

ARMING STEM

INTERCHANGEABLE PRIMER DETONATORS

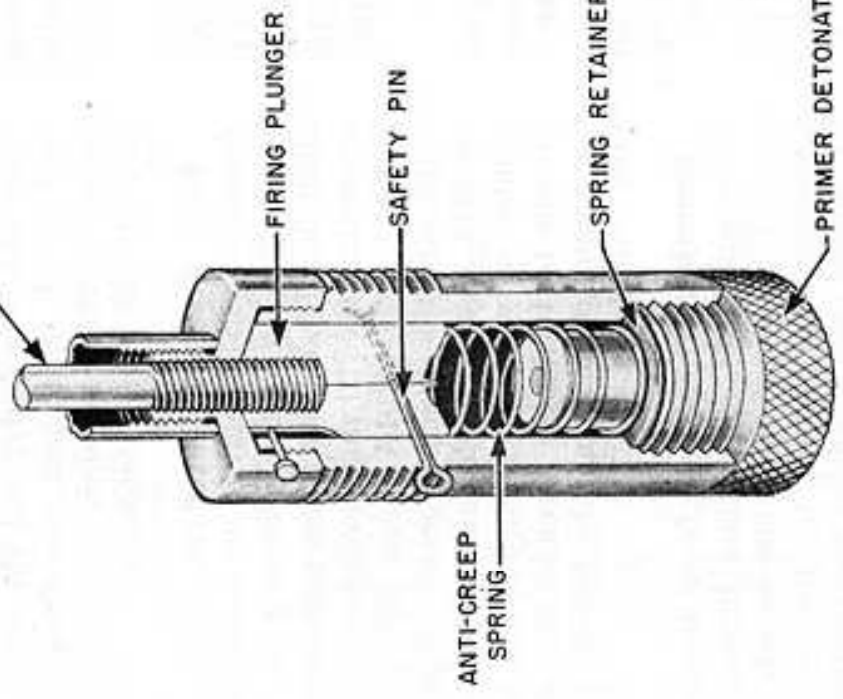
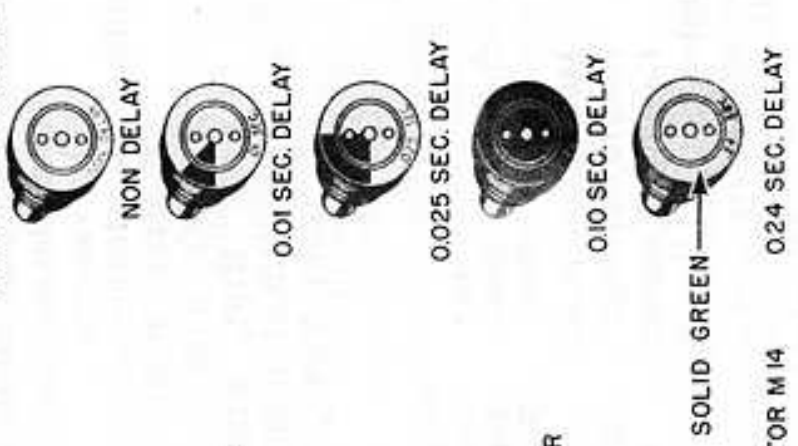


Figure 324. Tail Fuzes AN-M100 and M160 Series

M160, M161, M162 AN-M100A2C, and AN-M101A2C (Tail Mechanical Impact Bombs)

- M160.....100-lb. G.P. AN-M30
- 250-lb. G.P. AN-M57
- 220-lb. Frag. AN-M88
- 260-lb. Frag. M81

- M161...500-lb. G.P. AN-M64 (AN-M43)
- 500-lb. S.A.P. AN-M58
- 500-lb. Incend. AN-M76
- 500-lb. Chem. AN-M78
- 600-lb. G.P. M32
- M162...1,000-lb. G.P. AN-M65 (AN-M44)
- 1,000-lb. S.A.P. AN-M59

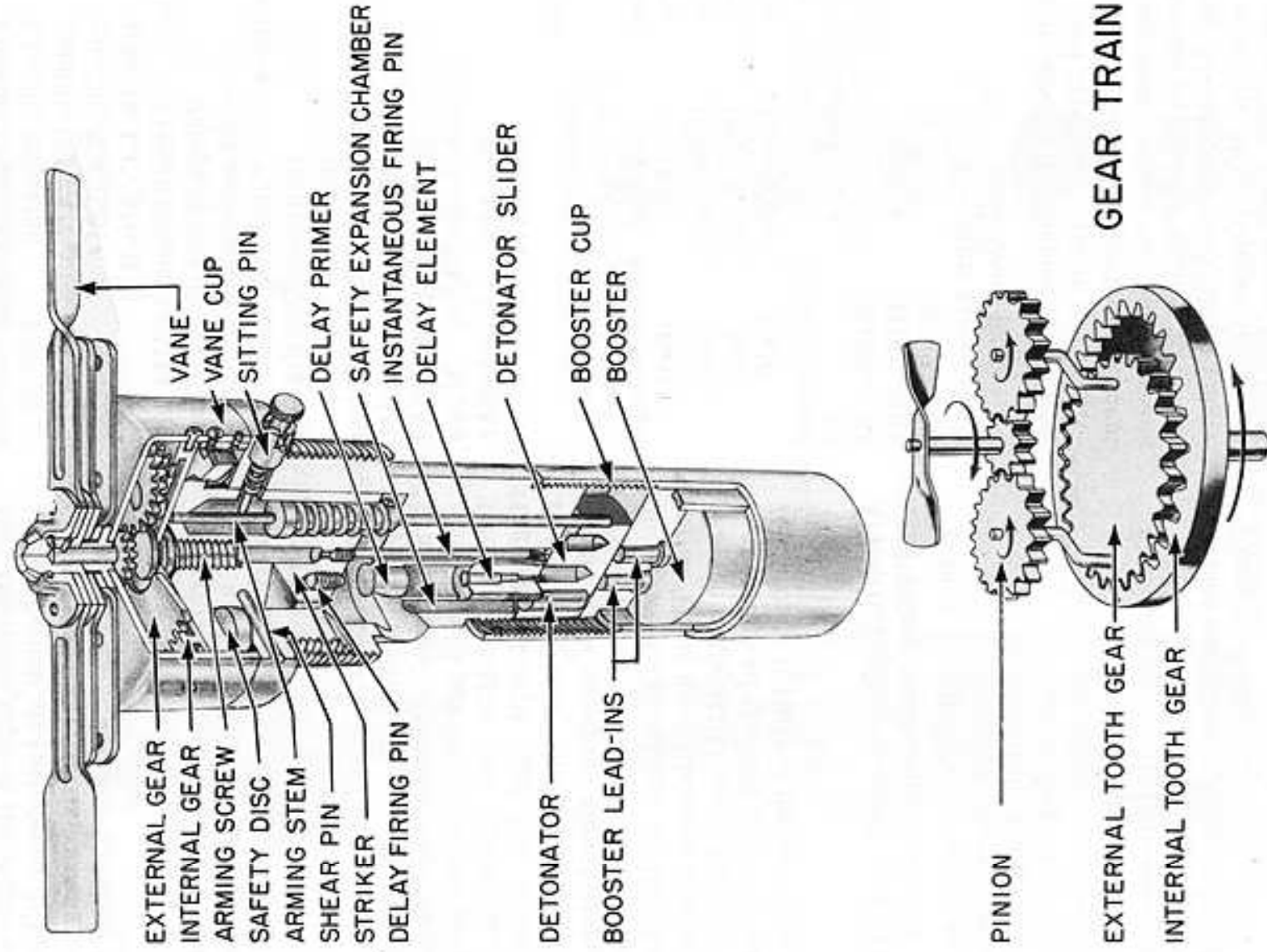
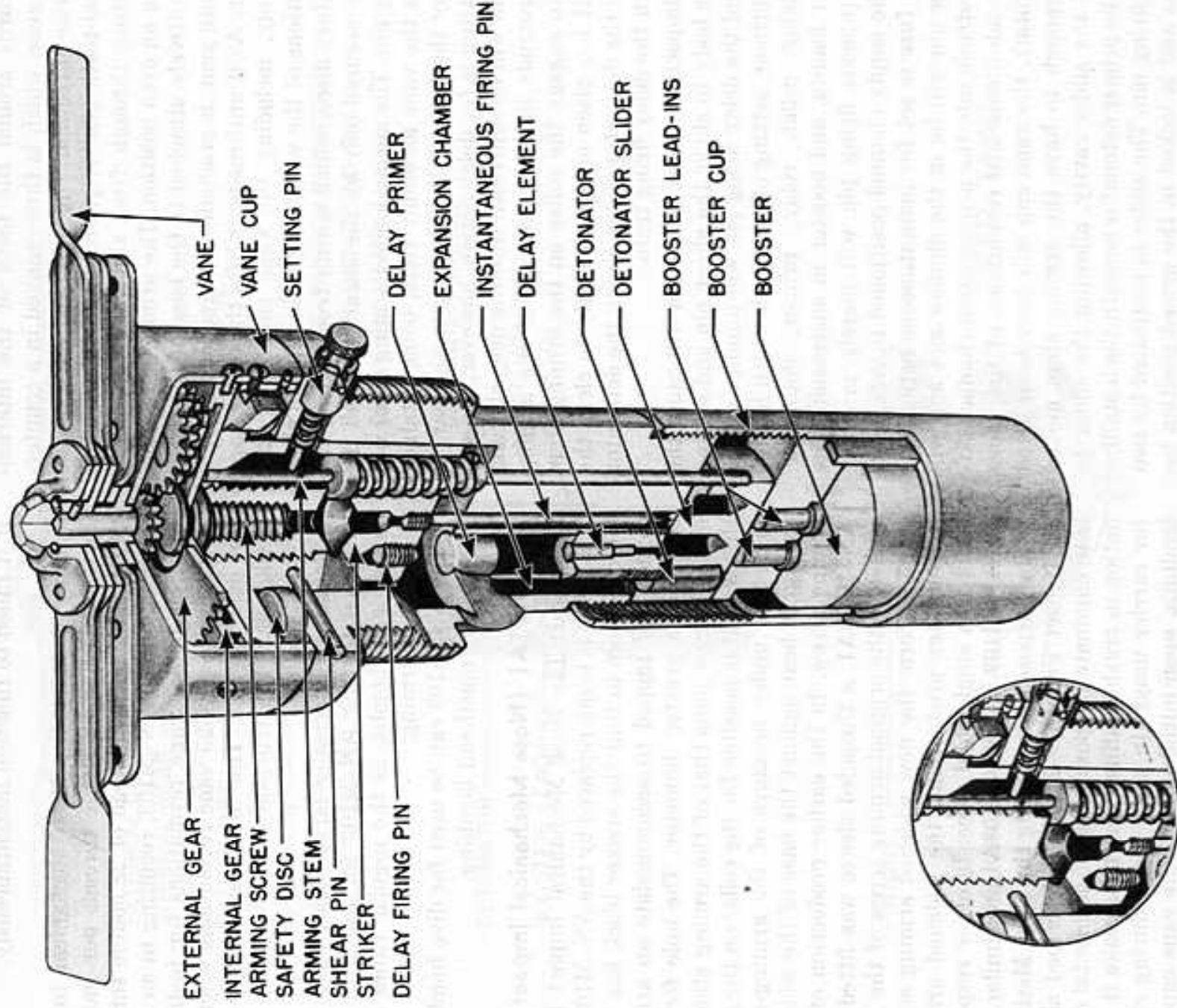


Figure 325. Nose Fuze AN-M103

General: The AN-M103 was the standard nose fuze in service. When shipped, the fuze is set for delay action. One auxiliary booster is required when this fuze is used in Navy bombs. When used in light-case, fragmentation, chemical, incendiary, and aircraft depth bombs, the fuze should be set for instantaneous action to

prevent breaking up of the bomb case before detonation occurs.

Operation: When bomb is dropped, the arming wire is pulled and the vanes rotate. The two pinion gears are rotated counterclockwise, their off-center hubs walking the external-tooth gear



SOLID ARMING SCREW OF LATER AN-M103A1 PRODUCTION

Figure 326. Nose Fuze AN-M103A1

Operation: The operation of the AN-M103A1 in the former, the arming stem, in addition to is the same as that of the AN-M103 except that, bearing against the internal gear, has its collar

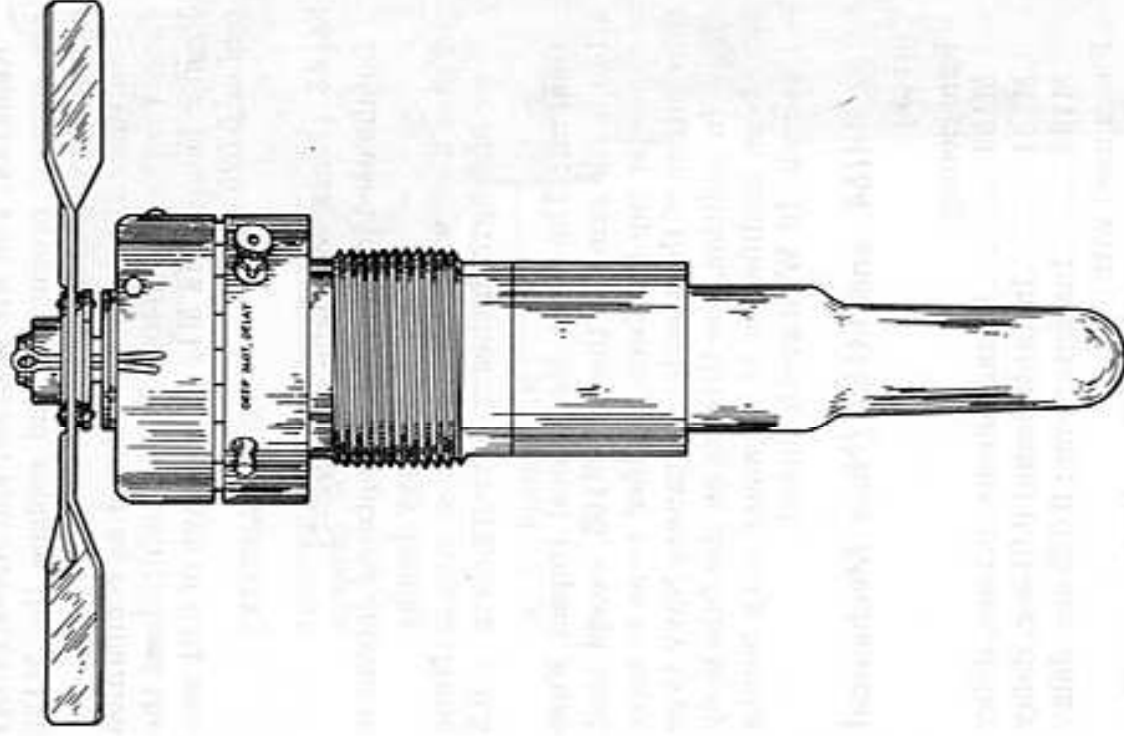


Figure 327. Nose Fuze M148

the addition of a second shoulder, higher up on the arming stem, which bears against the bottom of the arming screw.

This series of fuzes is designed as a companion group for the M160, M161, and M162; and serves to eliminate the difficulties discussed with reference to the M160 series.

To distinguish the new series from their prototypes, the following markings are employed: the top of the M163 vane cup is painted completely yellow; and, in the M164 and M165, the vane cup is painted yellow except for the black sections indicating the delays.

T32E1 and T33E1 (Nose Mechanical Impact)

Bombs G.P. bombs which receive AN-M103 — Skip-bomb size

Functioning T32E1 — 4- to 5-second delay

T33E1—11- to 14-second delay

Armed condition Safety discs out
Fuzes used with M113, M113A1, M116

General: A nose fuze for minimum-altitude bombing, this design changes the Nose Mechanical Impact Fuze AN-M103 to give the necessary long delay. The T32 and T33 differ only in the amount of pyrotechnic delay. The delay feature is accomplished by drilling axially through the fuze body—two tubes for the powder train and a third for an expansion chamber. A larger axial hole houses the rotor containing the detonator, and provides detonator safety for this fuze. There is no instantaneous firing train.

Operation: Rotation of the vanes makes the arming spindle and the striker block move upward, with the assistance of the spring, until the safety discs are flung out by the leaf spring which is located inboard of them. As the arming spindle rises, it allows the rotor stem, which is spring-loaded downward, to turn the rotor, bringing the detonator in line with the lower end of the delay train. The fuze is now fully armed. On impact, the striker block is forced down, mashing the firing pin into the primer and setting off the delay powder train. The powder is in the two lower small tubes, and burns from the primer down to the detonator, in the rotor, then to the booster lead-in, and finally at the booster. The uppermost small tube is an expansion chamber, to prevent pressure from the burning delay powder from causing a malfunction.

