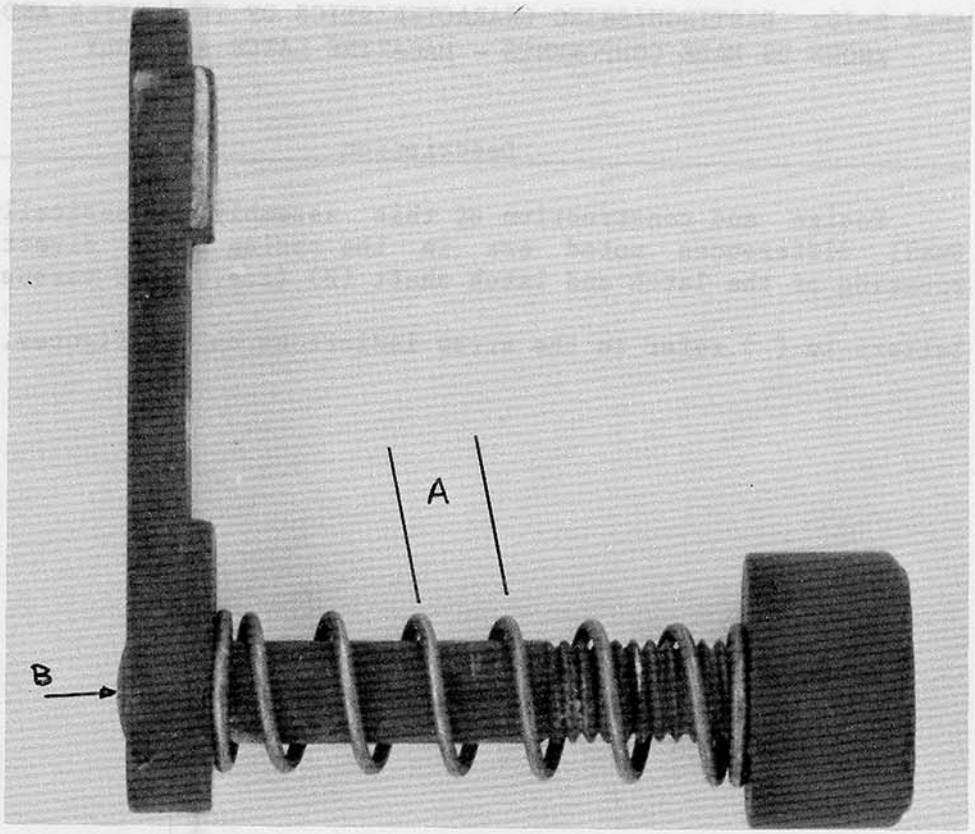
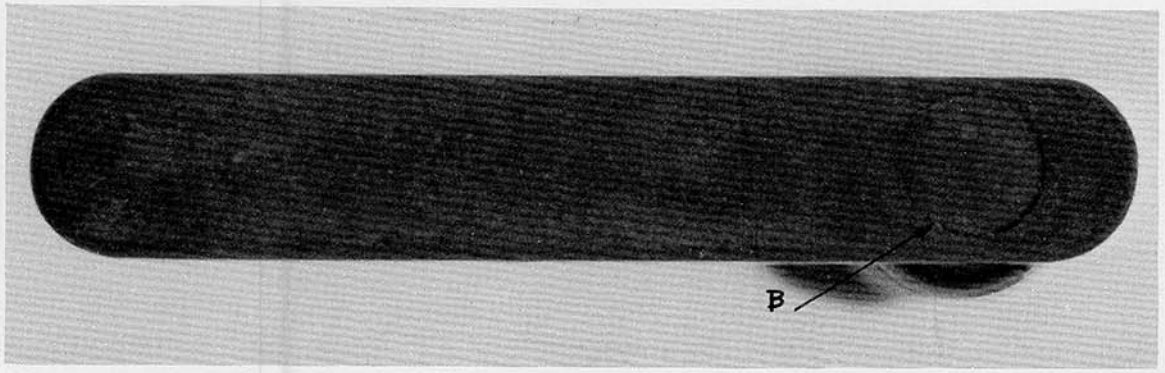
TABLE 2-26. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - MAGAZINE LATCH ASSEMBLY

Figure No.	Description
2-95 2-96	Design and construction of this assembly are basically the same. Small differences noted are in the spring pitch direction (A) and riveting of the latch and latch shaft (B) (i.e., flat versus crowned).

Note: The letters in ( ) refer to the arrow indicators on the figures.

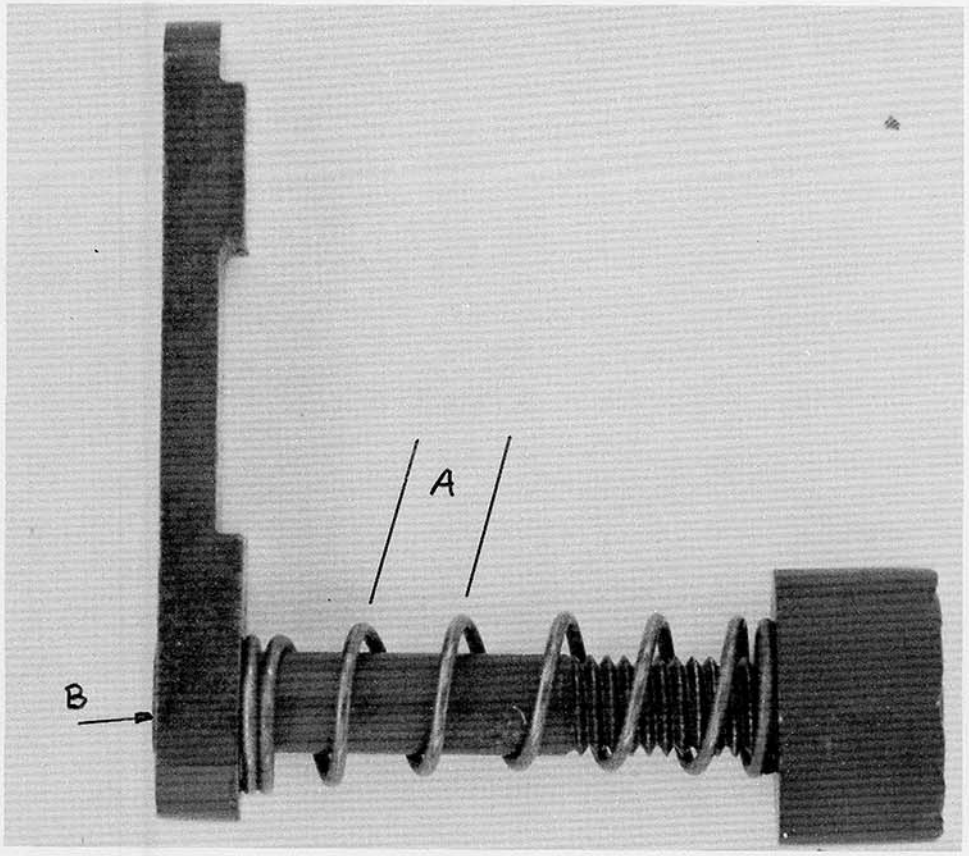


Top view

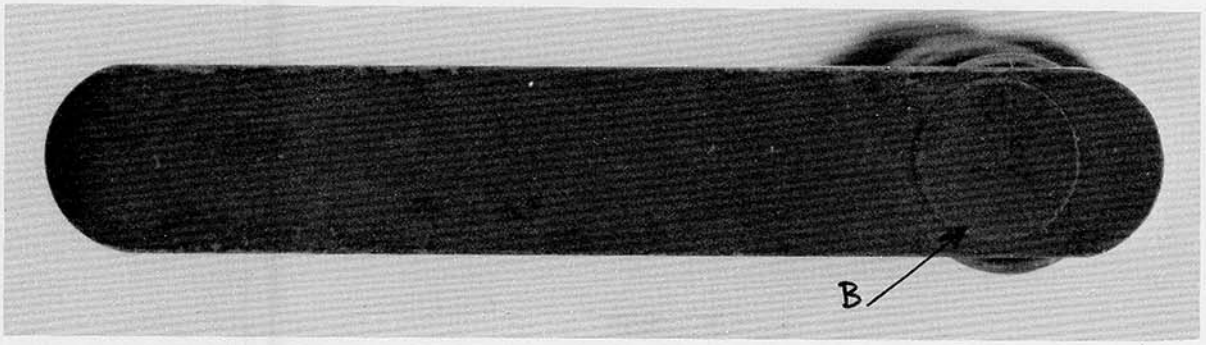


Left side view

Figure 2-95. Colt M16A1 rifle SN 6418244 magazine latch assembly views.



Top view



Left side view

Figure 2-96. Test rifle magazine latch assembly views.

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TABLE 2-27. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - TRIGGER

Figure No.	Description
2-97 2-98	Both the test rifle and Colt produced rifle triggers are made in the same basic design, by precision casting. Current production parts incorporate a reduced width section toward the rear of the trigger (A). The manufacturer's mark (B) and mold mark (C) found on the Colt part was not present on the test rifle trigger. There was no indication of defacement of the test rifle part for the purpose of removing identification marks.
2-99	Early US production triggers did not have a reduced width rear section (A). In the example shown, produced under a 1966 year contract, the only identification mark was a mold mark. Other US made spare parts had no marking, the sole identification being the packaging marking.
2-100	Bottom views show the reduced width of the rear portion of test rifle and current Colt rifle parts and the full width design of early production parts (A). Variations in width and location, of blending of the back rib of the trigger are shown in (B) and (C), respectively for the three trigger types.

Note: The letters in ( ) refer to the arrow indicators on the figures.

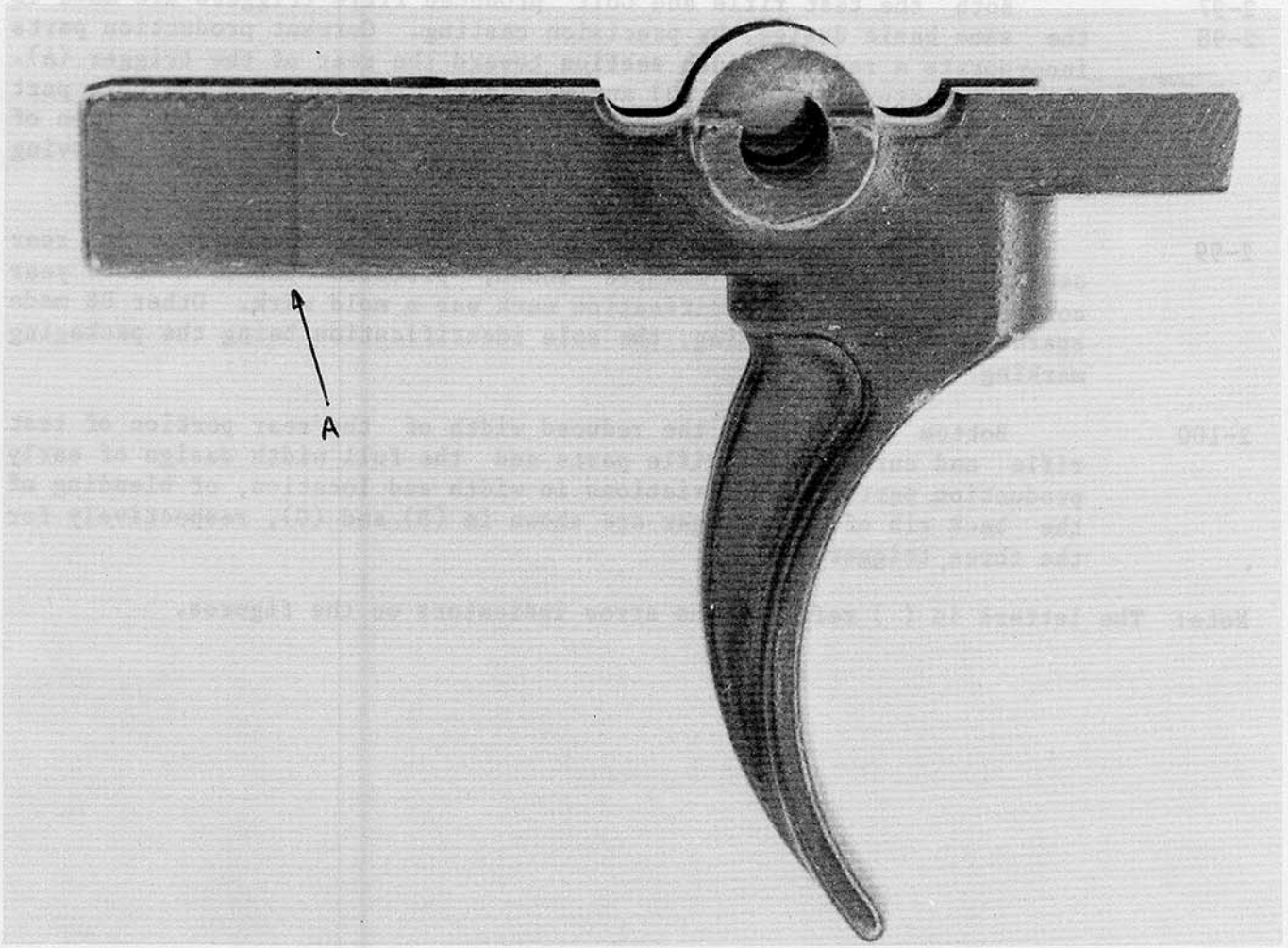


Figure 2-97. Test rifle trigger right side view.

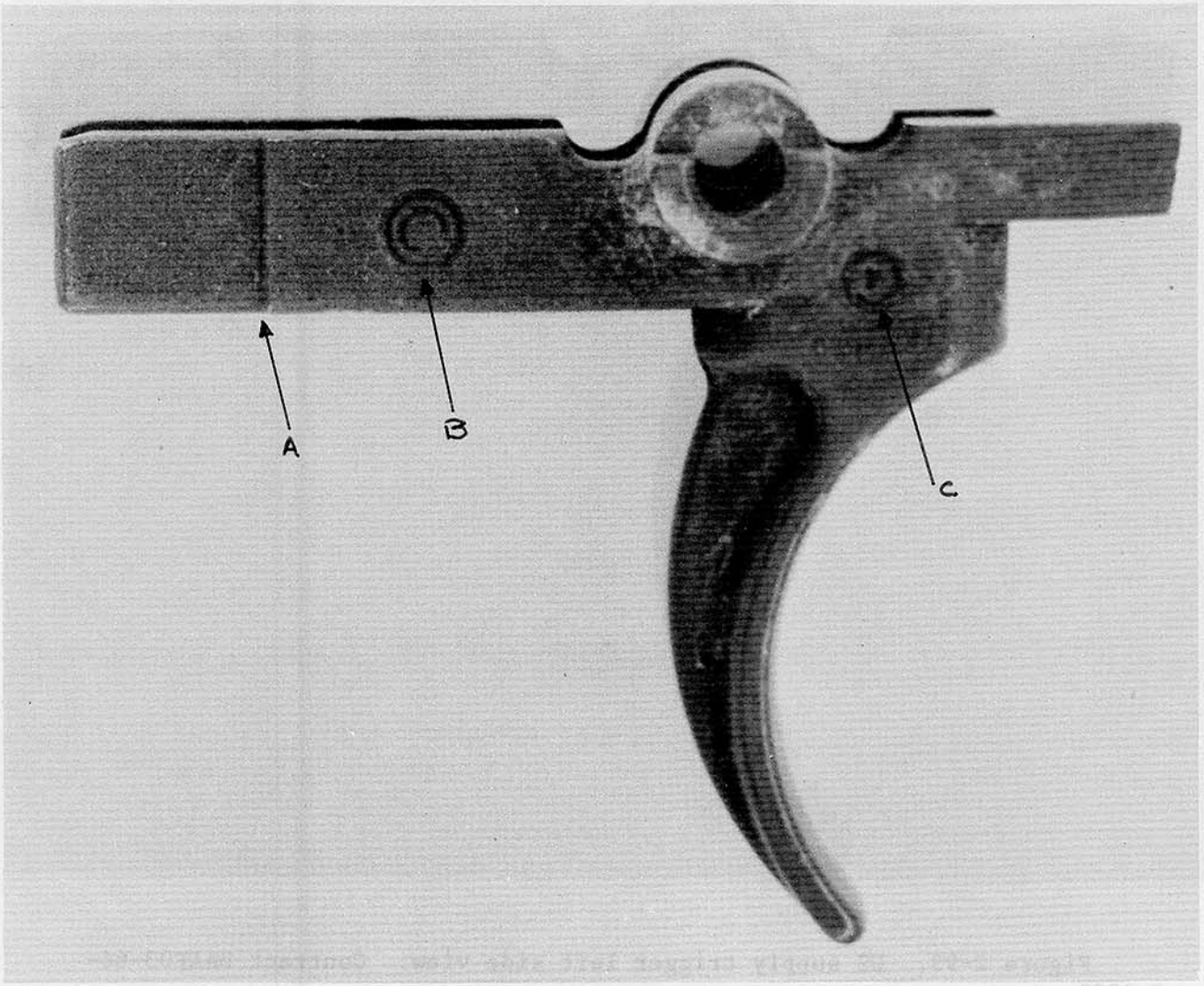


Figure 2-98. Colt M16A1 rifle SN 6418244 trigger right side view.

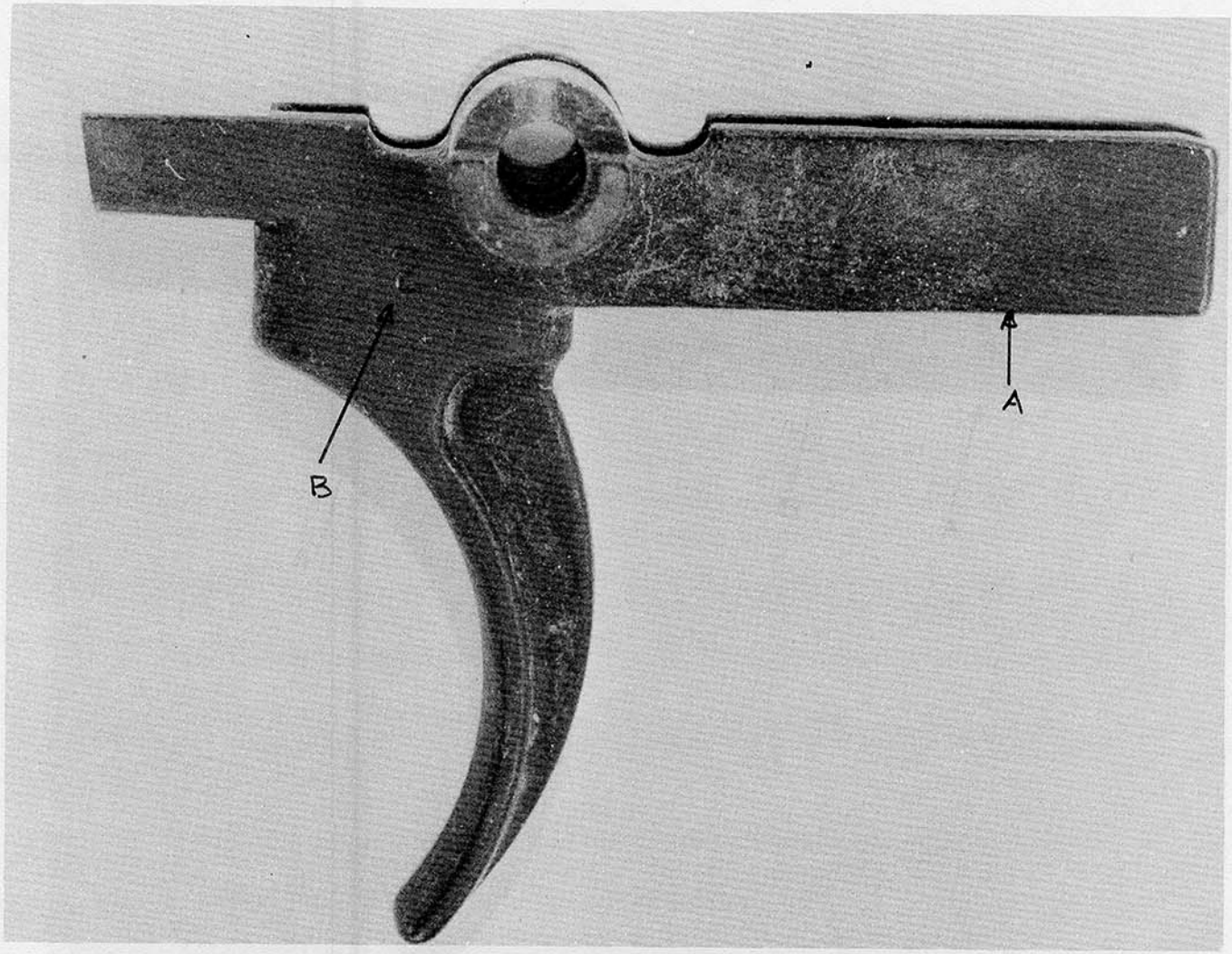
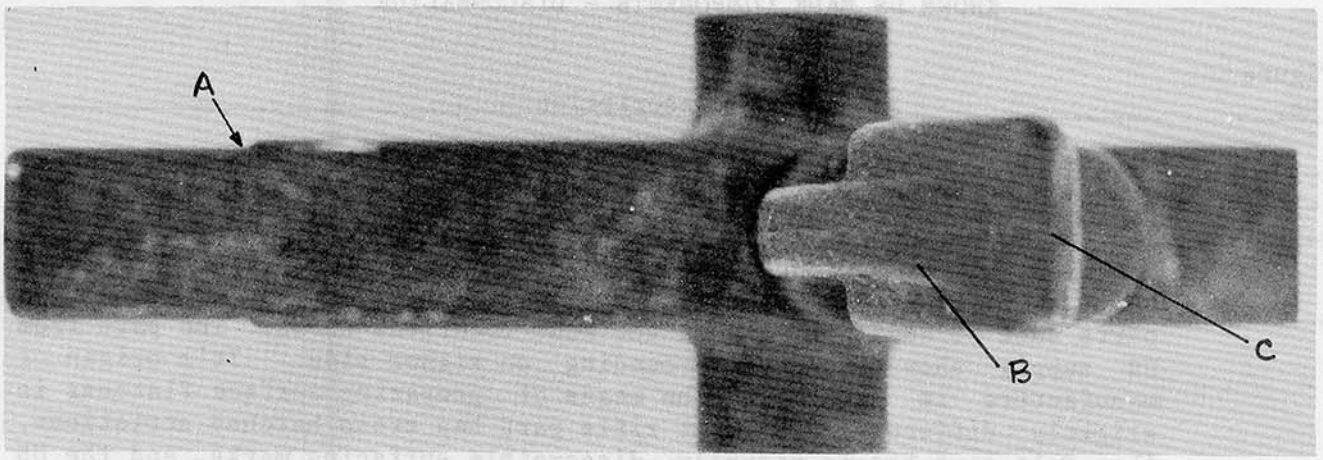
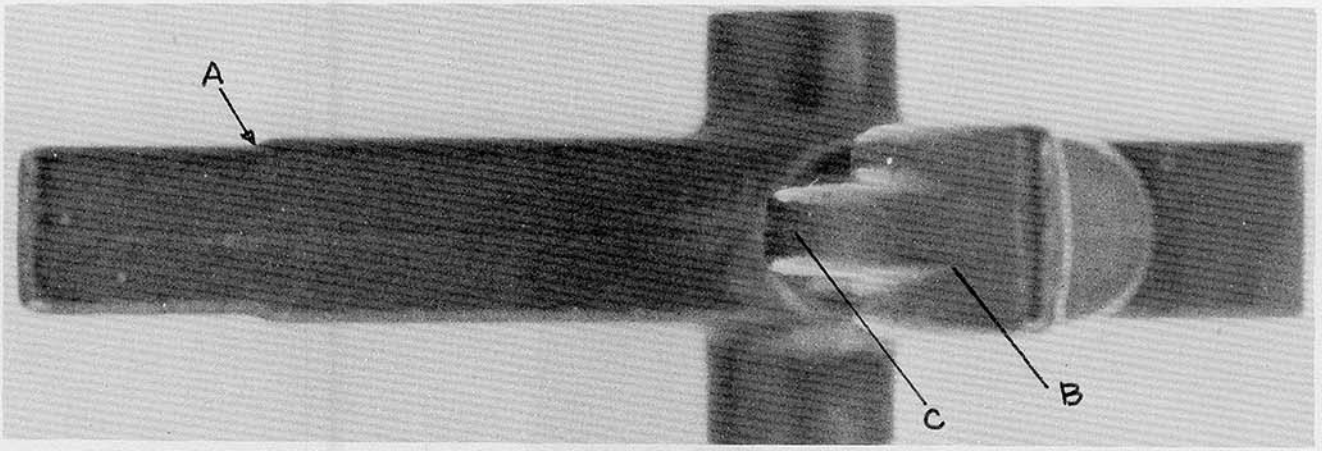


Figure 2-99. US supply trigger left side view. Contract DAAF03-66-C-0020.

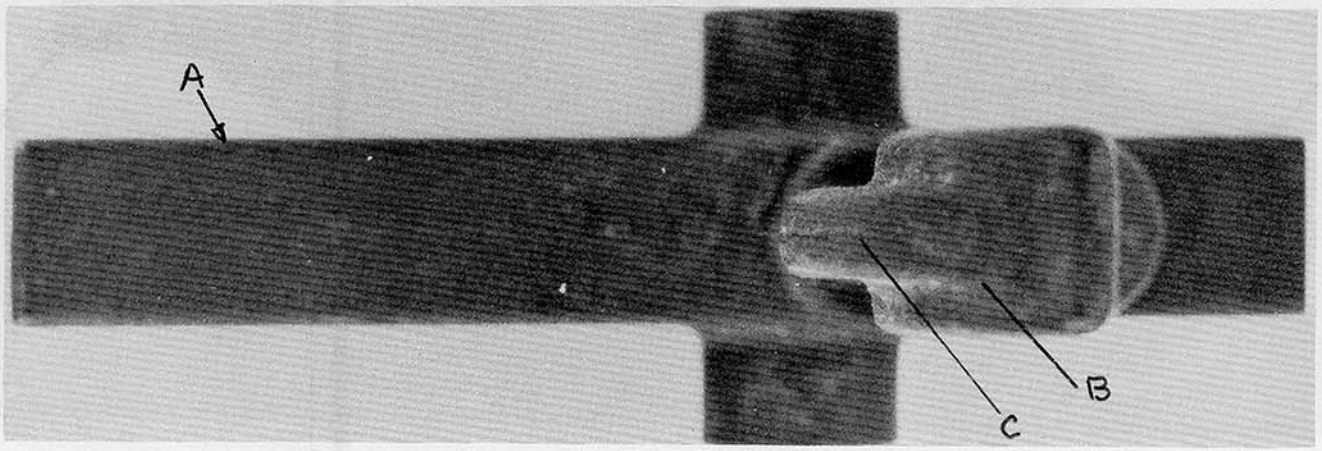
Note: Contract DAAF-03-68-C-0051 (6/68) part is the same, except does not have mold number mark.



Colt M16A1 rifle SN 6418244



Test rifle



US supply contract DAAF03-66-C-0020

Figure 2-100. Trigger bottom views.

TABLE 2-28. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - DISCONNECTOR

Figure No.	Description
2-101 2-102 2-103	The design and construction of the disconnectors were basically the same. The parts were precision stamped. Only the part assembled in the Colt made rifle has a manufacturer's mark (B). The amount and location of edge rounding on the right side of test rifle and Colt rifle parts (A) is approximately the same. The left side of both these parts show no edge rounding at the four locations shown. The part from US supply shows no edge rounding on either side. It's origin of manufacture is unknown. The means of preparing surface flatness is slightly different. The test rifle part has cross hatched striations, the Colt part has no visually discernible surfacing marks, and the US supply part has lengthwise striations.

Note: The letters in ( ) refer to the arrow indicators on the figures.

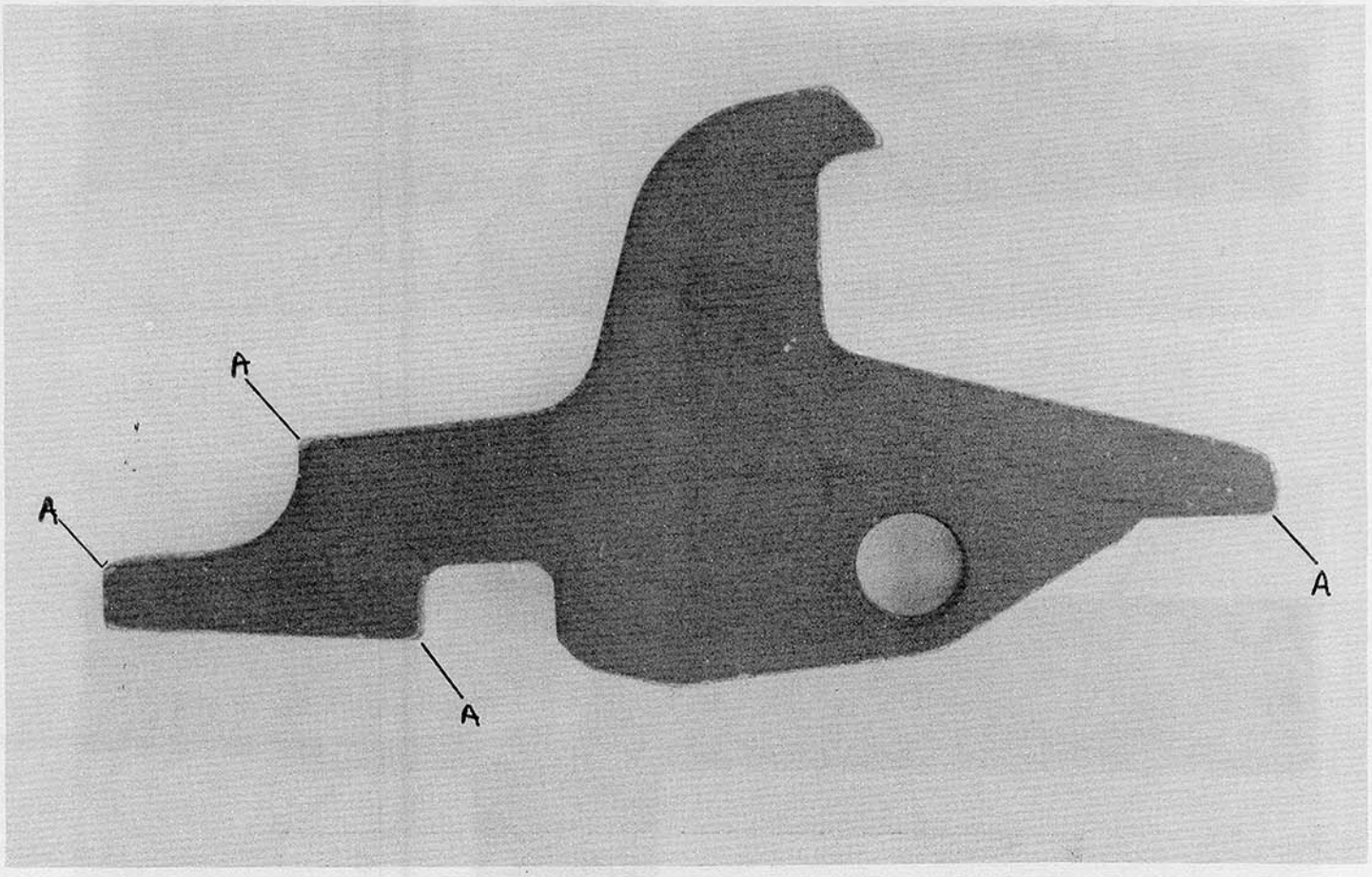


Figure 2-101. US supply disconnector right side view.

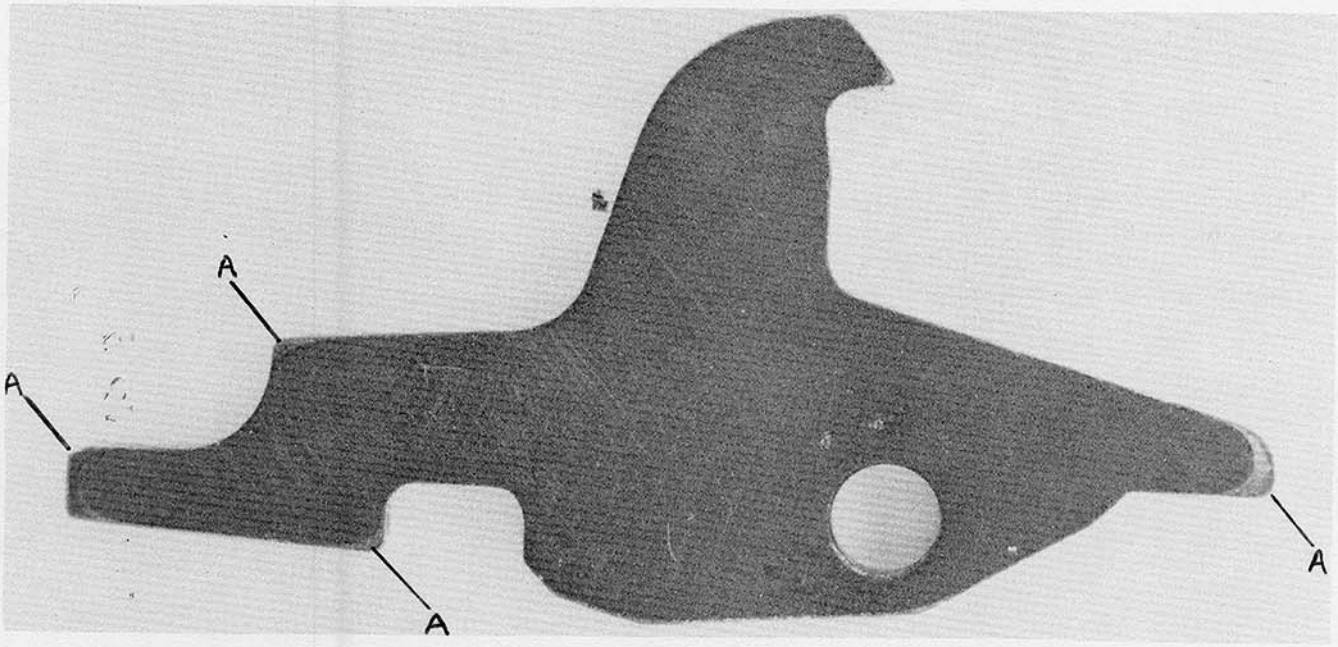


Figure 2-102. Test rifle disconnector right side view.

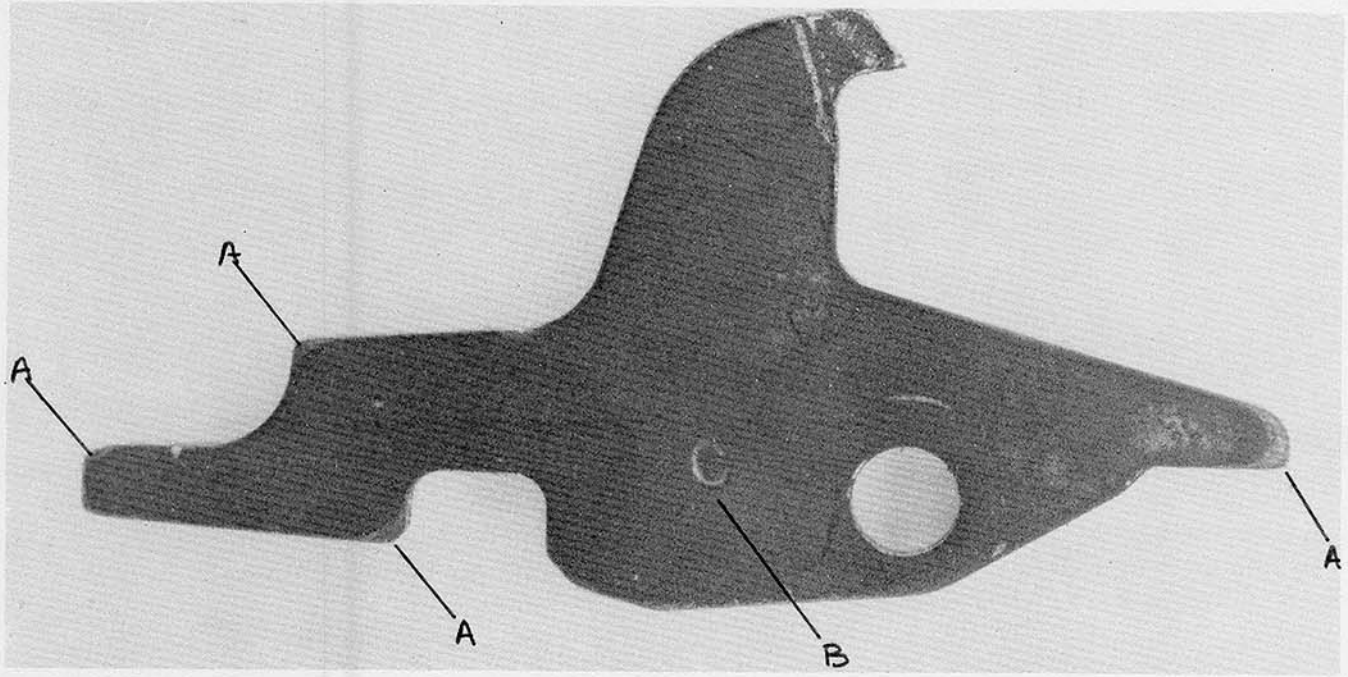


Figure 2-103. Colt M16A1 rifle SN 6418244 disconnector right side view.