AN-M104 (Obsolescent) and M109 (Obsolete) (Mechanical Impact)

Bombs AN-M104—23-lb. Frag. AN-M40
M109—20-lb. Frag. AN-M41

Functioning Instantaneous
Armed condition When delayed arming disc is out

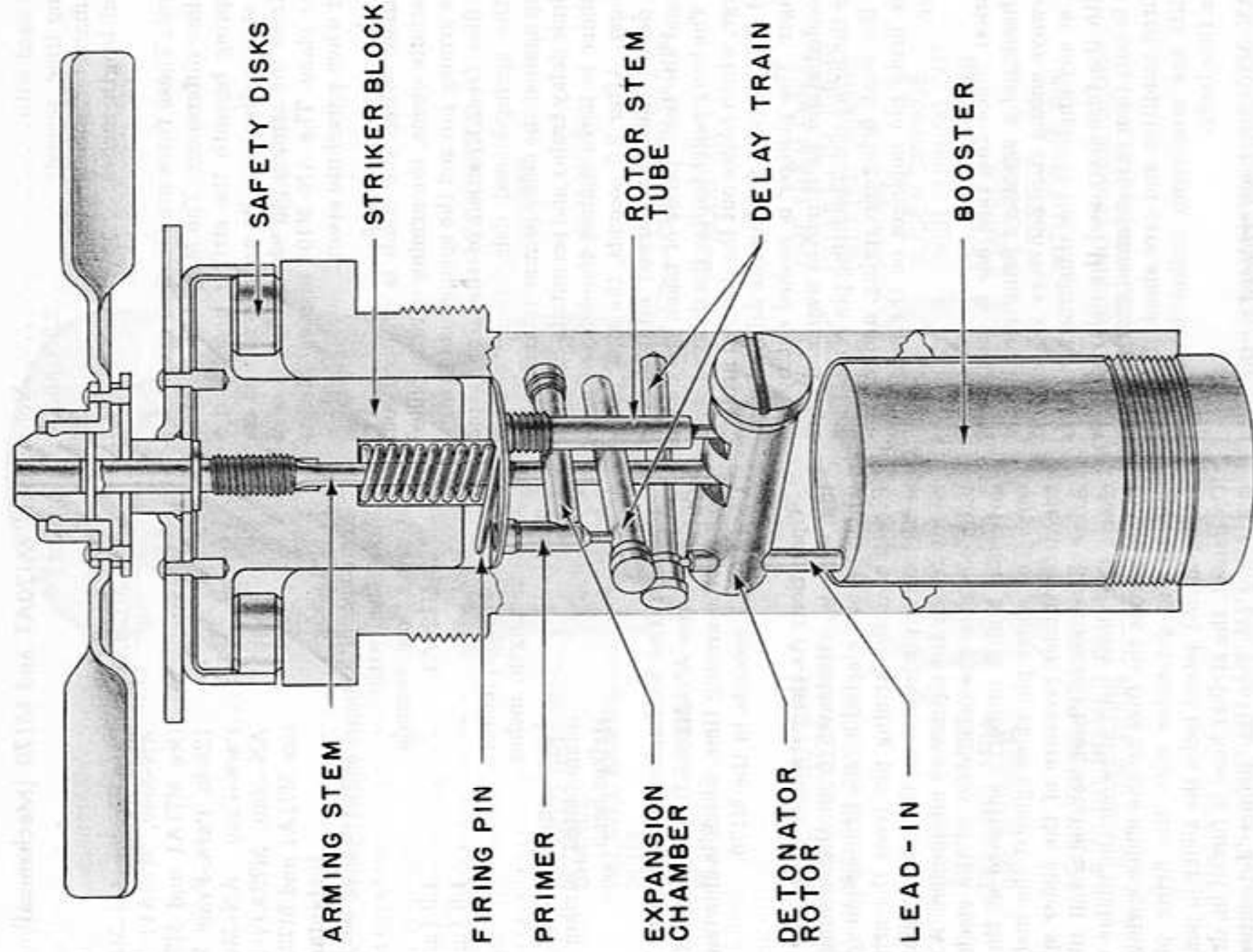


Figure 328. Nose Fuzes T32E1 and T33E1

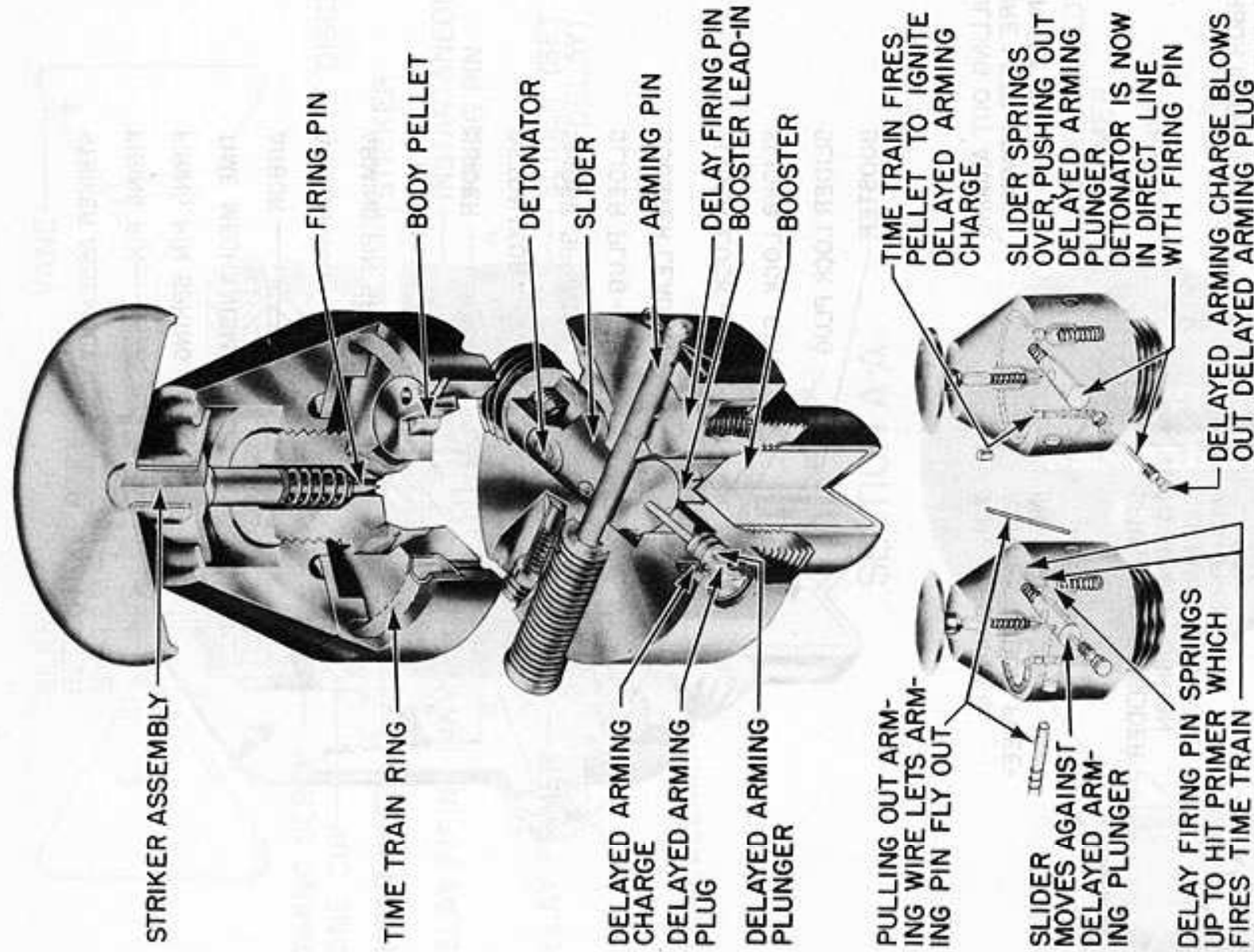


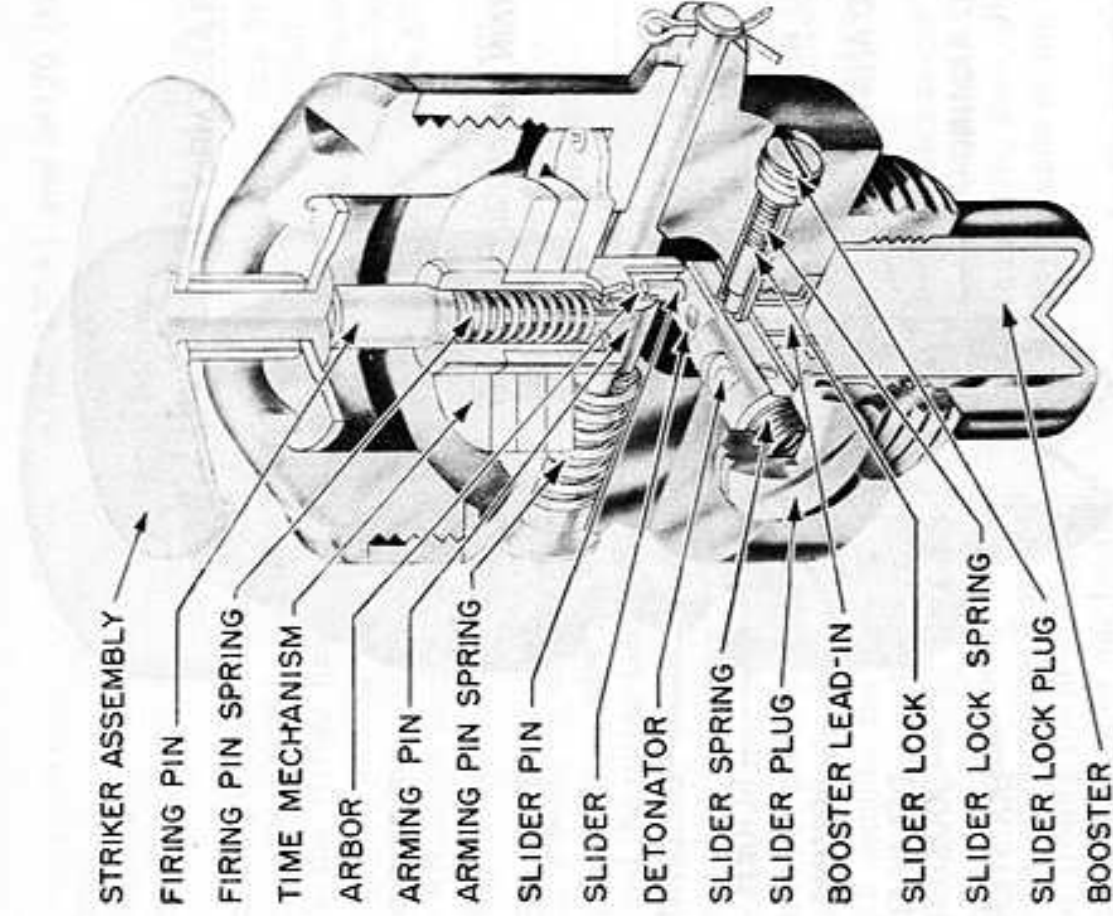
Figure 329. Nose Fuze AN-M104

Remarks: The M120 and AN-M120 did not have the clockwork regulator, and had an arming time of 2.5 (± 0.25) seconds; hence, attacks had to be made at higher levels. External appearance of all designs is the same.

This fuze is replacing the AN-M104 in the

parachute fragmentation bomb.

The M170 is designed to supplant the AN-M120A1 in all bombs receiving the AN-M120A1, except for the 120-pound Para.-Frag. Bomb M86, which will continue to use the older fuze.



PULLING OUT ARMING WIRE LETS ARMING PIN FLY OUT

ARBOR IS THEN FREE TO TURN, STARTING TIME MECHANISM

TIME MECHANISM ROTATES ARBOR, FREEING SLIDER PIN

SPRING MOVES SLIDER TO ARMED POSITION ALIGNING DETONATOR WITH FIRING PIN

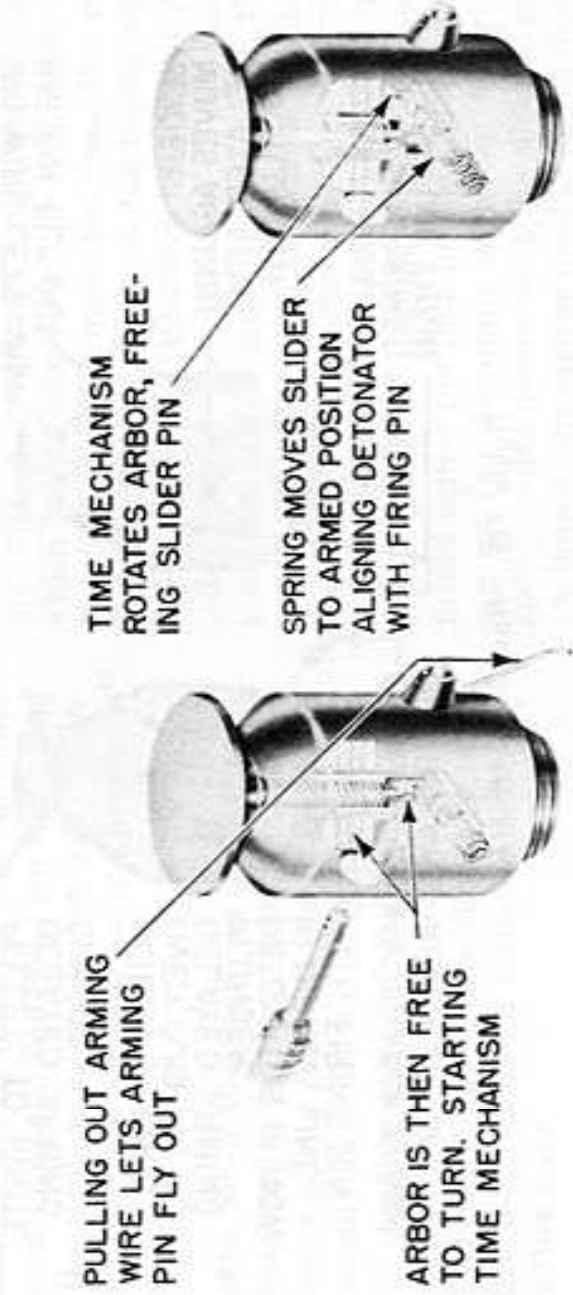
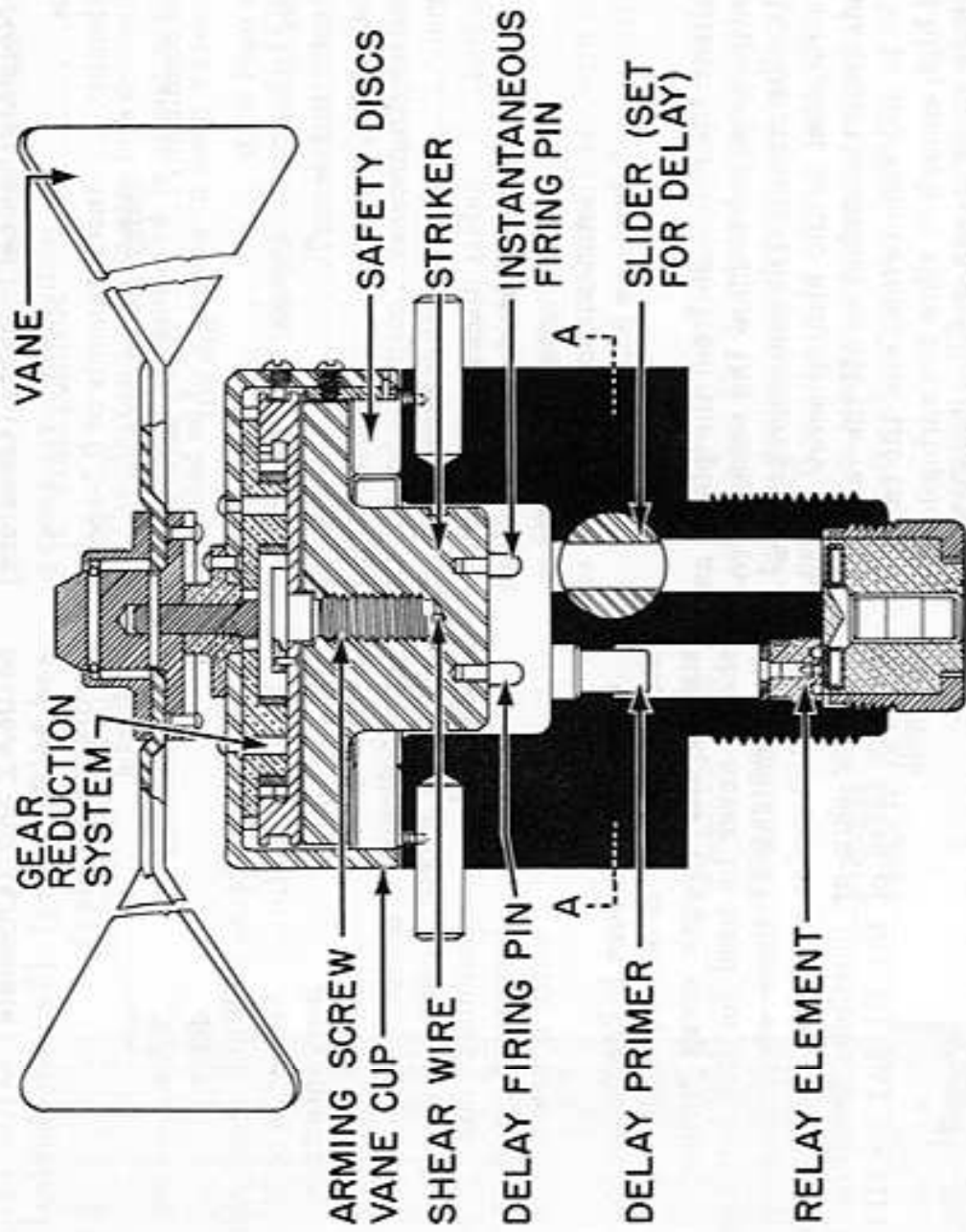


Figure 330. Nose Fuze AN-M120A1



SECTION A-A

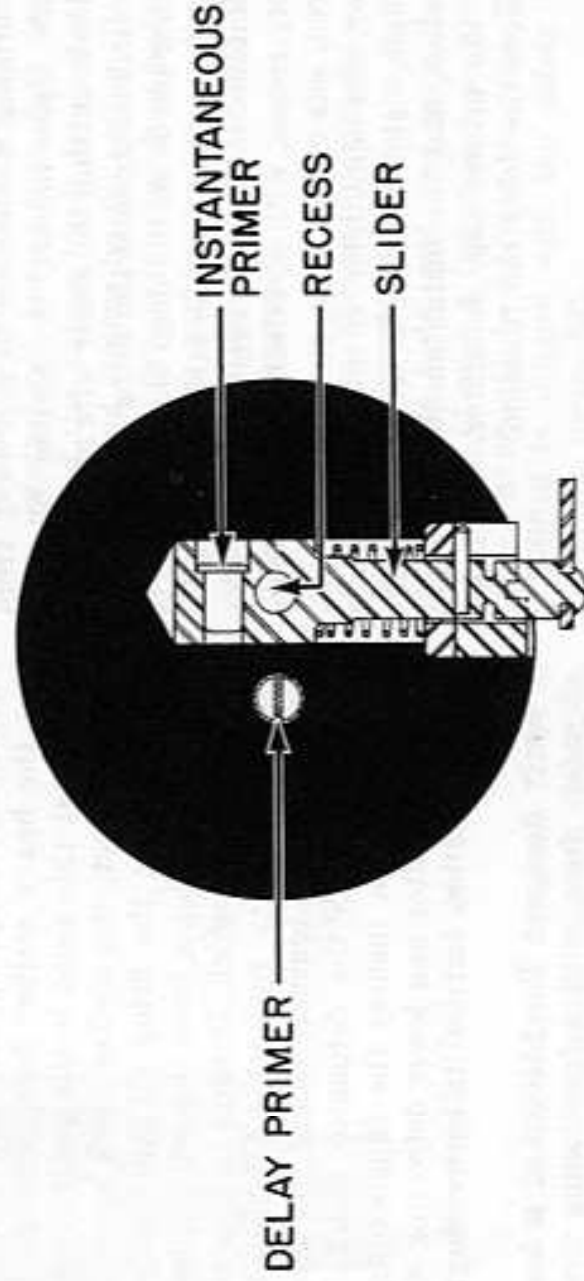


Figure 331. Nose Fuze M-105

pin would pop out, leaving the fuze in a dangerous armed condition.

The Bureau Of Ordnance has decreed that all these fuzes encountered in naval activities be disposed of by dumping in deep water.

M108 (Nose Mechanical Impact) (Obsolete)

- Bombs.....Target Identification M75
- FunctioningInstantaneous
- Armed condition..When safety block is gone
- Fuzes used with.....None
- Arming time.....Instantaneous
- Body diameter, inches.....1.3
- Over-all length, inches.....2.6
- Material...Brass fuze body with cadmium- or zinc-plated steel striker

General: This fuze is not threaded into the bomb nose, but is pushed down and held there by two spring-loaded retaining balls which protrude from the side of the fuze. The fuze requires an adapter ring having an annular groove to receive the retaining balls.

Operation: When the arming wire is withdrawn from the arming pin as the bomb is dropped, the arming pin is ejected from the fuze by the action of the arming-pin spring. The safety block holder then falls free of the fuze, and the safety block is ejected clear of the striker and striker by its spring. On impact, the striker is driven into the fuze body, cutting the shear wire and impinging on the primer, setting off the upper detonator and the lower detonator successively.

Early design: The early M108 did not have a safety block inserted between the striker head and the fuze body, and was quite dangerous, as a drop of only a few inches on a hard surface was enough to activate the fuze. The M108 Modified is shipped with the safety block as shown in figure 333.

Remarks: This fuze was designed for use in the 100-pound Incendiary Bomb M47. It is being replaced by the AN-M126A1 in all bombs except the Target Identification Bomb M75.

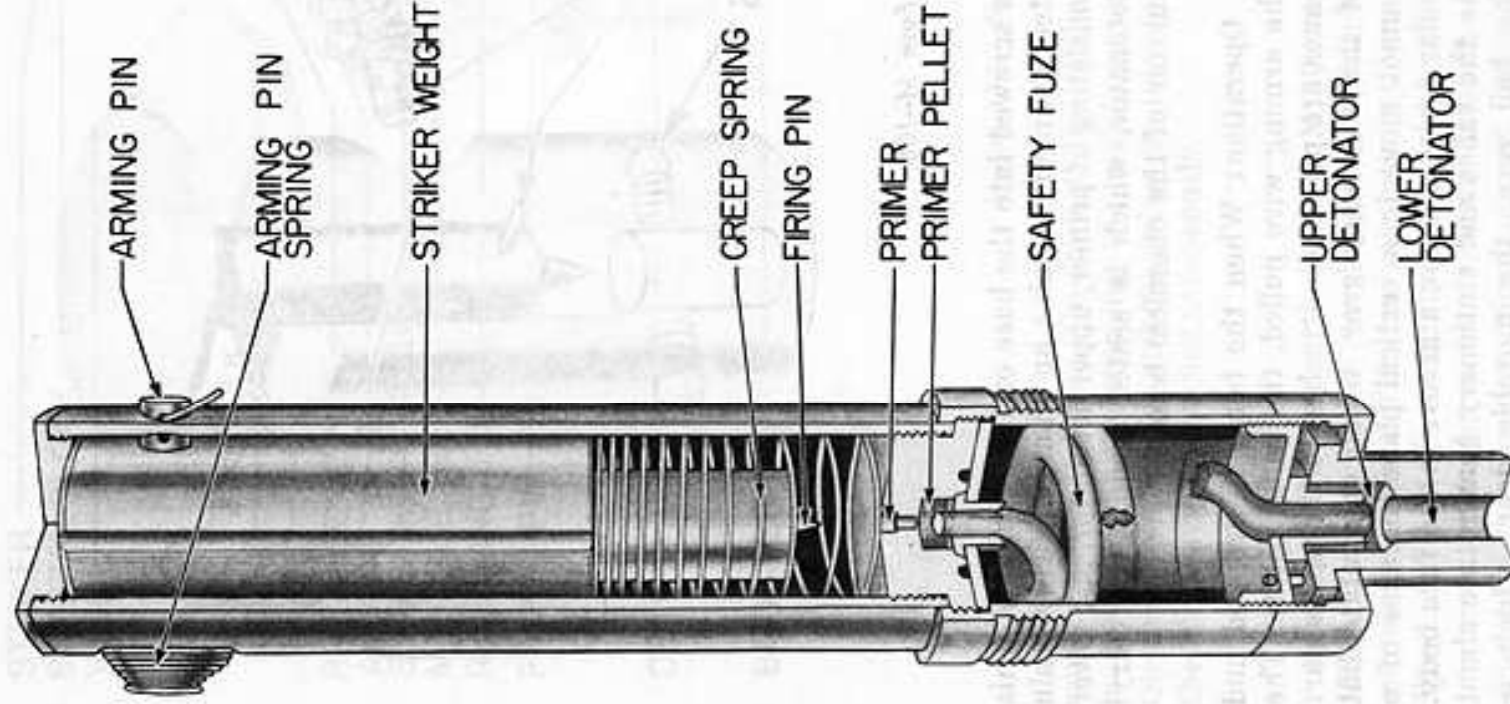


Figure 332. Tail Fuze M-106

Remarks: If any of these fuzes are found in storage or elsewhere in an unarmed condition, they should be carefully checked to ascertain that the wire clip preventing the arming pin from being ejected by its spring is in good condition and not rusted or weak. Should this clip or wire rust through and give way, the arming

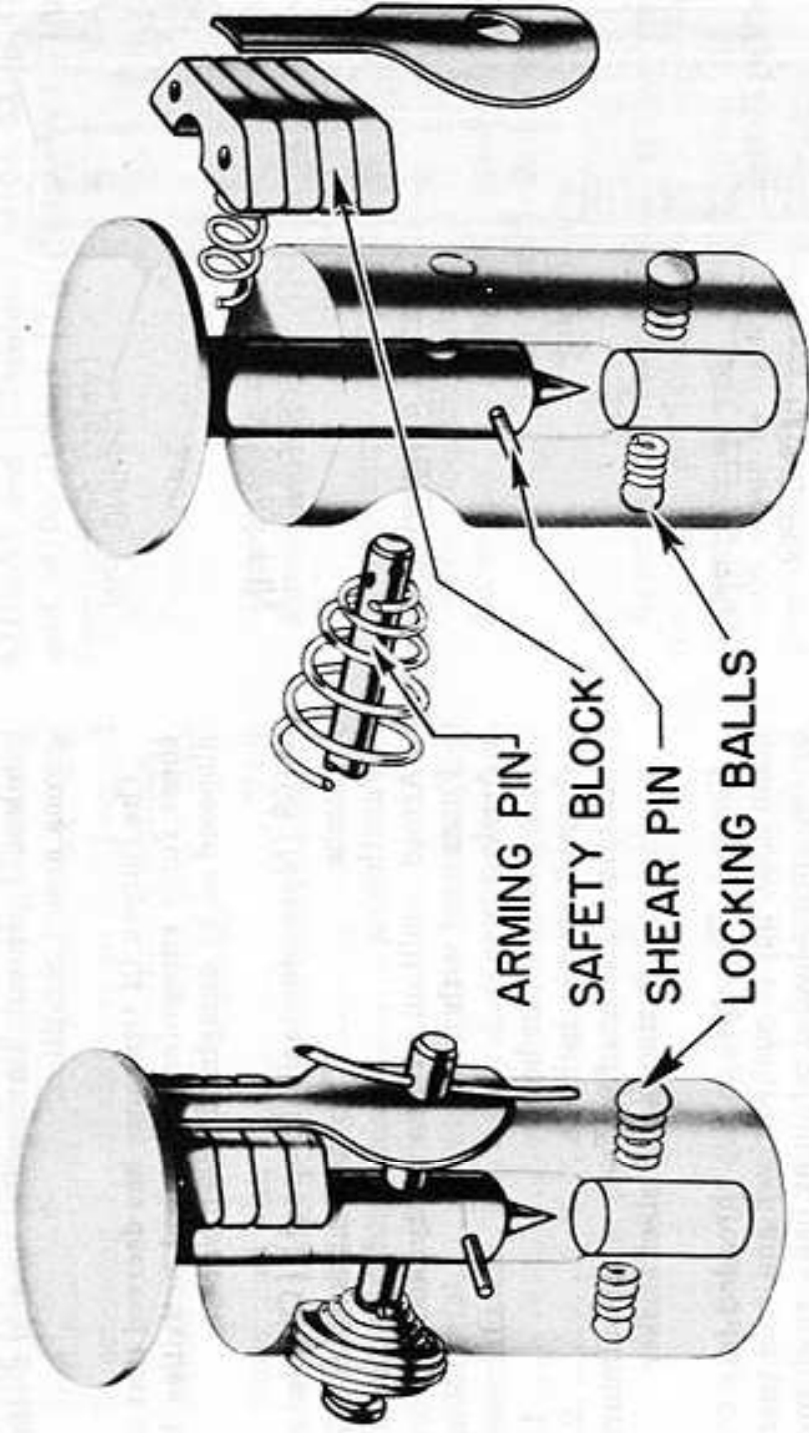


Figure 333. Nose Fuze M-108

AN-M110A1, AN-M126A1, M110 (Obsolete), and M126 (Obsolete) (Nose Mechanical Impact)

Bombs 20-lb. Frag. AN-M41A1
 115-lb. M70 Chemical
 AN-M126A1 100-lb. Chemical AN-M47A2

Functioning Instantaneous
 Armed condition When safety block is gone

Fuzes used with None

Arming time 260 vane revolutions

Vane span, inches 3.0

Body diameter, inches 1.7

Over-all length, inches. AN-M110A1—3-5/8

AN-M126A1—3-1/16

Material Aluminum body with steel safety blocks and striker

General: These two fuzes are identical in both construction and operation. The only difference is that the booster is eliminated from the AN-M126A1. Instead of the booster, a steel cylinder, having the same dimensions as the booster,

is screwed into the base of the fuze body. This steel cylinder contains an enlarged firing train consisting of primer, upper detonator, and lower detonator, which is seated against the tetryl burster of the chemical bombs.

Operation: When the bomb is dropped and the arming wire pulled, the vanes rotate. The vanes are positively attached to the upper part of the stationary gear, which can rotate but cannot move in a vertical plane, because of a collar which rides in a groove in the fuze body. As the vanes and stationary gear rotate about the ball race, the movable gear, which is threaded up inside the stationary gear, also rotates. Both gears mesh with an idler gear, and (since the movable gear has one more tooth than the stationary gear) for each rotation the movable gear lags one tooth, thus unscrewing downward from the stationary gear. As the sleeve of the movable gear moves down, it releases the safety block, allowing the block to be expelled by centrifugal force. The sleeve is moved down far enough in 260 rotations of the

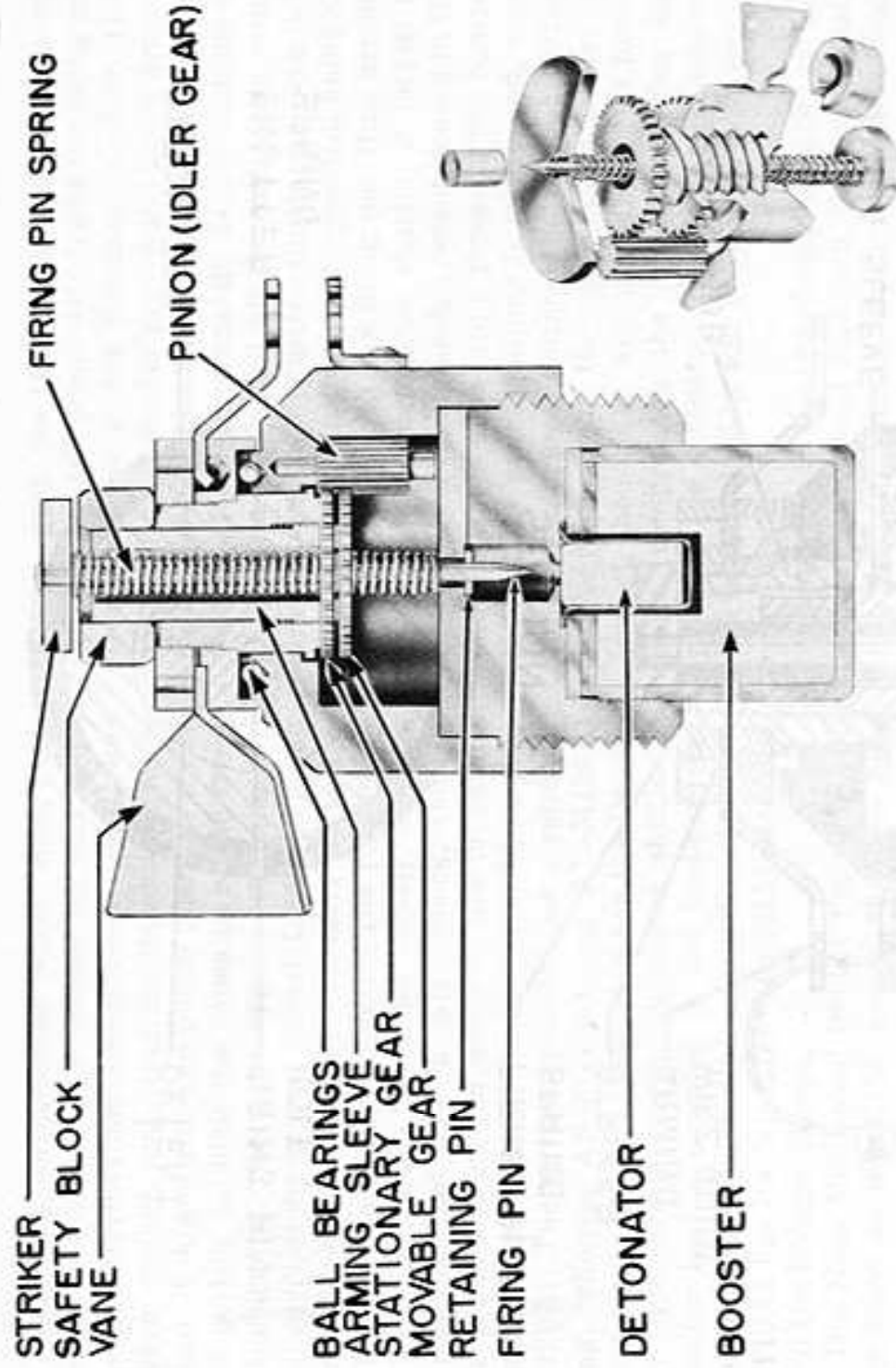


Figure 334. Nose Fuze AN-M110A1

vanes to arm the fuze. On impact, the striker is driven down, overcoming the resistance of the firing-pin spring; and the firing pin initiates the explosive action instantaneously.