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TABLE 2-29. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - HAMMER ASSEMBLY

Figure No.	Description
2-104 2-105	The design and construction of the test rifle and Colt rifle hammer assembly are basically the same. Both parts are precision cast. There are no manufacturer's or mold marks on the test rifle part; however, there is a sprue mark at (A). The Colt rifle hammer has a mold mark in this same general location (A) and the manufacturer's marks to the right (D). The sides of the hammer, adjacent to the secondary (automatic) sear surface are a radiused, as-cast surface (B). The corresponding surfaces on the Colt part are milled right angle edges. The length of the trigger override surface which is located above the primary sear surface is longer on the test rifle part (C). There is a large relief cut on the face of the hammer, adjacent to the primary sear surface (D), on the Colt rifle. This cut is approximately 1/3 the length on the test rifle part.
2-106 2-107	The major sprue location is on the front face of the hammer on both parts. Grinding off the rough surface (A) prevents accurate determination of actual size and location differences of the sprue. The shape of the hammer at (B) is slightly different. The amount of radius where the trunnions and the main body of the hammer join is larger in the test rifle part (C).

Note: The letters in ( ) refer to the arrow indicators on the figures.

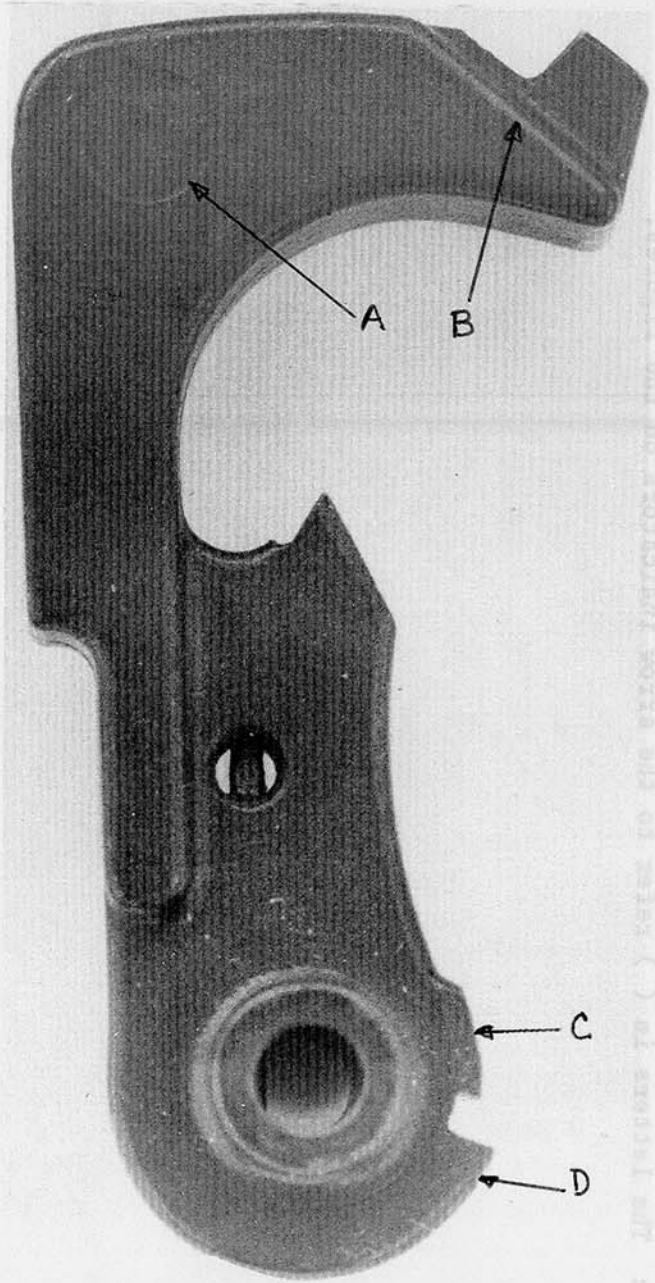

Figure 2-104. Test rifle hammer assembly left side view.

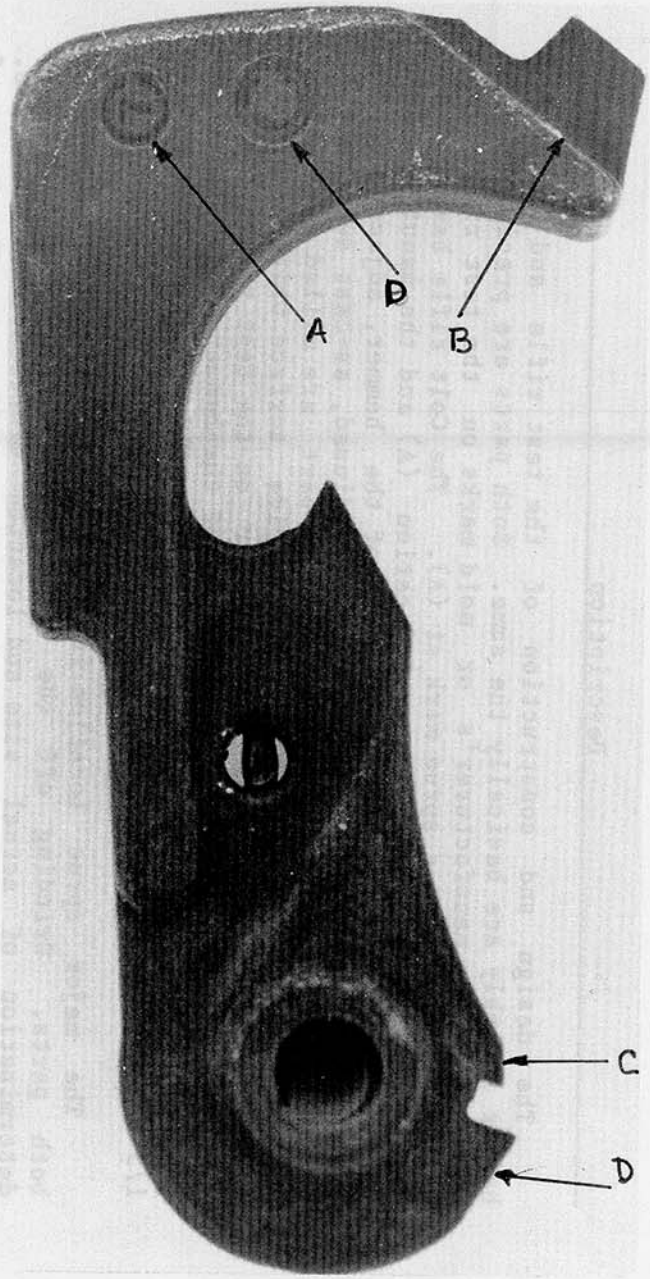

Figure 2-105. Colt M16A1 rifle SN 6418244 hammer assembly left side view.

Figure 2-107. Colt M16A1 rifle SN 6418244 hammer assembly front view.

Figure 2-106. Test rifle hammer assembly front view.

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TABLE 2-30. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - LOWER RECEIVER EXTENSION

Figure No.	Description
2-108 2-109 2-110 2-111	The parts shown in the four figures are basically the same design and method of manufacture. Small differences noted are in the method of starting the thread lead (A). In the test rifle part, the first thread is milled to a uniform depth around the periphery of the part. The Colt rifle uses the same method, except that the cutting tool is withdrawn during rotation of the extension, which produces a tapered lead. Early US supply parts did not machine any chamfer or lead on the first thread. The current production design parts (fig. 2-108, 2-109, and 2-110) have the same rear end. Two parallel flats are machined on each side to allow use of a wrench to tighten the extension. The irregular shape shown in (B) (fig. 2-109) was caused by wrench slippage during removal from the Colt rifle. The early design extension did not use wrench flats on the rear of the part (C) (fig. 2-111). Instead, a through-hole was drilled below the front end of the tube into which a steel rod could be inserted for tighening purposes (C).

Note: The letters in ( ) refer to the arrow indicators on the figures.

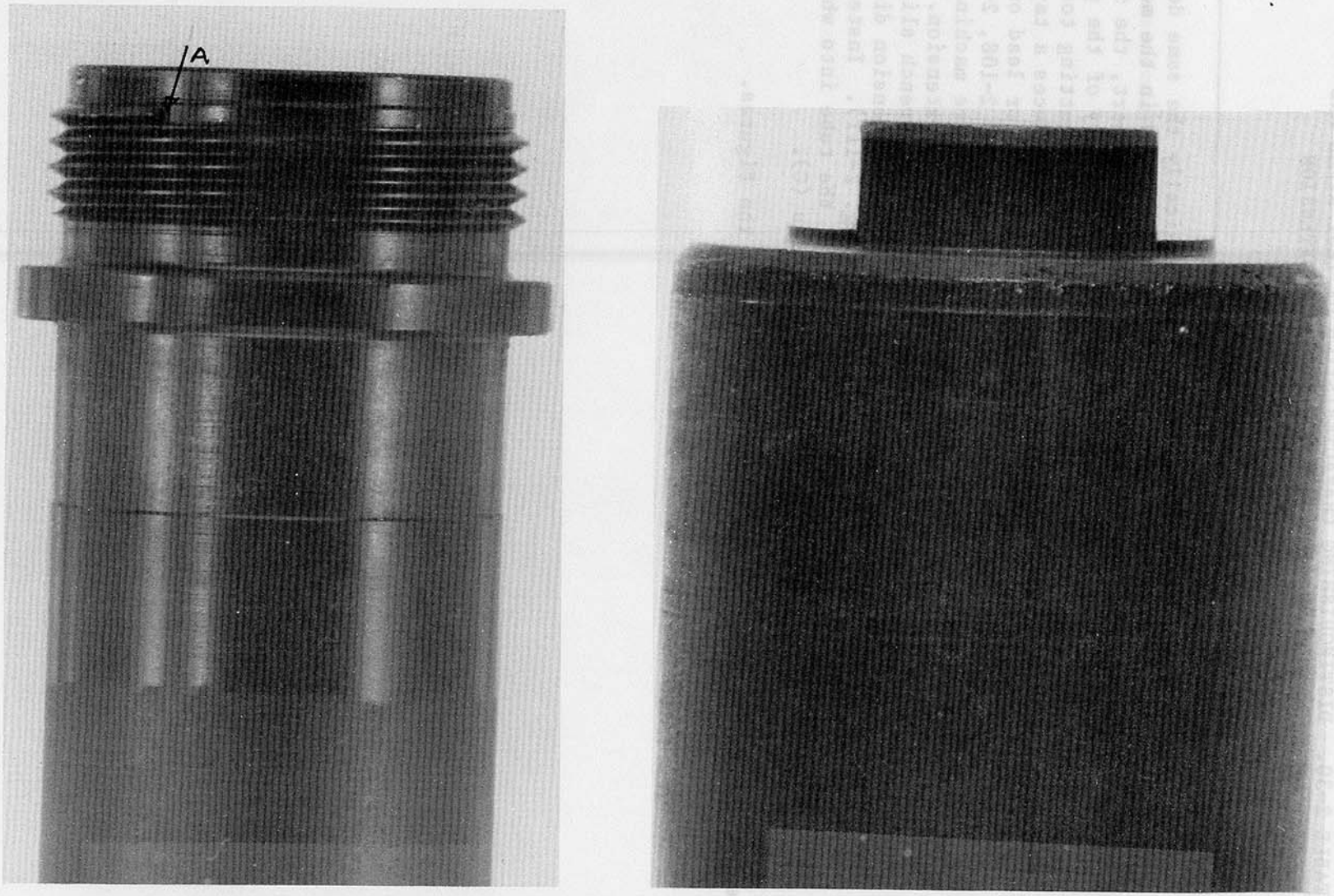
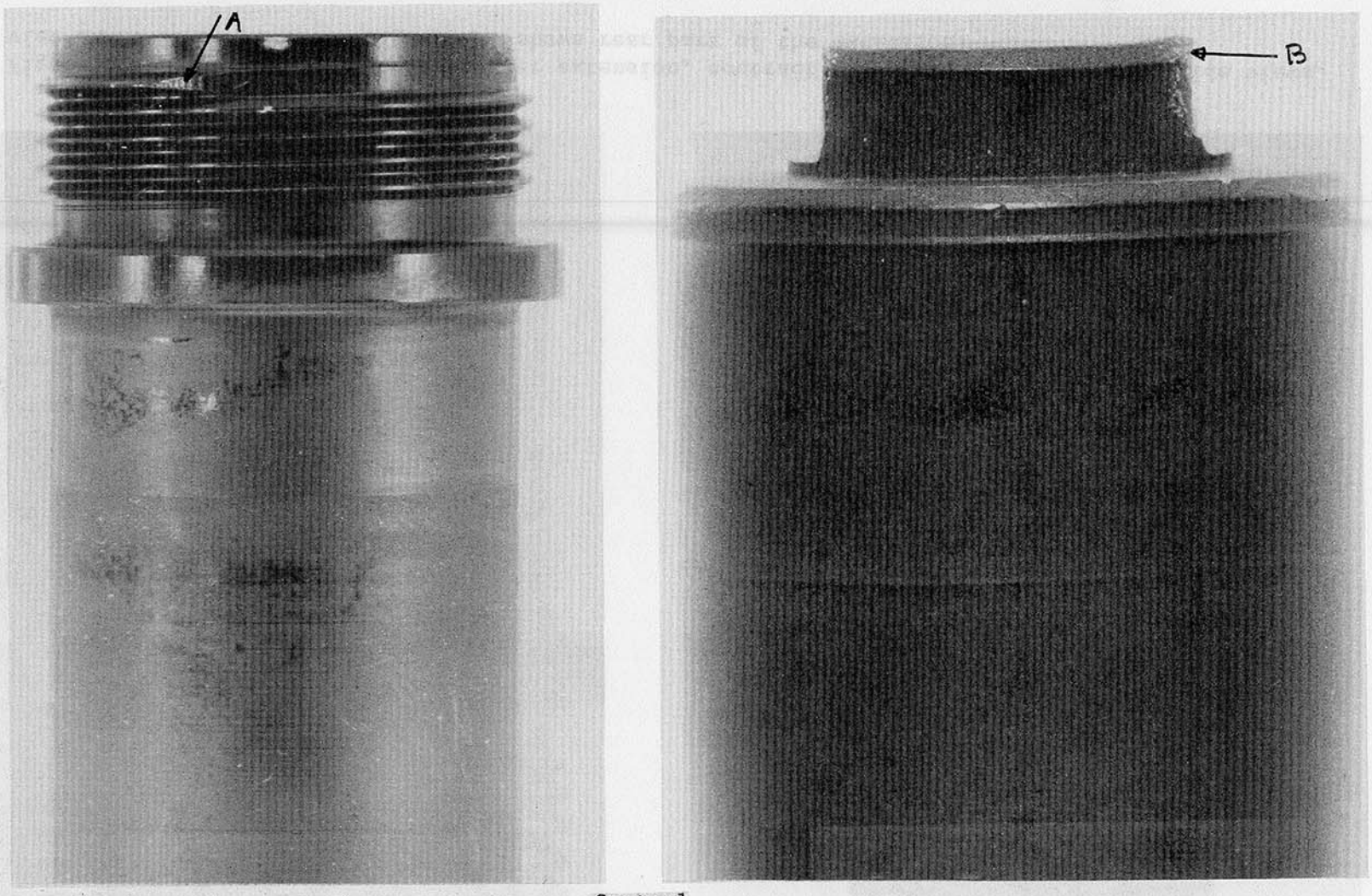


Figure 2-108. Test rifle lower receiver extension side views. Left view shows front part and right view shows rear part of the extension.



Control

Figure 2-109. Colt M16A1 rifle SN 6418244 lower receiver extension side views. Left view shows front part and right view shows rear part of the extension.

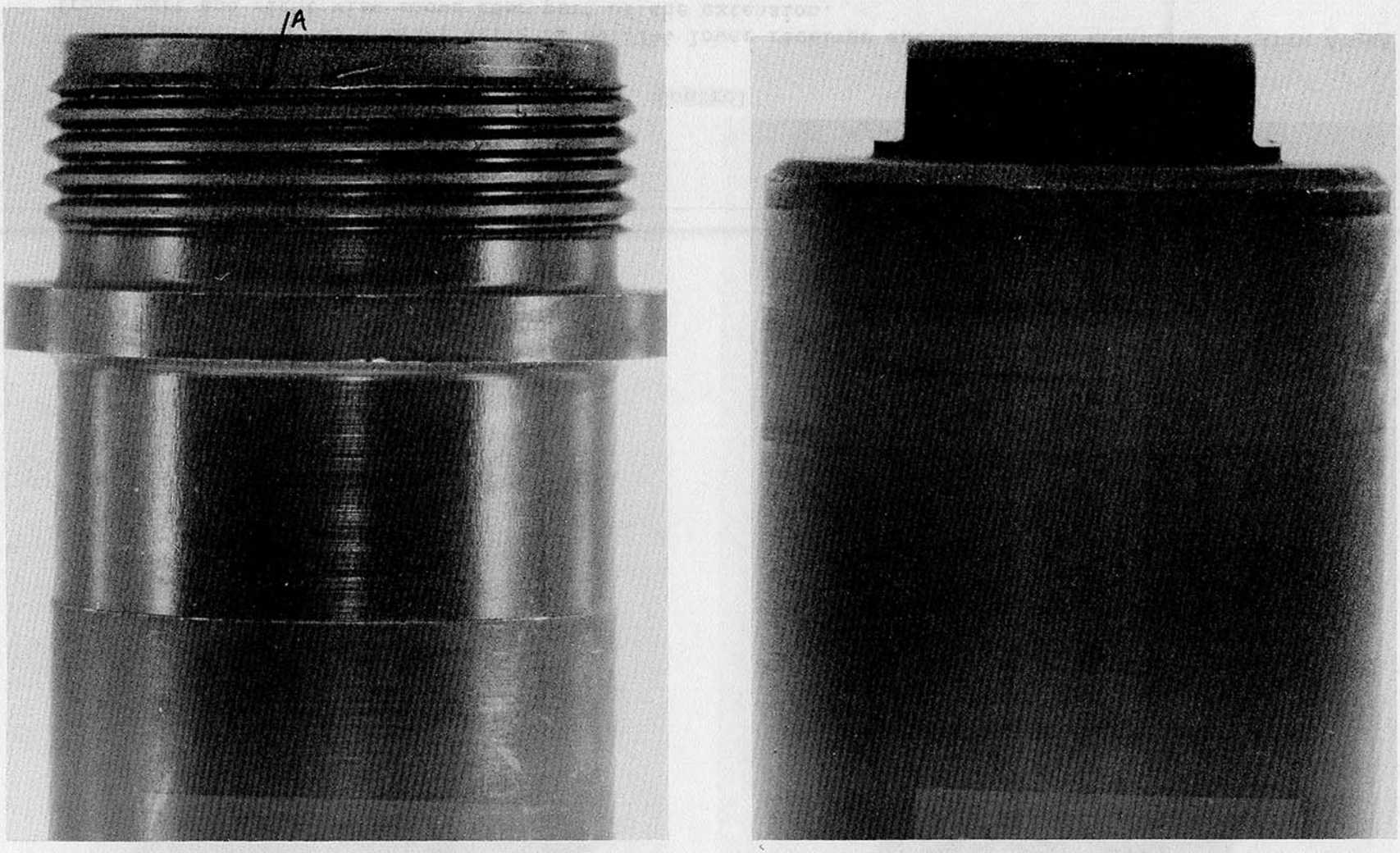


Figure 2-110. US supply lower receiver extension, contract DAAF03-66-C-0020 (6/67), side views. Left view shows front part and right view shows rear part of the extension.

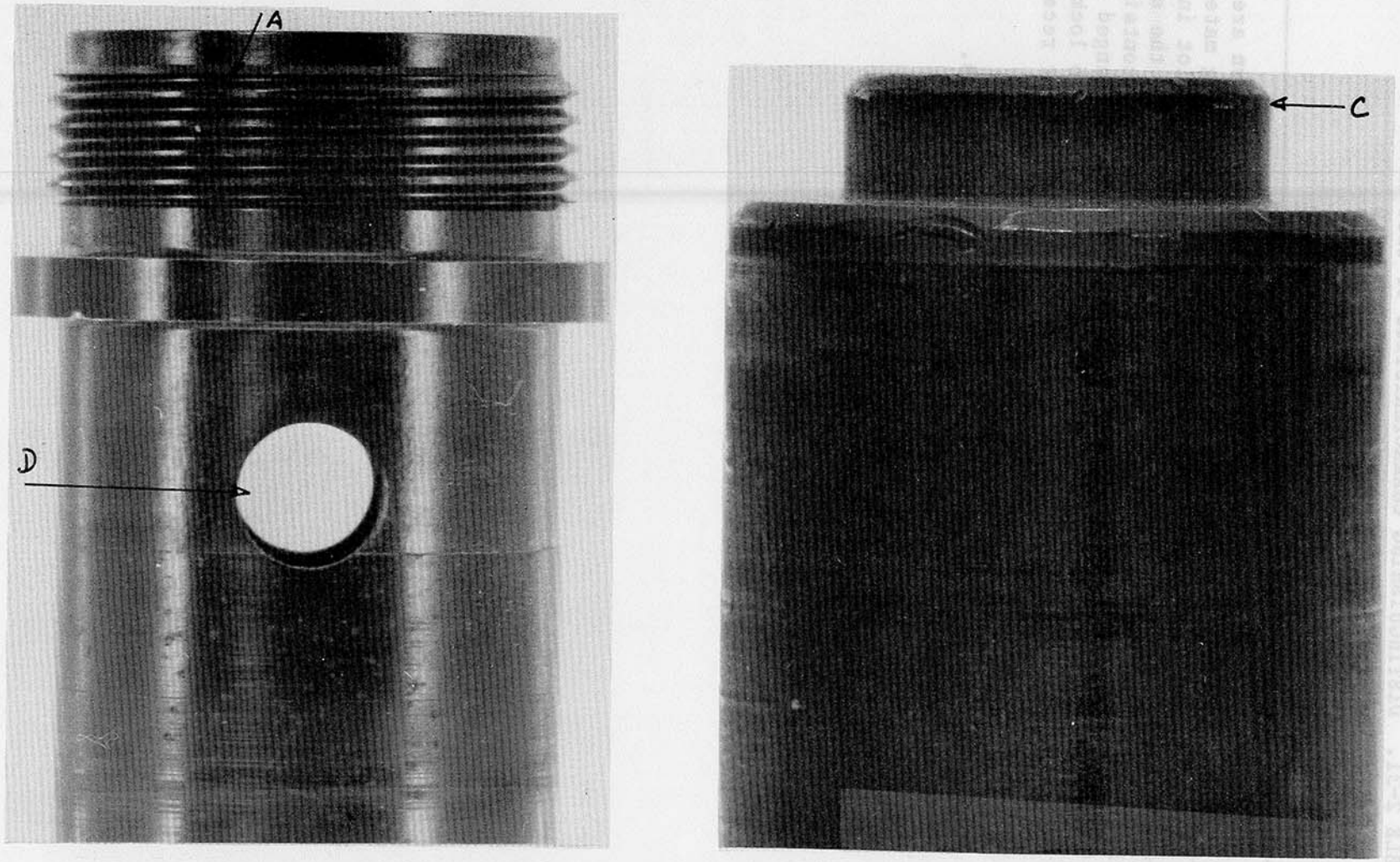
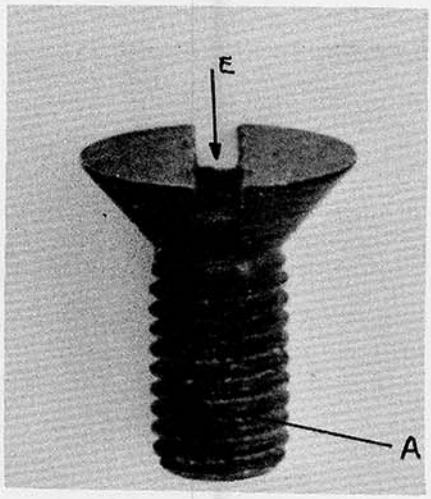


Figure 2-111. US supply lower receiver extension (old style) side views. Left view shows front part and right view shows rear part of the extension.

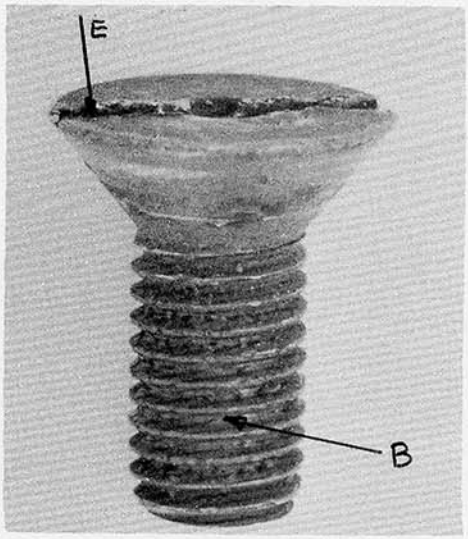
TABLE 2-31. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - BUTT CAP SCREW

Figure No.	Description
2-112	The basic design and construction of the screws shown are the same. The differences noted are that the screw retaining material is located approximately in line with the screw head slot in all parts except the test rifle, which is located about 90° to the slot. Early US supply parts are characterized by a drilled hole containing a plug of plastic material (C). Subsequently, this was changed to a sprayed on spot of fluxable plastic material used to lock the threads when screwed into the rear end of the lower receiver extension.

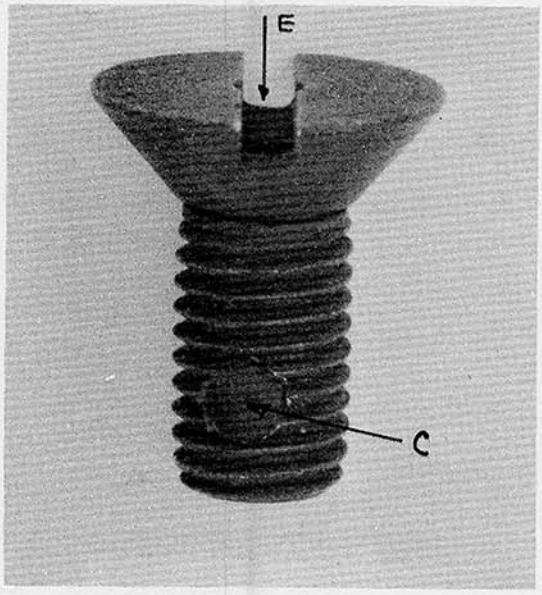
Note: The letters in ( ) refer to the arrow indicators on the figures.



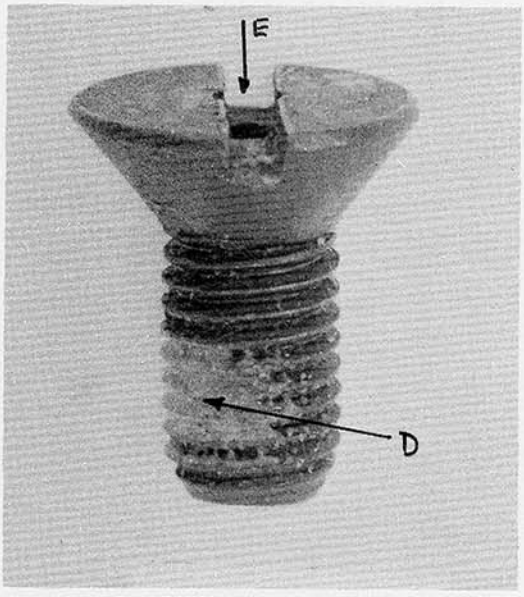
Colt M16A1 rifle SN 6418244



Test rifle



US supply



US supply

Figure 2-112. Butt cap screw side-view showing type of thread lock. A = green, sprayed, B = blue, sprayed, C = black; plug, D = yellow, sprayed.

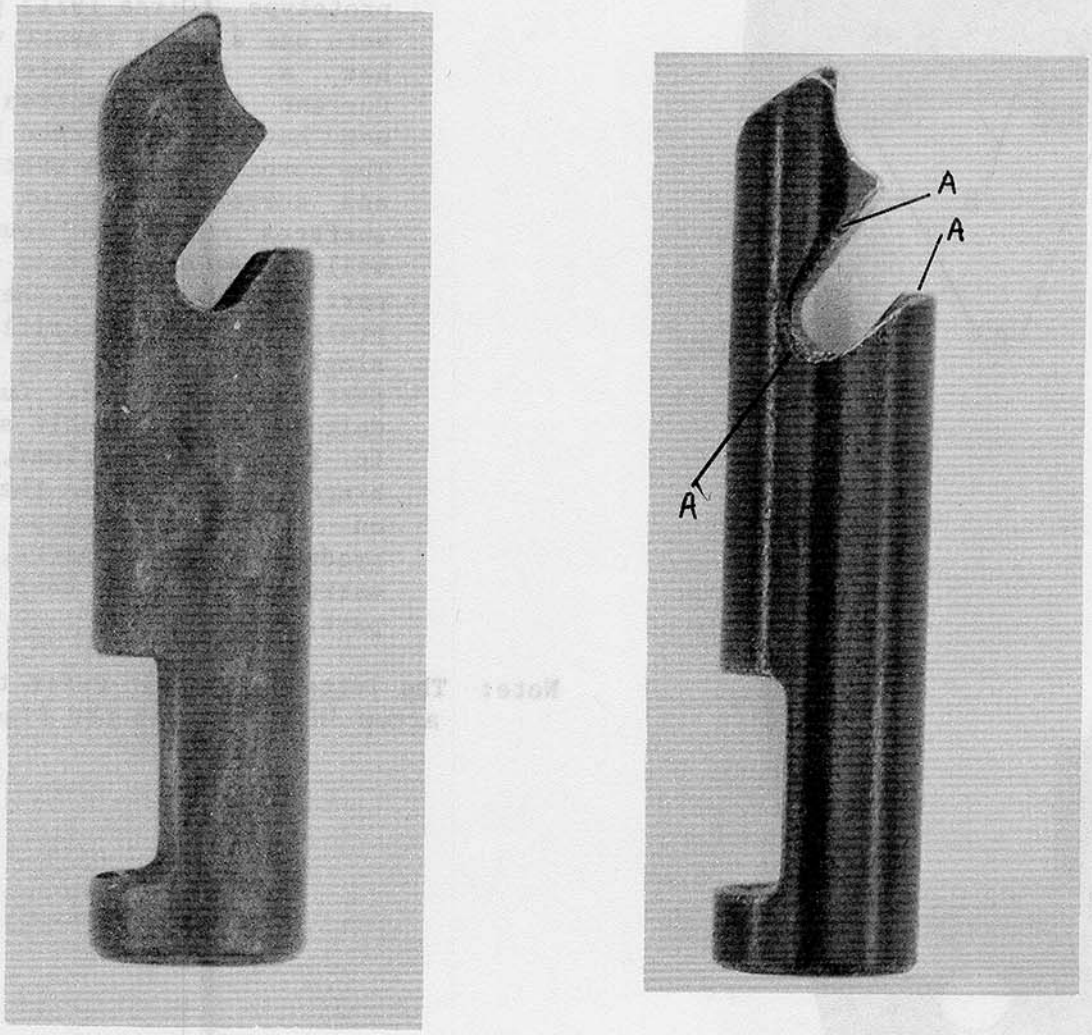
Note: All parts are same size. Figures not to scale.

(Page 140 Blank)

TABLE 2-32. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - STORAGE DOOR LATCH

Figure No.	Description
2-113	Design and construction of the parts shown are basically the same. Both use a hardened, nonplated surface finish. Originally (until July 1972) this latch was plated. Small differences were noted in the use of the edge chamfering of latch surfaces on the test rifle (A).

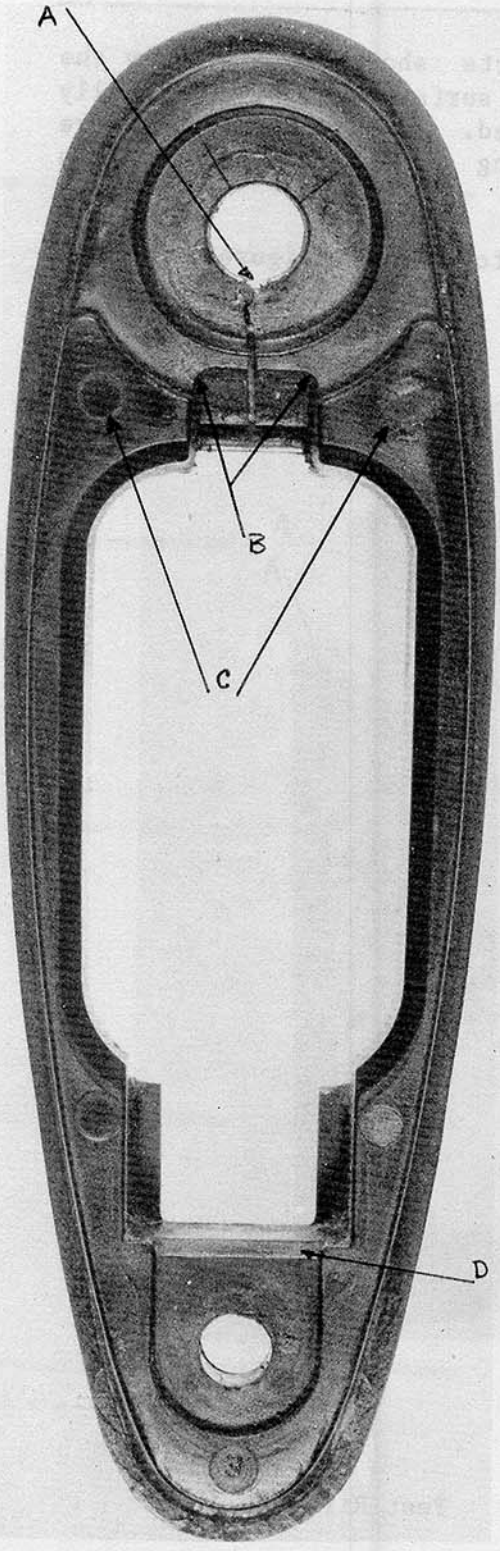
Note: The letters in ( ) refer to the arrow indicators on the figures.



Colt M16A1 rifle
SN 6418244

Test Rifle

Figure 2-113. Stowage door latch left side view.



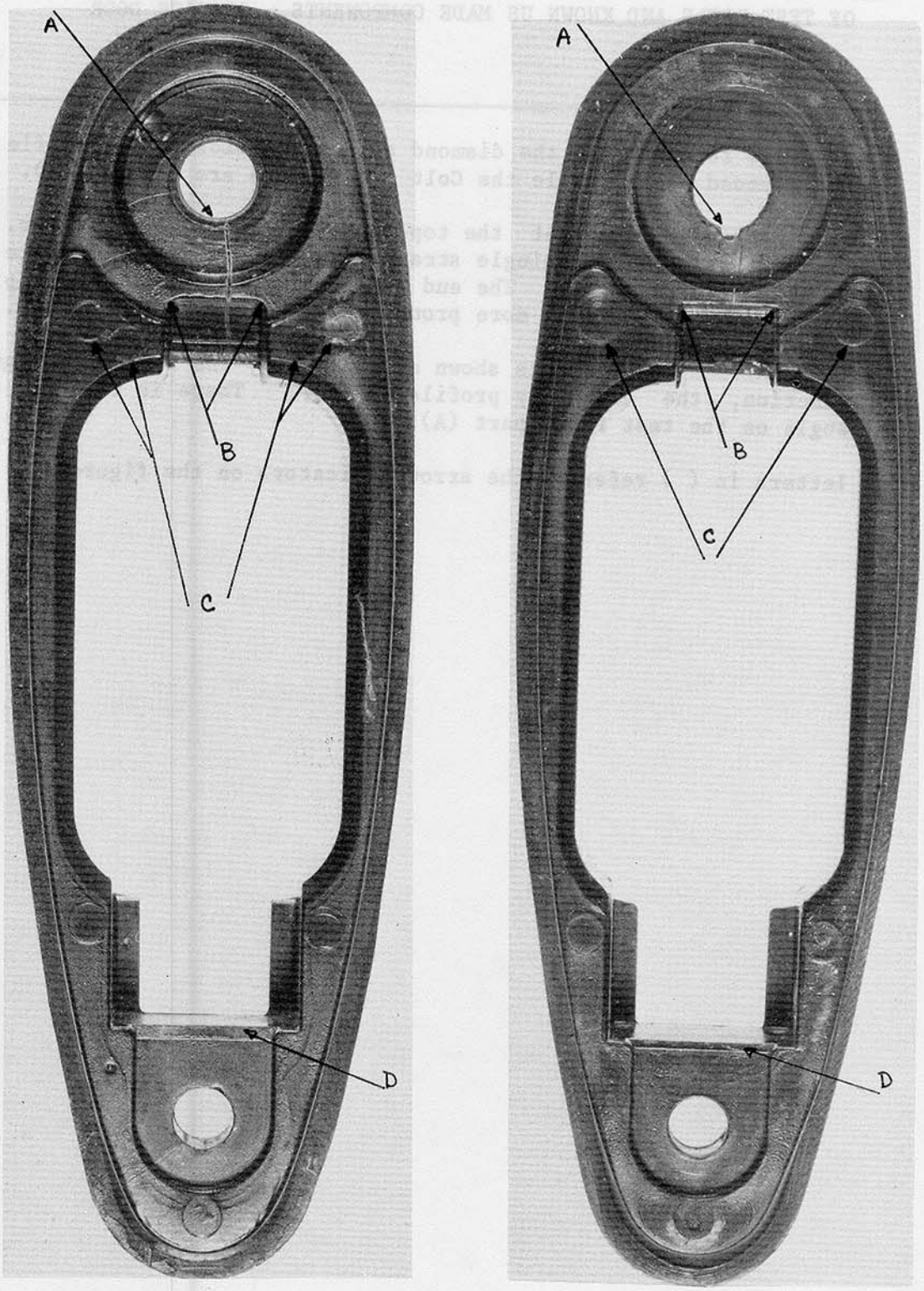
Colt prototype

Figure 2-114. Butt cap inside view.