Remarks: The original designs, M110 and M126, had more teeth on the gears, and consequently required 570 vane revolutions to arm. They also had three safety blocks, each 120° segments, and the arming sleeve fitted in a groove in the blocks in the unarmed position, preventing them from falling out. The original designs also had larger vanes.

If the striker head is flush with the fuze body, the fuze is in a fired condition. In such condition, the striker should not be pulled away from the fuze, as the firing pin is sensitive and withdrawal might create sufficient friction to ignite the primer.

M158 and M159 (Nose Mechanical Impact) Bombs

M158	Frag. AN-M41 and AN-M41A1 115-lb. Chemical M70
M159	100-lb. M47A2 (H) 100-lb. M47A2 (WP) 100-lb. Incend. AN-M47A2 100-lb. Incend. AN-M47A3

Functioning Instantaneous
Armed condition When striker protrudes
0.25 inches beyond vane
nut

Fuzes used with None
Arming data 440 vane revolutions;
1,000 feet of air travel

Vane span, inches	3.0
Body diameter, inches	1.752
Over-all length, inches	
M158	3.69
M159	3.22
Material	Aluminum body with steel safety blocks and striker

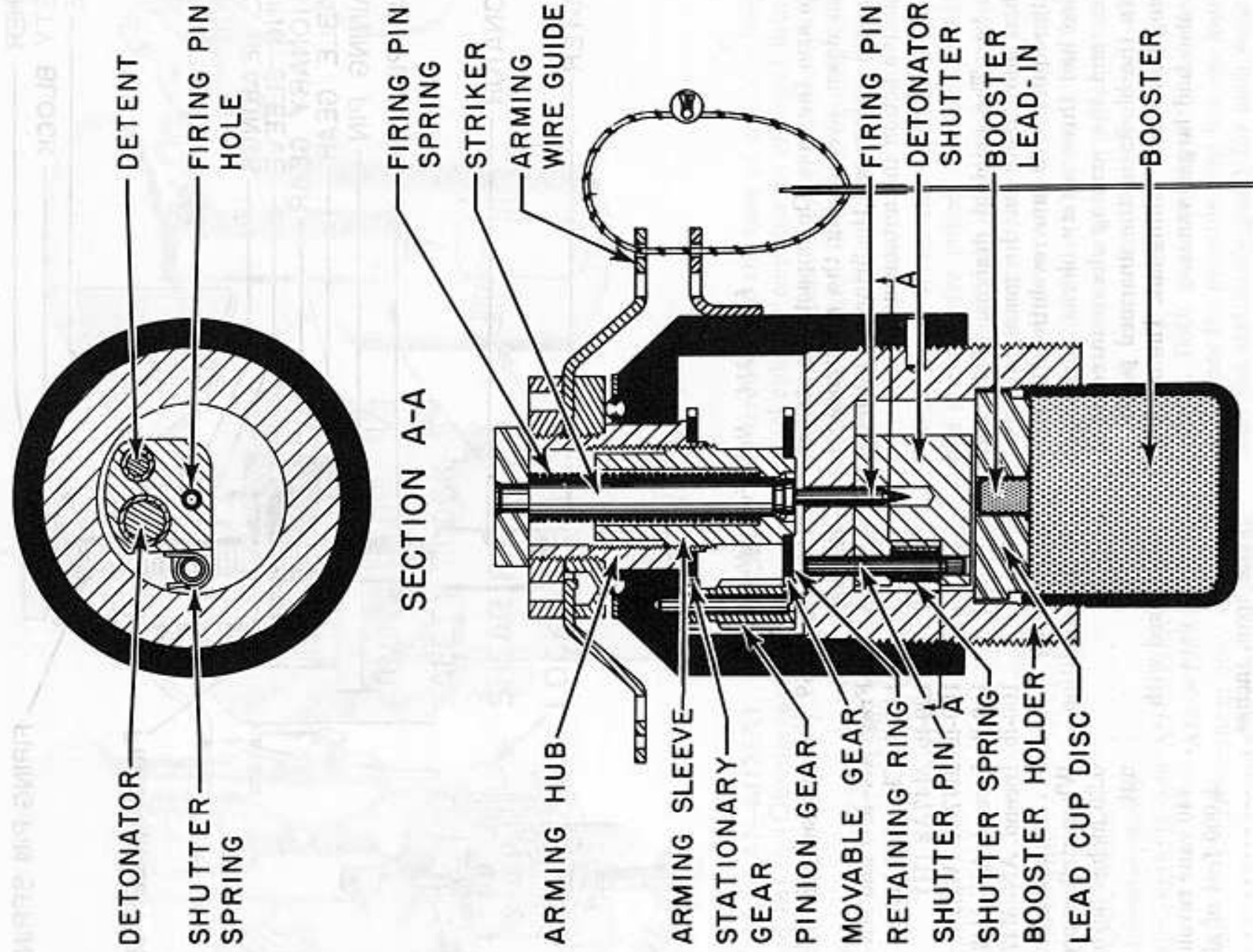


Figure 335. Nose Fuze M158

General: These fuzes are essentially the same as the Nose Mechanical Impact Fuzes AN-M110A1 and AN-M126A1, except that

they incorporate a spring-actuated detonator shutter which rotates into position after withdrawal of the firing pin, and is locked

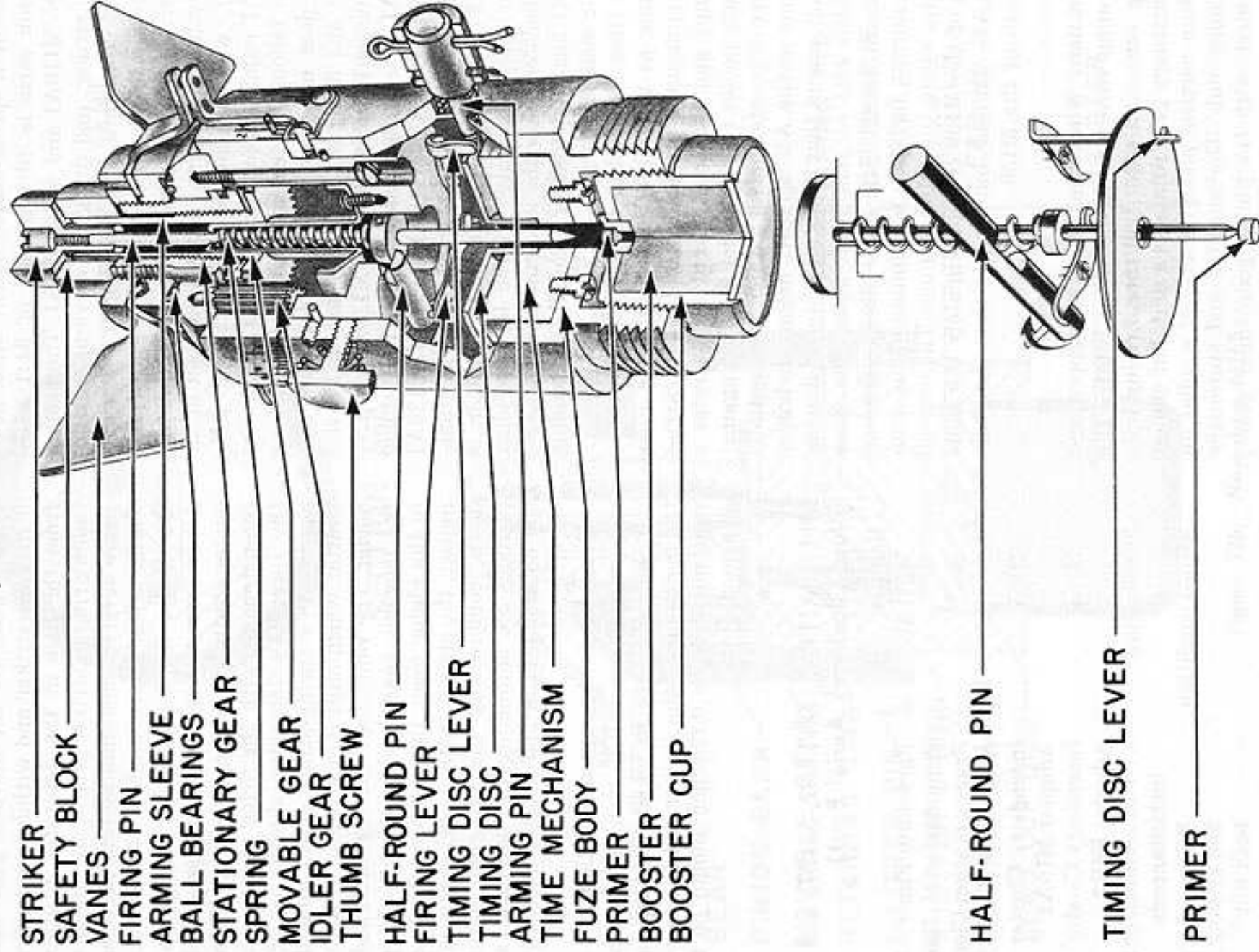


Figure 336. Aerial Burst Fuze M111A2

AN-M128, AN-M145, AN-M146, and AN-M147 (Nose Clockwork Aerial Burst)**Bombs**

- AN-M128 Cluster, Incendiary, AN-M17A1
 AN-M145 Cluster Adapter, Incendiary, E6R2
 AN-M146 Flares and photo flash; Butterfly
 Clusters M28 and M29
 Target Identification
 Bombs M89, M90, M98
 AN-M147 Target Identification

Bomb M84; Incendiary AN-M47A2, A3

Functioning Aerial burst, 5-92 seconds; or instantaneous

Armed condition When safety collar and arming pin are both out, and detonator is aligned under firing pin

Fuzes used with None for M128, M146 and M147; M152 or M153 used with M145

- Arming time** Approximately 260 vane revolutions
 Vane span, inches 3
 Body diameter, inches 1.93
 Over-all length, inches. AN-M128, AN-M145 —6.2; AN-M146—5.67; AN-M147—5.72.

Material Aluminum alloy body with zinc- or cadmium-plated steel striker

General: These fuzes modify the Nose Clockwork Aerial Burst Fuze M11A2 by the addition of a detonator slider held out of line until the fuze is partially armed by a crank-shaped arming stem. The four fuzes in the series are identical, except for the boosters employed; the AN-M128 has the booster of the M127 (tetryl); the AN-M145, that of the M138 (tetryl-clay pellet); the AN-M146, that of the M11A2 (black powder); and the AN-M147, the AN-M126A1 primer detonator, instead of a booster

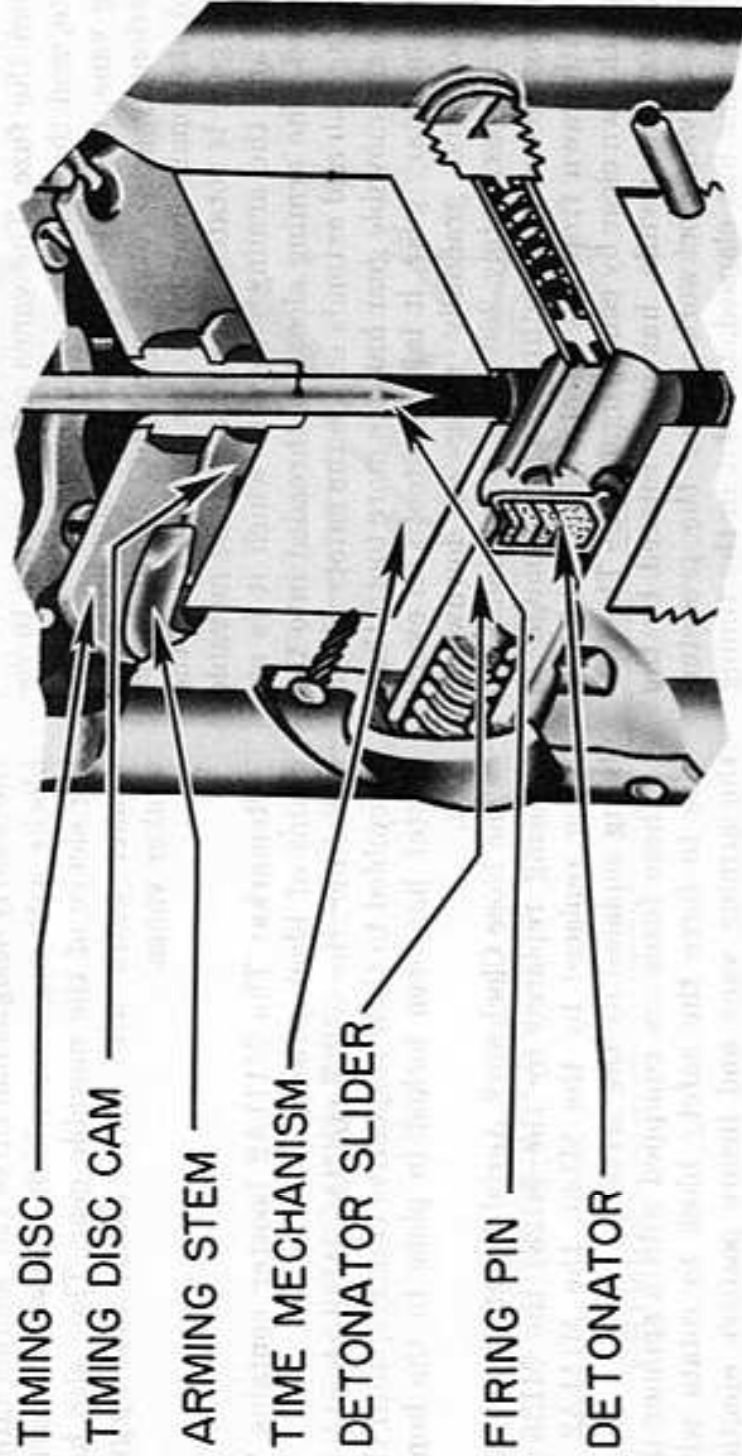


Figure 337. Aerial Burst Fuze AN-M128

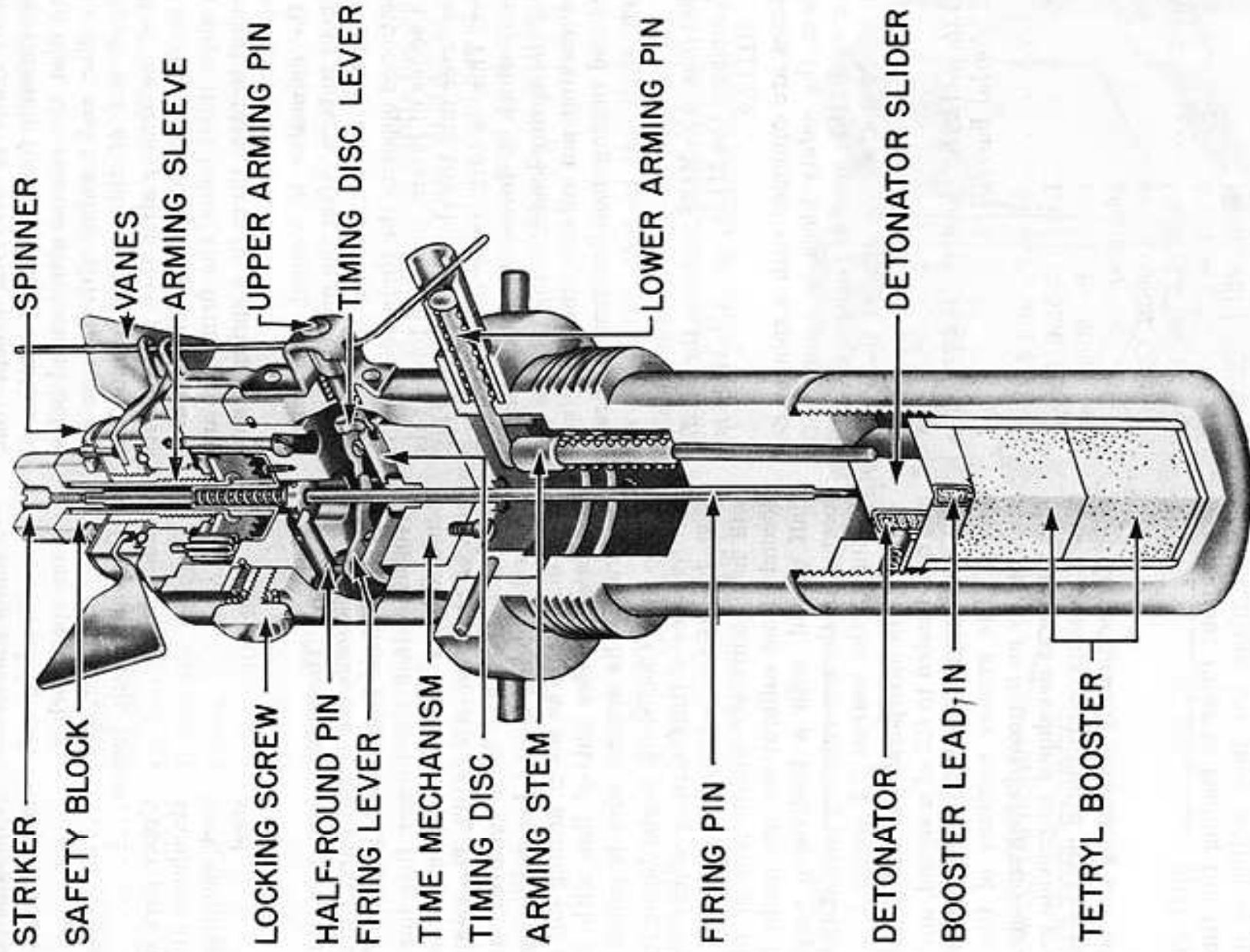


Figure 338. Aerial Burst Fuze M135A1

proximately 750 feet of air travel, the safety block is released from the fuze. After the set time has expired, the firing pin will be freed

and its spring will force it into the primer and detonate the bomb.