TABLE 2-33. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - BUTT CAP

Figure No.	Description
2-114 2-115	The design and construction of the parts shown are basically the same. All parts use a metal insert, for the latching surface. This insert is molded into the cap. Test rifle and Colt prototype (Circa 1971) parts both use a metal insert which has a notched hole (A). Current Colt production does not have the notched hole. The corners of both prototype and current production latch surfaces (B) are rounded, while those of the test rifle part are square. The Colt prototype and test rifle use single sprues in the upper part of the cap (C). Current Colt parts use double sprues in the same locations. The hinge relief (D) is the same on both prototype and production Colt parts, but narrower on the test rifle part.

Note: The letters in ( ) refer to the arrow indicators on the figures.



Colt M16A1 rifle SN 6418244

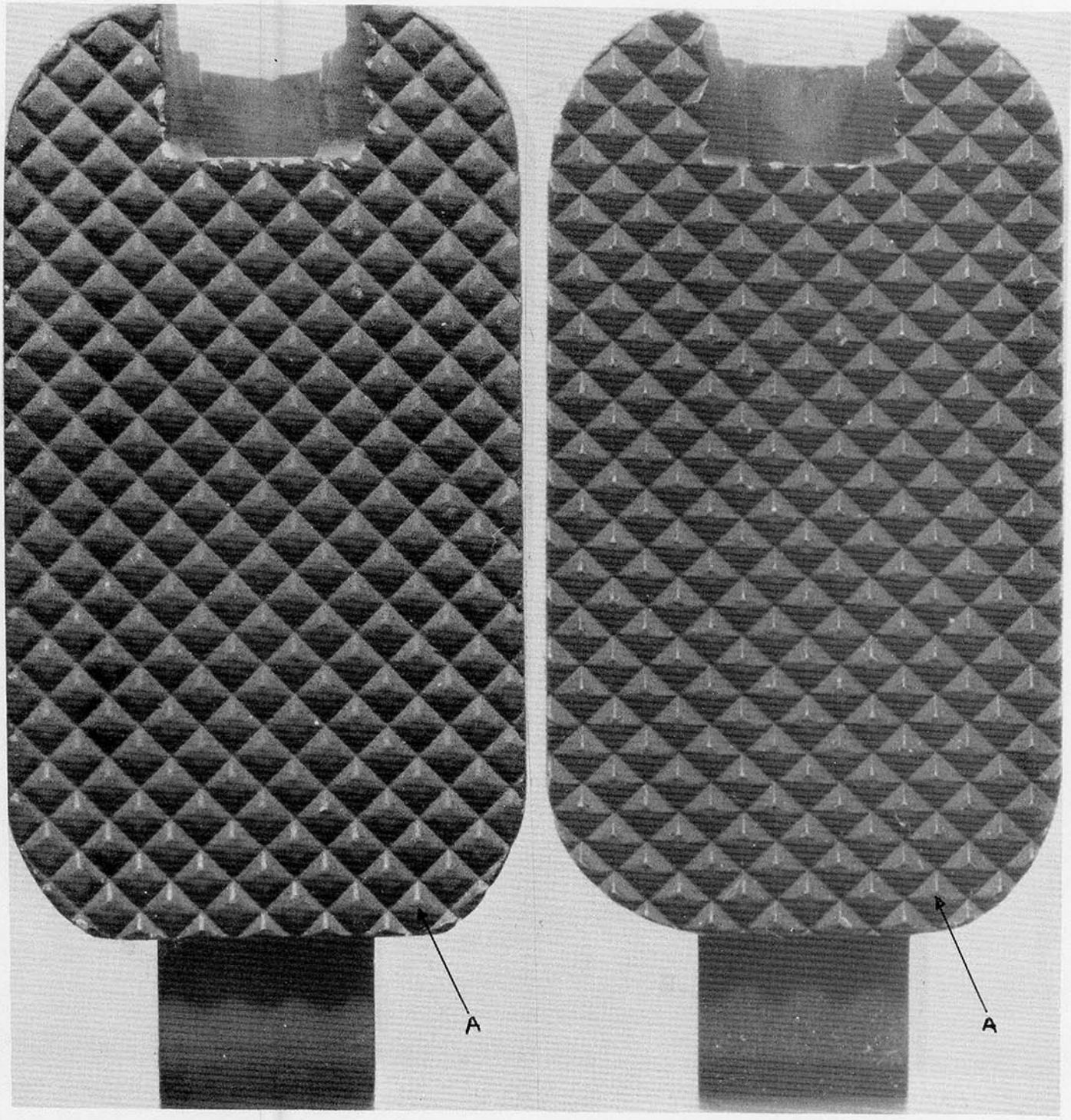
Test rifle

Figure 2-115. Butt cap inside view.

TABLE 2-34. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND OF TEST RIFLE AND KNOWN US MADE COMPONENTS - STOWAGE DOOR

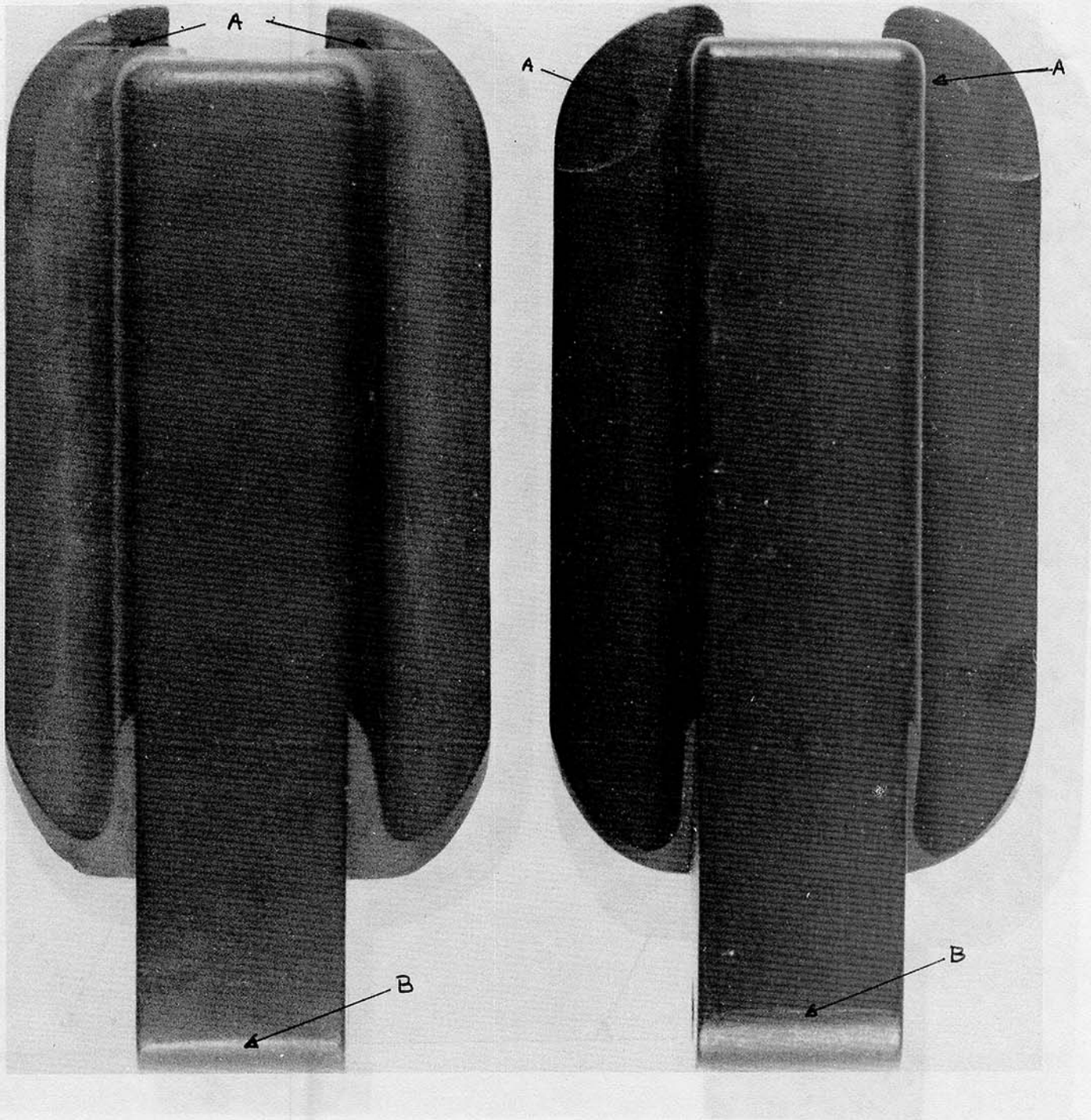
Figure No.	Description
2-116	The formation of the diamond shaped pyramids of test rifle part has rounded peaks, while the Colt rifle parts are pointed (A).
2-117	Machining cuts at the top (inside) of the door differ. The test rifle part is a single straight cut, while the Colt rifle part is two radius cuts (A). The end radius of the door, where it pivots on the hinge pin (B) is more pronounced on the Colt rifle part.
2-118	Although both parts shown are basically the same in design and function, the cast body profiles differ. There is a larger draft angle on the test rifle part (A).

Note: The letters in ( ) refer to the arrow indicators on the figures.



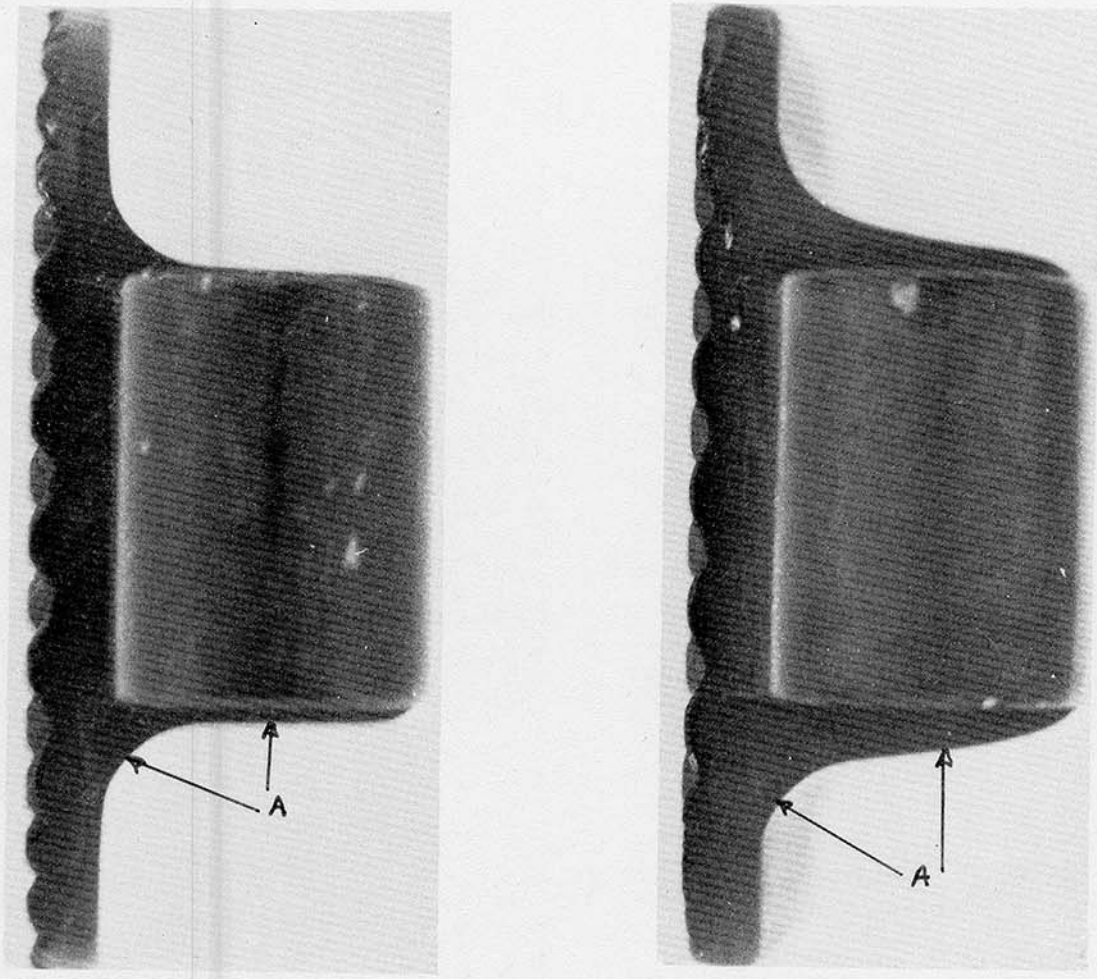
Test rifle Colt M16A1 rifle SN 6418244

Figure 2-116. Stowage door rear view.



Test rifle Colt M16A1 rifle SN 6418244

Figure 2-117. Stowage door front view.



Colt M16A1 rifle SN 6418244 Test rifle

Figure 2-118. Stowage door, hinge - end view.

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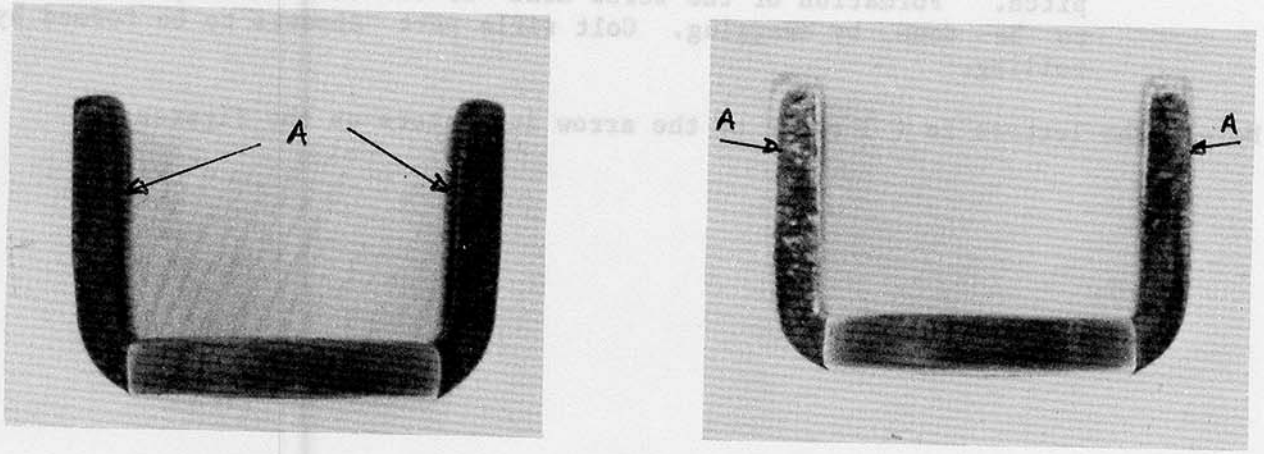
TABLE 2-35. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - BUTT PLATE ACCESS DOOR HINGE

Figure No.	Description
2-119	The two parts shown are designed and fabricated in the same basic manner. The difference is in the direction that the flat side of the stamping is bent. The rounded edge surface is on the outside of the Colt rifle part and on the inside on the test rifle part (A).

Note: The letters in ( ) refer to the arrow indicators on the figures.



Colt M16A1 rifle
SN 6418244

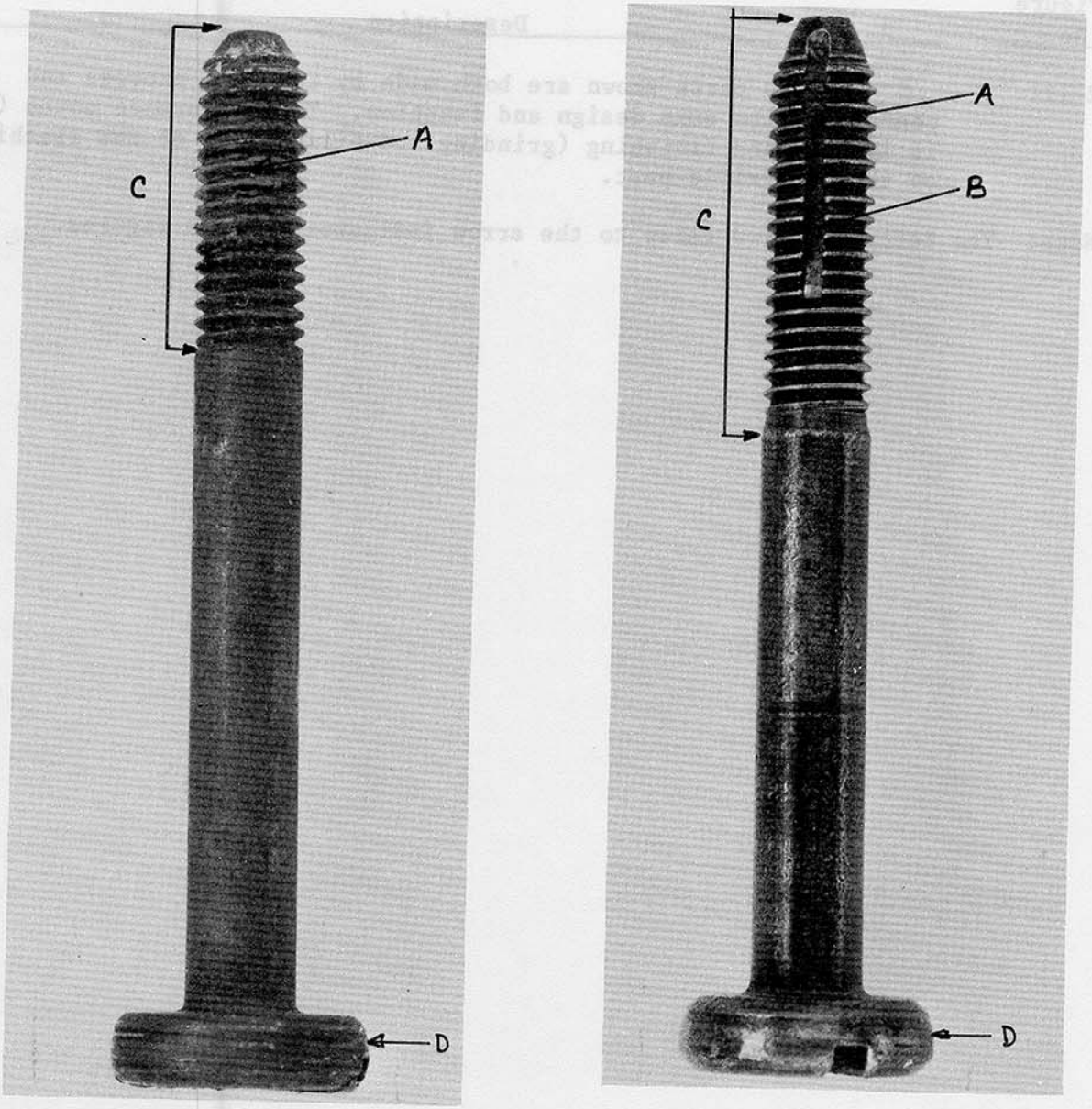
Test rifle

Figure 2-119. Butt plate access door hinge bottom view.

TABLE 2-36. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - STOCK SWIVEL SCREW

Figure No.	Description
2-120	The two parts shown, while performing the same function, exhibit several basic differences. These include the type of thread locking used (A) and (B), the length of thread (C), and the formation of the screw head. The thread locking medium on the test rifle part is a plastic insert pressed into an elongated slot that was milled into the screw. The Colt rifle part used a sprayed on spot of plastic material. The length of thread, length of front end chamfer, and amount of thread run out toward the head end of the screw are all greater on the test rifle part. Both screws use the same thread pitch. Formation of the screw head of the test rifle part appears to be done by swagging. Colt rifle part appears to be formed by rolling.

Note: The letters in ( ) refer to the arrow indicators on the figures.



Colt M16A1 rifle SN 6418244

Test rifle

Figure 2-120. Stock swivel screw side view.

TABLE 2-37. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - STOCK SWIVEL

Figure No.	Description
2-121	The two parts shown are both made by the same process and conform to the same design and function. The difference noted (A) is in the hand finishing (grinding and filing) off of the flashing on the test rifle part.

Note: The letters in ( ) refer to the arrow indicators on the figures.

Test

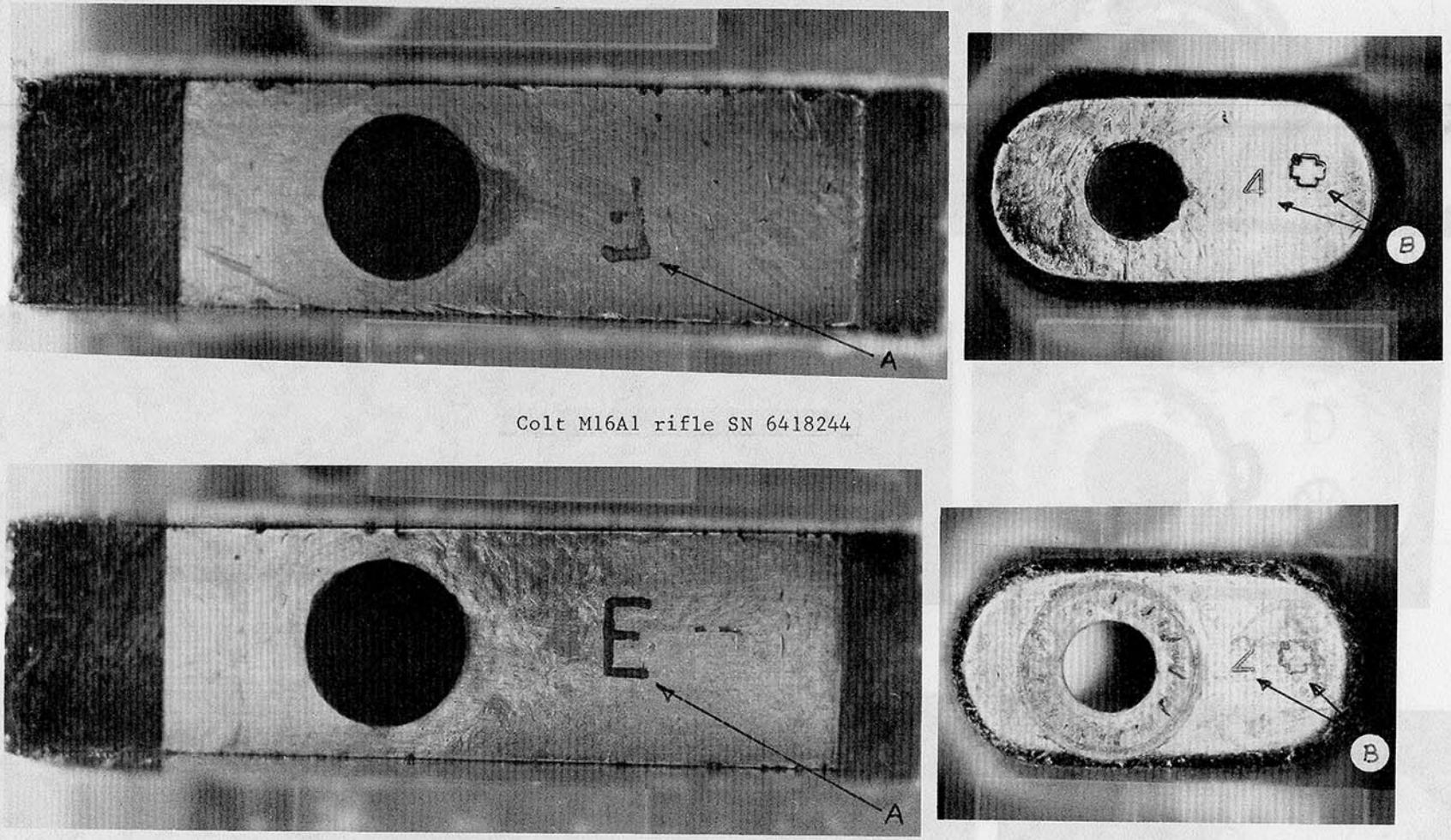
Control

Figure 2-121. Stock swivel front view.

TABLE 2-38. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - BLACK PLASTIC RIFLE GRIP

Figure No.	Description
-	All grips inspected were of basically the same design and construction. Primary differences noted were in the manufacturer's mold marks used in the injection molding process.
2-122	The test rifle and Colt rifle grip markings were basically the same relative to location and type (A and B). Both used letters in the top of the grip; both used an open cross and numeral on the bottom inside cavity.
2-123	Parts taken from US supply show no upper grip markings. All are marked with a C on the inside cavity plus other various marking schemes which differ from those shown in Figure 2-122.
2-124	The test rifle checkering pattern exhibits a more defined border than the Colt rifle or the other three spare parts (not shown) used in the comparison. The texture of the surface of the test rifle grip is more pronounced than any of the other grips inspected.
-	It is possible that early foreign production of plastic components in conjunction with approved Colt Industries supervision may have used molds produced in the USA that would contain the same markings as found on American production. Another possibility is that finished parts could have been furnished prior to startup of foreign production.

Note: The letters in ( ) refer to the arrow indicators on the figures.



Colt M16A1 rifle SN 6418244

Test rifle

Figure 2-122. Black plastic rifle grip. Left views are top views of the grips. Right views are inside bottom views of the grips.

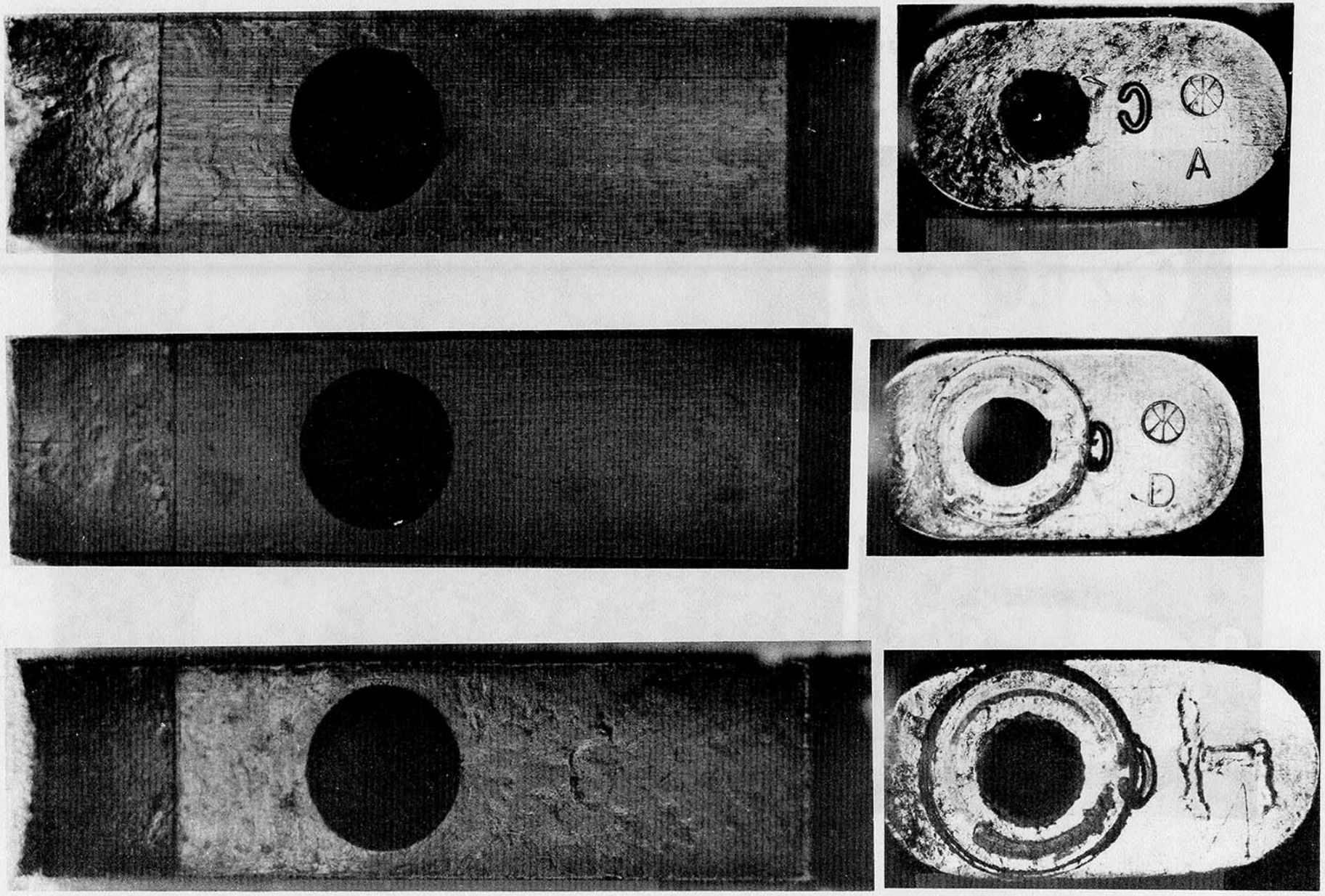


Figure 2-123. Various US supply black plastic rifle grips. Left views are top views and right views are inside bottom views of the grips.

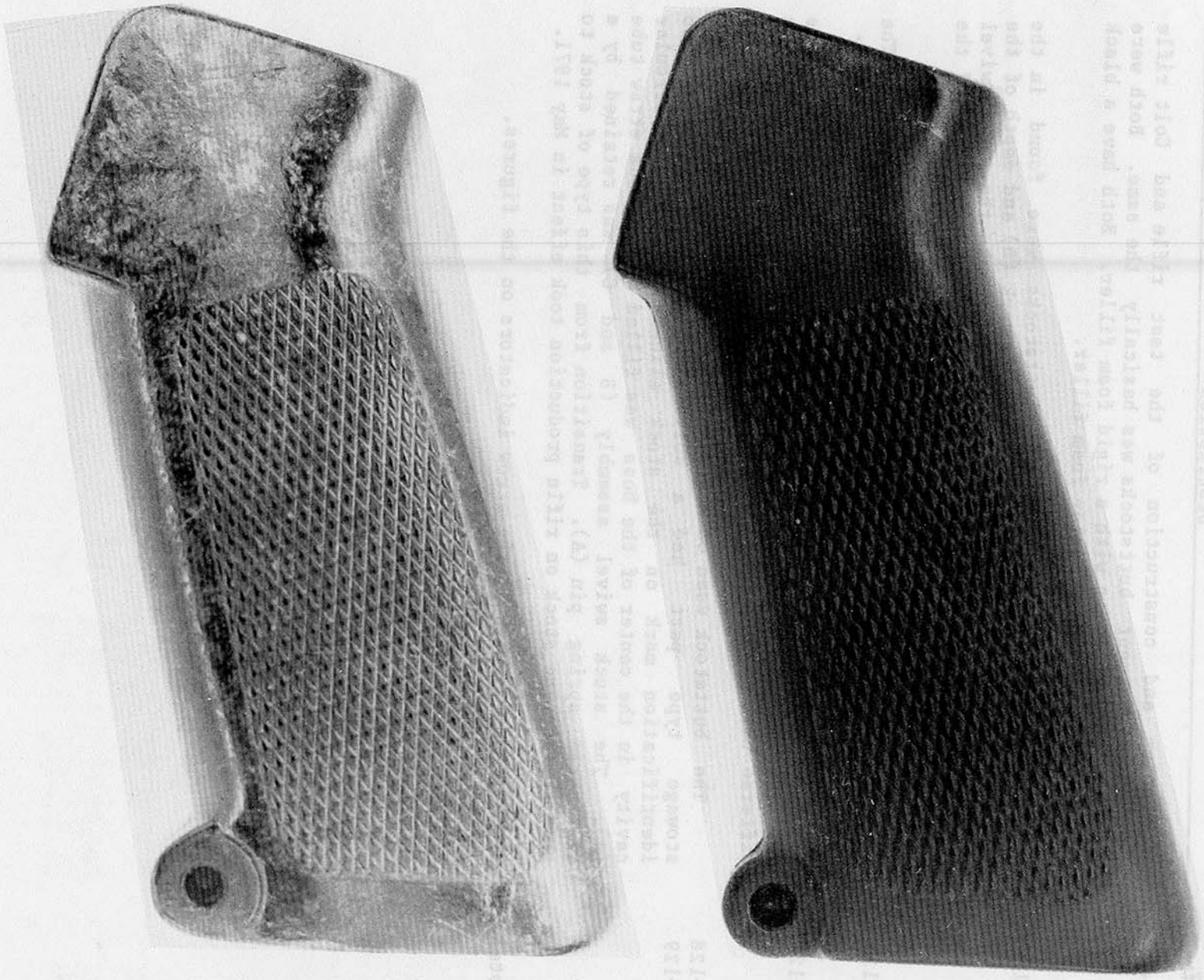
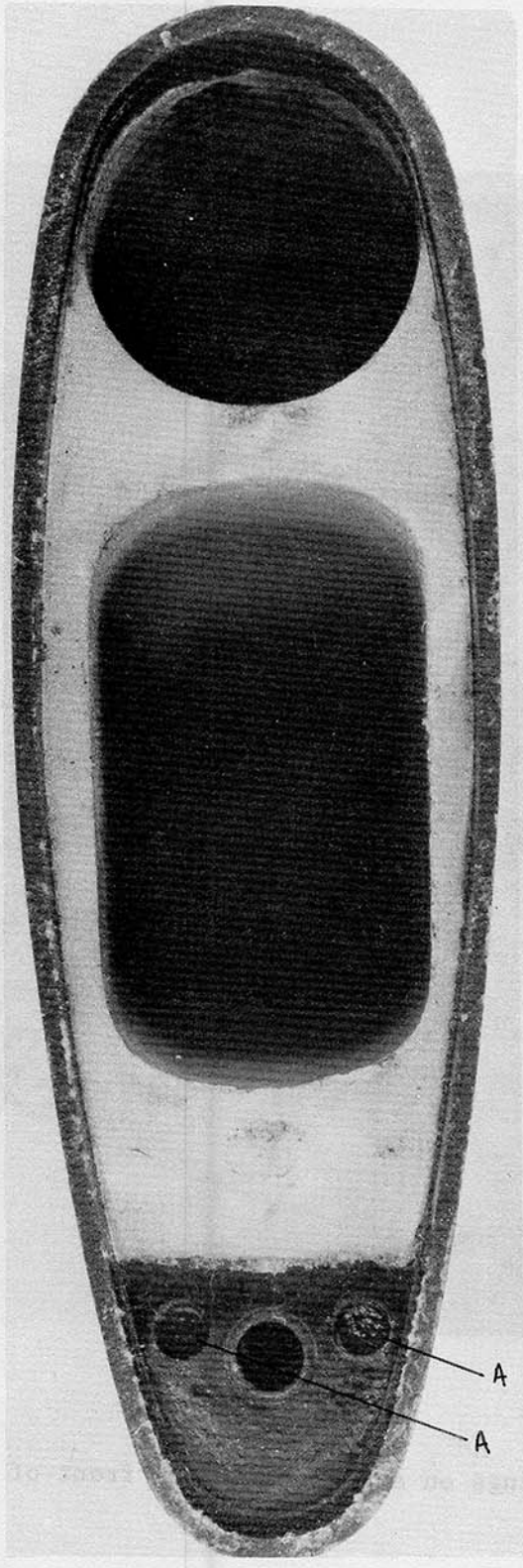


Figure 2-124. Left side view of the test rifle (at left) and Colt M16A1 rifle SN 6418244 black plastic rifle grip.