The bomb may detonate if it strikes a target

prior to complete functioning of the time mechanism, provided the arming wire has been withdrawn, in which case the firing pin would shear the rather delicate levers obstructing it.

Remarks: Effective use of these fuzes in G.P. bombs presupposes that a method can be devised for accurately measuring the altitude of release.

The round knurled locking screw has been replaced in current production with a wing-nut type, and replacement wing nuts are being sent to the field. This change was made so that ordnance personnel can get a good grip on the nut and eliminate the possibility that the setting might slip and cause either premature or late functioning.

The Nose Clockwork Aerial Burst Fuzes M135A1 and M136A1 are the same as the M135 and the M136, except that they incorporate a lower time limit of 10 seconds instead of 5 seconds. The minimum setting time was increased to prevent any possibility of damage to the plane by the bomb fragments. The M135A1 and

the M136A1 will replace the M135 and the M136 respectively, when available. It is recommended that a minimum setting of 10 seconds be used for all M135 and M136 fuzes now in the field.

M144 (Nose Clockwork Aerial Burst)

Bombs 250-lb. Target Identification M89, M90, M98
 Functioning 1.6 — 30.6 sec., or instantaneous if slider aligned

Armed condition When safety collar and arming pin are both out, and detonator is aligned under firing pin

Fuzes used with None
 Arming time 6 to 9 vane revolutions
 Vane span, inches 0.3
 Body diameter, inches 1.93
 Over-all length, inches 5.67
 Material Aluminum alloy body with zinc- or cadmium-plated steel striker

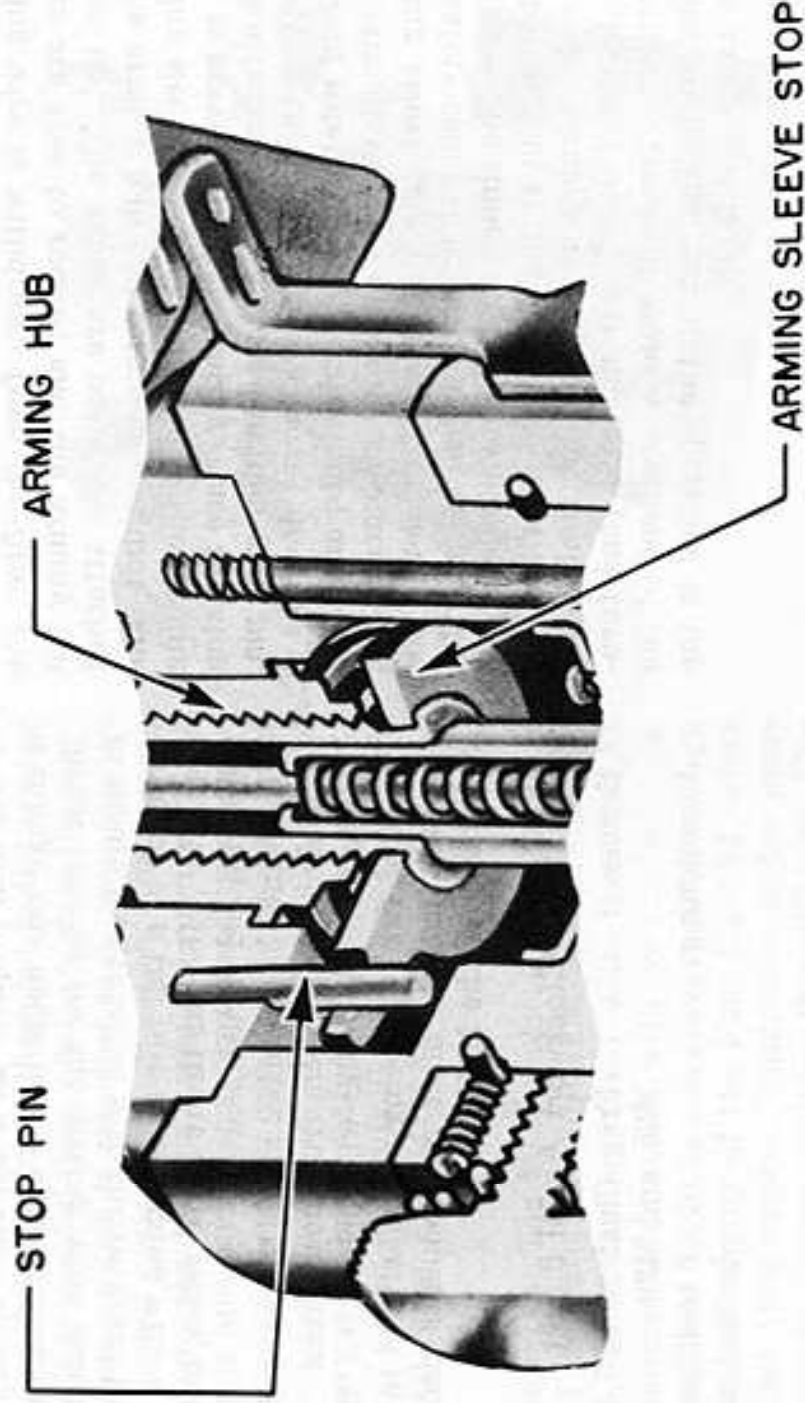


Figure 339. Aerial Burst Fuze M144

Armed condition. When safety block and arming pin are both out

Fuzes used with. None

Arming time. Approximately 6 to 9 vane revolutions

Vane span, inches. 3

Body diameter, inches. 1.63

Over-all length, inches. 4.5

Material. Aluminum alloy body with zinc- or cadmium-plated steel striker

General: The Nose Clockwork Aerial Burst Fuze M155 is the same as the M111A2, except that the gear-reduction system has been eliminated. A spinner device is incorporated to force the safety block to rotate with the arming vane. Elimination of the gear-reduction system has been accomplished by removing the stationary gear from the arming hub, and pinning the pinion gear in place so that it cannot rotate.

Operation: The vanes are positively attached to the arming hub and rotate as one unit. The arming sleeve, which is threaded to the arming hub, is prevented from rotating, since the movable gear which is attached to it, meshes with the bound pinion gear. However, the arming sleeve moves down as a result of rotation of the arming hub, and after approximately six to nine vane revolutions the arming sleeve has withdrawn far enough for the safety block to be thrown clear by centrifugal force. The remainder of the operation is like the Nose Clockwork Aerial Burst Fuze M111A2.

Remarks: The M155 replaces the M111A2 in the Fragmentation Clusters M26, M27, M28, and M29, since clusters fuzed with the M111A2 sometimes failed to open with low fuze settings. The cluster flight is not always stable enough to permit arming of the Fuze M111A2 before the set time expires. Elimination of the gear-reduction system obviates this difficulty. The spinner insures ejection of the safety block at completion of arming.

T77 (Nose Clockwork Aerial Burst)

General: The T77 is an M111A2 fuze body with anemometer vanes, instead of the propeller vanes. This development was produced to ensure proper functioning of this type of fuze when used in the Fragmentation Bomb Cluster M26, or earlier model of the cluster.

The cluster may tumble in flight, preventing ordinary vanes from rotating sufficiently in the proper direction to arm the M111A2; hence the anemometer vanes were substituted.

Description: Modification kits are issued to provide parts for converting the M111A2 into the T77 when the fuze is to be used in the fragmentation cluster. The kit contains the anemometer vane, vane nut, safety block, and fuze fixture. This fuze fixture serves as a support for the fuze during the process of modification.

Remarks: No such modification is necessary on the M155, because it arms in six to nine turns of the vanes.



Figure 340. Aerial Burst Fuze T77

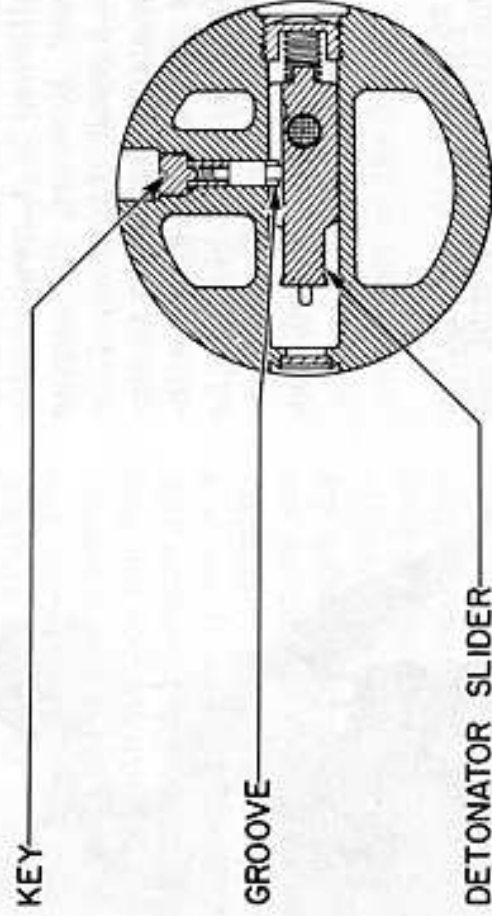
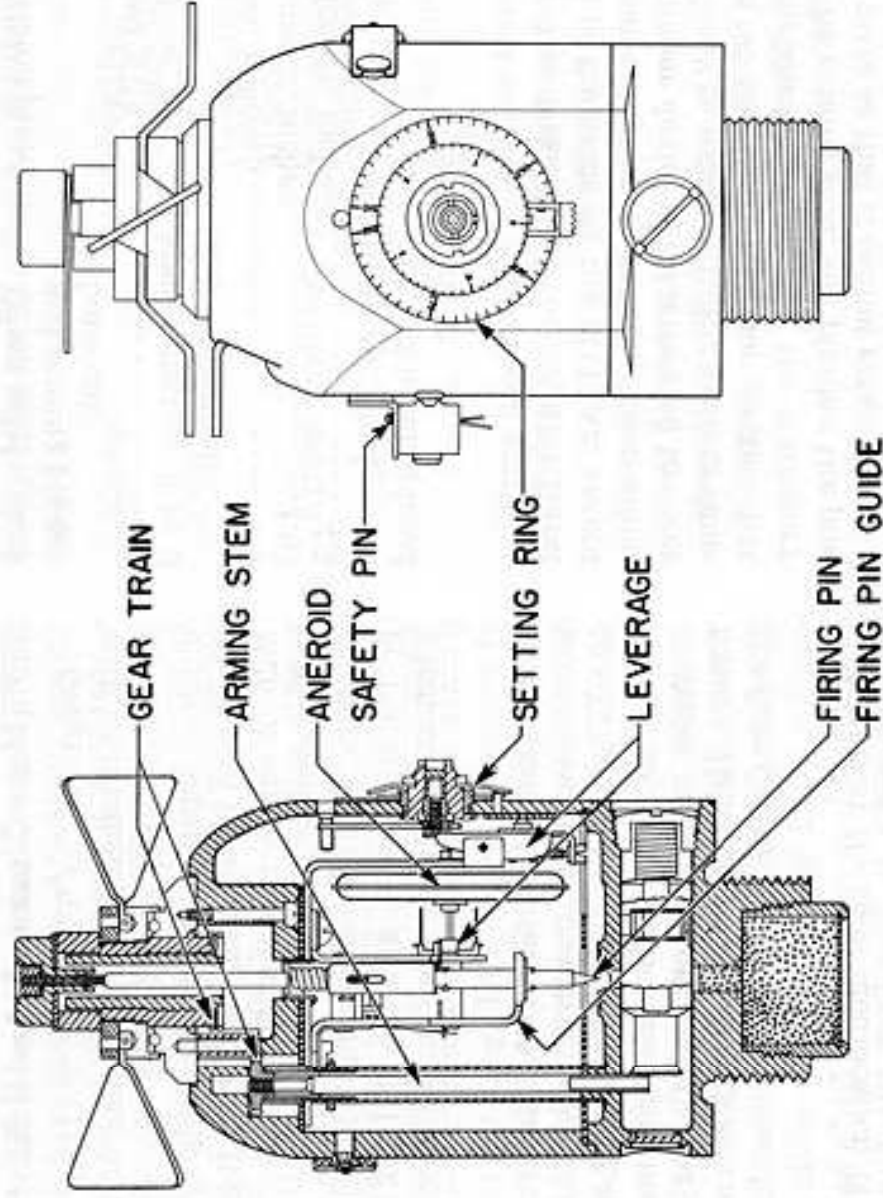


Figure 341. T27E4 Nose Barometric Fuze

T27E4 (Nose Barometric)

Bombs.....Not determined
 Functioning.....Preset to fire at certain pressure (altitude)

Armed condition.....Safety pin out;
 vane rotation
 Diameter, inches.....2.6 (approx.)
 Vane span, inches.....3.2
 Over-all length, inches.....6.0

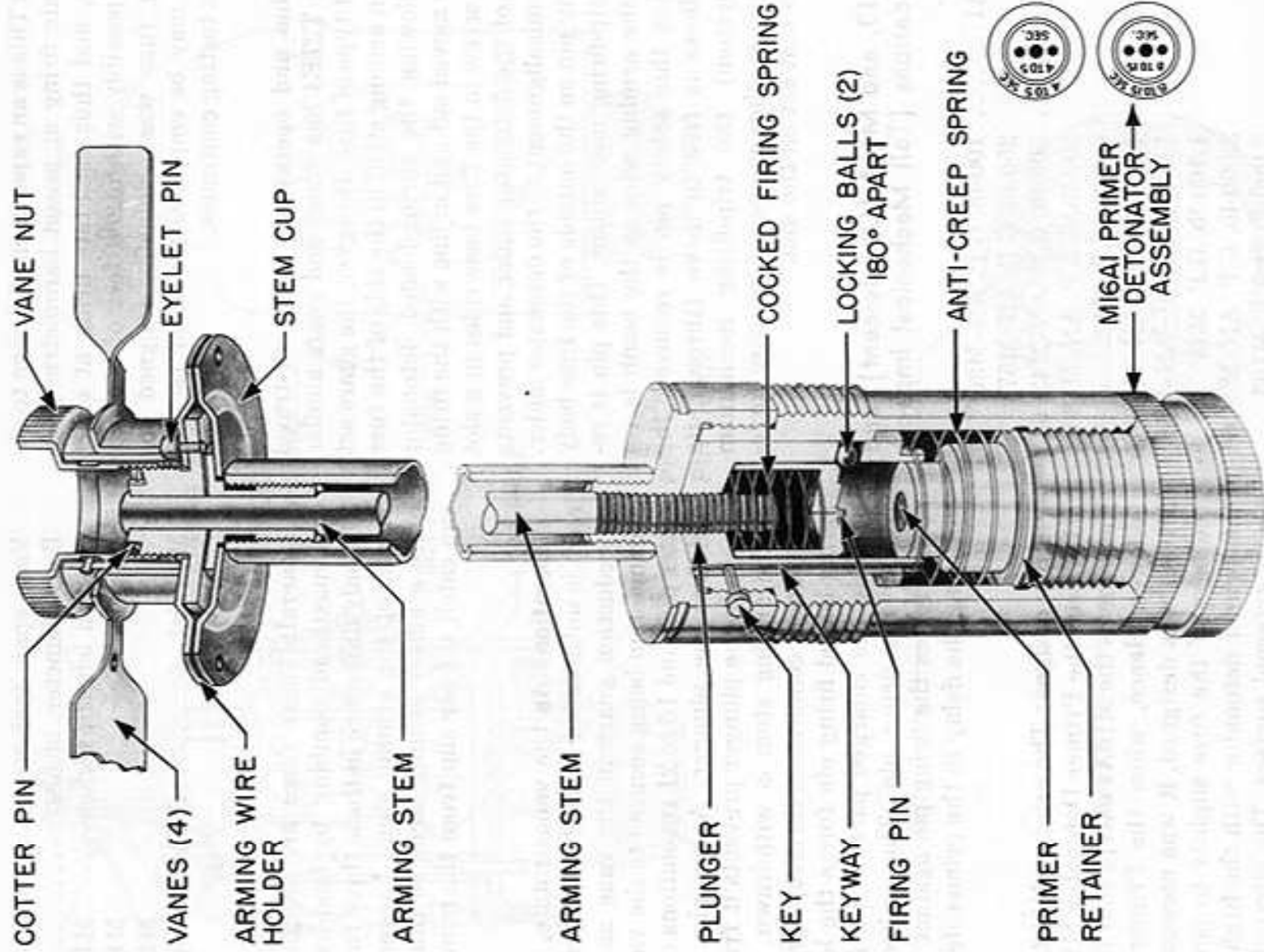


Figure 342. Tail Fuze M112A1

Remarks: This fuze will function on an impact angle of 3°, and gives positive action because of its cocked firing pin. This fuze is unsafe for carrier landings. Delay of 4 to 5 seconds should be used against sea targets, and delay of 8 to 15 seconds against land targets.

Never turn the vanes counterclockwise to render the fuze safe, as the arming stem may depress the plunger instead of engaging it.

These fuzes may have a groove around the top of the fuze body, or the top may be straight

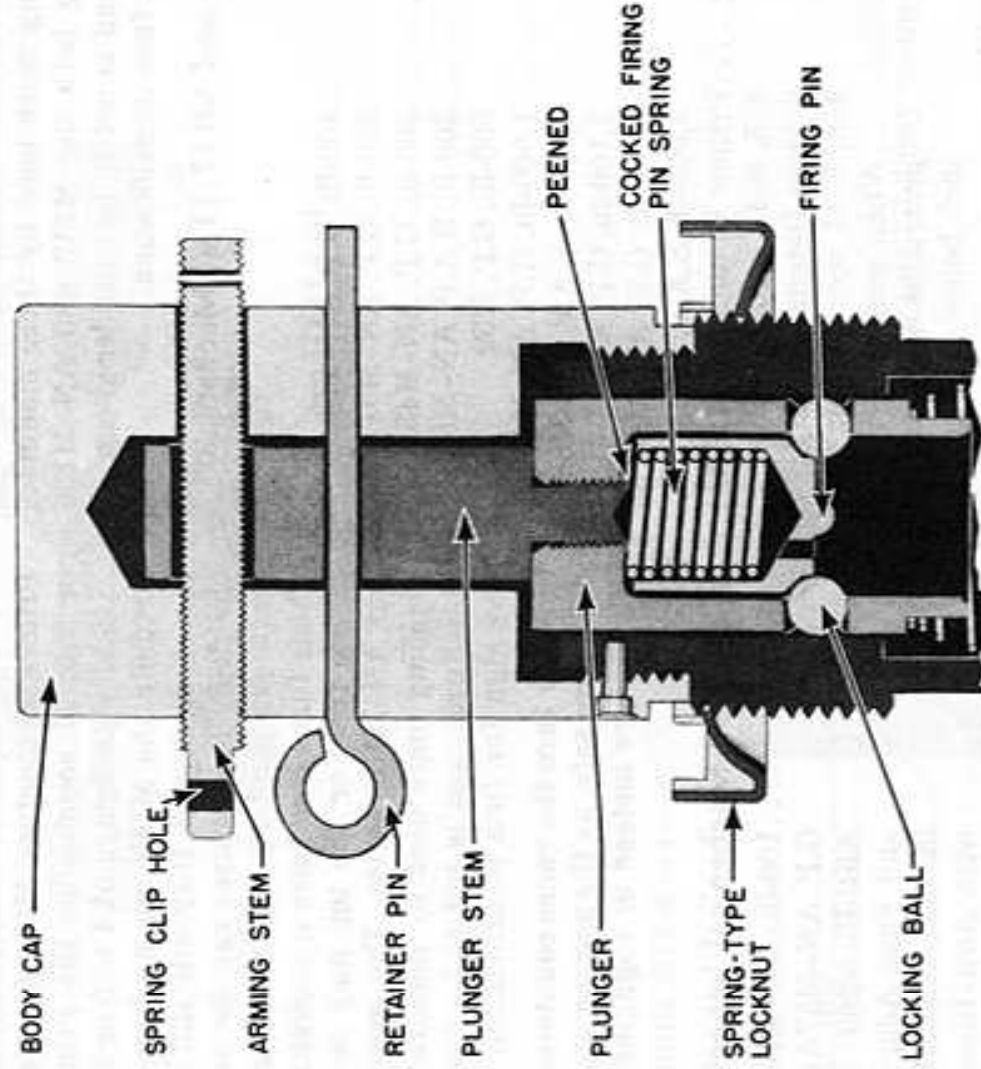


Figure 343. Tail Fuze M151

incorporated. In addition, the M151 uses an anemometer-type vane. The anemometer-vane arming shaft is attached to the arming stem by a spring clip.

Operation: Upon withdrawal of the arming wire from the arming shaft, the anemometer vane is free to rotate, and causes the arming stem to unscrew from the fuze. After approximately 12 vane revolutions, the arming stem has withdrawn completely from the plunger stem, and the fuze is armed. On impact, the plunger compresses the anti-creep spring and the spring-loaded firing pin forces the locking balls out into the enlarged part of the fuze cavity, freeing the firing pin. The cocked firing-pin spring forces the firing pin against the primer, initiating the delay in the primer detonator.

Remarks: The length of the anemometer-vane

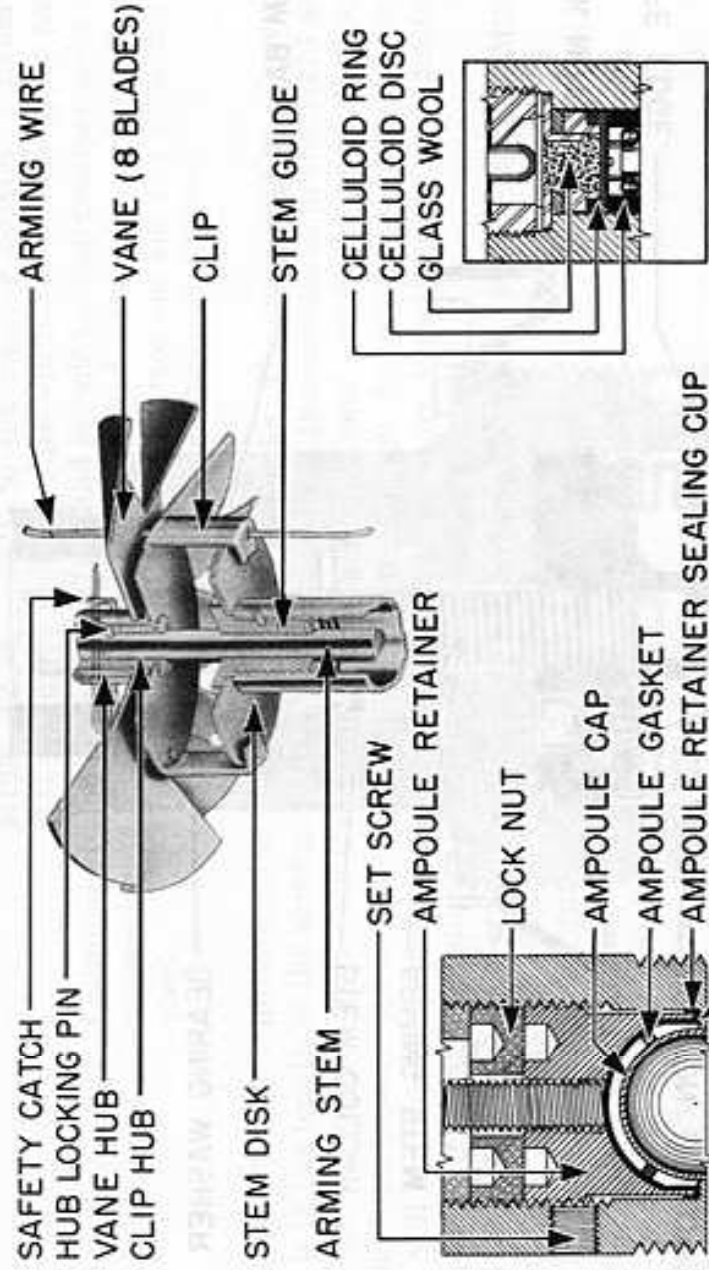
arming shaft varies in length, depending on the fuze adapter used, and is considered a part of the fuze adapter. The Adapter M202 uses a 4-inch arming shaft, and the M200 uses a 7 1/8-inch arming shaft.

Depending on which M16A1 primer detonator is used, the fuze will have a 4 to 5 or 8 to 15 second delay.

M123, M124, and M125 (Obsolescent) (Tail Chemical Time, Anti-Withdrawal)

Bombs

M123	100-lb. G.P. AN-M30A1
	250-lb. G.P. AN-M57A1
M124	500-lb. G.P. AN-M64A1
	500-lb. S.A.P. AN-M58A2
M125	1,000-lb. G.P. AN-M65A1
	2,000-lb. G.P. AN-M66A1, 66A2
	1,000-lb. S.A.P. AN-M59A1
	2,000-lb. S.A.P. M103



**RECENT
MODIFICATION**

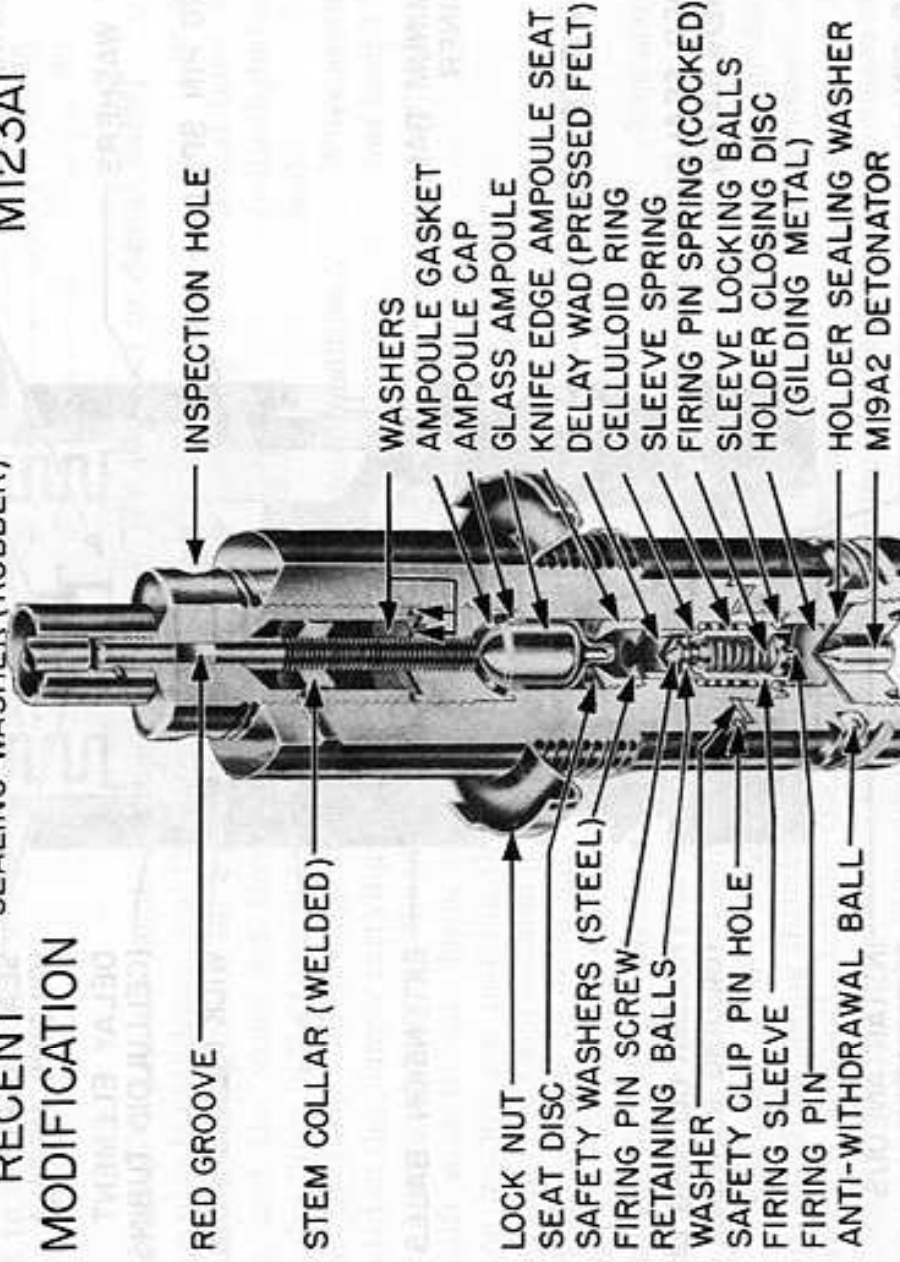


Figure 344. Tail Time Fuze M123A1

Arming time63 vane revolutions (min.)
84 vane revolutions (max.)

Vane span, inches5
Body diameter, inches1.5

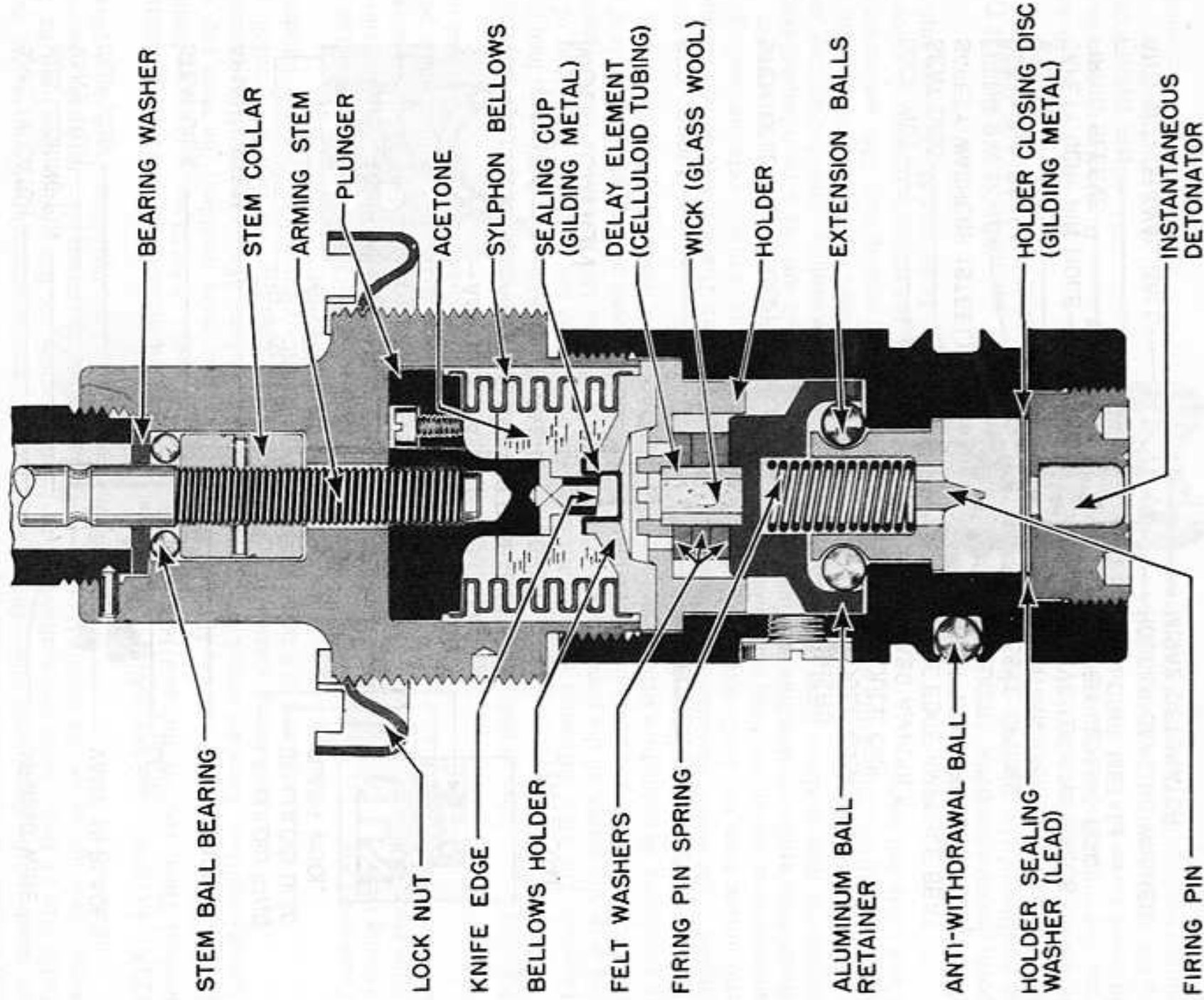
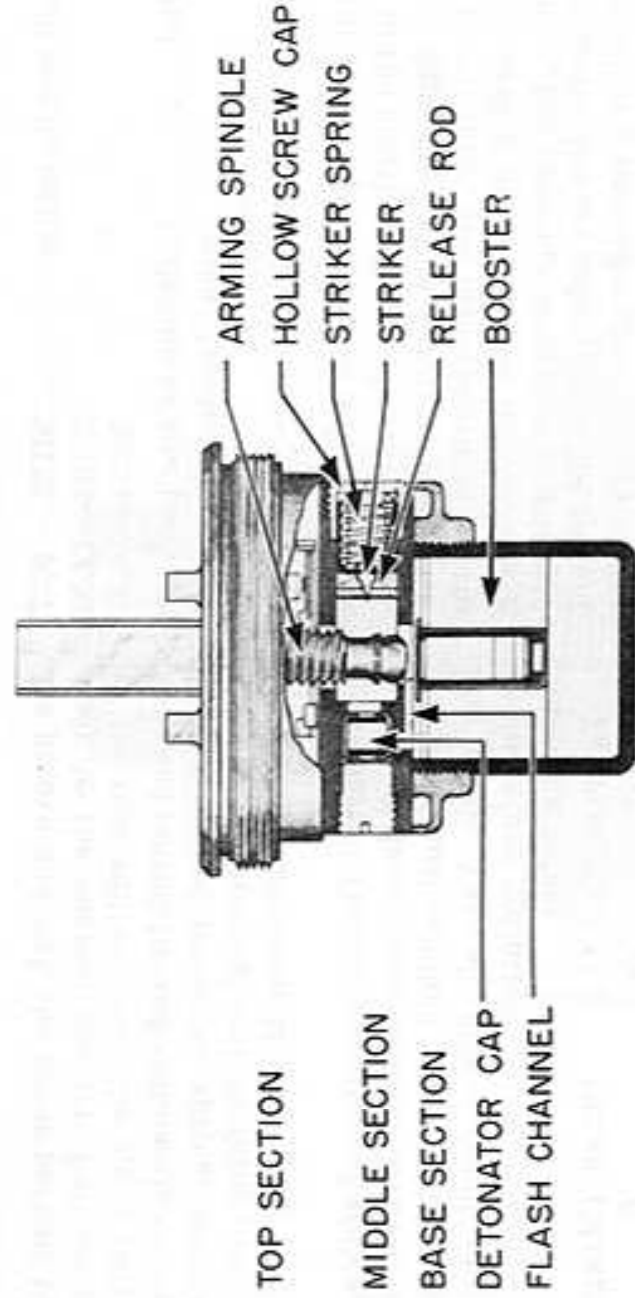
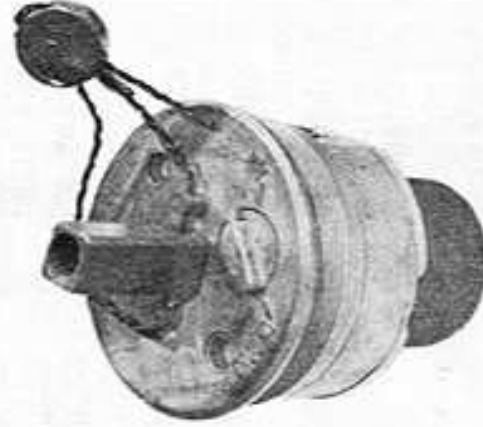