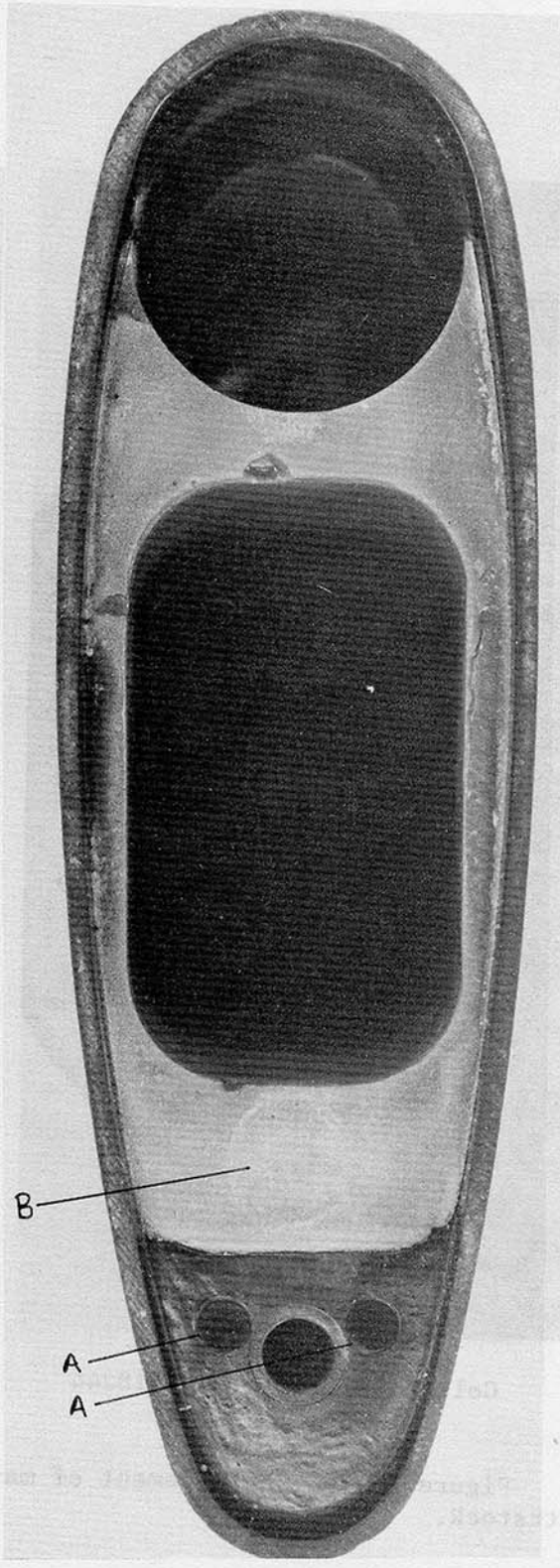
TABLE 2-39. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - BUTTSTOCK

Figure No.	Description
-	Design and construction of the test rifle and Colt rifle stowage compartment buttstocks was basically the same. Both were injection molded bodies with a rigid foam filler. Both have a black color exterior and light color foam filler.
2-125	Differences between the two buttstocks were found in the presence or absence of a foam filler sprue mark (B) and depth of the two sprue marks (A) and their relative location to the stock swivel hole. The depth of the test rifle sprues was double that of the Colt rifle part.
2-126	The shape of the buttstock alinement boss was the same. The identification marking on the front face of the boss was different.
2-127	The depth and internal oval shape of the stock swivel recess was the same. The outer profile of the corners of the recess differed (A).
2-128 2-129	The buttstock used on M16 type rifles prior to adoption of the stowage type part had a solid butt plate. There was no identification mark on the stock alinement boss. The circular cavity in the center of the boss was filled with a soda straw tube (A). The stock swivel assembly (B and C) was retained by a transverse spring pin (A). Transition from this type of stock to the stowage type stock on rifle production took effect in May 1971.

Note: The letters in ( ) refer to the arrow indicators on the figures.

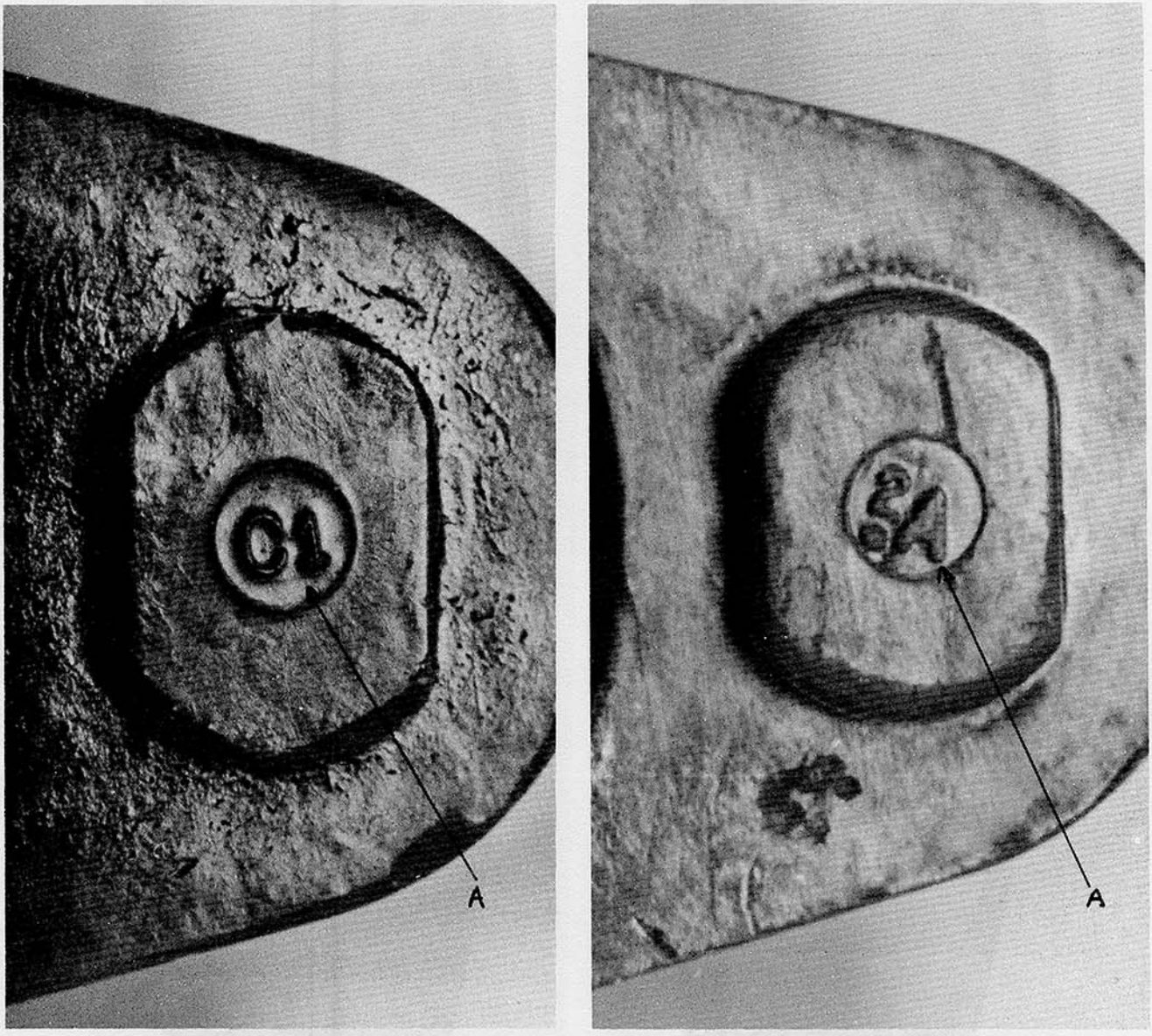


Colt M16A1 rifle SN 6418244



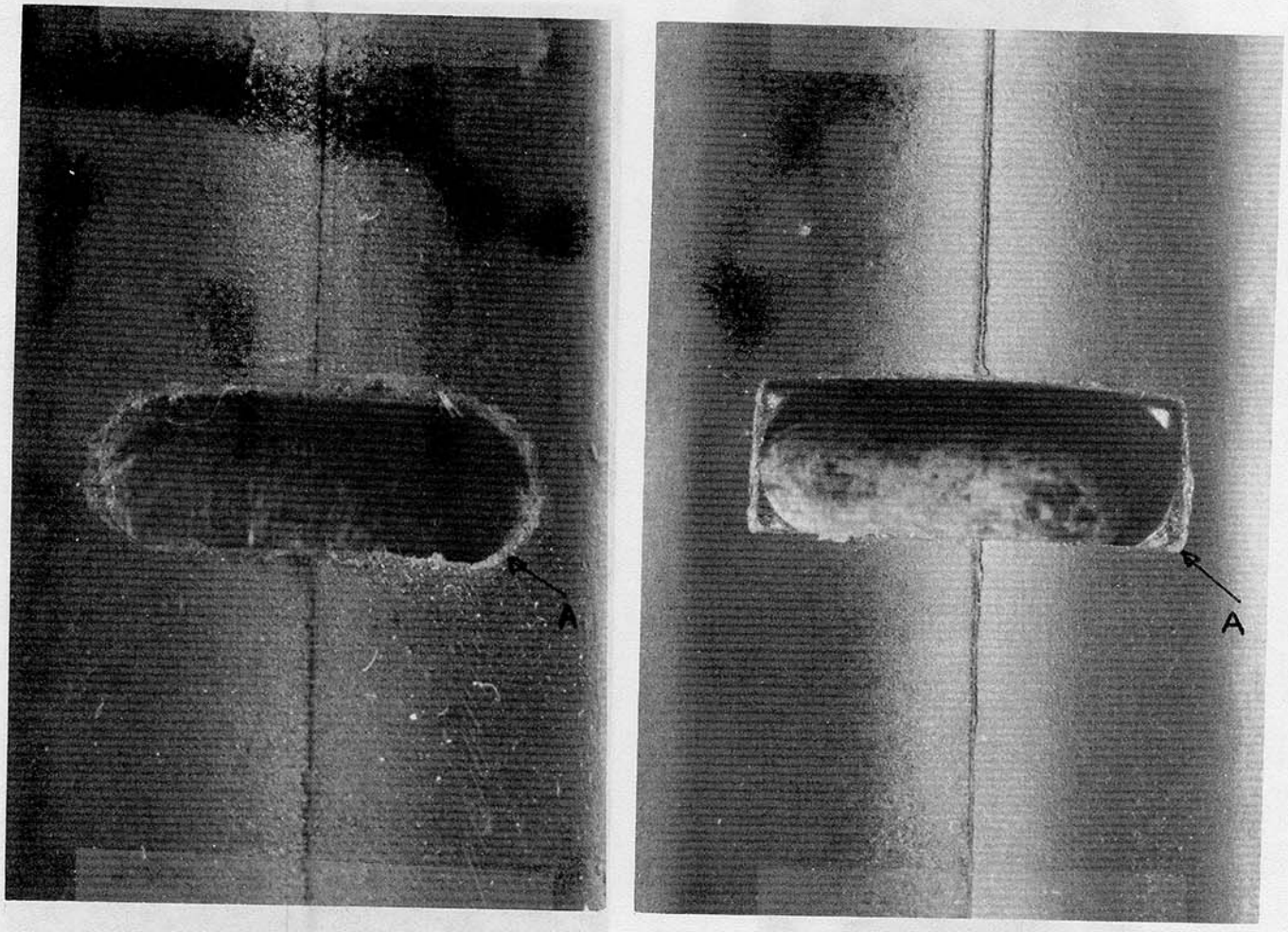
Test rifle

Figure 2-125. Interior rear view of buttstock.



Colt M16A1 rifle SN 6418244 Test rifle

Figure 2-126. Enlargement of markings on alinement lug on front of buttstock.



Colt M16A1 rifle SN 6418244

Test rifle

Figure 2-127. Enlargement of swivel slot in bottom of rifle buttstock.

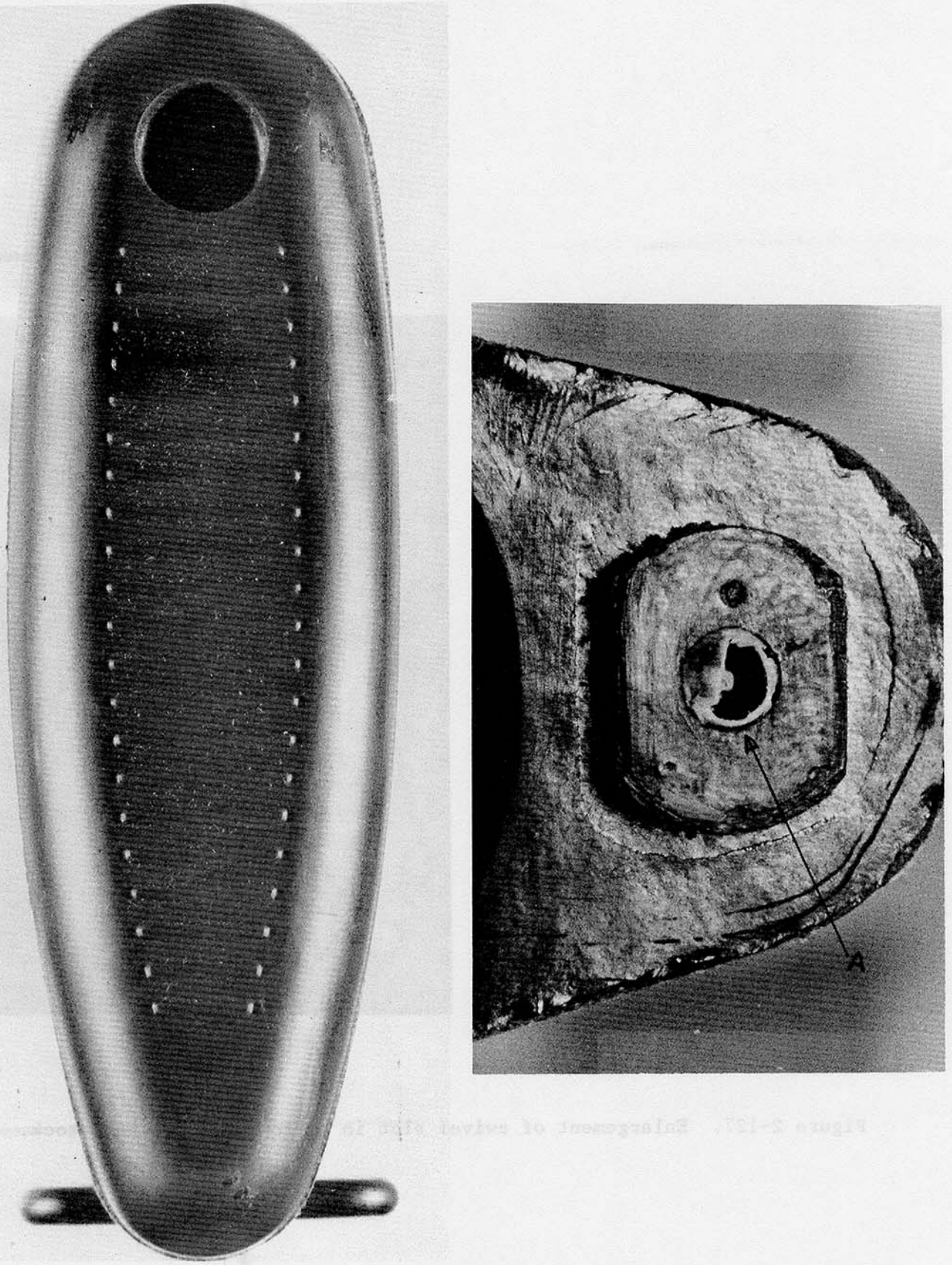


Figure 2-128. Old style stock assembly (NSN 1005-00-017-9549) showing rear end (left) and front end (right) views.

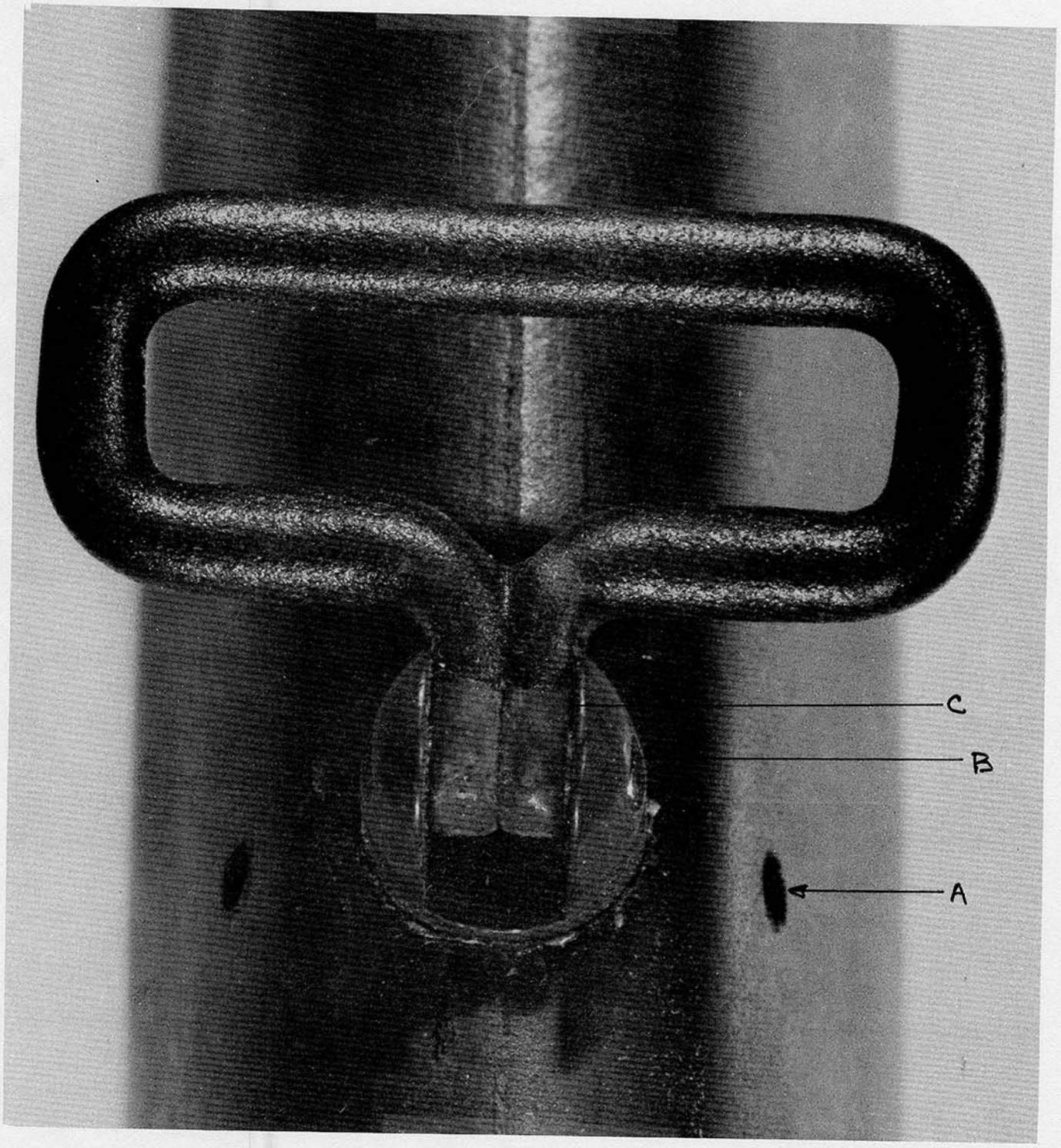


Figure 2-129. Old style stock assembly (NSN 1005-00-017-9549) showing sling swivel assembly.

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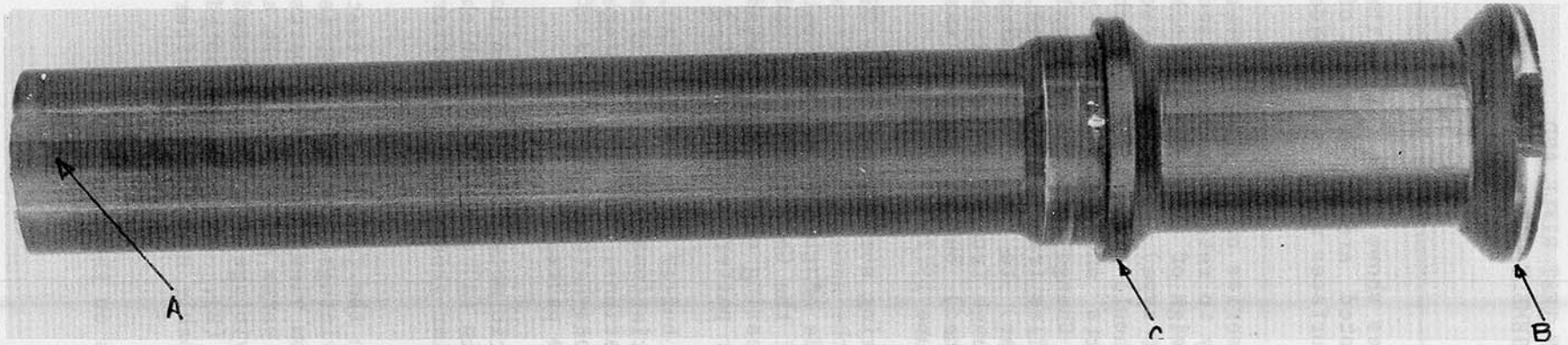
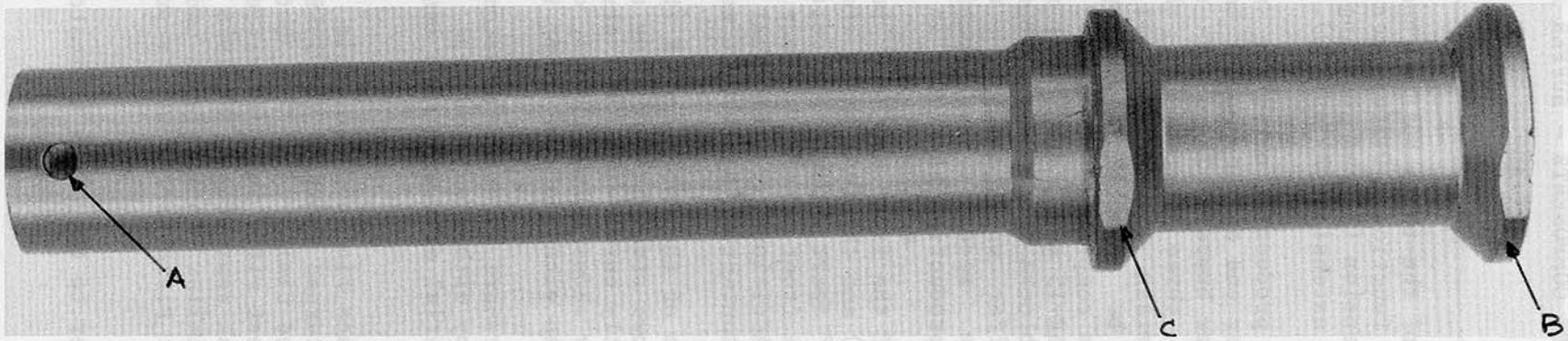
TABLE 2-40. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - BUFFER ASSEMBLY

Figure No.	Description
2-130	The design of the three buffer bodies shown is basically the same in terms of function. Differences noted are in the means of buffer bumper retension (A) and bearing surfaces which ride inside the lower receiver extension (B) and (C). Current Colt production parts use a series of annular grooves inside of the rear end of the buffer body to retain the oversized (press fit) buffer bumper. The first design of the inertia block type buffer (all three shown are of that type) used a transverse spring pin to retain the bumper. (It should be noted that both types are to be found in spare parts and are completely interchangeable as complete assemblies.) Change from the original buffer found in AR-15 and XM16/XM16E1 rifles (ring-spring design, without inertia blocks and buffer bumper) to the first design inertia block buffer was in 1968. Change from the first type (pinned) to the second type (unpinned) buffer bumper was incorporated into production in rifles in June 1972. The shape of the front and rear bearing surfaces of early US supply (Circa 1968) and the test rifle are the same. Each has three flats spaced 120° apart around the outside of the two cylindrical bearings. Only the front bearing surface of the Colt rifle part had the three flats. Additionally, its front bearing surface is crowned to reduce surface contact. (See bright wear pattern on this part.)
2-131 2-132 2-133	Surface finish of the front end of the buffer body differs (A). The Colt rifle shows straight grinding striations. The test rifle part shows slightly curved grinding striations. The 1968 vintage part from US supply shows slight curved, cross-hatched striations of a finer texture than either of the other two parts.
2-134 2-135 2-136	Buffer bumpers are an opaque elastomeric material, retained in the buffer body by either a transverse pin (A) or press fit which causes bumper material extrusion into annular grooves in the buffer body (B).
2-137 2-138 2-139	The top surface finish of the mold on the Colt rifle and test rifle parts is a turned finish. The 1968 vintage US supply part is a ground or lapped finish (A). The bottom view of the same parts show that the test rifle and Colt rifle parts are ground, with a center sprue break remaining. The 1968 vintage part has a ground lapped surface similar to its front end (B). It should be noted that only the test rifle part exhibits probable end finishing after molding.

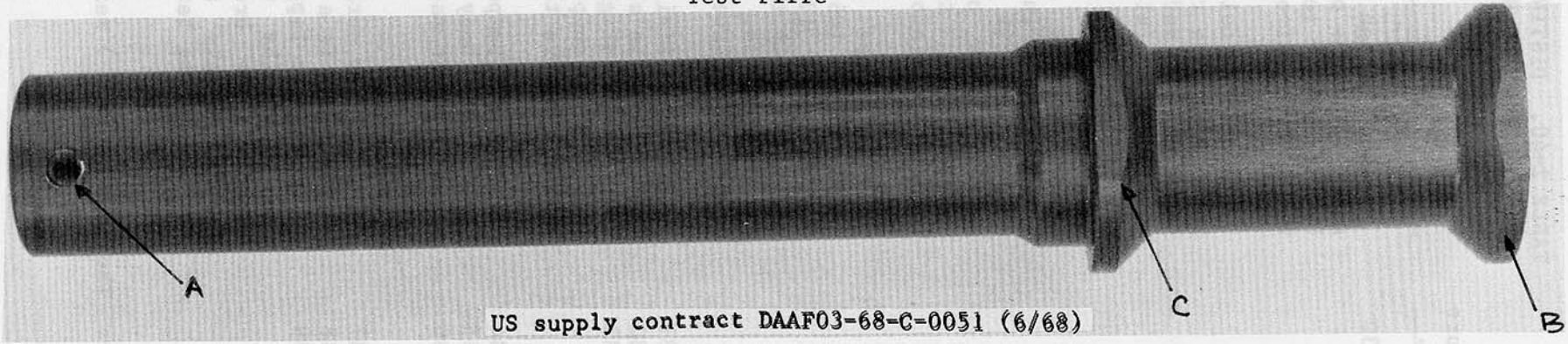
Note: The letters in ( ) refer to the arrow indicators on the figures.



Colt M16A1 rifle SN 6418244

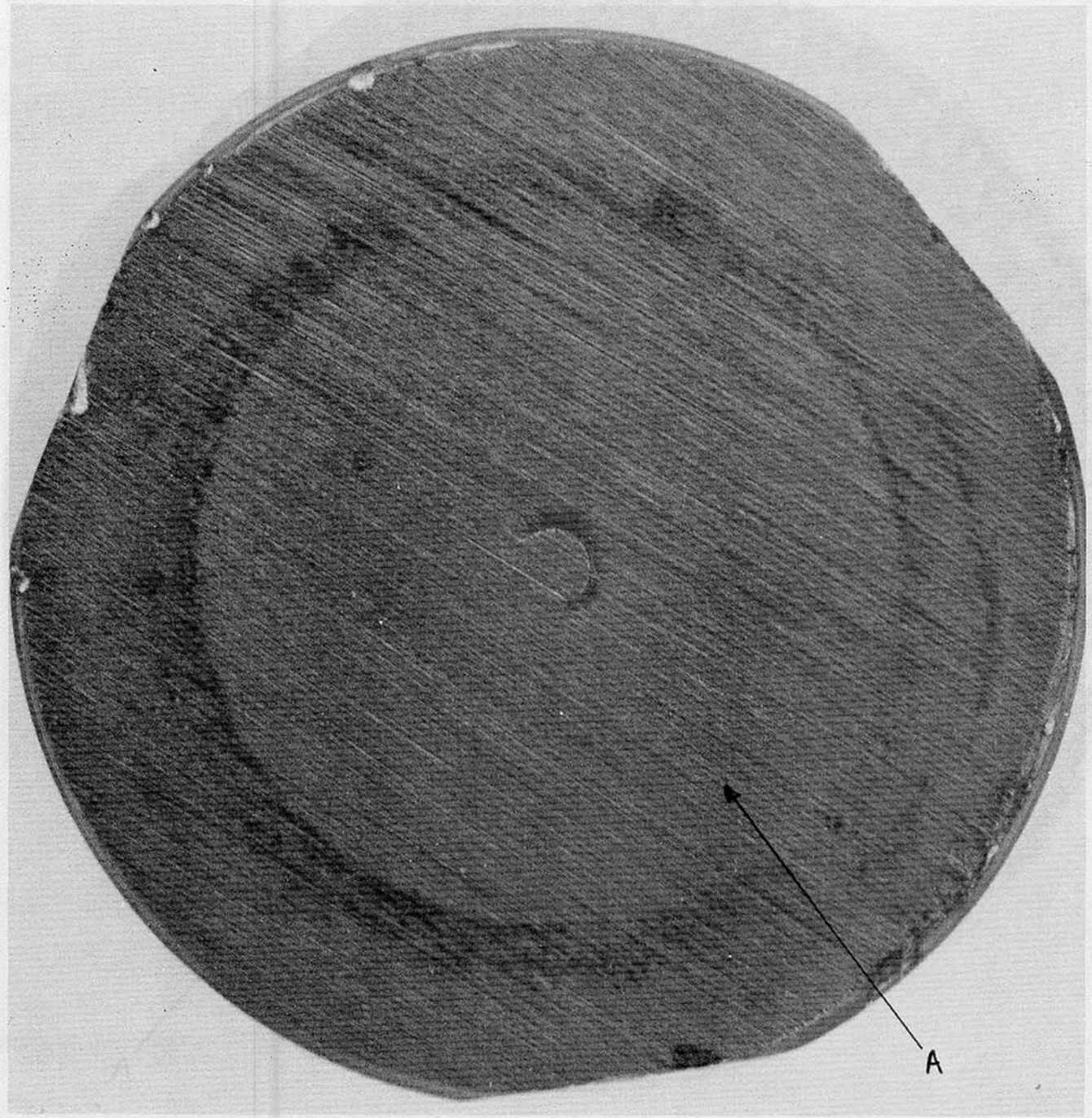


Test rifle



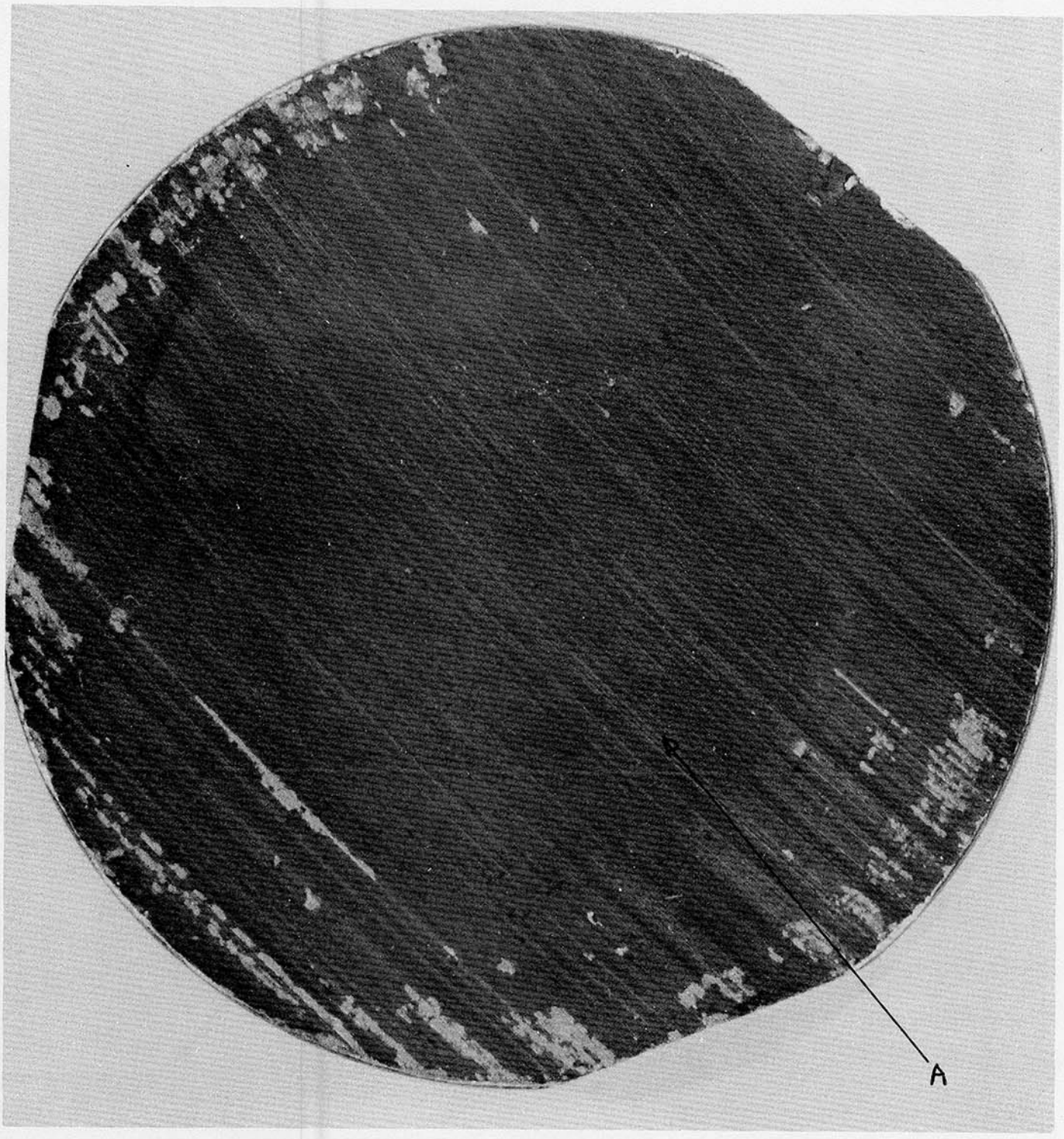
US supply contract DAAF03-68-C-0051 (6/68)

Figure 2-130. Buffer body side view.



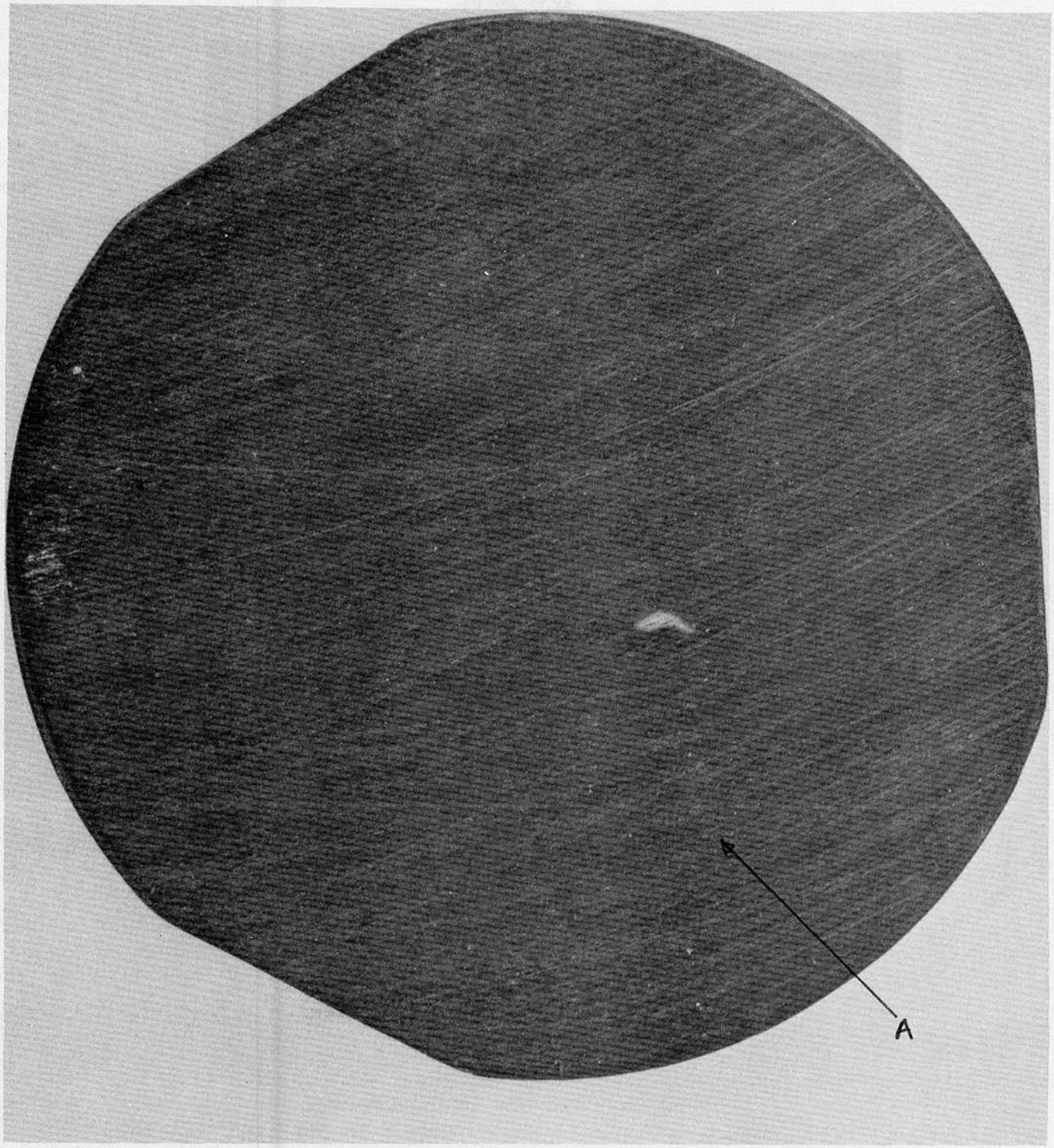
Colt M16A1 rifle SN 6418244

Figure 2-131. Buffer body (front view).



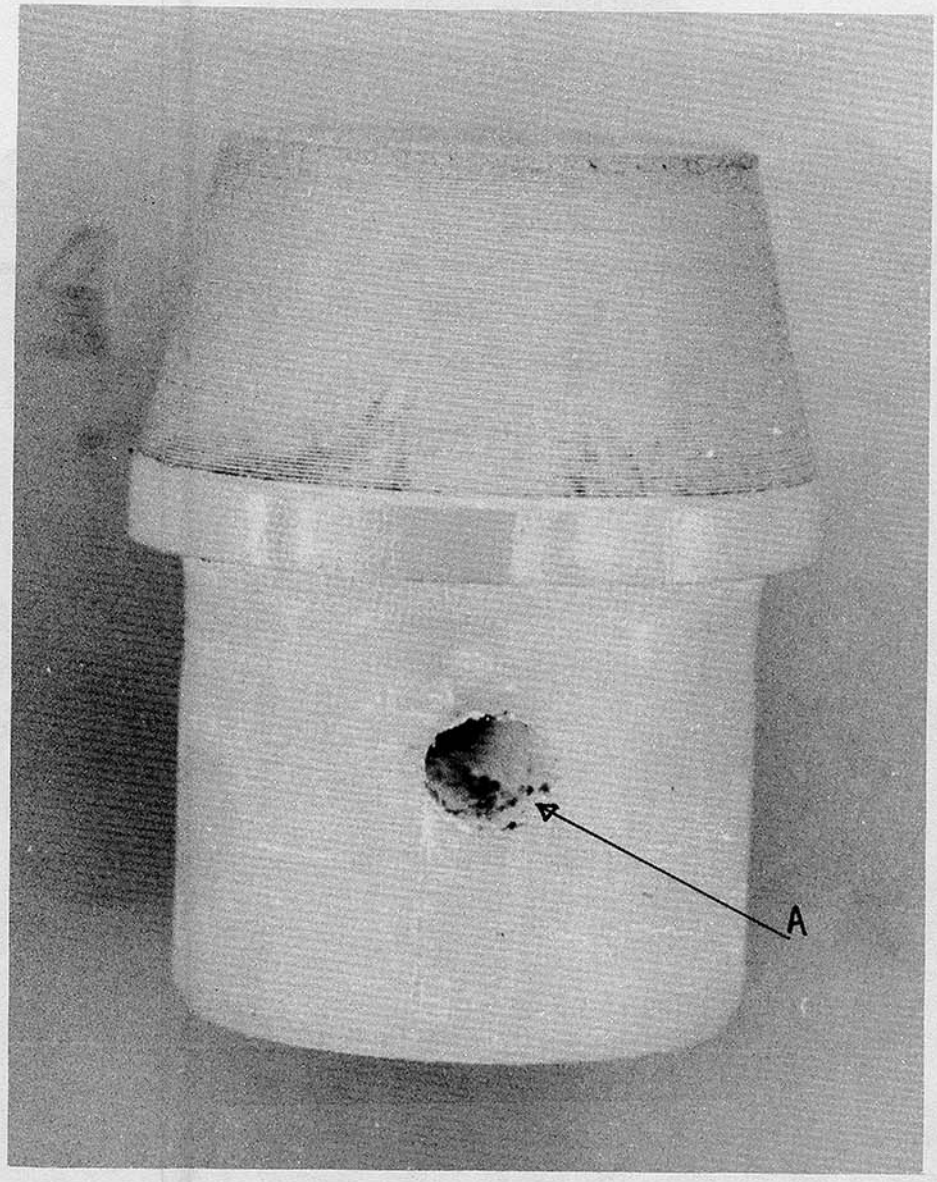
Test rifle

Figure 2-132. Buffer body (front view).



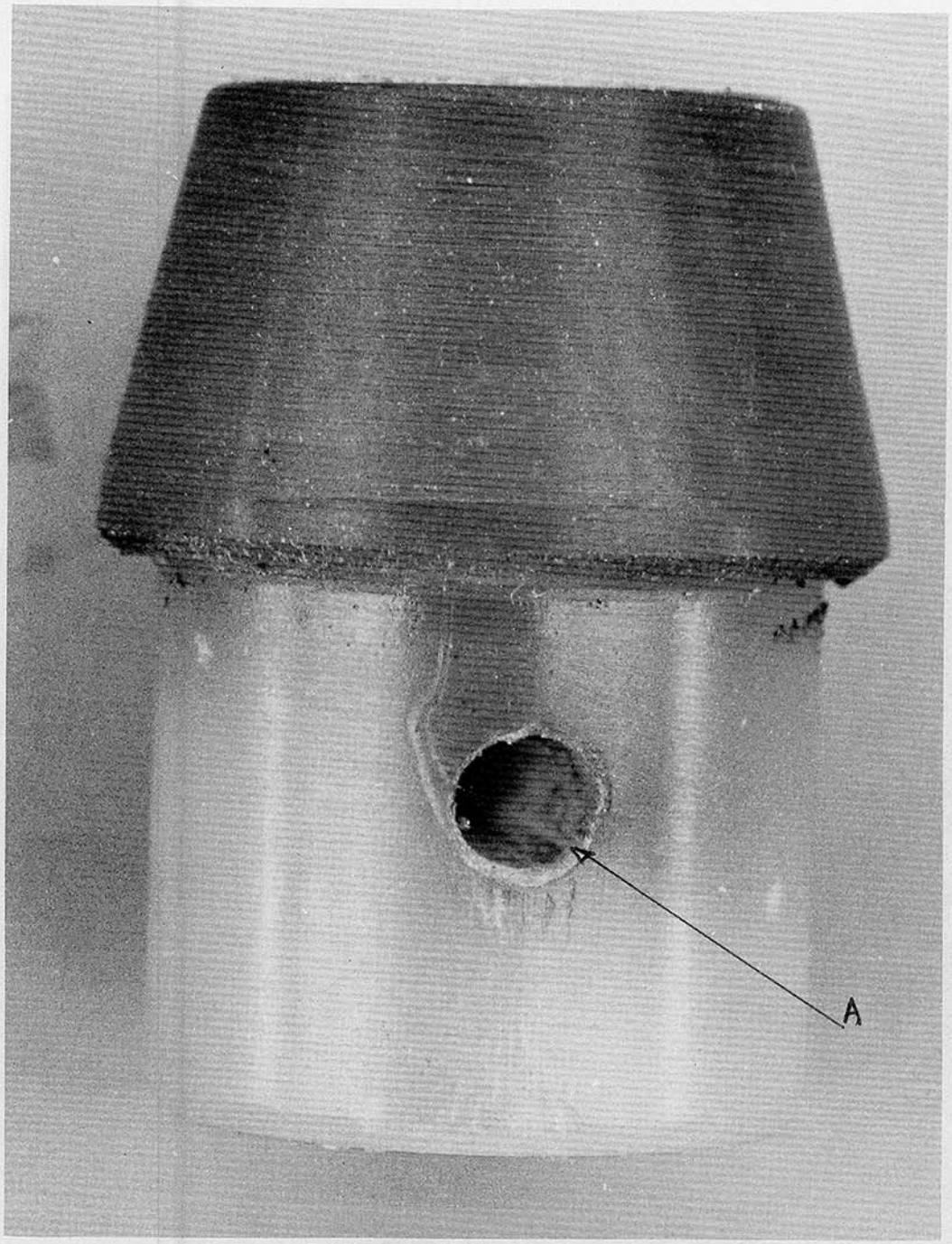
US supply contract DAAF03-68-C-0051 (6/68)

Figure 2-133. Buffer body (front view).



Test rifle

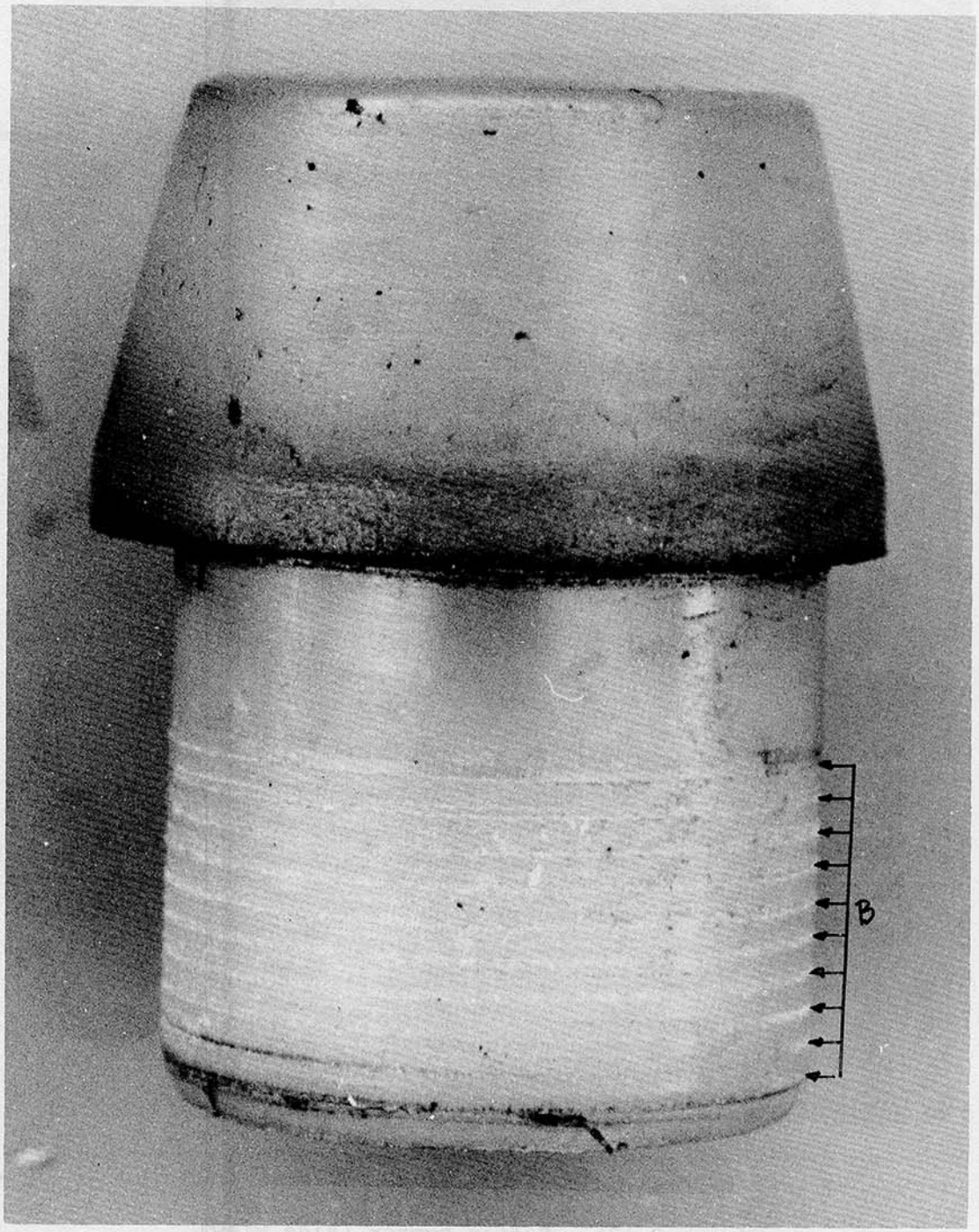
Figure 2-134. Buffer bumper (side view).



US supply contract DAAF03-68-C-0051 (6/68)

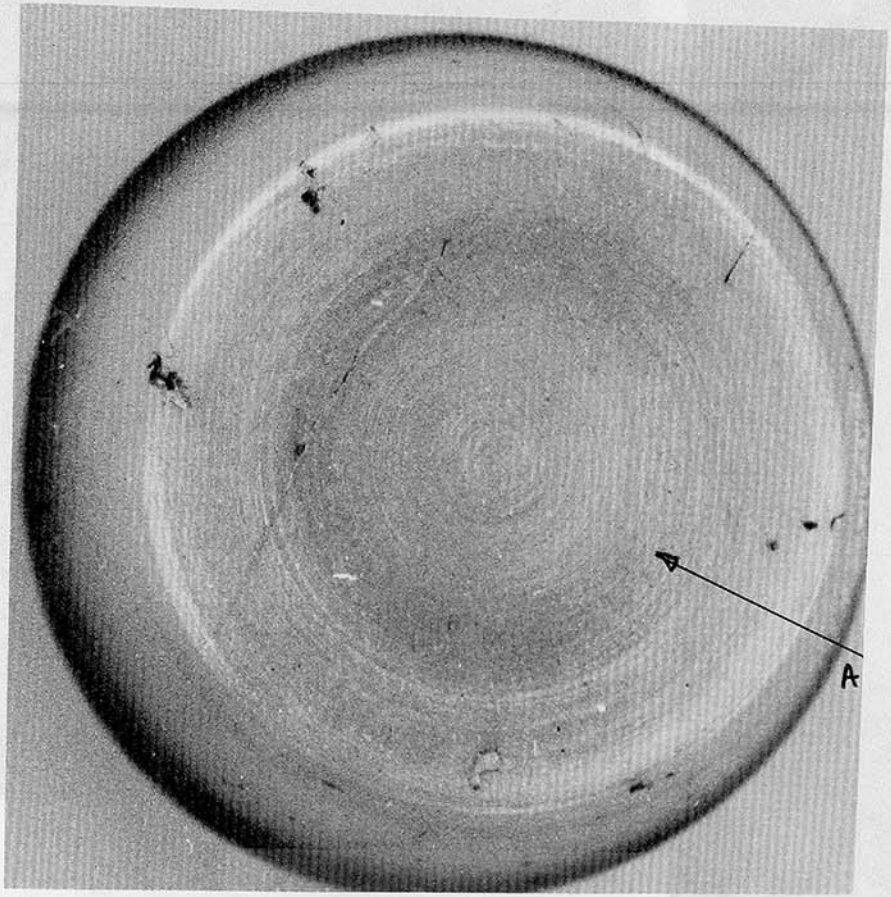
Figure 2-135. Buffer bumper (side view).

Note: Dark coloration of upper half of part is from storage conditions.



Colt M16A1 rifle SN 6418244

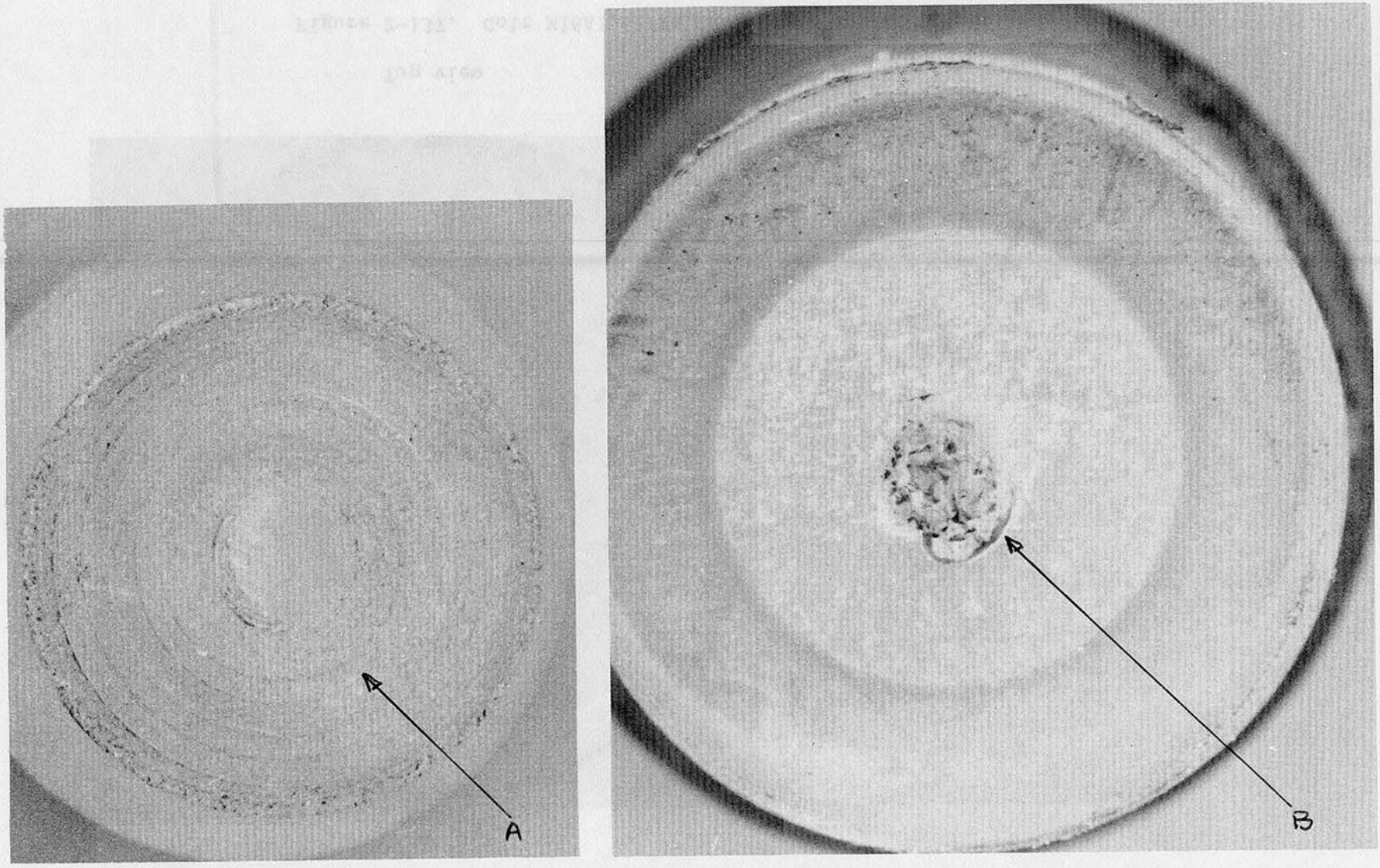
Figure 2-136. Buffer bumper (side view).



Top view

Bottom view not available.

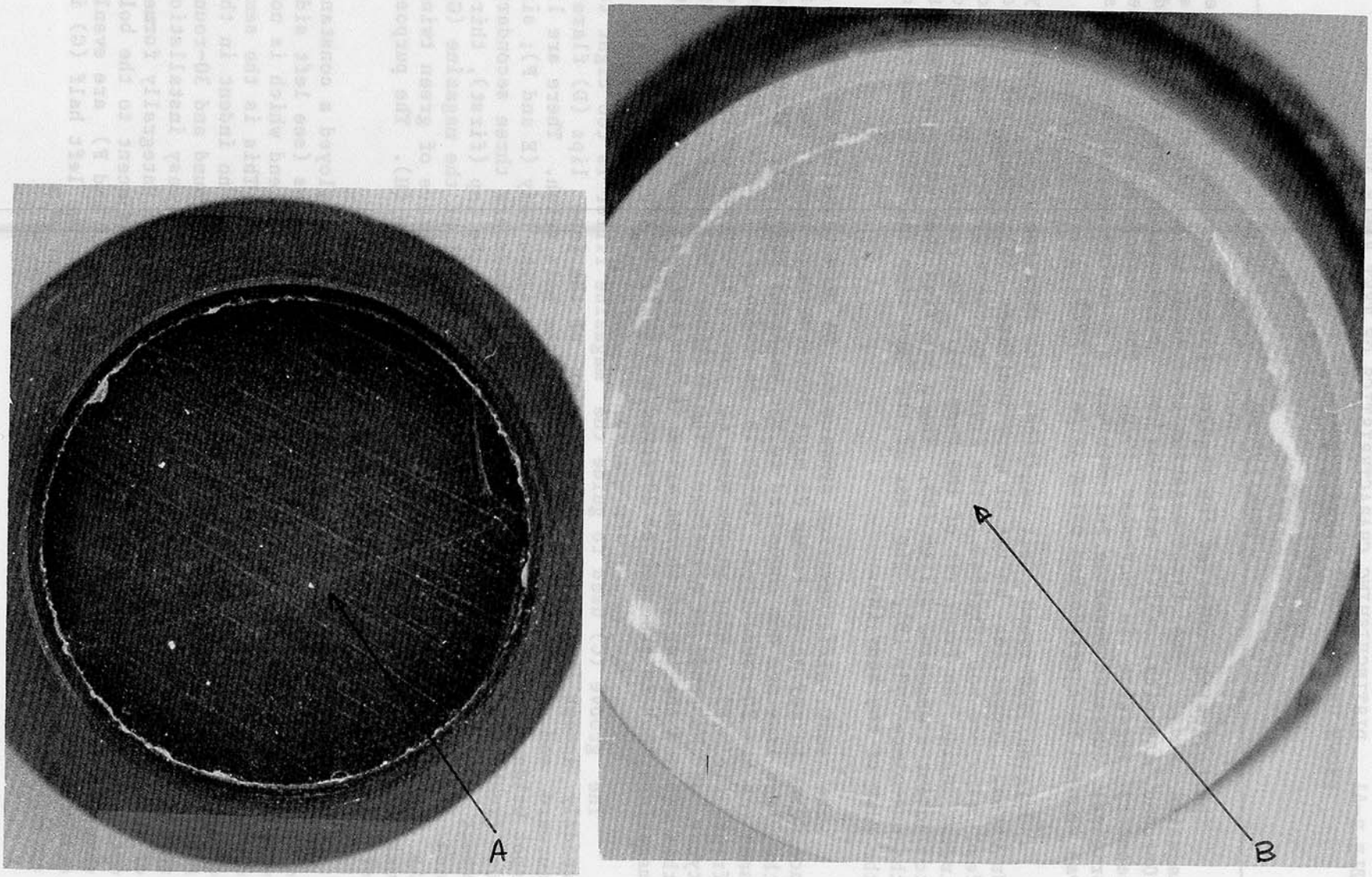
Figure 2-137. Colt M16A1 rifle SN 6418244 buffer bumper rear view.



Rear view

Front view

Figure 2-138. Test rifle buffer bumper end views.



Rear view

Front view

Figure 2-139. US supply buffer bumper (contract DAAF03-68-C-0051 (6/68)) end views.

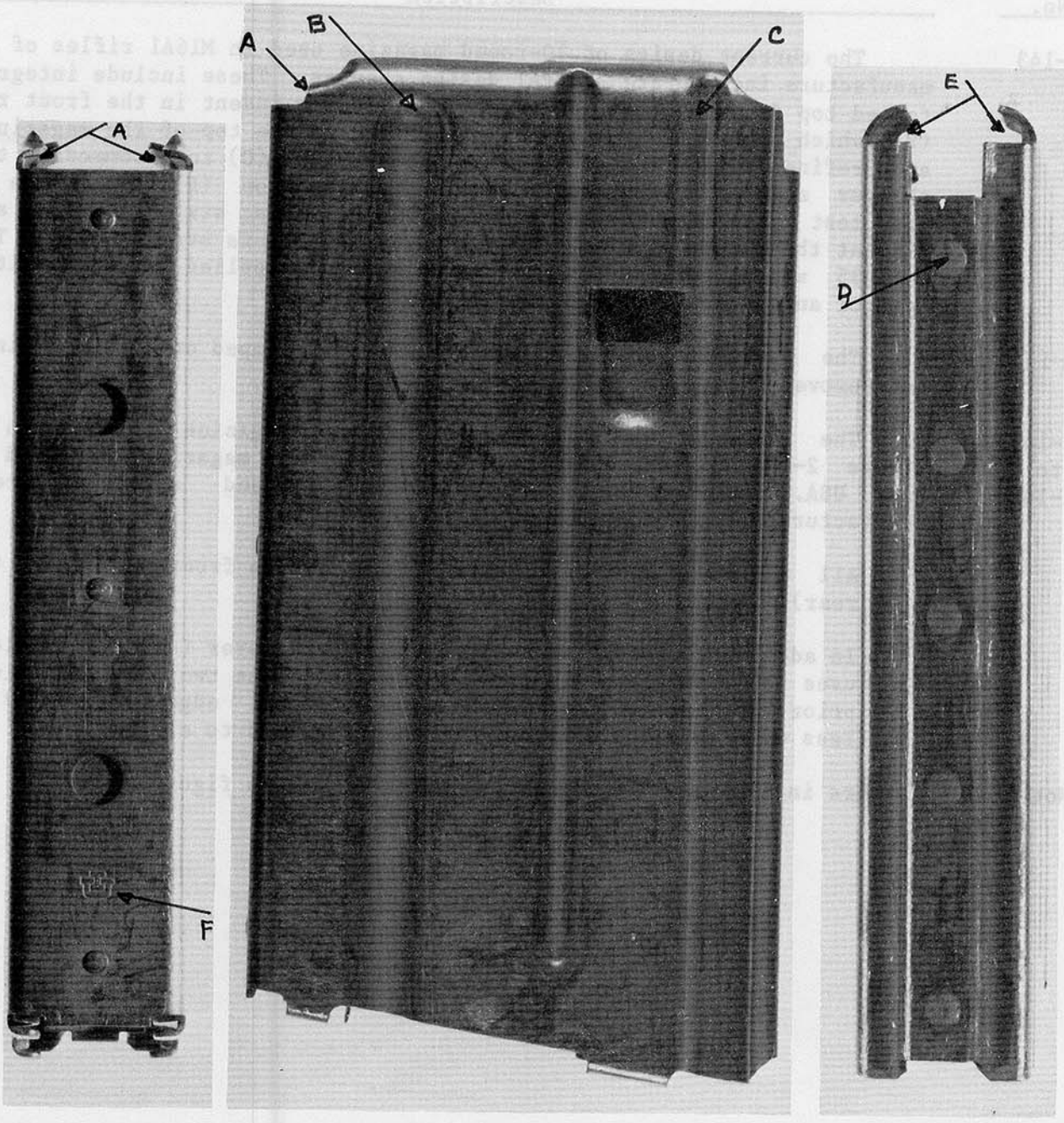
TABLE 2-41. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - MAGAZINE ASSEMBLY

Figure No.	Description
2-140 to 2-149	The following series of ten figures represent various views of the magazine body. The first magazine type used in the M16A1 rifle was 20-round capacity. This magazine was supplemented by a 30-round capacity magazine in November 1970. The plastic material in the original 30-round magazine follower was a phenolic composition. This was changed to a reinforced nylon in March 1972.
2-140	Original 20-round Colt magazine. The magazine body was made by Universal Industries as the UI mark indicates (F). The front of the feed lips are not attached to the front of the body (A). There is no indent inside the front rib of the body (B). The rear rib is contoured to accept a magazine filler (C). There are five spot welds to connect the one-piece body (D). The rear of the feed lips are not connected to the rear of the body (E).
2-141	The test rifle magazine appears to be of a transitional design, not found in any of the known US made 30-round magazines. The front of the feed lips are not connected to the magazine body (A). This is the same as the 20-round type. There is no indentation in the top of the front rib (B). This is the same as the 20-round and early 30-round types of US produced magazines. The distance between the top end of this rib and the top of the magazine is greater than current production magazines, but is the same as 20-round and early 30-round types. The groove (C) used to guide the magazine filler is too tight to readily accept the filler. The rear of the feed lips (D) flares outward and joins the stop surface for the bolt catch. There are 12 spot welds retaining the two halves of the magazine body (E and F); six at front and the remainder at the rear. There are three secondary spots at the front of the magazine located at the top (first), third and fifth primary weld. The edge of the left half of the magazine (G) is not straight at the front of the magazine. A piece of green twine was wrapped and tied round the body of the magazine (H). The purpose of this addition is not known.
2-142	Early 30-round magazines of US production employed a constant curvature of the body to properly stack the cartridges (see left side view). The top of the magazine (A) uses an open end which is not connected to the body of the magazine at the front. This is the same design as used on the 20-round magazine. There is no indent in the front rib (B); this is the same as found in the 20-round and 30-round test magazines. The depth of the grooves (C) allows easy installation of the charger adapter. The rear of the feed lips is integrally formed with the body. There is no flaring of the body adjacent to the bolt catch stop surface (D). The 12 spot welds (E and F) are evenly distributed, front and rear. The edge of the magazine left half (G) is straight.

TABLE 2-41 (CONT'D)

Figure No.	Description
2-143	The current design of 30-round magazine used in M16A1 rifles of US manufacture incorporate several design changes. These include integral formed top front end (A), cartridge positioning indent in the front rib (B), which places the top of the rib closer to the top of the magazine, and refined definition of the rear groove shape (C) to accommodate the charger adapter. The rear feed lip configuration (D) is the same as the test rifle magazine. There are 12 spot welds; six at the rear and six at the front. The edge of the magazine half is straight (G). The No. 35 which appears on this magazine was applied as a test item control and is not a production marking (H).
2-144	The manufacturers part number (A) was stamped on this magazine, but removed from all subsequent production items.
2-145 to 2-149	The salient points in current 30-round magazine design shown in Figure 2-143 are generally found in all 30-round magazines produced in the USA. Commonality and variations found among different manufacturers are noted as follow: (1) All magazines have 12 spotwelds (six at the front and six at the rear). (2) In additional to the spotwelds, one manufacturer (see fig. 2-146) uses six indexing indents (H) to aline the two magazine halves prior to spotwelding. The amount of front edge overlap (G) is less with this one manufacturer when compared to all others.

Note: The letters in ( ) refer to the arrow indicator on the figures.



Front Left side Rear

Figure 2-140. Three views of 20-round aluminum magazine body (Colt marked floor plate).

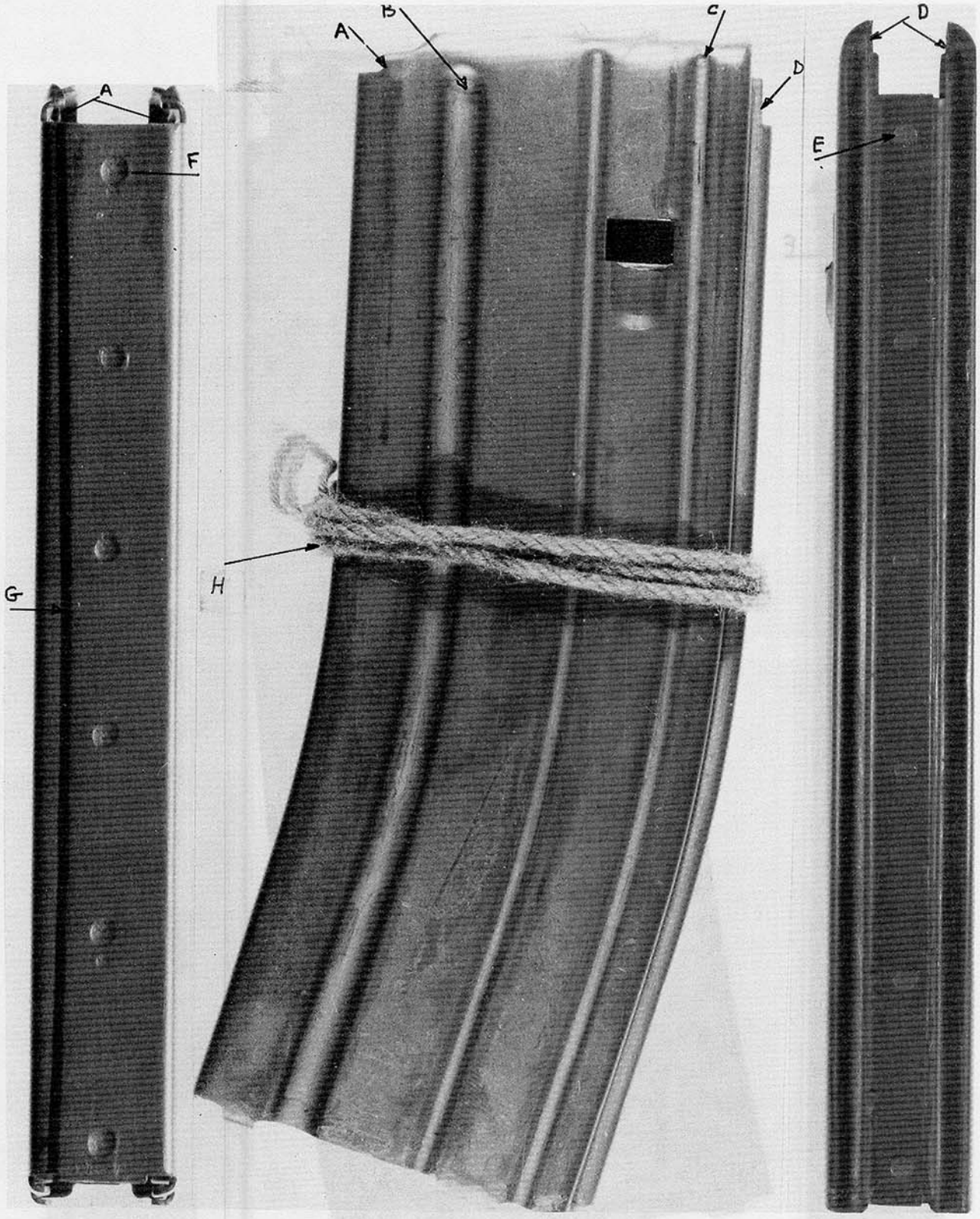


Figure 2-141. Three views showing 30-round aluminum magazine from test rifle.