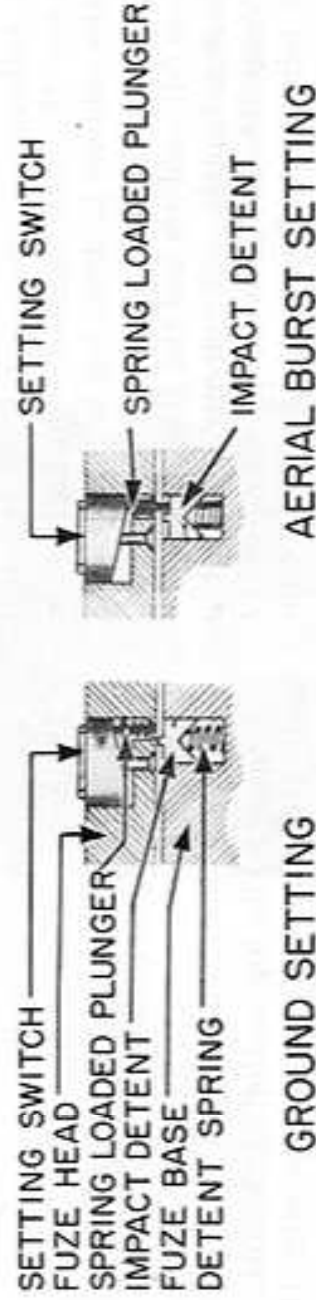
Figure 345. Tail Time Fuze M132



CROSS SECTION



EXTERIOR



SETTING SWITCH

Figure 346. Impact or Aerial Burst Fuze M129

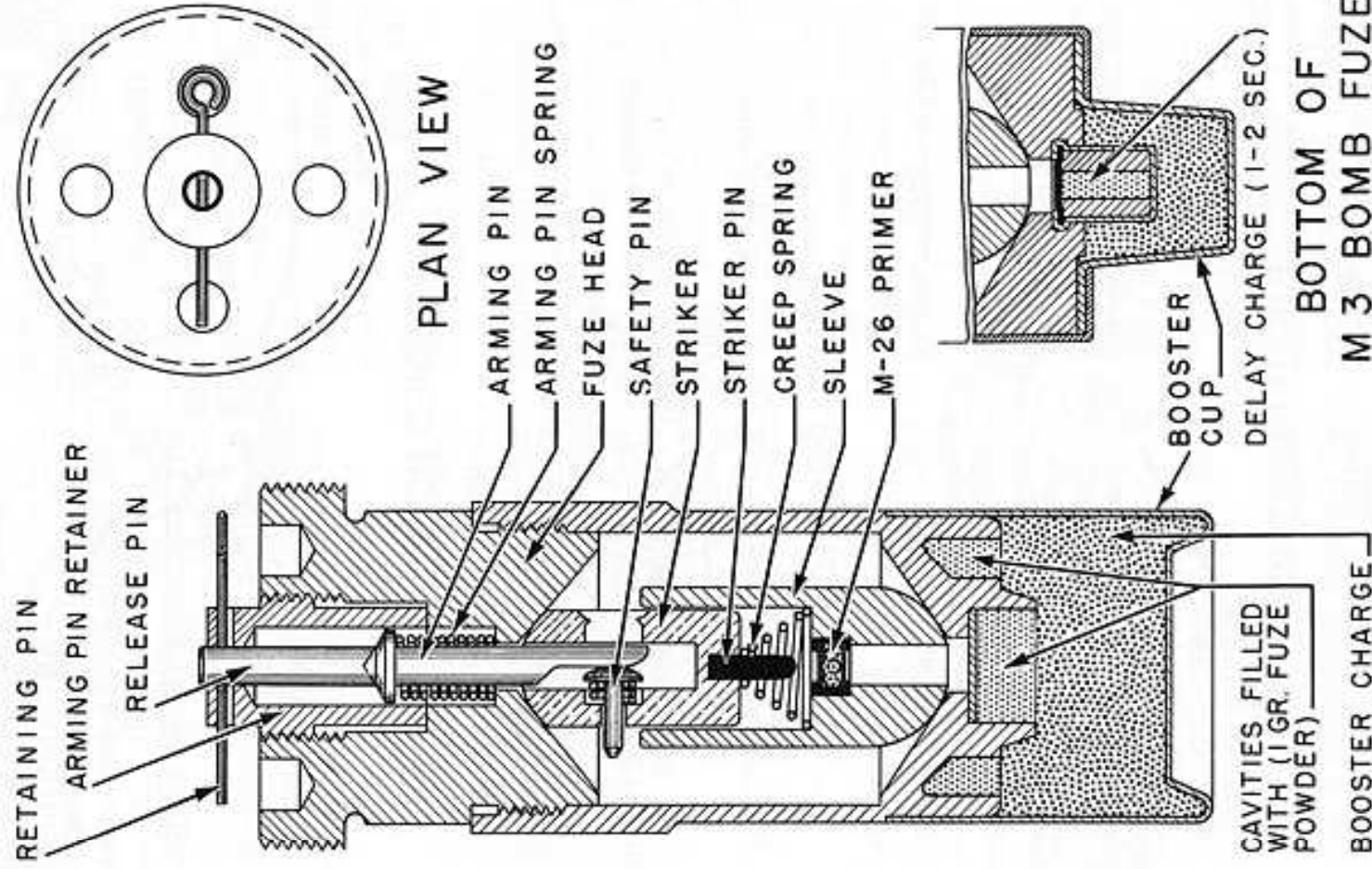


Figure 350. All-Ways Action Nose Fuze M142

experimental production of the M74; however, it was found that the 1 to 2 second delay incorporated in this fuze was unnecessary, as the inherent delay was sufficient. Therefore, it was redesigned and designated the Nose Fuze M142.

The Nose Fuze M142 is an all-ways action fuze which screws into the nose of the bomb.

This fuze consists essentially of a steel head and arming-pin retainer, steel striker pin and safety pin; zinc alloy die casting striker, sleeve, fuze casing and arming pin; Percussion Primer M26, cavities in the end of the case filled with one gram of fuze powder, and a zinc booster cup filled with three grams of propellant powder.

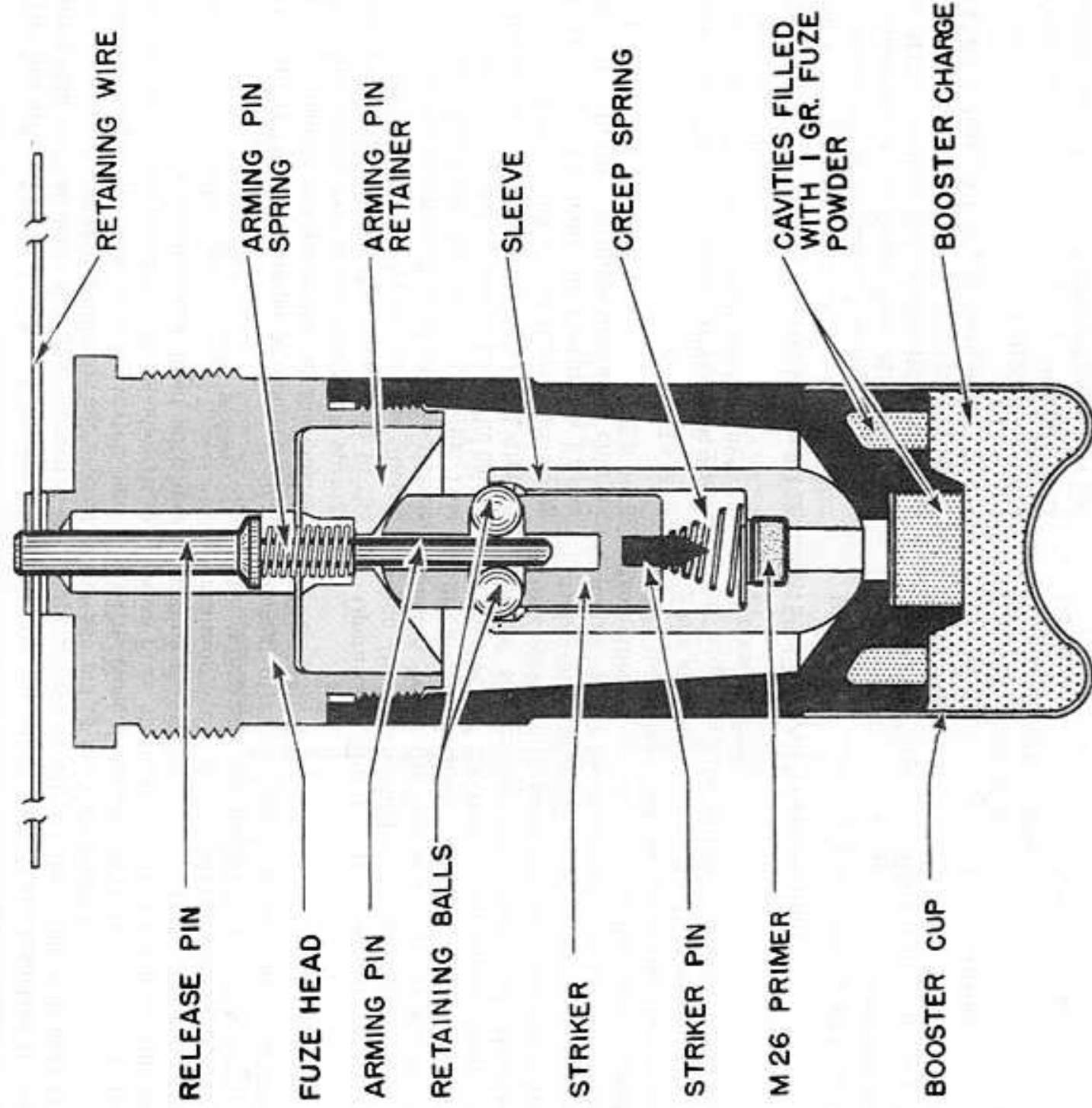


Figure 351. All-Ways Action Nose Fuze M142A1

spring against the head of the fuze, depressing the arming pin. When the bombs are released, the arming pin, together with the arming band, is forced out by the arming-pin spring, permitting the safety pin to enter the cavity in the

striker. Impact forces the striker pin and sleeve together, causing the striker pin to pierce the Percussion Primer M26, which, in turn, ignites the starter mixture, and subsequently the HC smoke mixture.

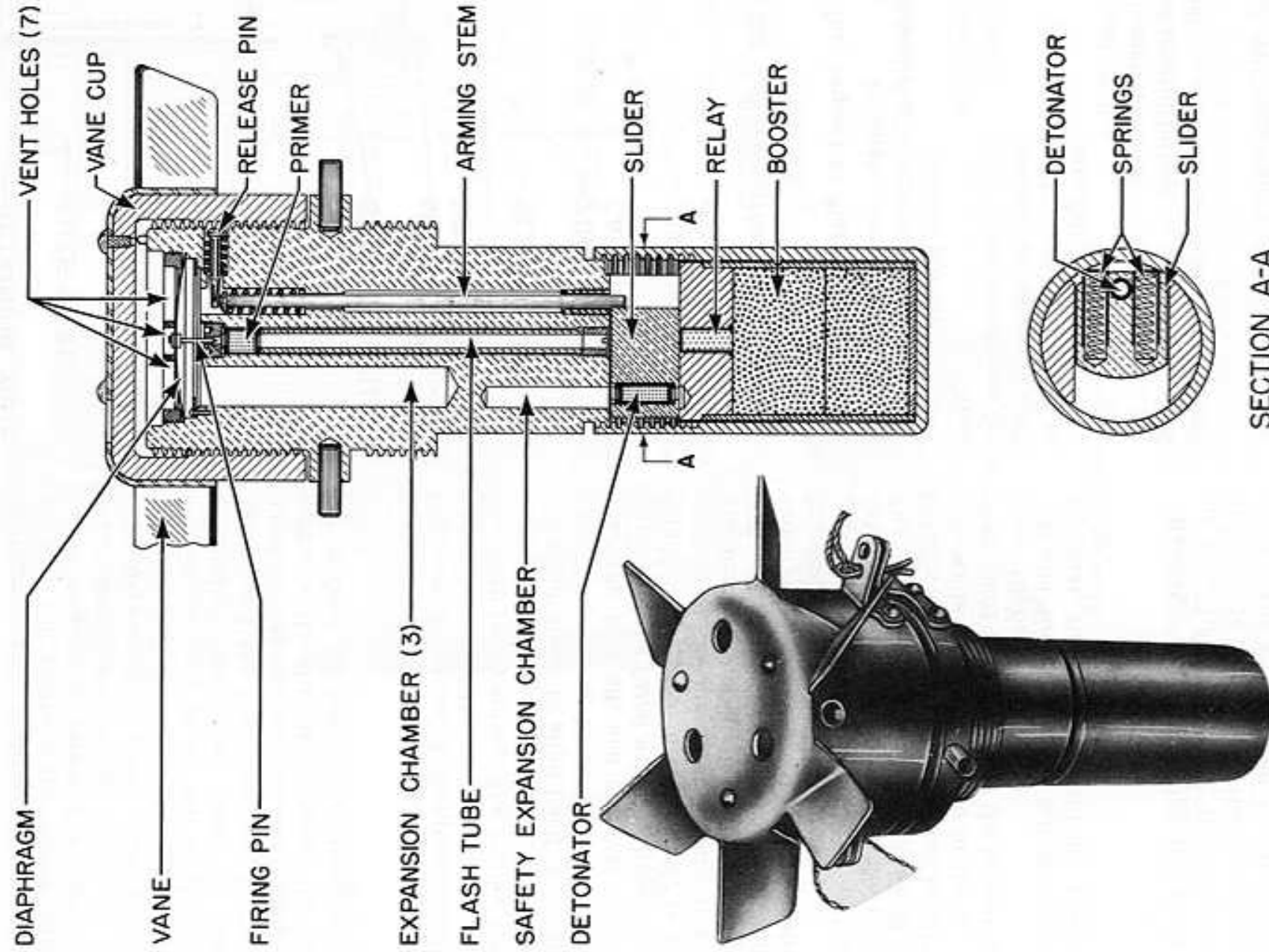


Figure 353. Impact or Blast Pressure Fuze M149

might prevent complete inward movement of the diaphragm.