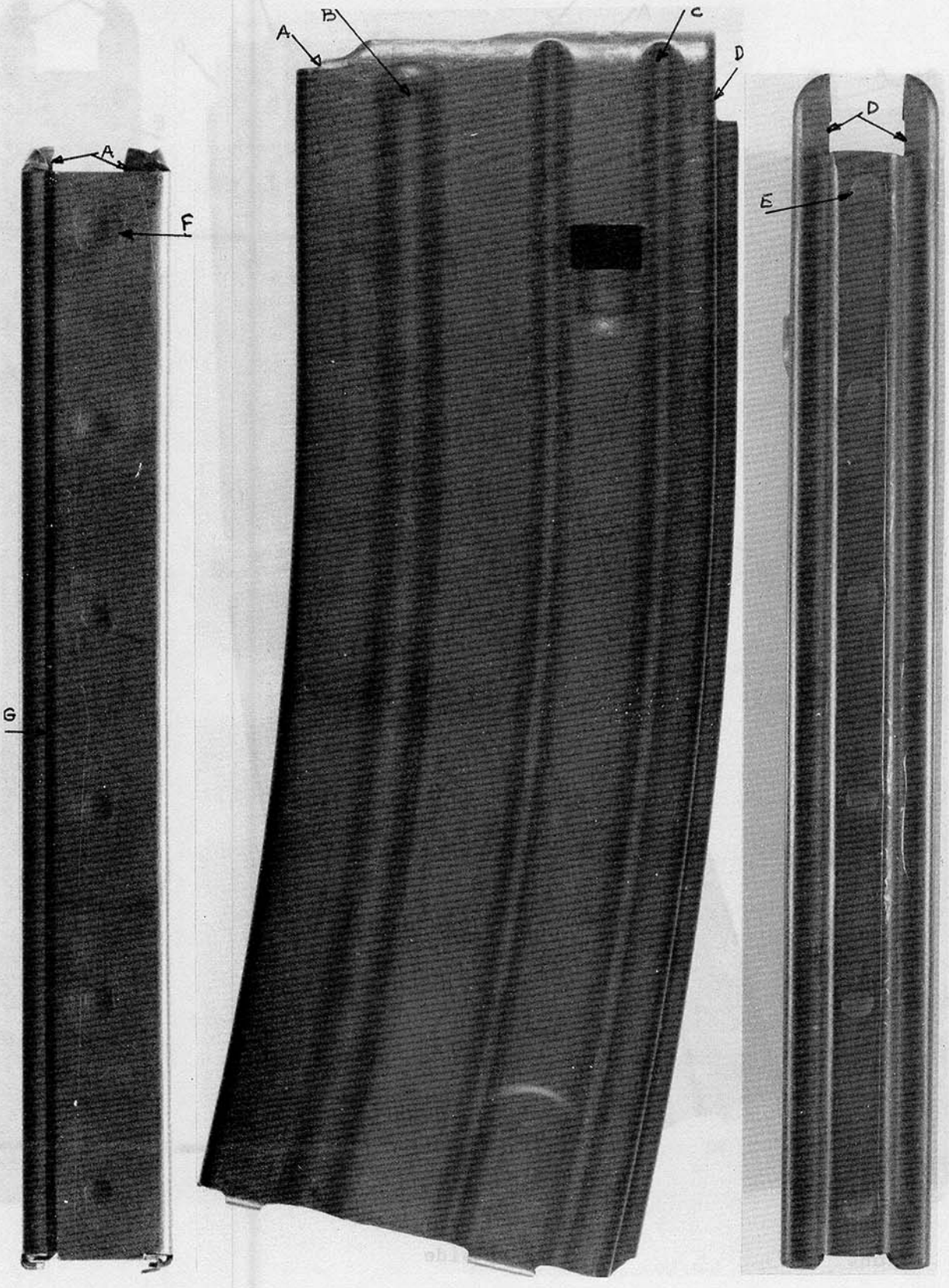
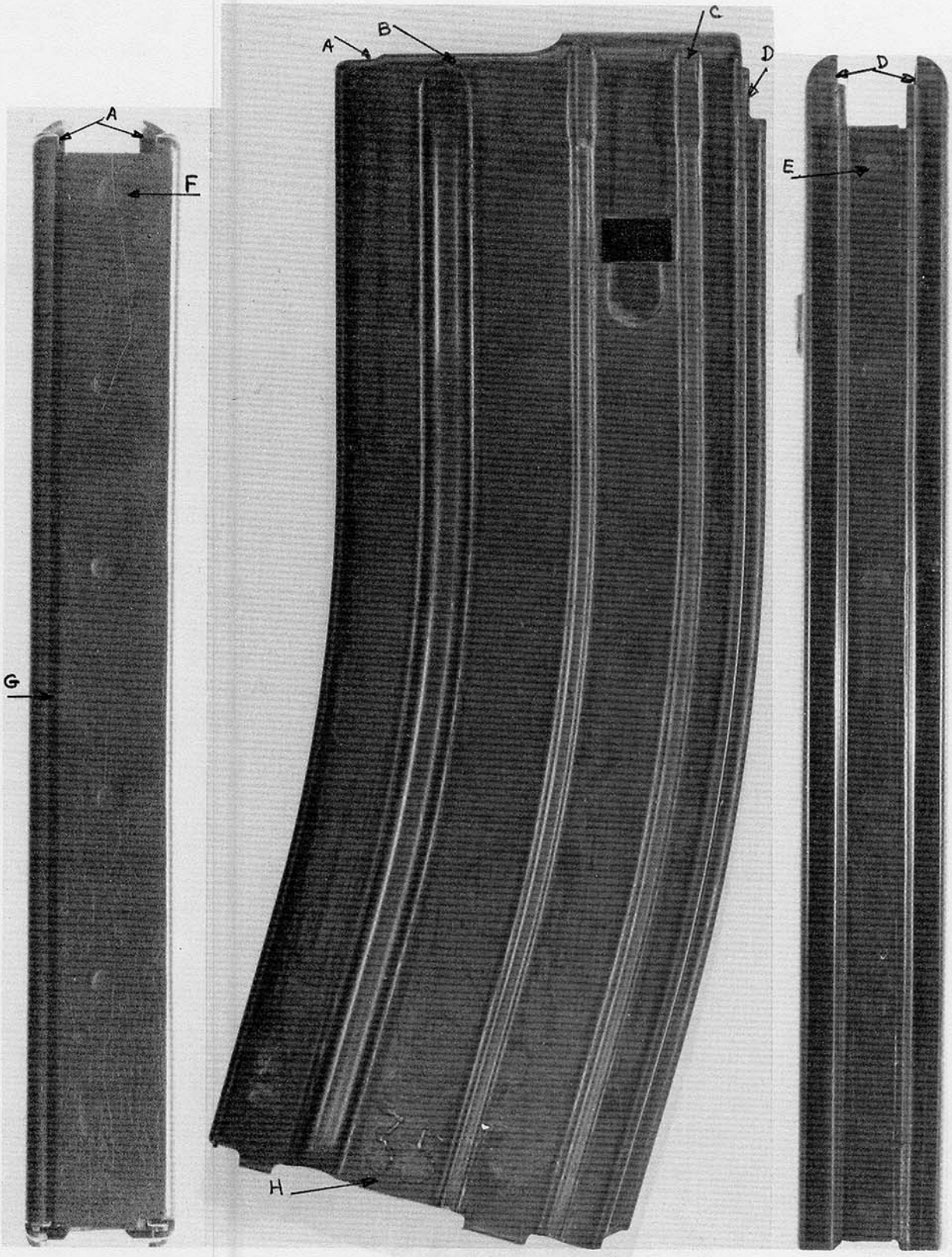
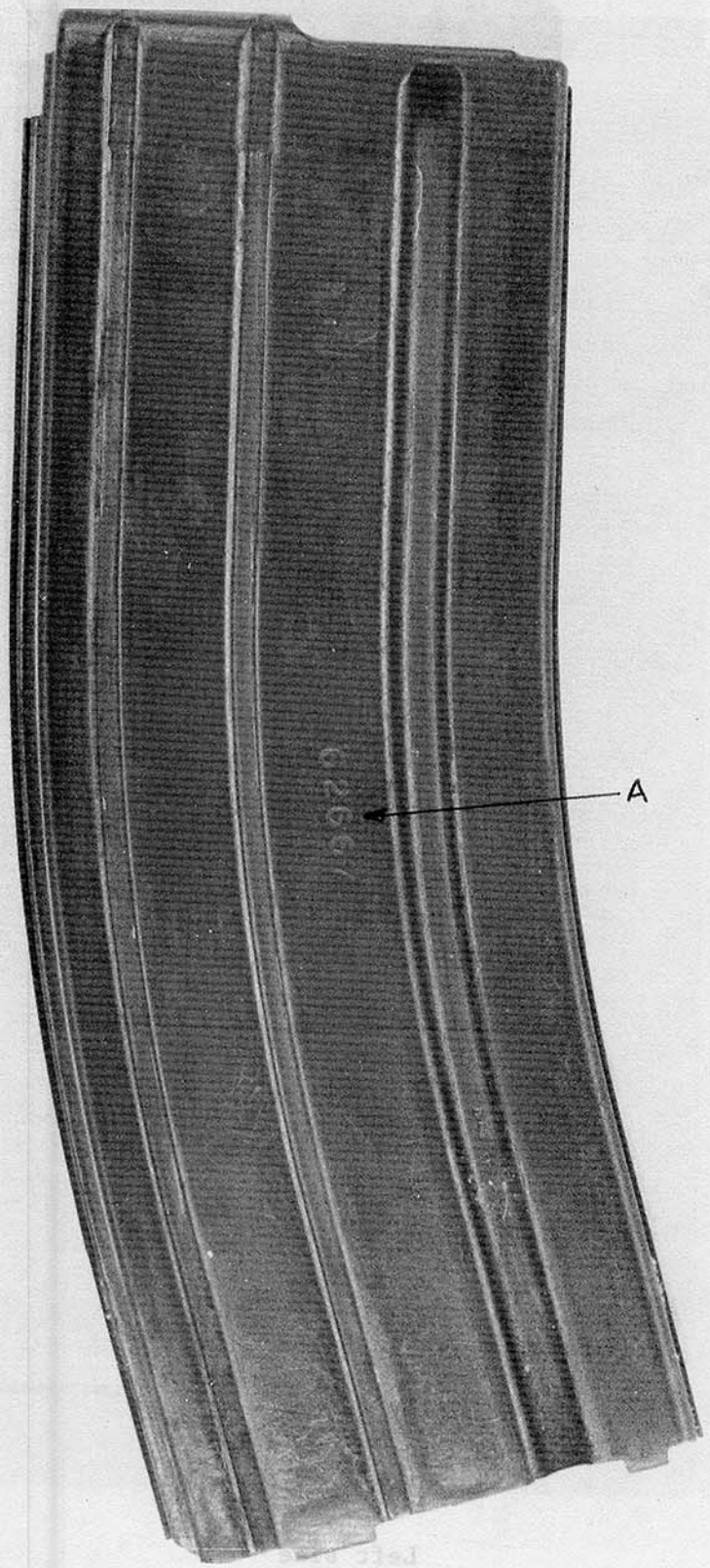


Figure 2-142. Three views of the Colt old style (constant curve) 30-round aluminum magazine body (Circa 1967).



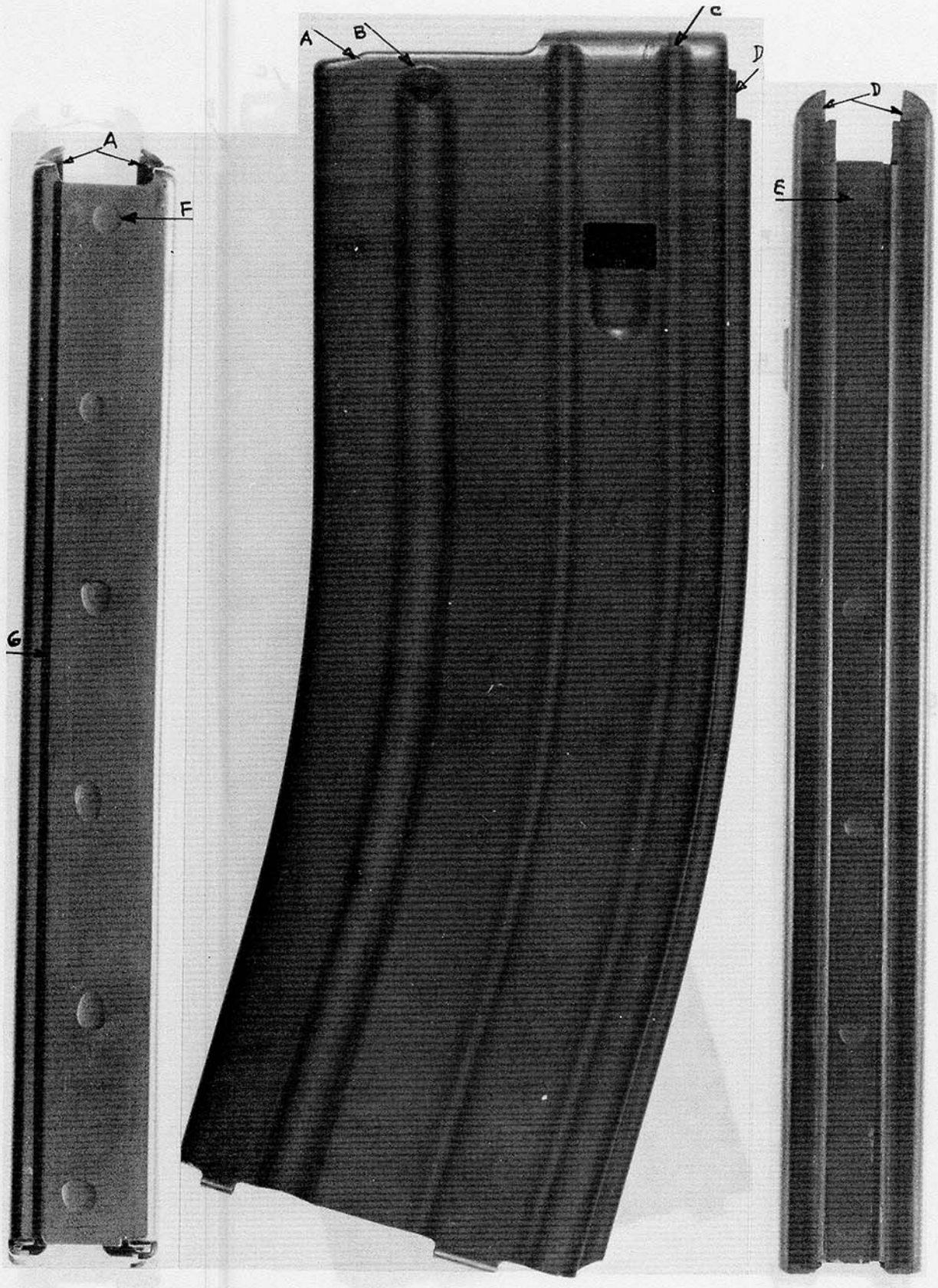
Front Left side Rear

Figure 2-143. Three views of the 30-round aluminum magazine body from Colt Initial Production Test sample of current design (Circa 1970).



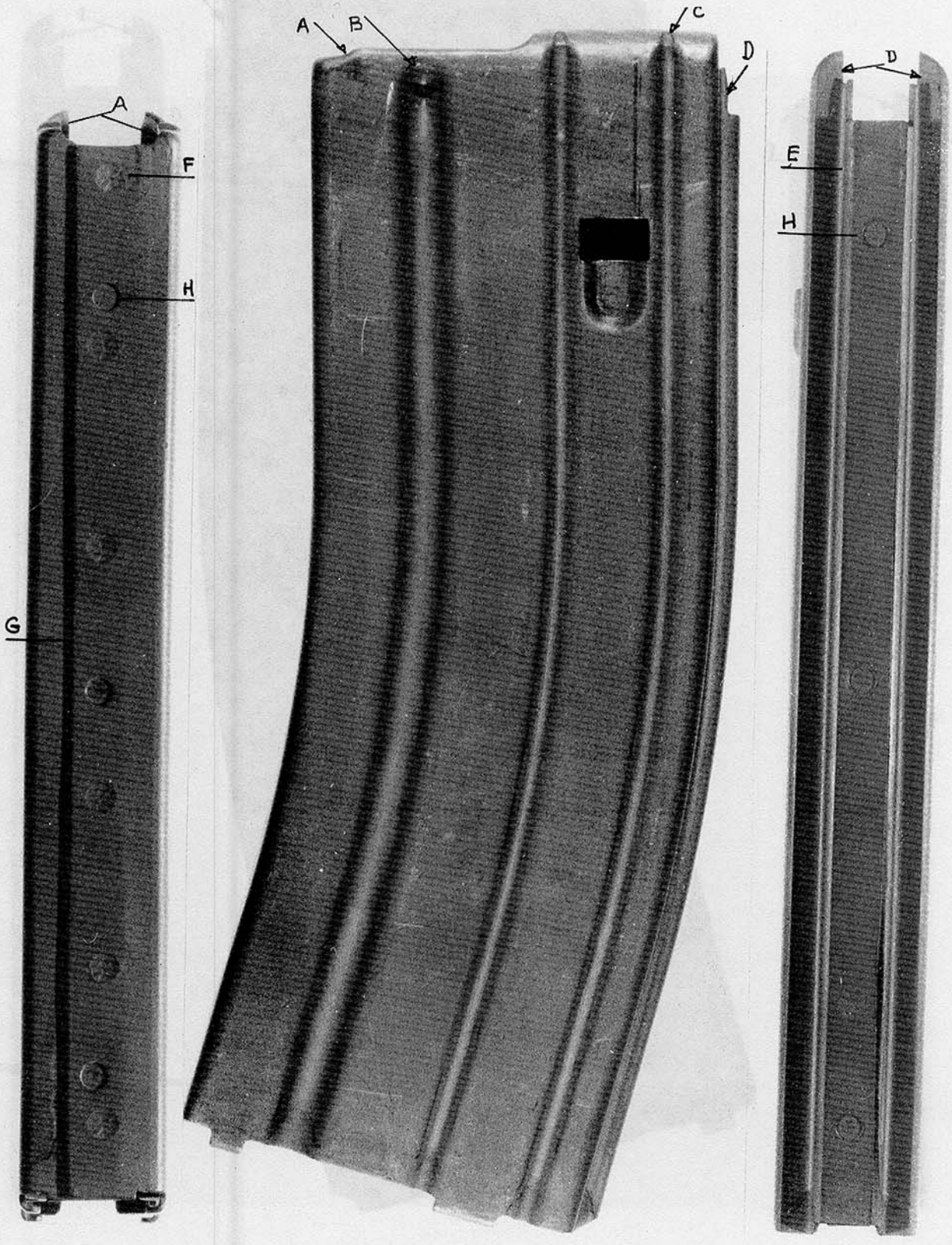
Right side view of 30-round aluminum body from colt.

Figure 2-144. Initial Production Test sample of current design (Circa 1970).



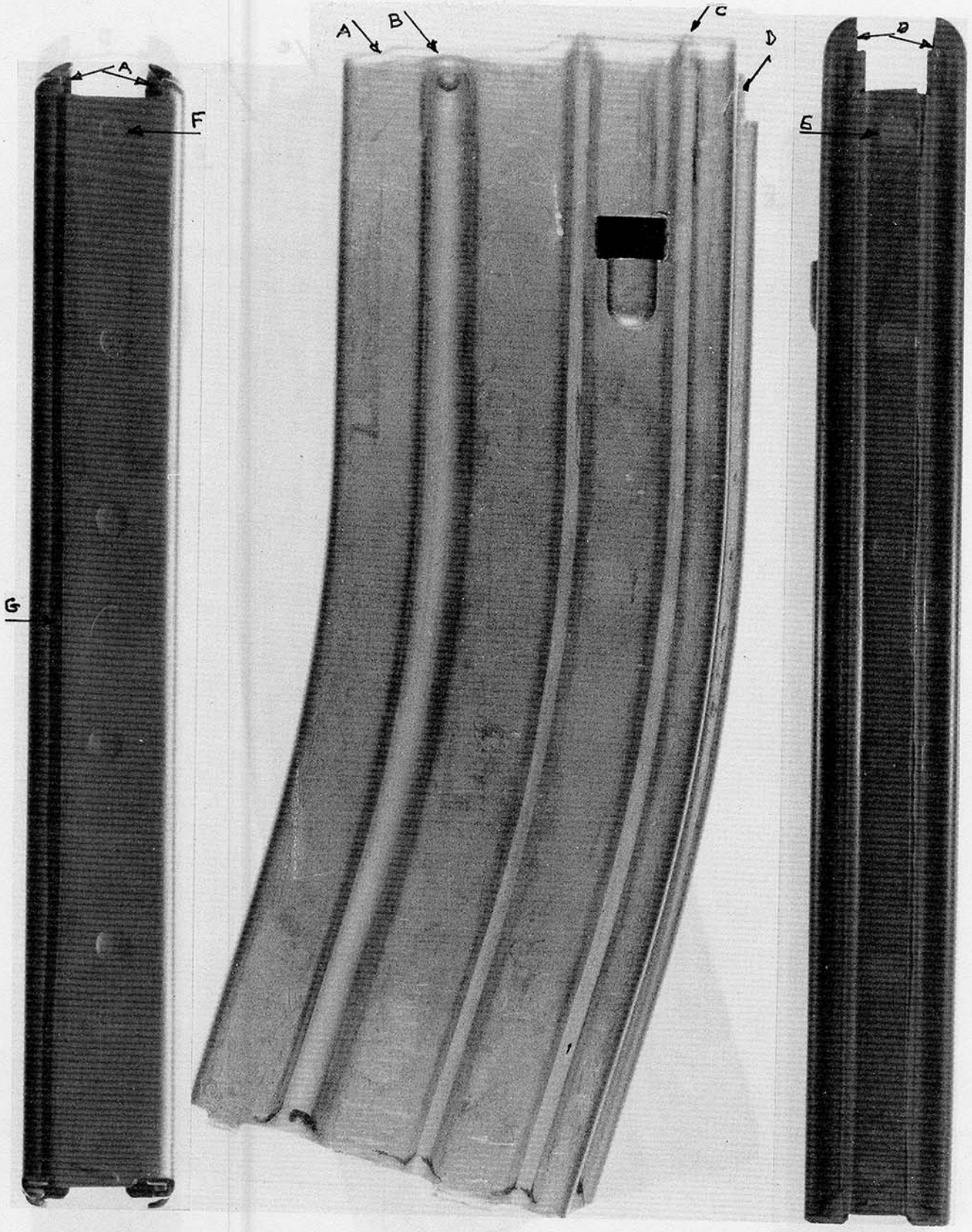
Front Left side Rear

Figure 2-145. Three views of current Colt production 30-round aluminum magazine body (Circa 1981).



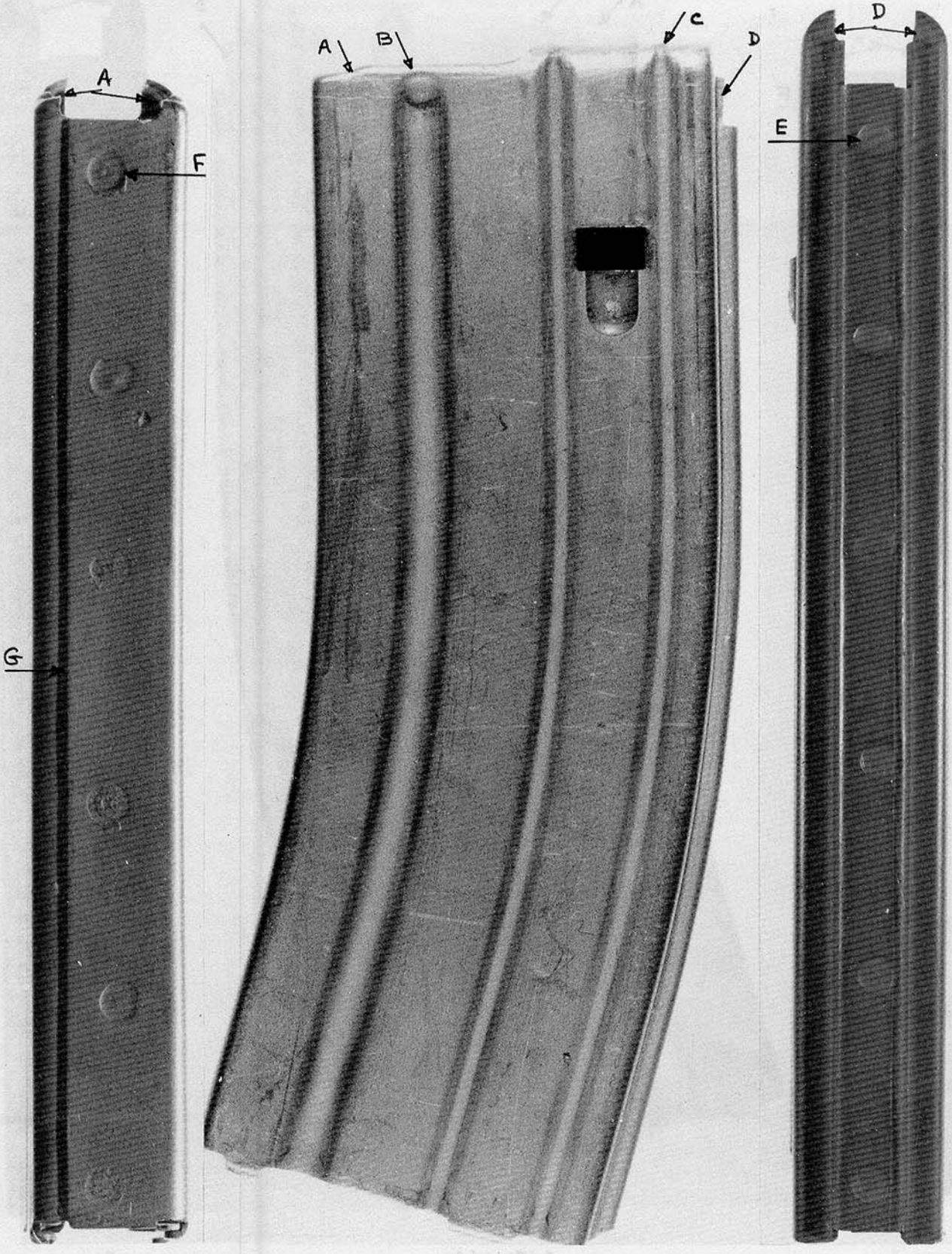
Front Left side Rear

Figure 2-146. Three views of current Cooper Industries production 30-round aluminum magazine body (Circa 1982).



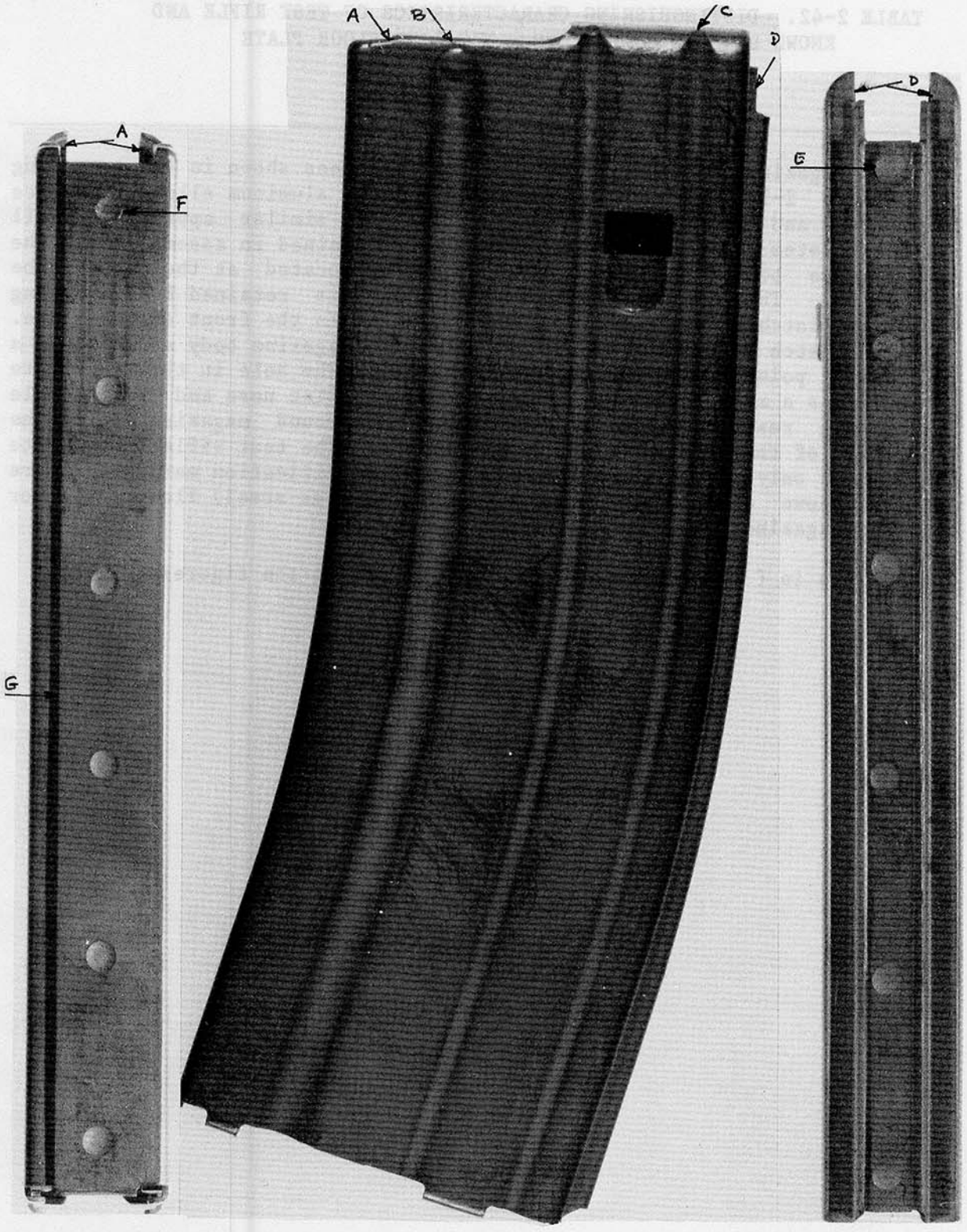
Front Left side Rear

Figure 2-147. Three views of current production aluminum 30-round magazine body from Adventure Line Mfg. Co., Inc. (Circa 1981).



Front Left side Rear

Figure 2-148. Three views of current production aluminum 30-round magazine body from Adventure Line Mfg. Co. (Circa 1979).



Front Left side Rear

Figure 2-149. Three views of current production aluminum 30-round magazine body from OKAY Industries (Circa 1981).

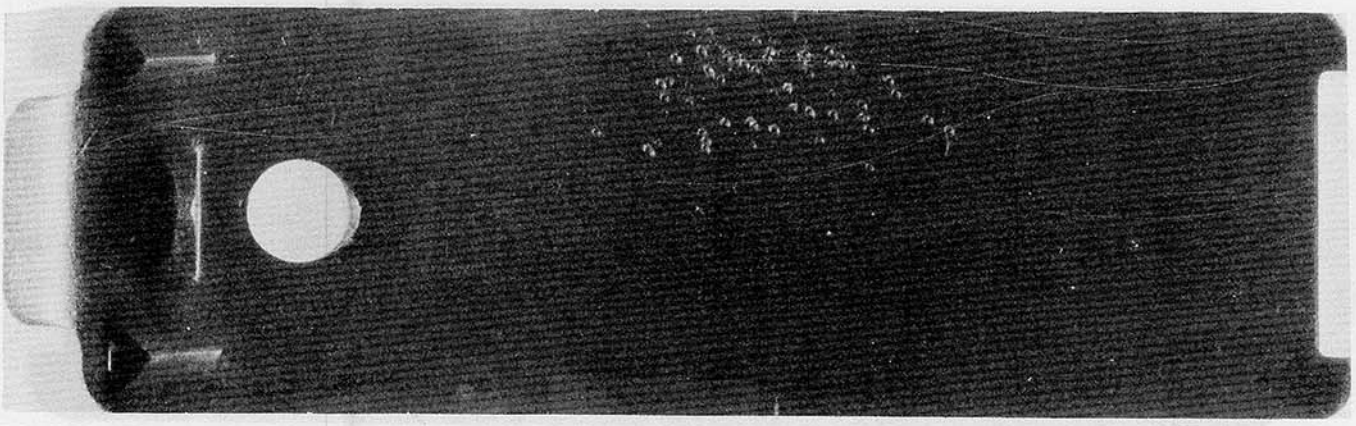
TABLE 2-42. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - MAGAZINE FLOOR PLATE

Figure No.	Description
2-150 to 2-152	Magazine floorplates used in the magazines shown in the preceding Figures 2-140 to 2-149 are all made from aluminum alloy. They are formed and marked in a punch press or similar apparatus. All floorplates from 30-round magazines are retained in assembly with the magazine body by the two detent surfaces located at the rear of the plates. The 20-round magazine floorplate is retained by the spring steel latch which intrudes into a slot cut in the front of the plate. This latch is riveted to the front of the magazine body and acts as a bullet point protector for the magazine. The hole in the floorplate used as a means of disassembly (insert a bullet nose and pry up while pushing rearward) are at the rear for 30-round magazine and at the front of the 20-round magazine floorplate. The test rifle floor plate is the only one which does not have any identification marking. There are known examples of experimental (stainless steel) floorplates for Colt magazines which are unmarked.

Note: The letters in ( ) refer to the arrow indicators on the figures.

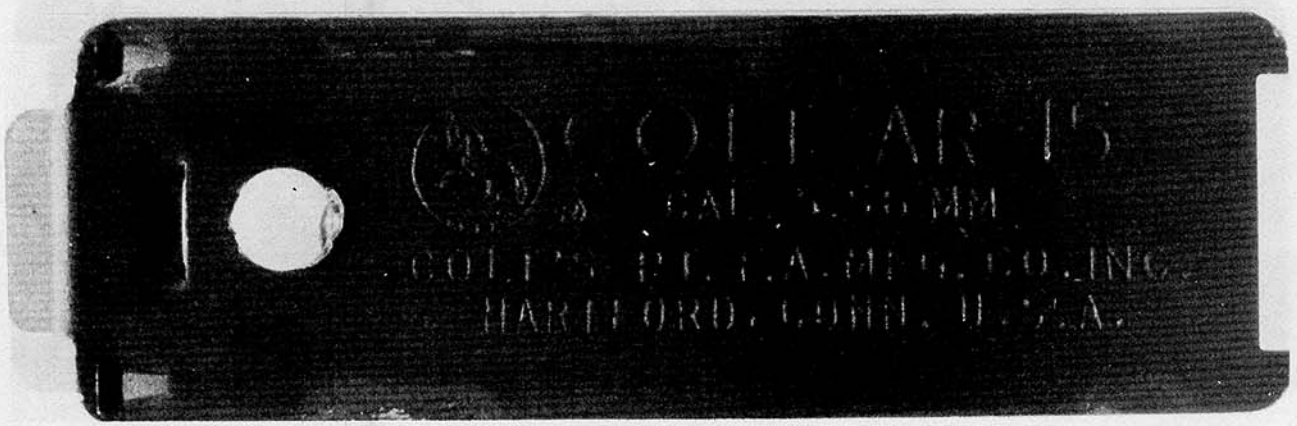
30-round OKAY Industries, Inc. New Britain Conn. (ref fig. 2-149)

20-round Colt Industries (ref fig. 2-140)



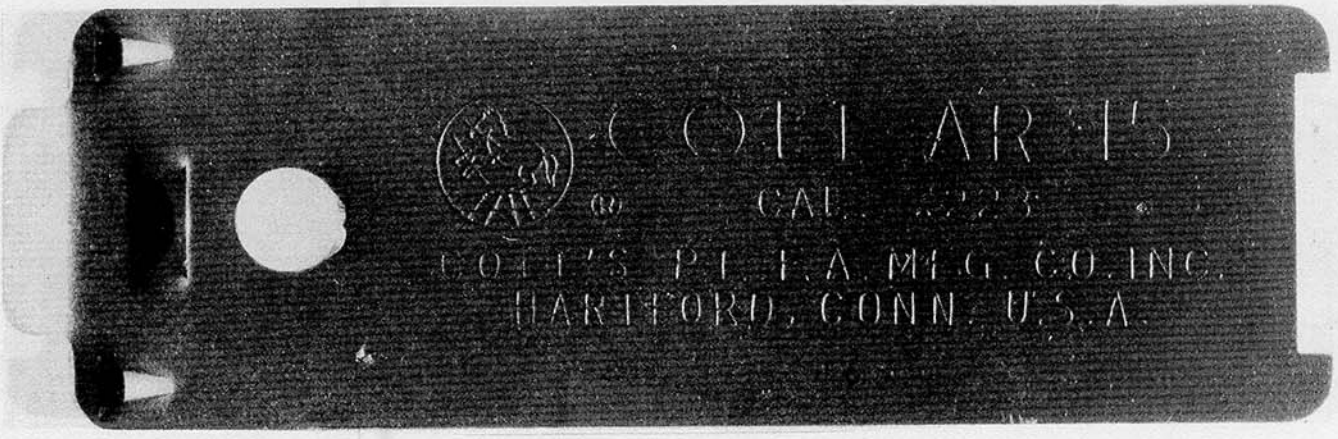
30-round Test rifle (ref fig. 2-141)

Figure 2-150. Magazine floorplate bottom views.



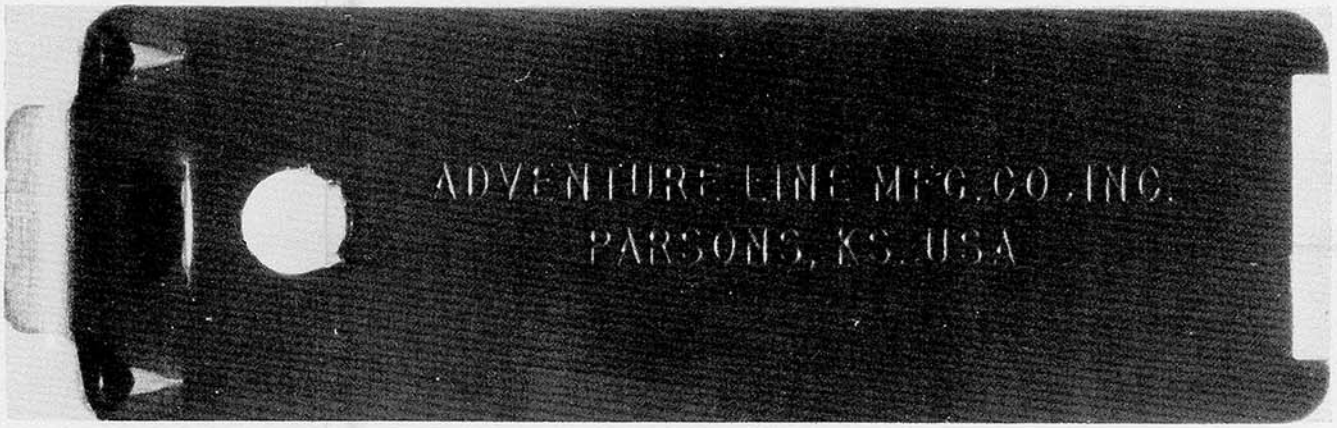
30-round Colt Industries (ref fig. 2-143)

30-round Colt Industries (ref fig. 2-145)

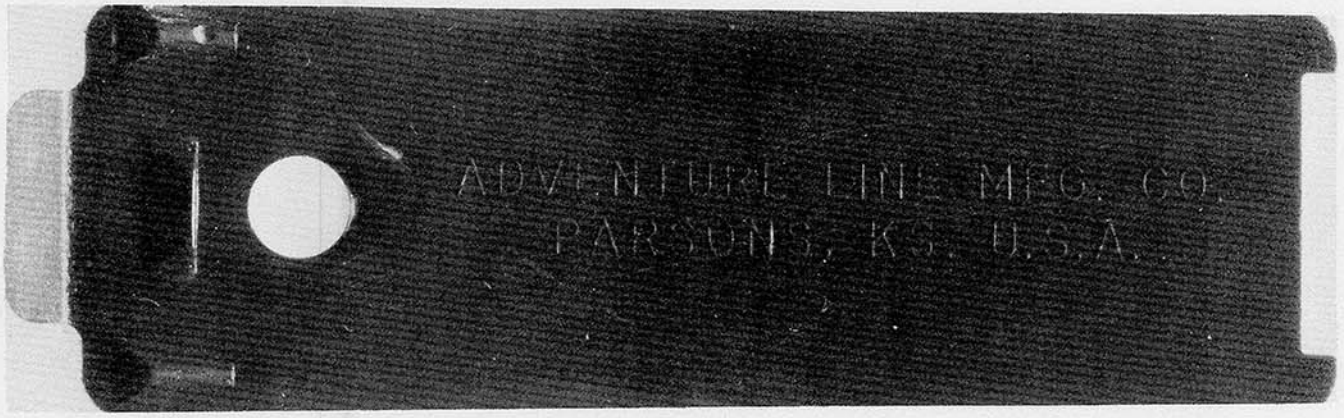


30-round Colt Industries (ref fig. 2-142)

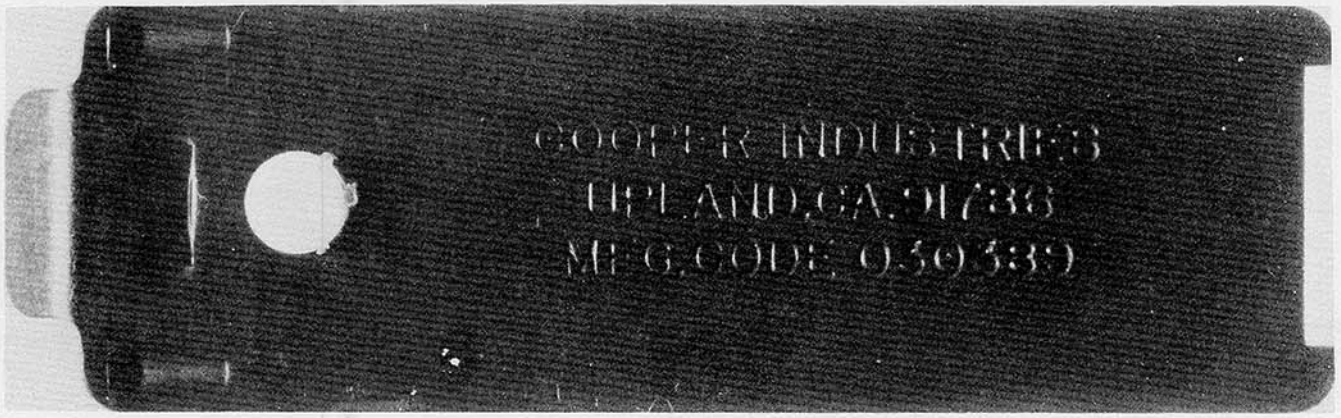
Figure 2-151. Magazine floorplate bottom views.



30-round Adventure Line (ref fig. 2-147)



30-round Adventure Line (ref fig. 2-148)



30-round Cooper Industries (ref fig. 2-146)

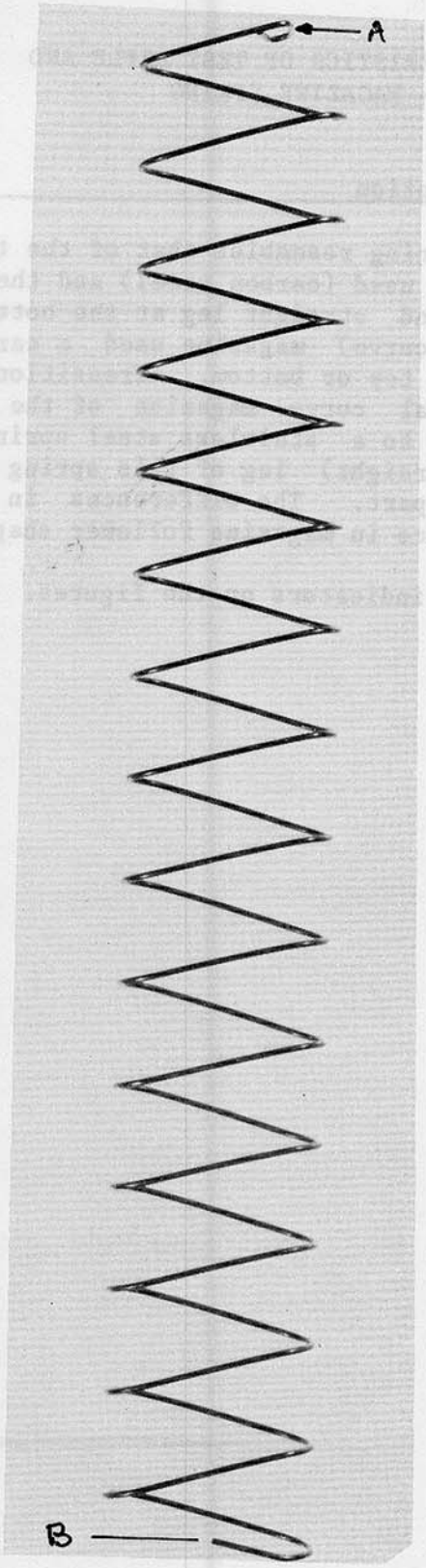
Figure 2-152. Magazine floorplate bottom views.

(Page 192 Blank)

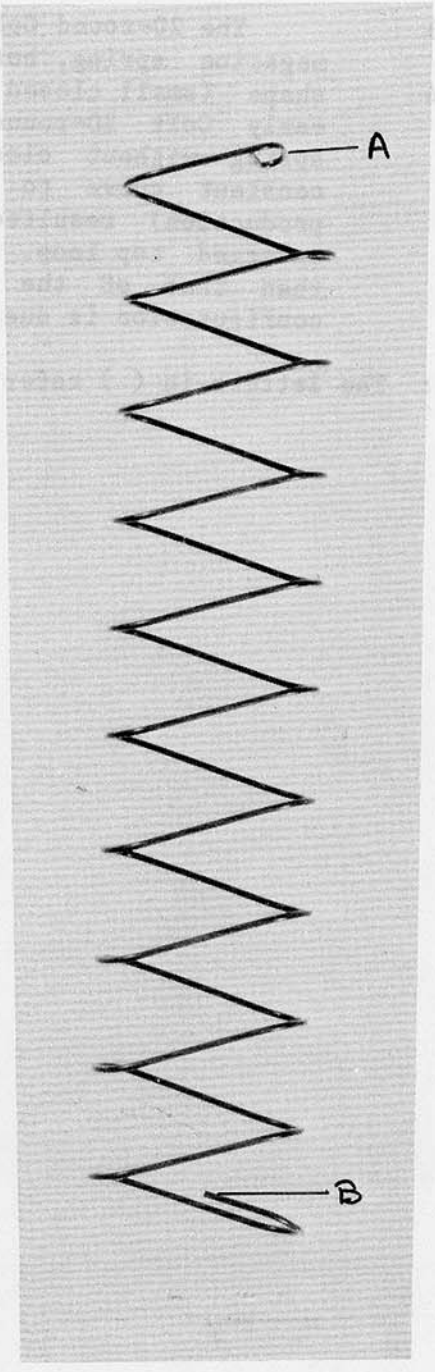
TABLE 2-43. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - MAGAZINE SPRING

Figure No.	Description
2-153 and 2-154	The 20-round Colt magazine spring resembles that of the test rifle magazine spring, both in material used (carbon steel) and the end loop shape (small closed loop at top and straight leg at the bottom). The early Colt 30-round (constant curve) magazine used a carbon steel spring without closed loop at top or bottom. Transition from the constant curve to the tangential curve magazine of the Colt (US production) resulted in a change to a stainless steel spring with an enlarged top loop. The lower (straight) leg of this spring is longer than that of the test rifle part. The differences in upper end configuration is due to a difference in magazine follower shape.

Note: The letters in ( ) refer to the arrow indicators on the figures.

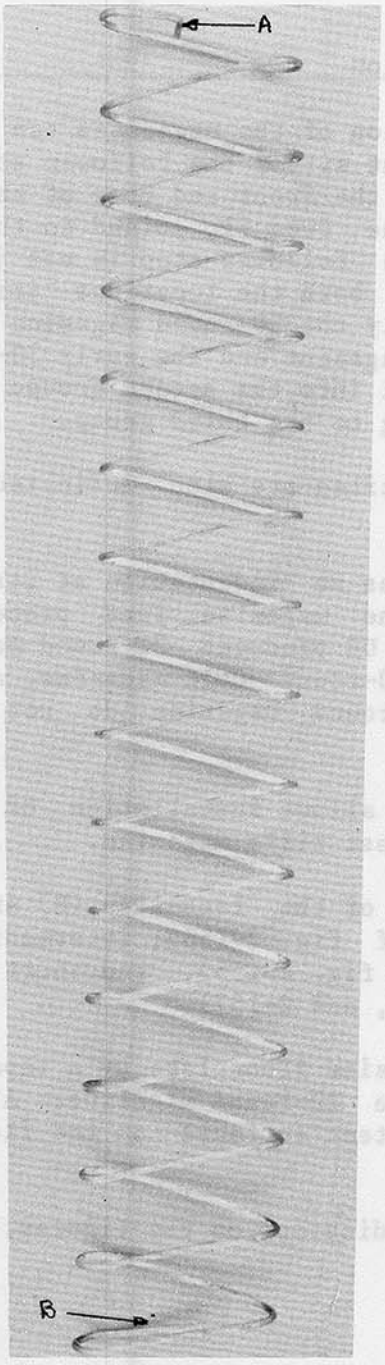


Test rifle 30-round
(ref fig. 2-141)

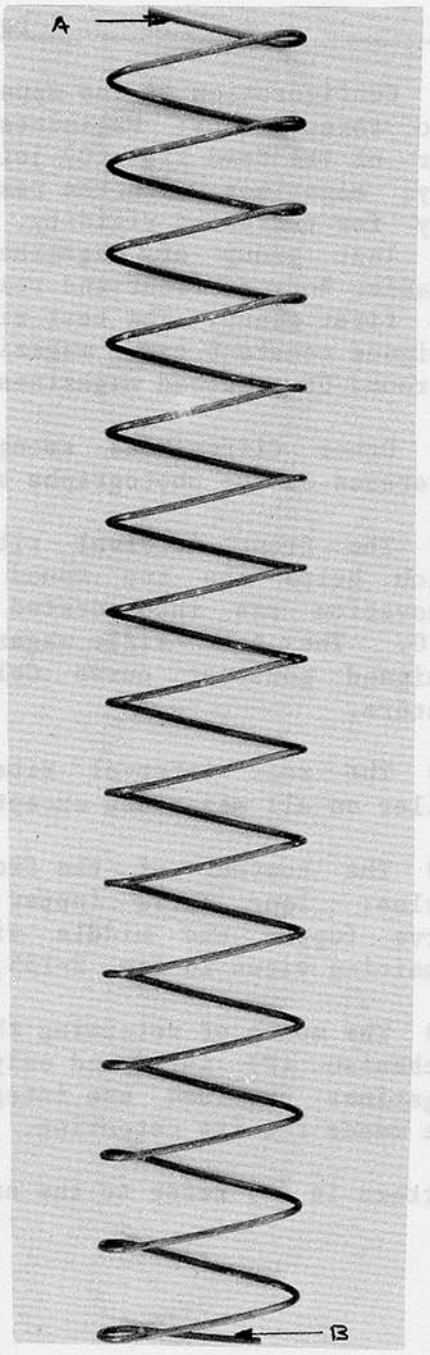


Colt 20-round
(ref fig. 2-140)

Figure 2-153. Magazine follower spring left side views.



Colt, Adventure Line, Cooper, and OKAY Industries 30-round (ref fig. 2-143 to 2-149)



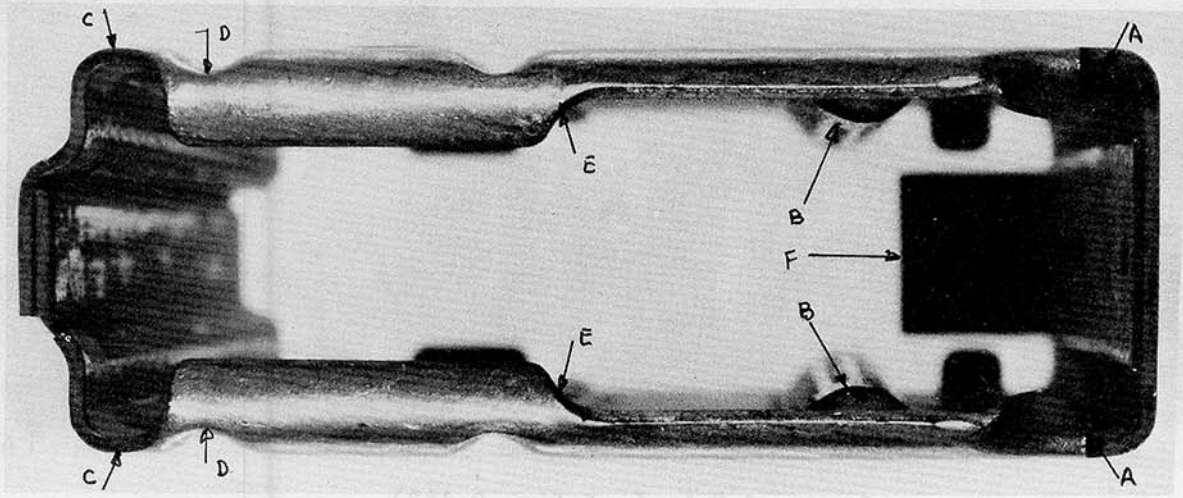
Colt 30-round (ref fig. 2-142)

Figure 2-154. Magazine follower spring right side views.

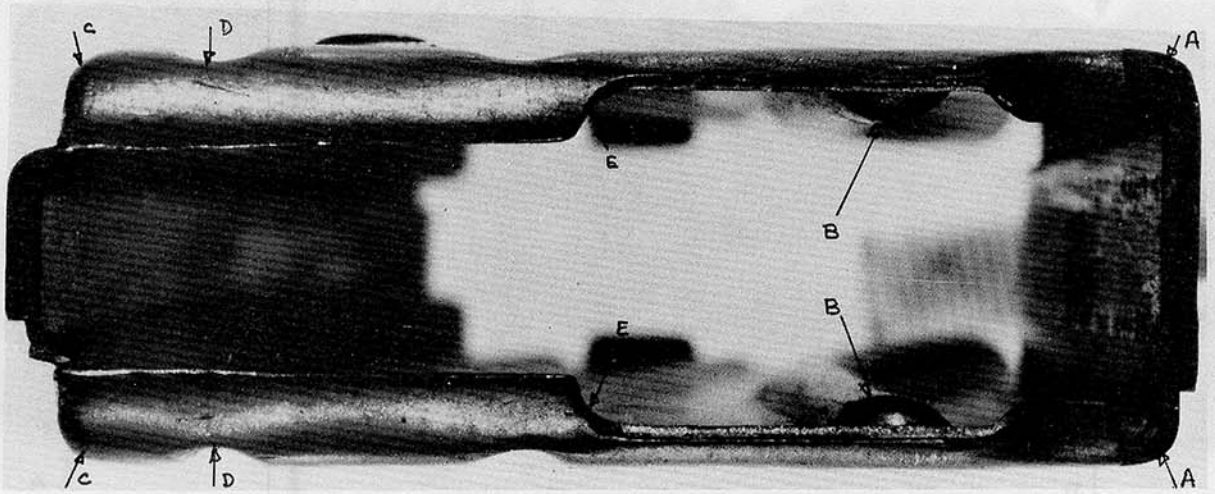
TABLE 2-44. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - MAGAZINE BODY (TOP VIEW)

Figure No.	Description
2-155 to 2-157	Configuration of the upper portion of the magazines can be divided into three groups: Magazines without either the follower stops (A) or rear of the feed lips (C) joined to the front and rear of the magazine body; magazines with the rear of the feed lip joined to the magazine body for increased rigidity, but the follower stop is not joined; and the last group of magazines has both the locations joined to the magazine body at front and rear. Only the 20-round magazine belongs in the first group. The test rifle magazine and the early 30-round Colt designed constant curve magazine fall into the second group. All other 30-round US produced magazines belong to the third group. Other differences among magazines are also indicated by letter reference on the photographs shown. (1) The front interval rib (B) has an indentation at its upper end which helps the top round in the magazine feed properly. This innovation was incorporated into US produced 30-round magazines in 1970. The test rifle magazine, 20-round Colt magazine, and earlier designed constant curve Colt 30-round magazine do not have this feature. (2) The rear interval ribs (D) allows installation of a magazine filler on all magazines except the test rifle magazine. (3) The contour of the front end of the feed lips (E) are of three styles: long curve (upper view of fig. 2-156); intermediate length curve (upper and middle view in fig. 2-155), and short curve (all remaining views in fig. 2-155, 2-156, and 2-157). (4) The means of retaining the magazine floorplate by a separate latch mechanism (F) is found only on the 20-round magazine. All 30-round magazines examined use integral detent surfaces on the floorplate as the means for its retention.

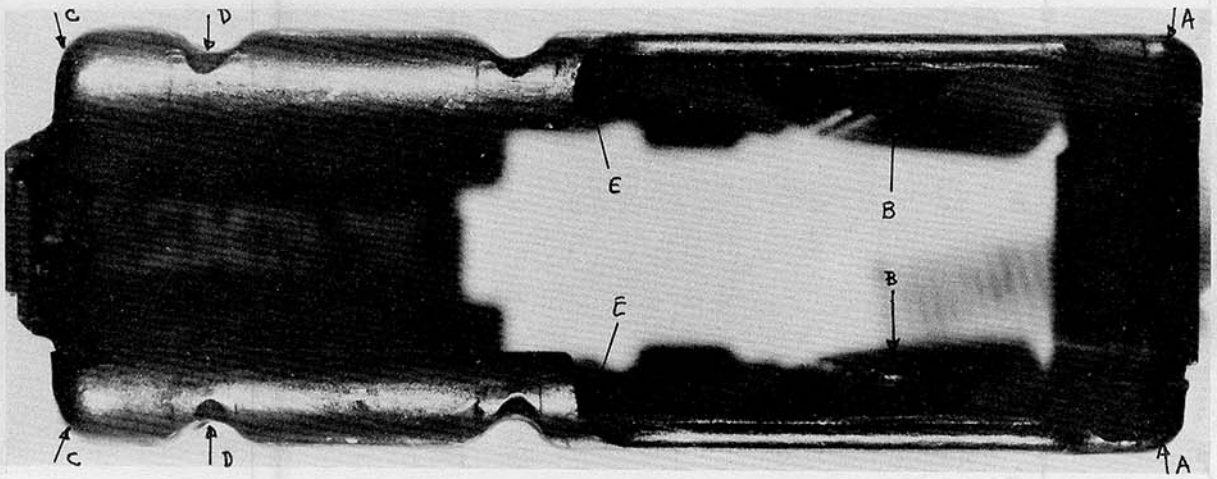
Note: The letters in ( ) refer to the arrow indicators on the figures.



20-round Colt (ref fig. 2-140)

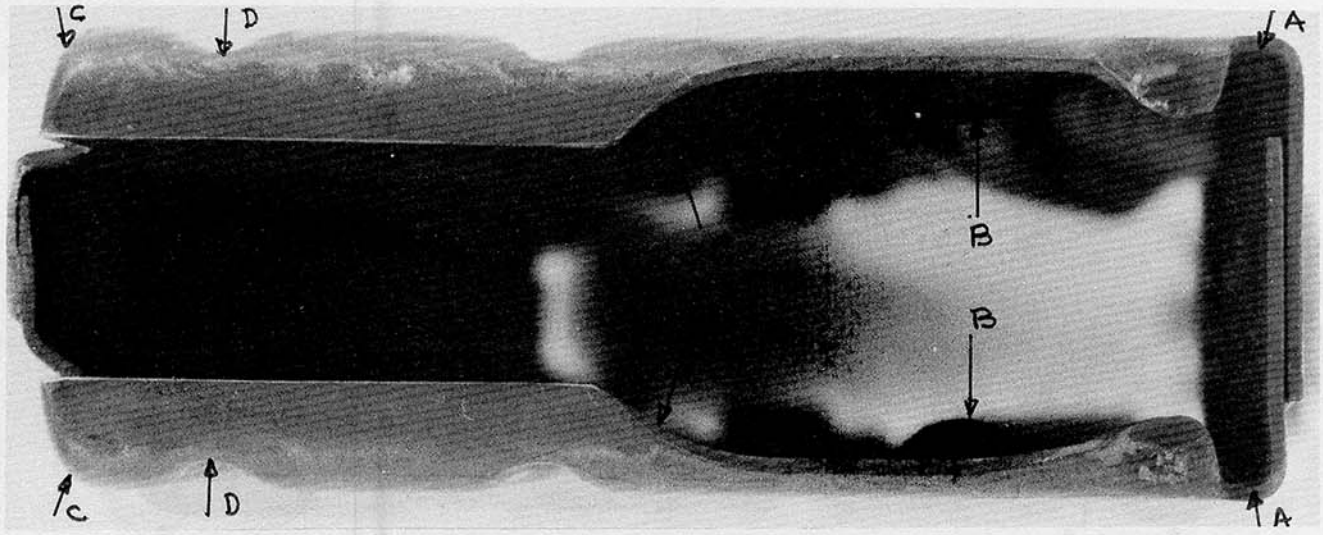


30-round Test rifle (ref fig. 2-141)

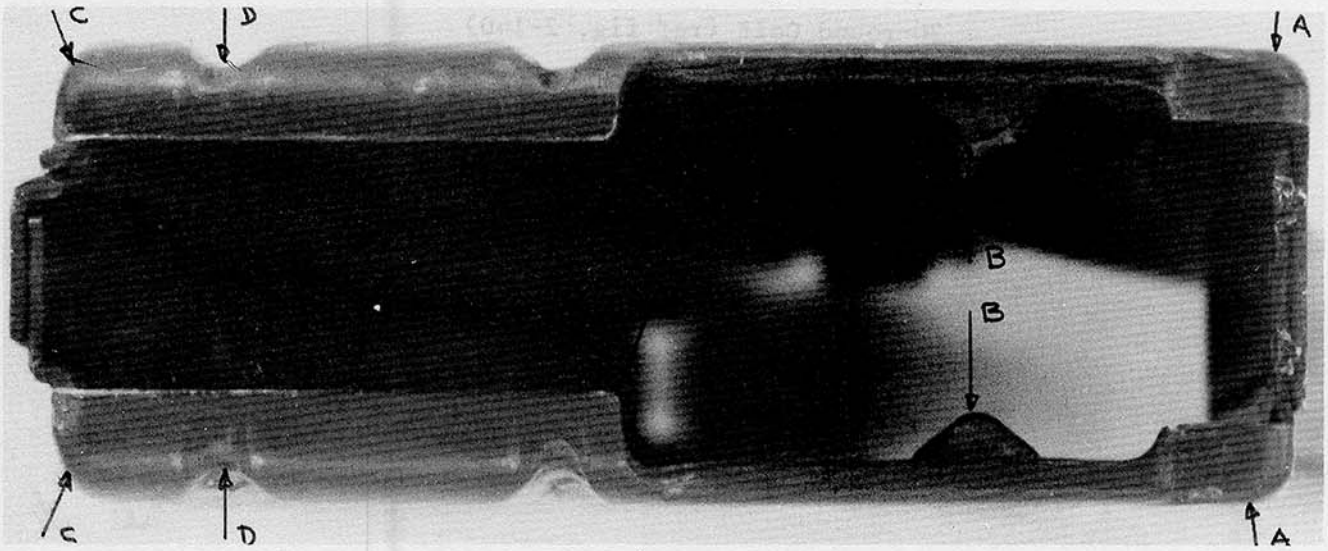


30-round OKAY Industries (ref fig. 2-149)

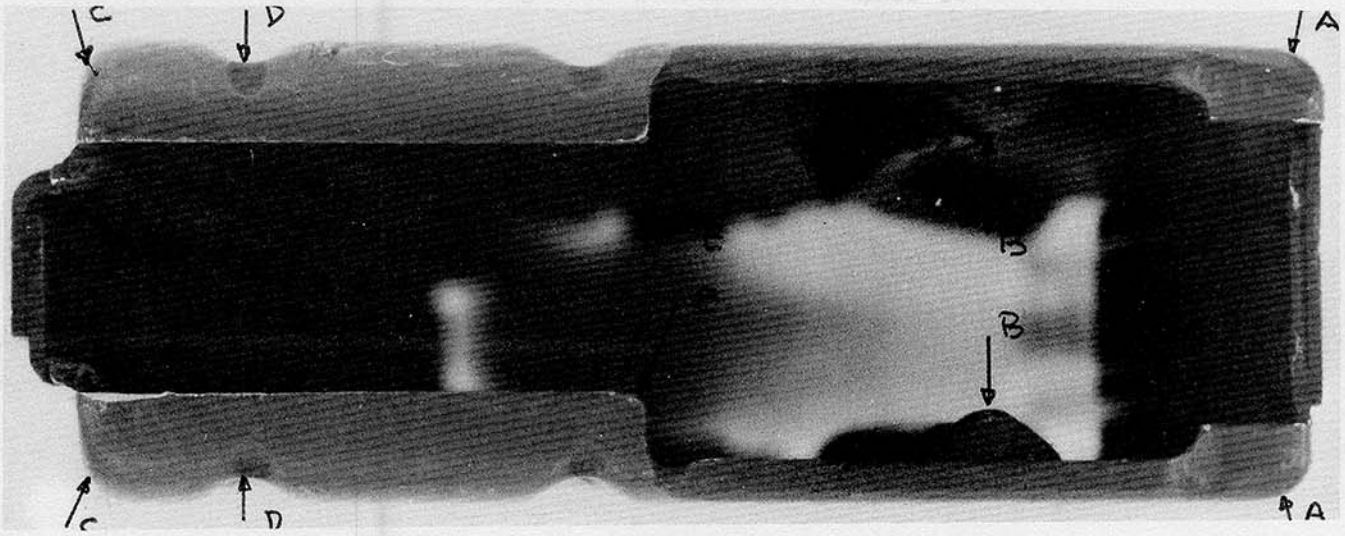
Figure 2-155. Magazine body top views.



30-round Colt (ref fig. 2-142)

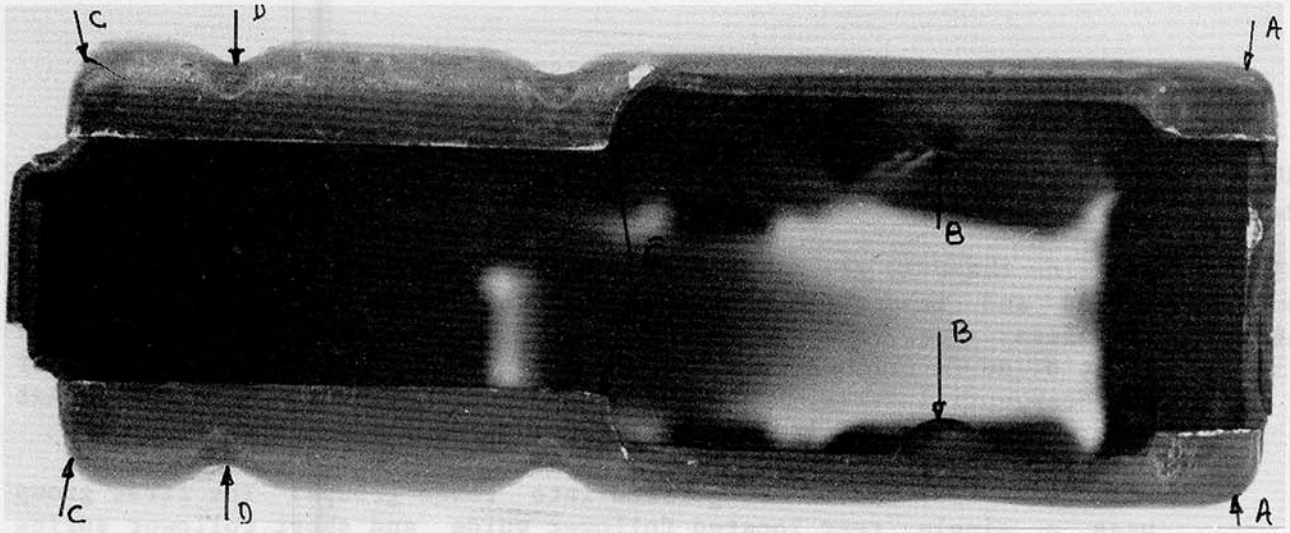


30-round Colt (ref fig. 2-143)

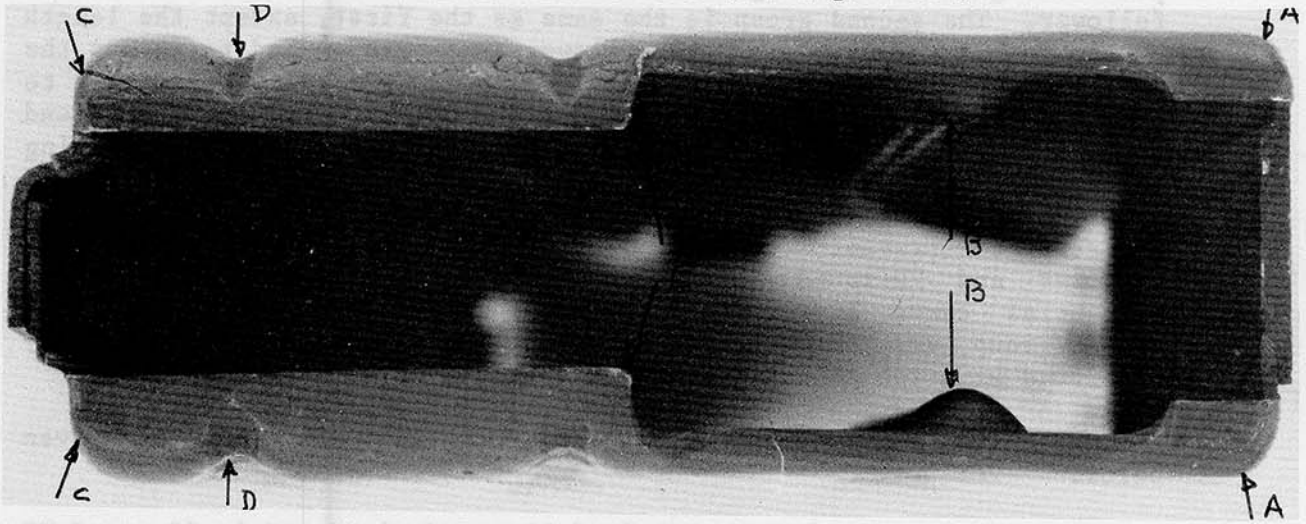


30-round Colt (ref fig. 2-144)

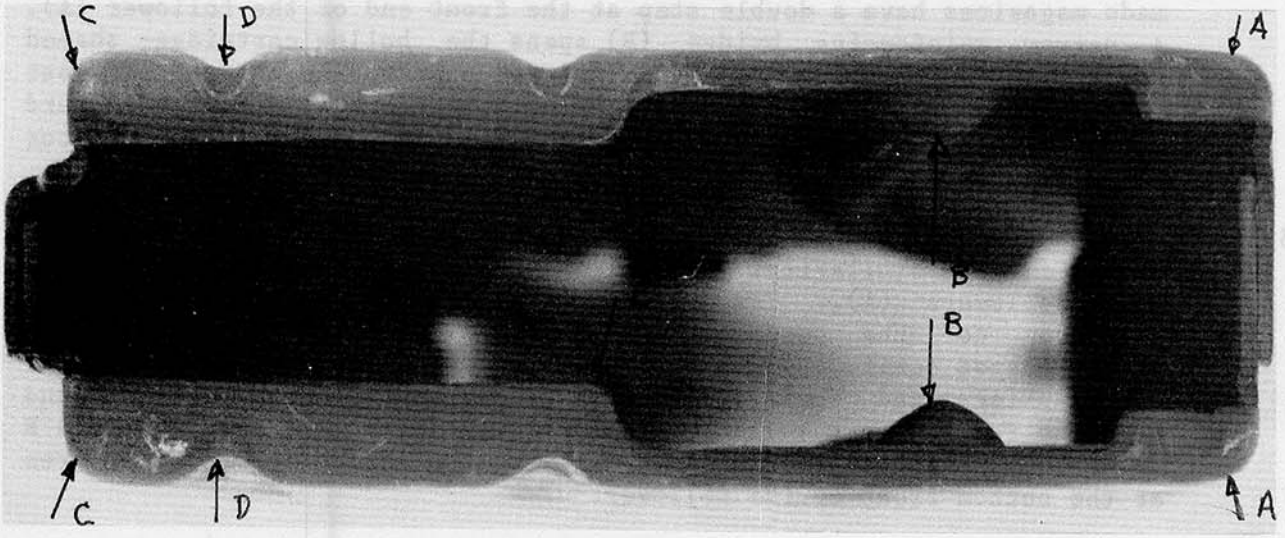
Figure 2-156. Magazine body top views.



30-round Adventure Line (ref fig. 2-148)



30-round Adventure Line (ref fig. 2-147)



30-round Cooper Industries (ref fig. 2-146)

Figure 2-157. Magazine body top views.

TABLE 2-45. DISTINGUISHING CHARACTERISTICS OF TEST RIFLE AND KNOWN US MADE COMPONENTS - MAGAZINE FOLLOWER

Figure No.	Description
2-158 to 2-164	In the USA, the material used for magazine followers in early M16 rifles and its predecessor, the AR-15 rifle, was metallic; either stainless steel, or aluminum alloy. The introduction of reinforced plastic as a follower material occurred in 1970 with the adoption of the tangential curve, Colt designed, 30-round magazine. Prior to that date, the 30-round Colt magazine used a steel sheet-metal follower. Followers can be categorized into three groups: The first group uses a single rear located follower guide and short follower spring positioning/retaining lug located centrally on the bottom of the follower. The second group is the same as the first, except the length of the lug on the bottom of the follower that retains and positions the follower spring is lengthened. This creates a positive stop surface to prevent magazine overloading. The third group utilizes both front and rear follower guides and a small follower spring positioning/retaining lug located centrally, forward of center on the bottom of the follower. The long front and rear guides of this group act as positive stop surfaces to prevent magazine overloading. The test rifle magazine follower and 20-round Colt magazine are in the first group. All tangential curve 30-round US made magazines have followers of the second group, and the Colt constant curve 30-round magazine is the only one found with the third type of follower design. Detailed differences in follower design and manufacture are given below.
2-158	The present reinforced plastic follower design used in 30-round US made magazines have a double step at the front end of the follower (A). A narrow reinforcing bridge (B) spans the hollow cartridge- shaped cavity (C) and connects with the follower stop/spring positioning post (D). There is a sprue at the end of this post and also at the forward end of the follower (E). Inside the forward sprue is a designator (No. 7).
2-159	Comparison of the test rifle and Colt 20-round magazine followers shows a close similarity. A single step is found at the front end of both followers (A). The width of the bridge (B) and its position relative to the post is the same. The shape of the hollow bullet-shaped cavity (D) are similar. The rear support (E) is similar. Die markings and sprue locations differ (C). Only the 20-round magazine follower has any manufacturer's markings. They are a double N in a square and the No. 3. Both are located inside the recessed area at the bottom front of the follower.

TABLE 2-45 (CONT'D)

Figure No.	Description
2-160	The left side profile of the two followers shown in Figure 2-159 continues to show the similar shape of these parts. The bullet profile (A), and follower spring retaining/positioning tab are the same (B). The rear guide (C) is the same except for the bevel at the rear back side of the test rifle part. Thickness of the cartridge platform (D) is different.
2-161	The similarities and differences in manufacturing processes and markings of current production followers are shown in this figure. The double step front end (A) is the same. Bridge location and size (B) is the same. Internal shape of the hollow cavity which produces the bullet shape on the top of the cartridge platform (C) differs slightly in end profile. The sprue location on the end of the follower stop (D) is the same. Sprue location and marking or lack of marking (E) differs.
2-162	Comments on the bottom view of the current production Colt magazine follower correspond to those given in Figure 2-161. The shapes shown in the top view and left side view of this follower correspond to similar views of the other three current production 30-round magazine parts (Adventure Line, Cooper, and OKAY).
2-163	Comparison of the original plastic follower used in the Colt tangential curve 30-round magazine with current production (fig. 2-162) reveal several differences. These are single versus double step at front (A), no bridge spanning a hollow cavity of the bullet (B and C), solid front end with centrally located sprue (a No. 7 is molded into the sprue mark), part number painted on follower (F), and short bevel on rear end of bullet (G). The sprue at the end of the post is the same as found on current production followers (D).
2-164	The sheet steel follower of the constant curve Colt magazine is similar in design to that of the Stover 63 magazine follower, which is an apparent predecessor. The Colt follower is characterized by a forward positioned follower spring positioner/retainer (A), symmetrical bullet (B), and front and rear legs (C) used to control follower position within the magazine.

Note: The letters in ( ) refer to the arrow indicators on the figures.