This fuze is detonator safe. In the unarmed position, the detonator is lined up with the

SECTION A-A

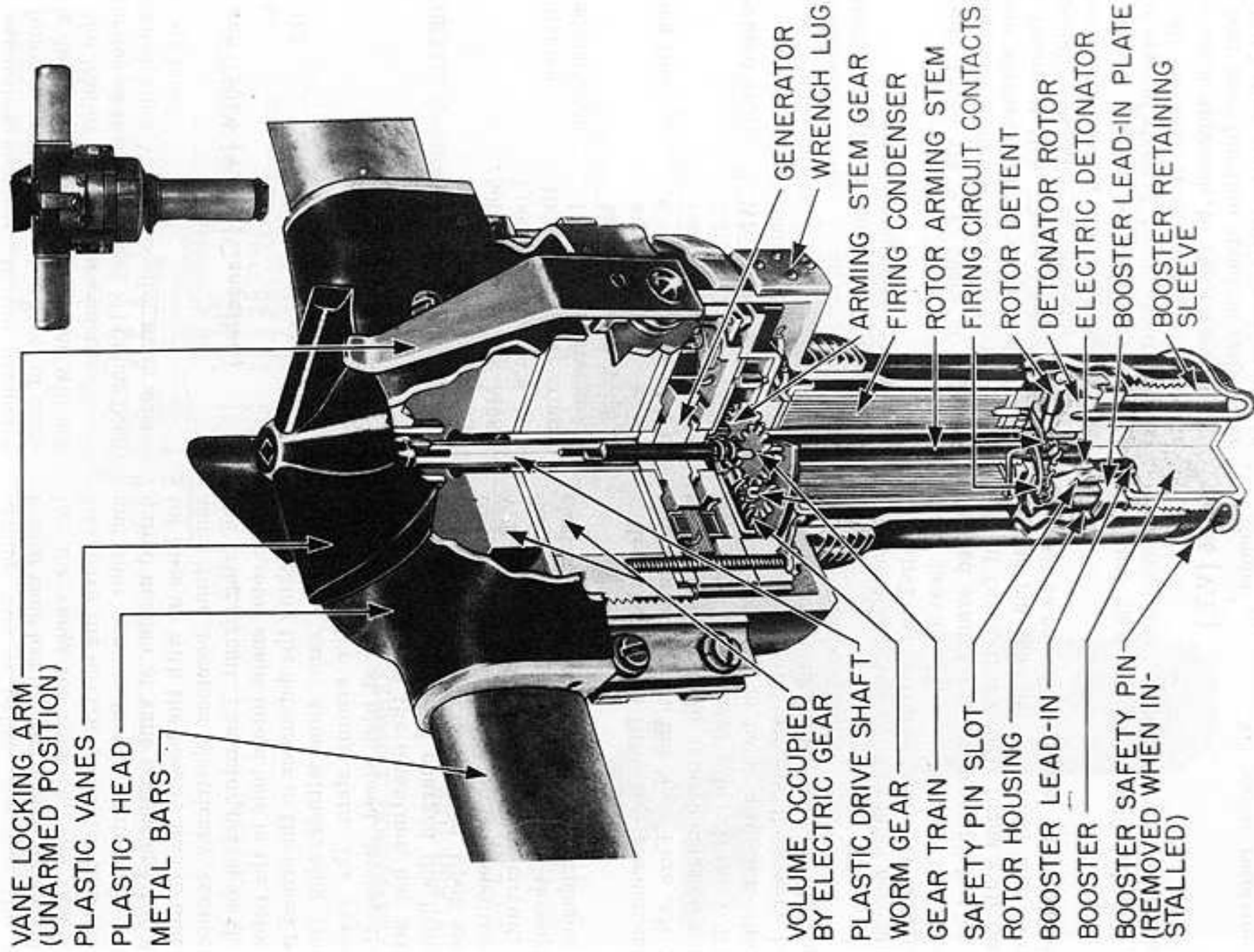


Figure 354. V.T. Fuze M166

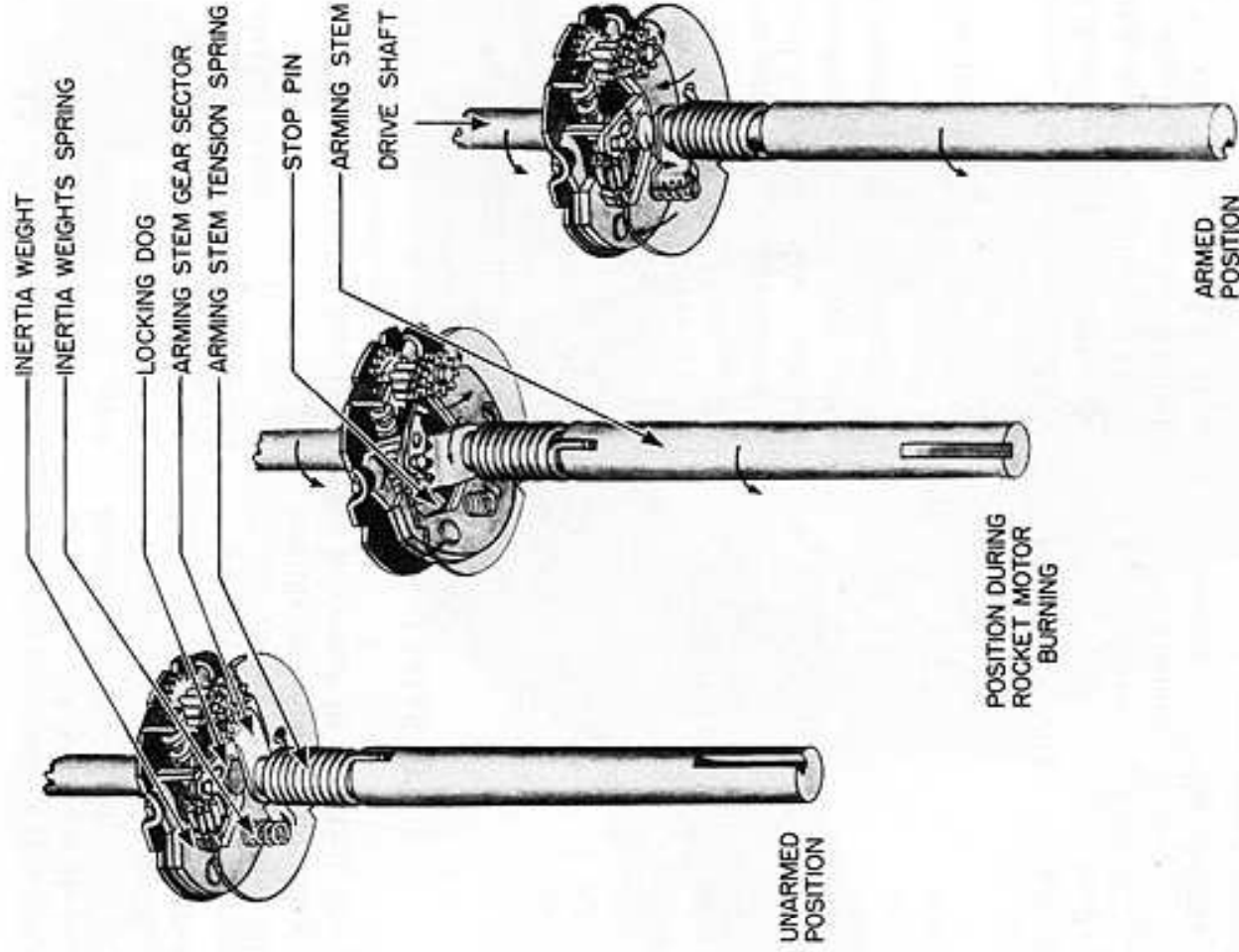


Figure 355. V.T. Fuze M168—Arming Device

bombing. S.A.T. can be extended by use of the T82 (V.T.) (Cancelled) Air-Travel Arming Delay ML.

Operation: Like the T50 series.

Remarks: These fuzes are not to be used for horizontal bomb runs, because the minimum S.A.T. is such that the fuzes may be completely armed when only 250 feet below the carrying aircraft, and early bursts in this position would cause damage to the plane.

T82 (V.T.) (Cancelled)

Bombs.....	All bombs receiving Fuze AN-M103A1
Functioning.....	40-60 feet above ground
Arming time.....	3,600 ft. min. S.A.T.
Fuze used with.....	AN-M100A2 series normally; M160 series
Over-all length, inches.....	8.4
Body diameter, inches.....	10.0 (across bars)
Material.....	Steel body, plastic top, two aluminum bars athwartships

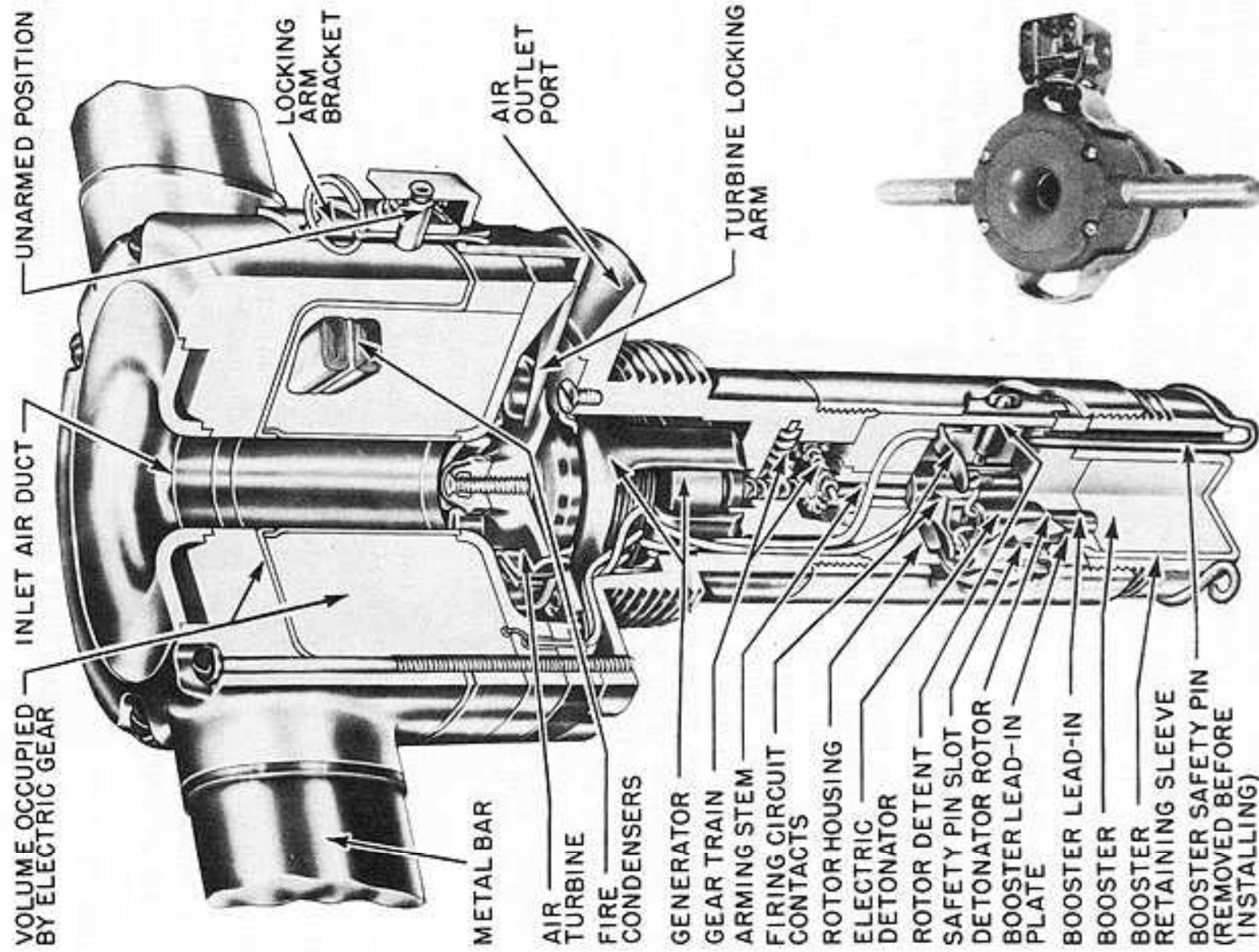


Figure 356. V.T. Fuze T82

General: This is a V.T. fuze of the bar type. This fuze, like the V.T. Fuze M166, is more sensitive to head-on approach to a target than the ring type and less sensitive to "passing" objects. It can be used interchangeably in any bomb which takes the Nose Mechanical Impact

Fuze AN-M103A1 when air burst is desired. At the present stage of development, approximately 90 per cent of the fuzes will function properly upon approach to the target, and the remainder either will function spontaneously after arming but before approaching a target, or will be inoperative.

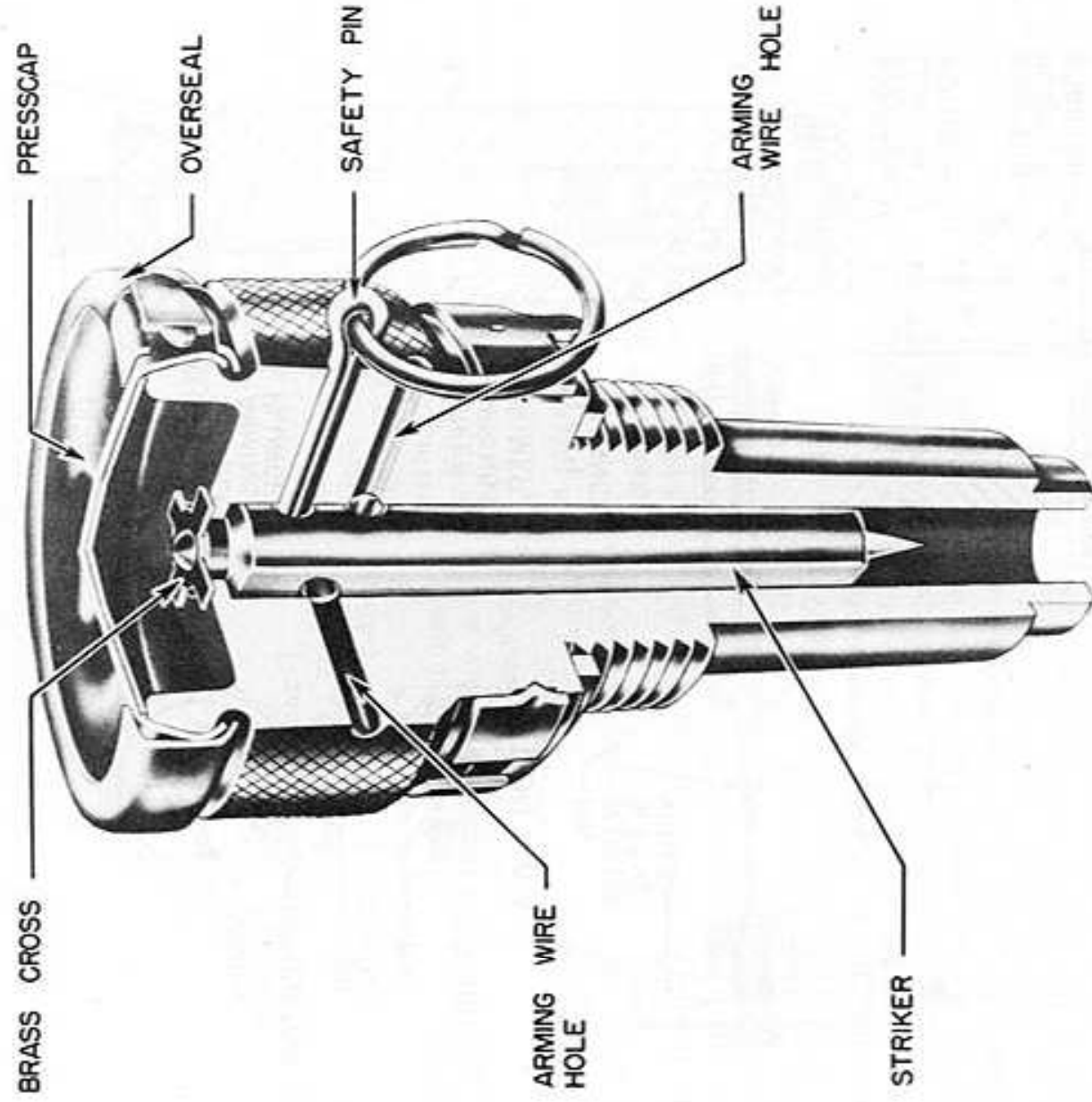


Figure 357. Tail Pistol T708

T723 (Tail Mechanical Impact)

Bombs..... 12,000-lb. T10; 22,000-lb. T14 (3 T723's in tail)

Functioning..... Delays to be determined in tests; will depend on mission

Armed condition..... When arming spindle is out of fuze; no external evidence

General: The Tail Mechanical Impact Fuze T723 is designed as a replacement for the Pistol T708 (British No. 58) in the G.P. Bombs T10 and T14, to provide air-travel arming.

Description: This fuze has its windmill vanes mounted outside the tail cone, and connected to the fuze arming spindle by a slotted sleeve, which allows the spindle to thread out into the slot. The fuze is detonator safe, the detonator being housed in a rotor which lines up after the arming spindle is out of the fuze. A larger auxiliary booster is used with this fuze, because of the size of the bomb.

Operation: The shipping plug is removed when the fuze is inserted in the bomb. Release from the plane pulls the arming wire and allows the vanes to start rotating. They thread