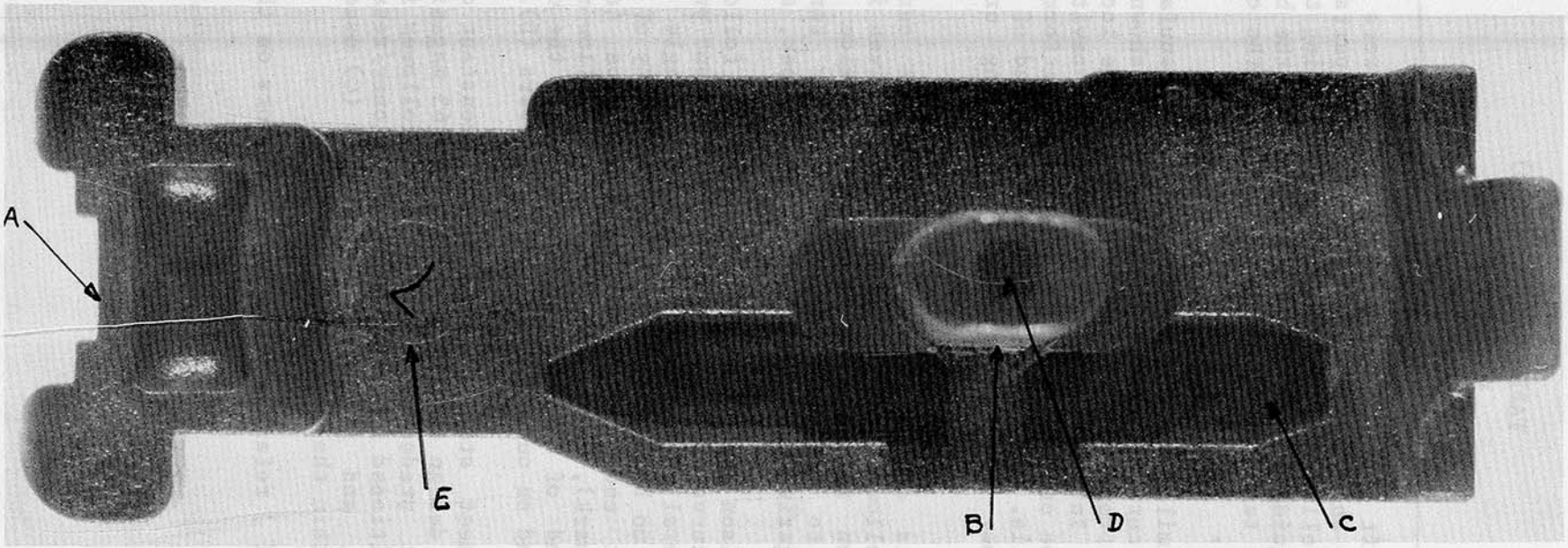
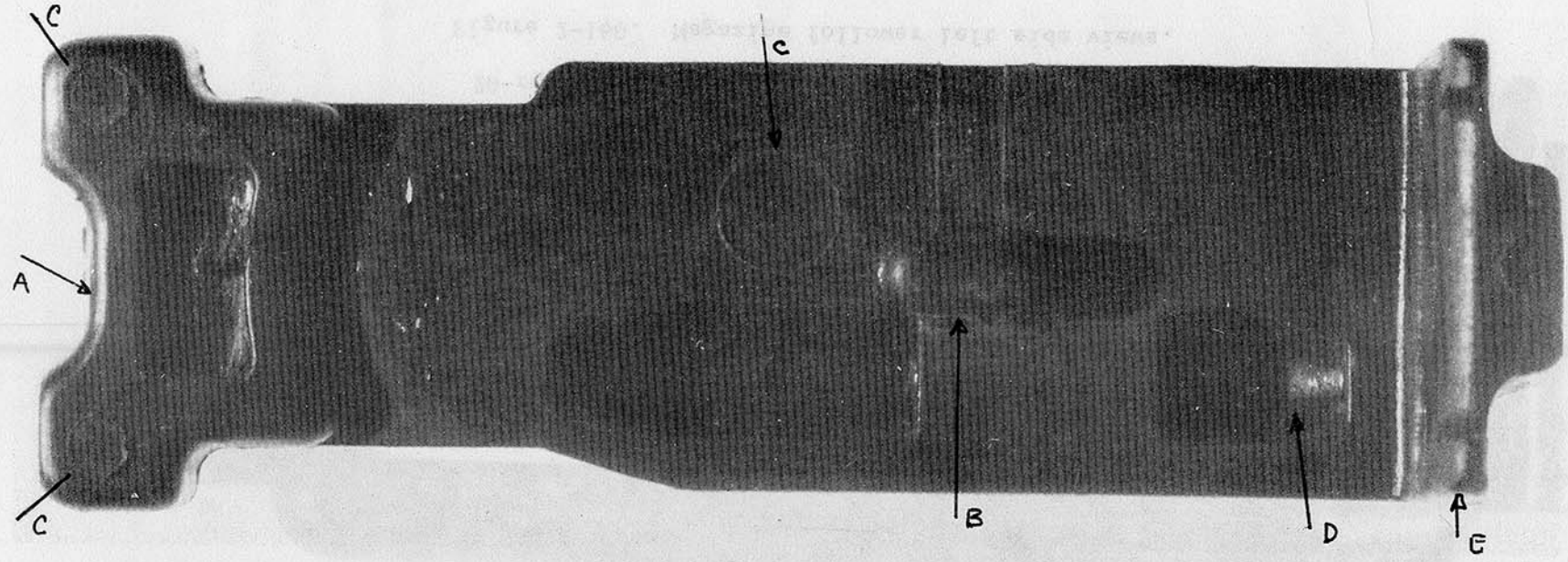
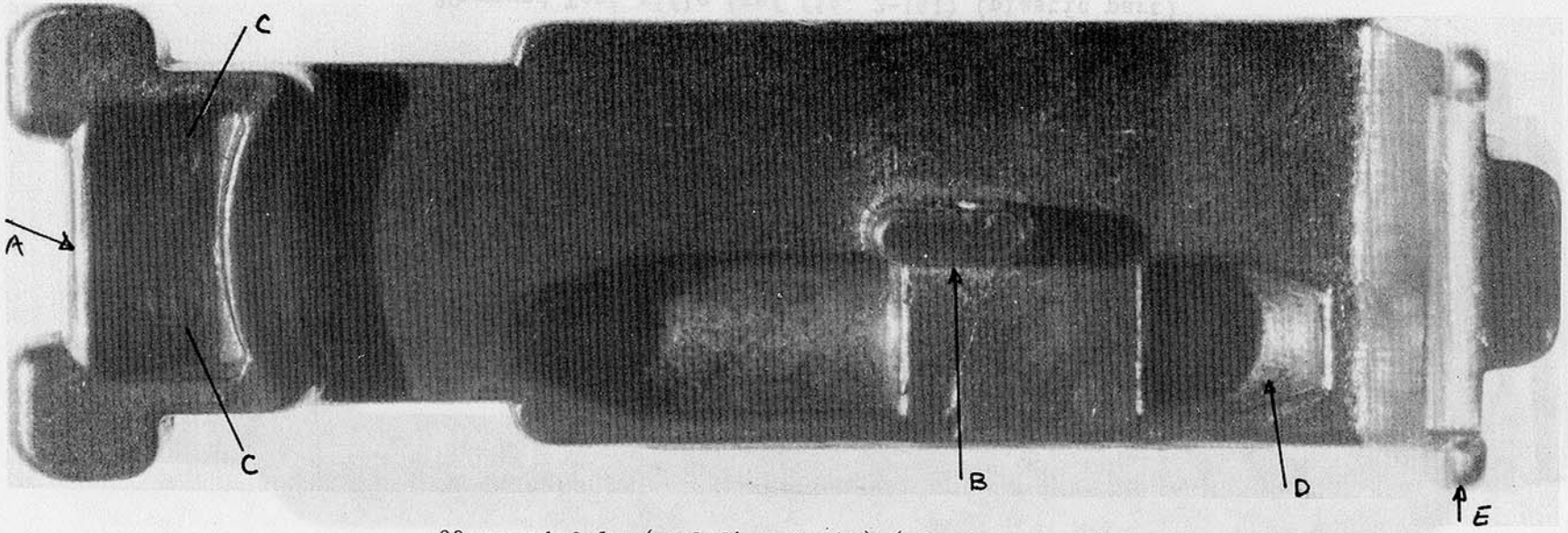


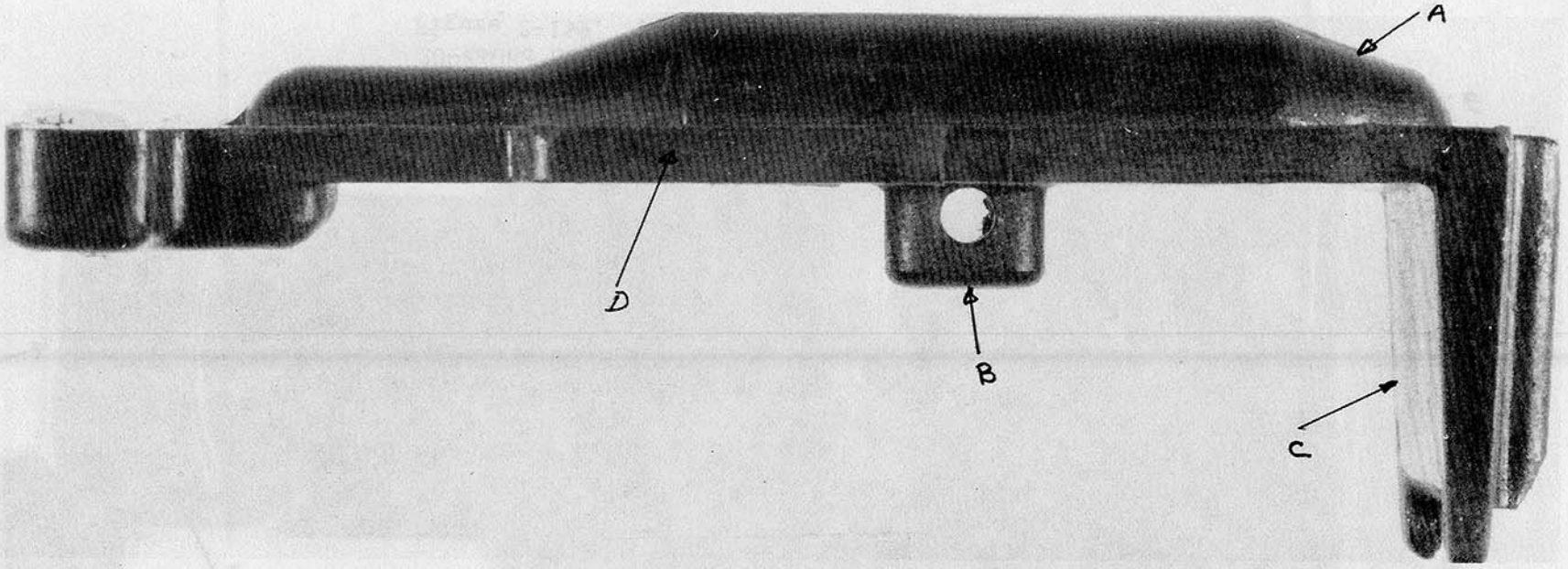
Figure 2-158. Bottom view of 30-round magazine follower from OKAY Industries (ref fig. 2-149) (plastic part).



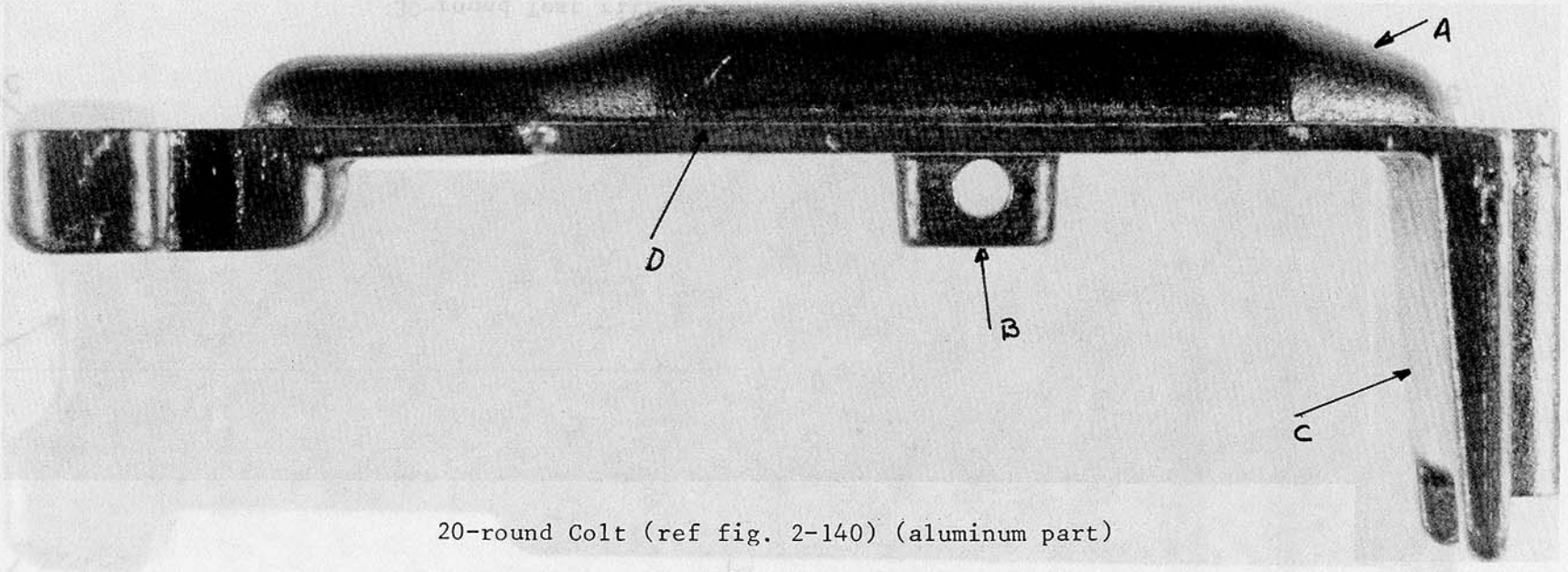
30-round Test rifle (ref fig. 2-141) (plastic part)



20-round Colt (ref fig. 2-140) (aluminum part)
Figure 2-159. Bottom view of magazine followers.

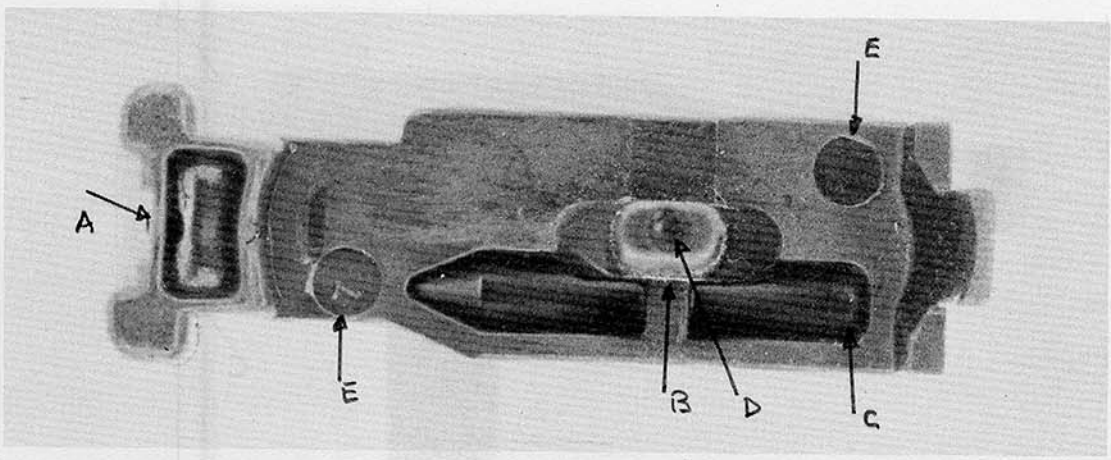


30-round Test rifle (ref fig. 2-141) (plastic part)

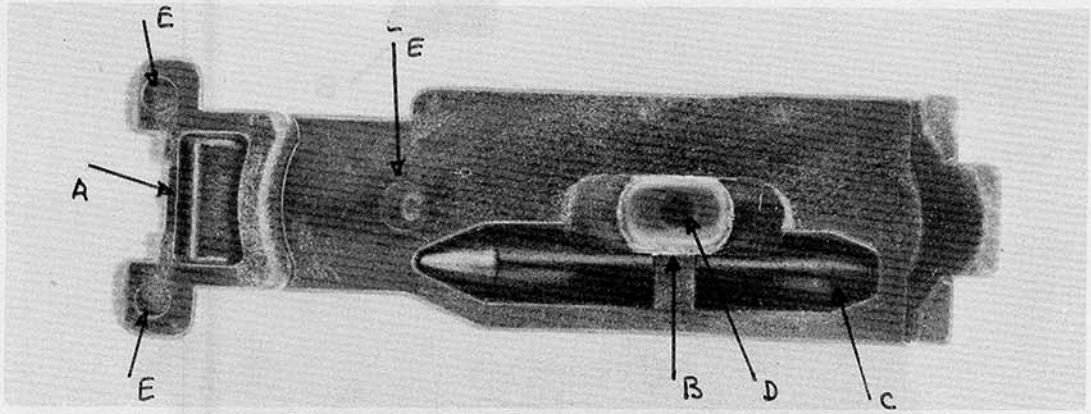


20-round Colt (ref fig. 2-140) (aluminum part)

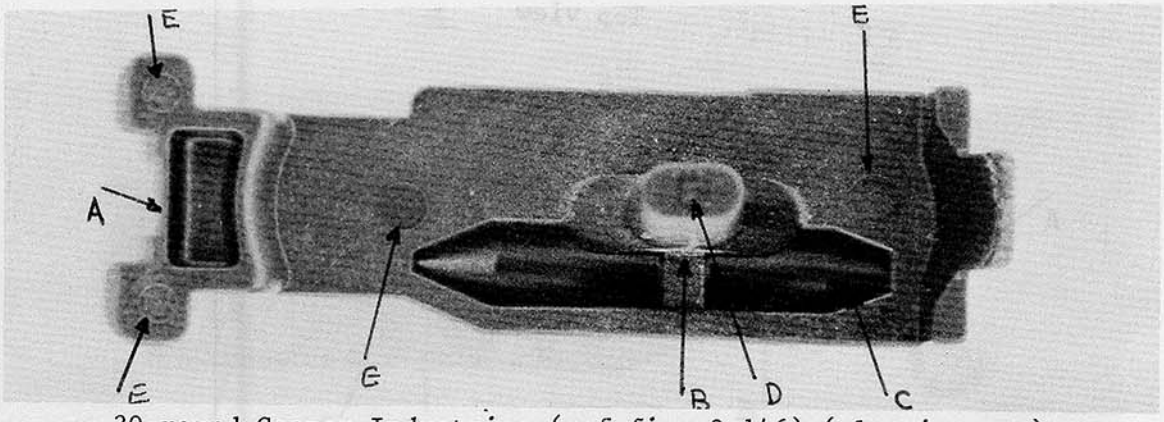
Figure 2-160. Magazine follower left side views.



30-round Adventure Line (ref fig. 2-147) (plastic part)

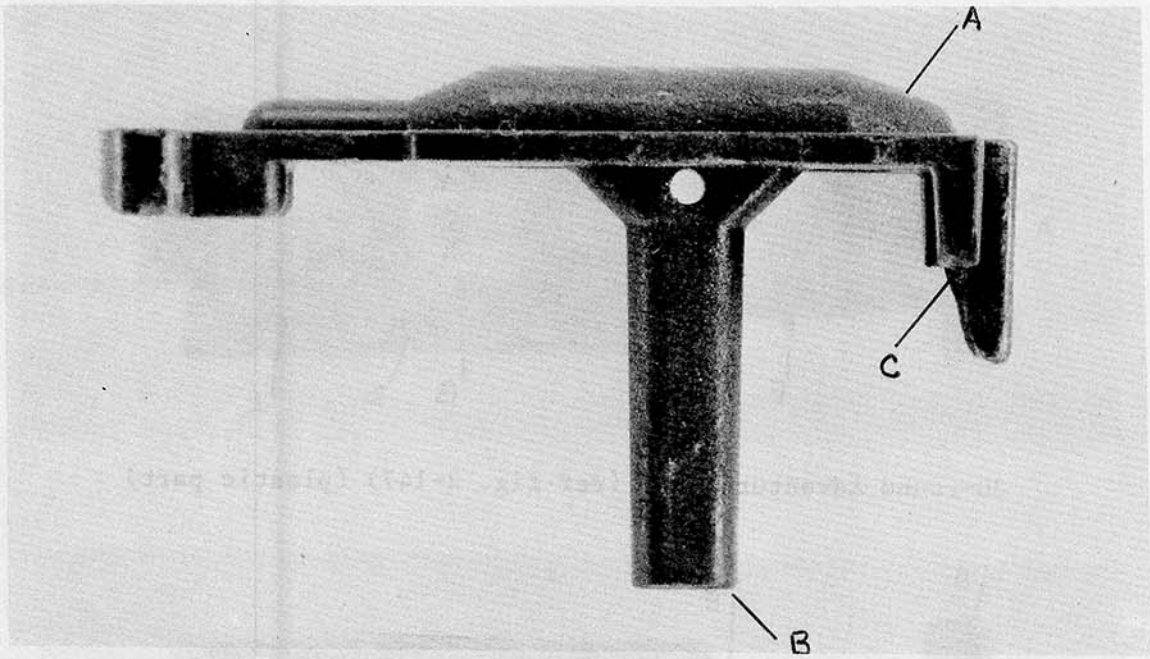


30-round Adventure Line (ref fig. 2-148) (plastic part)

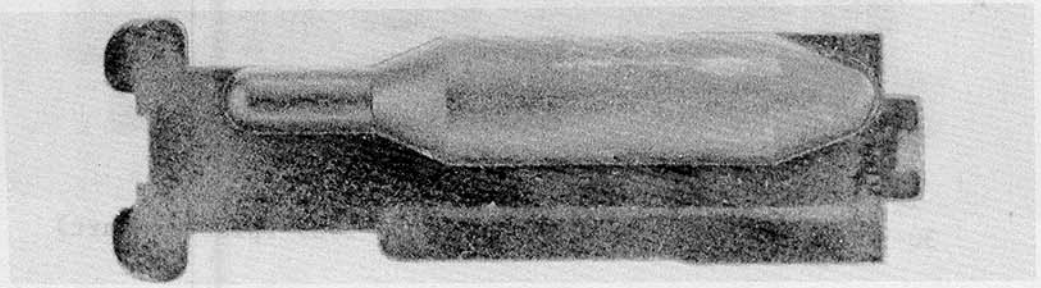


30-round Cooper Industries (ref fig. 2-146) (plastic part)

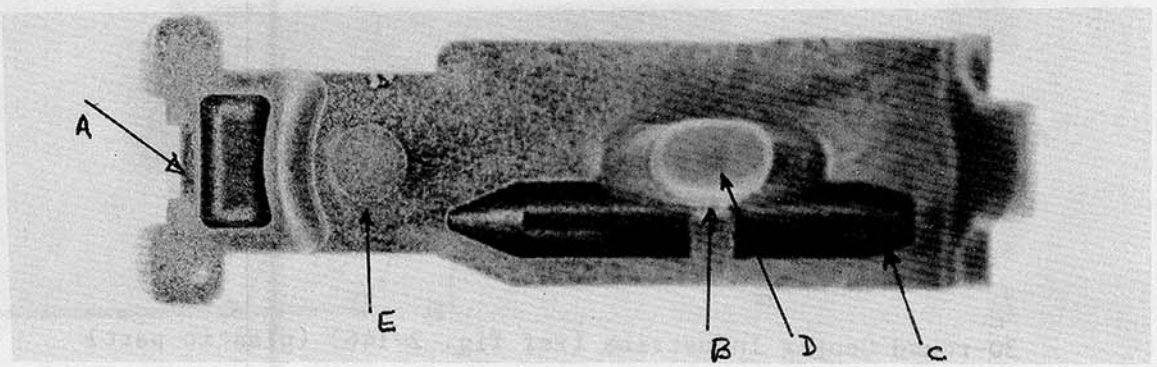
Figure 2-161. Magazine follower bottom views.



Left side view

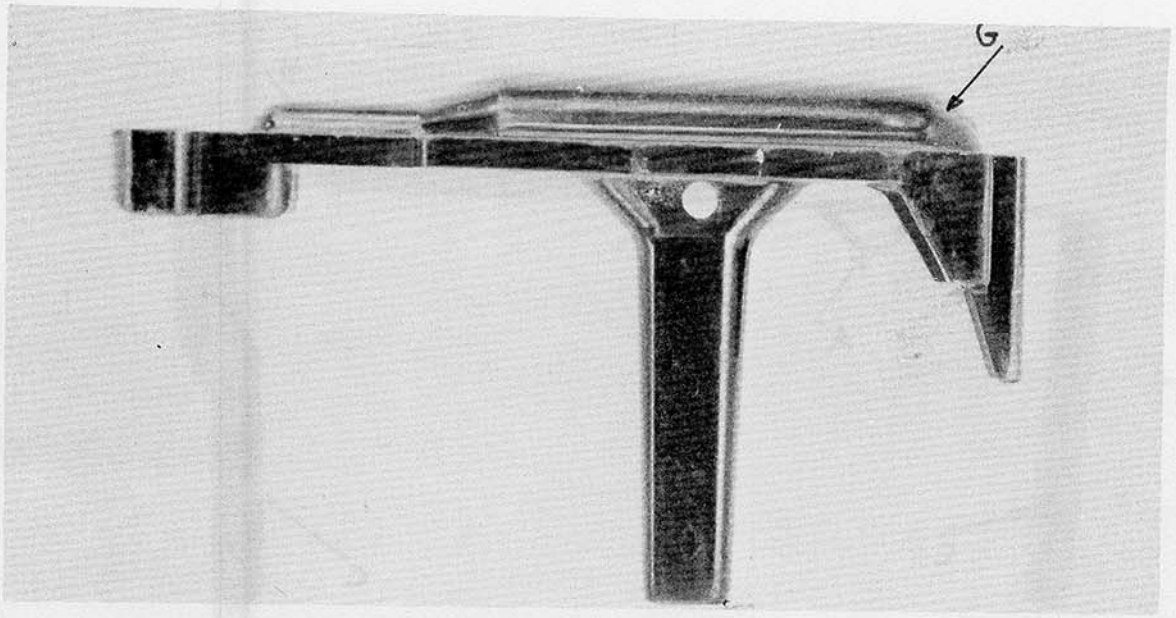


Top view

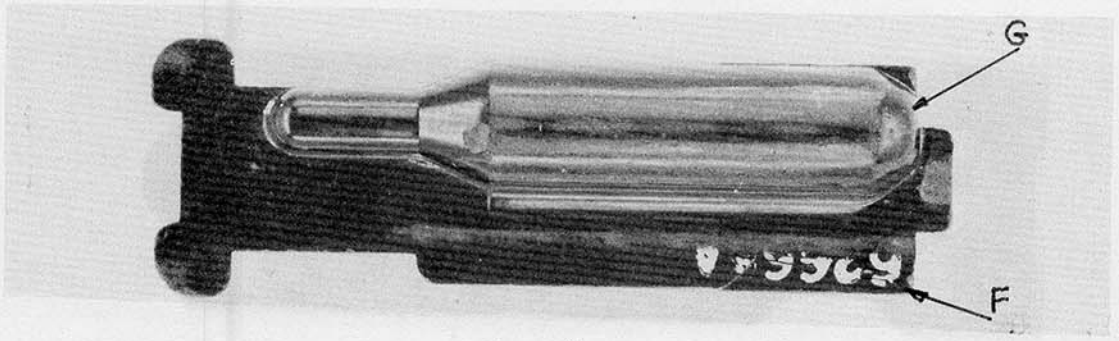


Bottom view

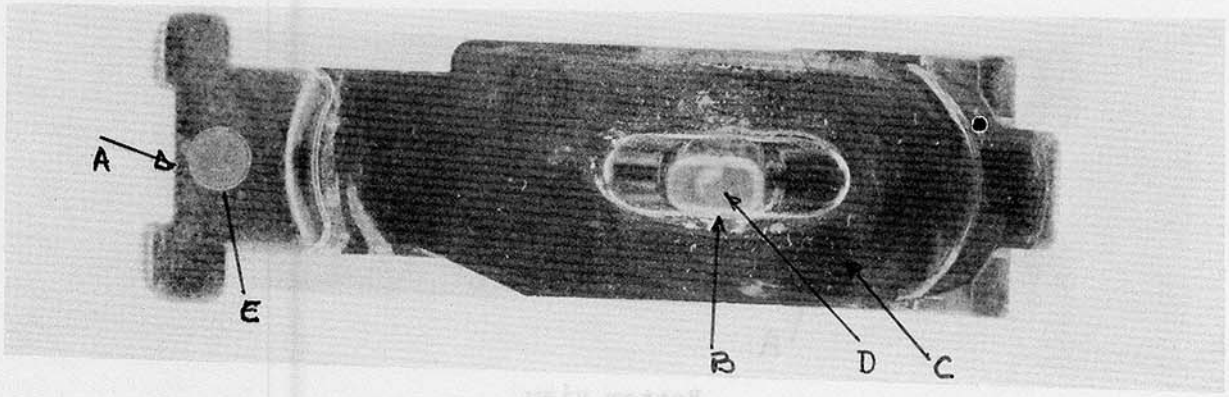
Figure 2-162. Three views of 30-round plastic follower from Colt magazine (ref fig. 2-145).



Left side view

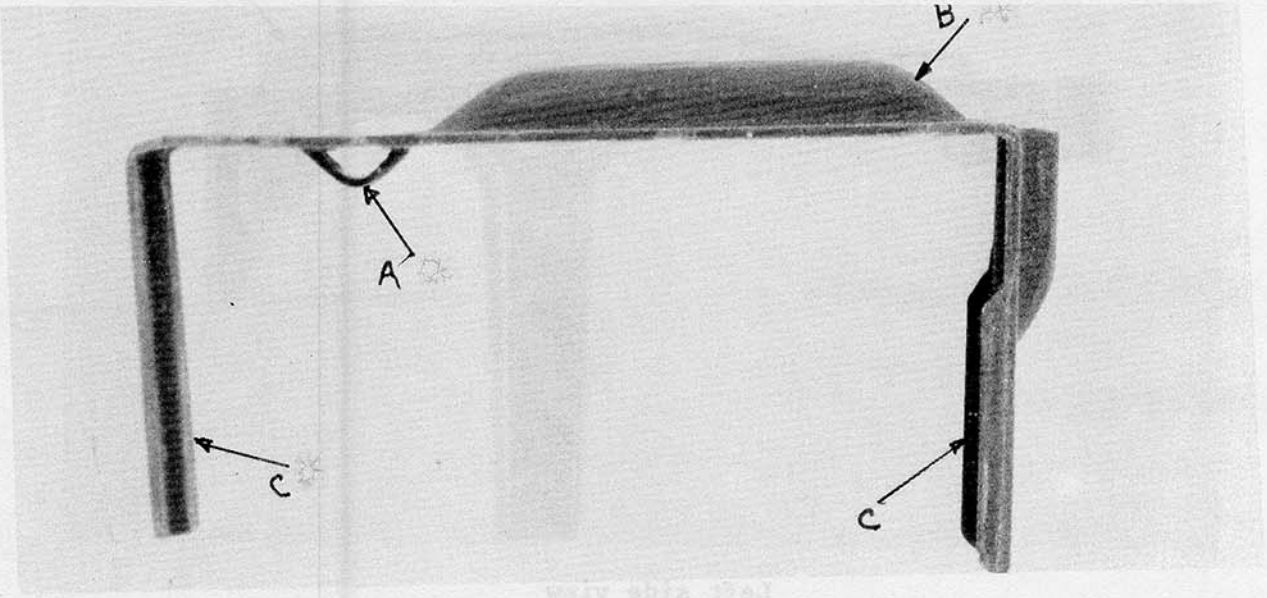


Top view



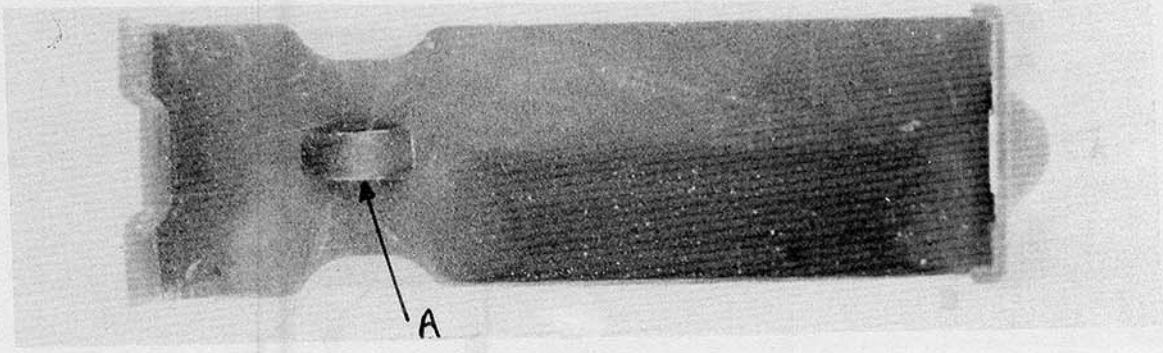
Bottom view

Figure 2-163. Three views of 30-round plastic follower from Colt magazine (ref fig. 2-143).



Left side view

Top view



Bottom view

Figure 2-164. Three views of steel follower from Colt magazine (ref fig. 2-142).

Major Engineering Changes to the M16A1 Rifle System (Excluding Ammunition) During the Period Sep 67 to Dec 74[a]

1. 18 March 1970, EO 92168 on Bolt Catch 8448628. Changes ramp angle to reduce BFRO malfunctions. Incorporated in all production of Contract DAAF03-71-C-0003, May 1971.

2. 10 June 1970, EO 02201 on Stowage Buttstock Assy 8448650. Initial release to provide on-weapon stowage of cleaning material. Incorporated in all production of Contract DAAF03-71-C-0003, May 1971.

3. 15 June 1970, EO 02202 on 30 Round Magazine Assy 8448670. Initial release of Government product drawings. Incorporated into production in November 1970.

4. 9 July 1970, EO 02182 on Bolt 8448510. Added a "deep freeze" requirement and controlled lug chamfers to assure bolt integrity and reduce BOB and BFRO malfunctions. Incorporated in all production of Contract DAAF03-71-C-0003, May 1971.

5. 3 August 1970, EO 02197-1 on Sight and Gas Tube Assy 8448565. Replaced spring pin with rivet on front sling swivel for reduction of field problem of loose or lost pins. Incorporated in all production of Contract DAAF03-71-C-0003, May 1971.

6. 19 February 1971, EO 02287 on Barrel. Introduced chromium plated bore into rifle production in December of 1971 and replacement barrel assemblies in July 1971.

7. 23 February 1971, EO 02299 on Lock Plate 8448676. Initial release to prevent automatic mode of firing during riot suppression. Initial production in May 1971.

8. 12 March 1971, EO 10620 on 30 Round Magazine Follower 8448672. Changed material to nylon, was glass reinforced phenolic, for added strength and reduced cost. Incorporated in all production of Contract DAAF03-71-C-0339, March 1972.

9. 15 September 1971, ERR 10836 on Buffer Assy 8448615. Eliminate spring pin by changing method of securing buffer bumper to buffer body with internal ridges, to reduce/eliminate cracked buffer bodies. Incorporated into production in June 1972.

[a] Data extracted from System Assessment for the 5.56-mm Rifle M16A1 dated 20 January 1975 by Headquarters, US Army Armament Command, Rock Island, IL 61201.

10. 28 October 1971, ERR 10865 on Forward Assist Plunger Assy 8448545. New design to convert plunger and cap to basically one piece, thereby reducing cost. Incorporated in repair part contract in September 1972.

11. 17 November 1971, ERR 10881 on Extractor Spring Assy 8448755. Redesigned spring and added a flanged cylindrical rubber insert to inprove reliability and increase service life by approximately three times. Incorporated into all rifle production in July 1972.

12. 30 November 1971, ERR 10894 on Blank Firing Attachment (M15A1) 8448763. Strengthened BFA frame to make it compatible with aluminum case blank rounds. Incorporated January 1972.

13. 6 December 1971, ERR 10788 on Low Light Level Sight Kit 8448688. Initial release. Contract awarded in February 1972.

14. 20 December 1971, ERR 10898 on Butt Plate Assy 8448656. Changed material to one piece acetal molding to improve low temperature characteristics and reduce cost. Incorporated in February 1972.

15. 17 February 1972, ERR 20630 on Buttstock 8448651. Added an alternative material and impact requirements to increase strength. Incorporated into production in October 1972.

16. 10 May 1972, ERR 20651 on Bumper, Buffer 8448619. Replaced proprietary material with a more readily available commercial material, and added ASTM dynamic modulus test to reduce cost and definitize functional requirements. Incorporation released May 1972.

17. 20 June 1972, ERR 20683 on Handguard, Left 8448558. Added three product improvement changes to increase strength and clarified the method of specifying drawing requirements. Released June 1972.

18. 13 July 1972, ERR 20697 on Handguard, Right 8448562. Added three product improvement changes to increase strength and revised method of specifying drawing requirements for clarification. Released July 1972.

19. 14 July 1972, ERR 20696 on Buttstock Door Plunger Assy 8448661. Changed material and plating to a case hardened, phosphated, dry film lubricated 1117 steel to reduce cost by utilizing a less costly material and processes and yet provide adequate strength and corrosion protection. Released July 1972.

20. 25 September 1972, ERR 20748 on Ejection Port Cover Assy 8448525. Changed overall size of housing and revised method of plunger retention to increase strength and decrease the breakdown and looseness of covers. Repair parts contract awarded in February 1973.

21. 15 December 1972, ERR 20827 on Barrel and Barrel Extension Assy 8448548, and Replacement Barrel and Front Sight Assy 8448663. Refined the rifle bore groove and land configuration to increase accuracy life. Released December 1972.

22. 29 December 1972, ERR 20822, on Rifle Assembly M16A1. Redefined the M16A1 Rifle as an end item with one 30 Round Magazine and one Sling. Incorporated December 1972.

23. 12 February 1973, ERR 20839 on Rifle Assembly M16A1. Released support Equipment List for the Rifle, 5.56mm: M16/M16A1, February 1973.

24. 2 March 1973, ERR 30645 on Barrel 8448549. Revised angle and radius on leading edge of rifle lands to further refine rifling configuration. Incorporated July 1974.

25. 7 March 1973, ERR 30637 on Blank Firing Attachment 12002900. Revised orifice diameter and configuration of the Restrictor to provide compatibility of the BFA with both the present M200 blank and with the new aluminum case blank. Model designation changed to M15A2, FSN and Assembly number revised accordingly to distinguish BFA design. Incorporated into production in March 1973.

26. 3 May 1973, ERR 30684 on Magazine Assembly 30 round 8448670. Eliminate Endurance testing. Removed special cleaning information, clarified color shade, and revised lubricant requirements. Released May 1973.

27. 5 May 1973, ERR 30689 on Low Light Level Sight kits and Front Sight Post 5911140. Provided alternative light source element for front sight post assembly. Implementation withheld pending amendment of AEC License.

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