

# TB 9-1980-23

## WAR DEPARTMENT TECHNICAL BULLETIN

### CLUSTER FRAGMENTATION BOMB T8\*

Ref: TM 9-1980, Bombs for Aircraft, 3 January 1942

War Department, Washington 25, D. C., 8 May 1944

#### 1. GENERAL.

a. CLUSTER, fragmentation bomb, T8 (fig. 1) is a 500-pound size cluster of six BOMB, fragmentation, 90-lb., T9, assembled with ADAPTER, cluster, T3. This cluster may be adjusted to discharge the individual bombs immediately (fig. 2) or, by the action of one or two mechanical time fuzes, to discharge the bombs 5 to 92 seconds after release of the cluster from the plane (fig. 1). The cluster components may be supplied unassembled, or partially assembled, as described below (pars. 5 and 6). The assembled cluster is 56 inches long and weighs approximately 585 pounds.

#### 2. BOMB, FRAGMENTATION, 90-LB., T9.

a. This bomb is designed for use individually or in clusters. The bomb body is approximately 20 inches long, 6 inches in diameter, and weighs approximately 85 pounds. The bomb is adapted for Nose Fuze, AN-M103 with a special short arming vane. The bomb body is cylindrical, with tapered nose and tail. The cylindrical portion consists of a tight spiral steel bar wrapped around a thin steel liner. Six loaded bomb bodies, unfuzed and without fin assemblies, are shipped strapped to a pallet (fig. 3). Six fin assemblies, six special arming vane assemblies for FUZE, bomb, AN-M103, and one arming wire assembly for the cluster, are shipped in a fin box. Fuzes for bomb and cluster are shipped separately.

#### 3. ADAPTER, CLUSTER, T3.

a. The T3 Cluster Adapter (fig. 4) is designed for either immediate or delayed opening. The adapter consists of two longitudinal

\*When standardized, it is expected that the following designations will be used:

CLUSTER, fragmentation bomb, M27

BOMB, fragmentation, 90-lb., M82

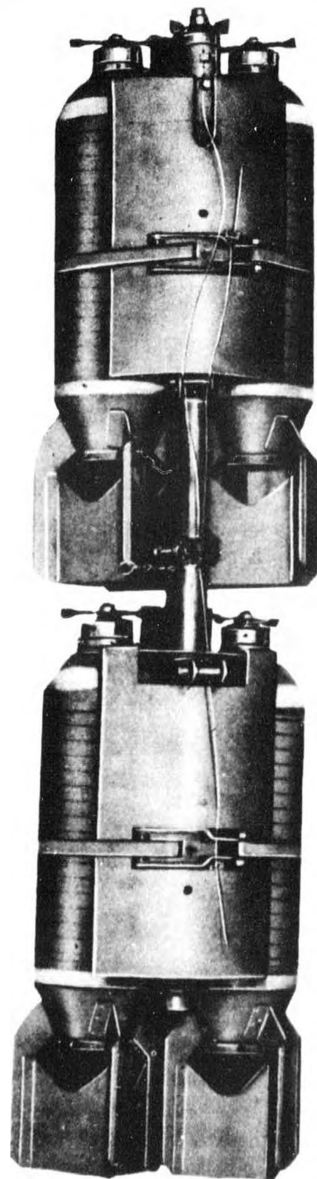
ADAPTER, cluster, M14

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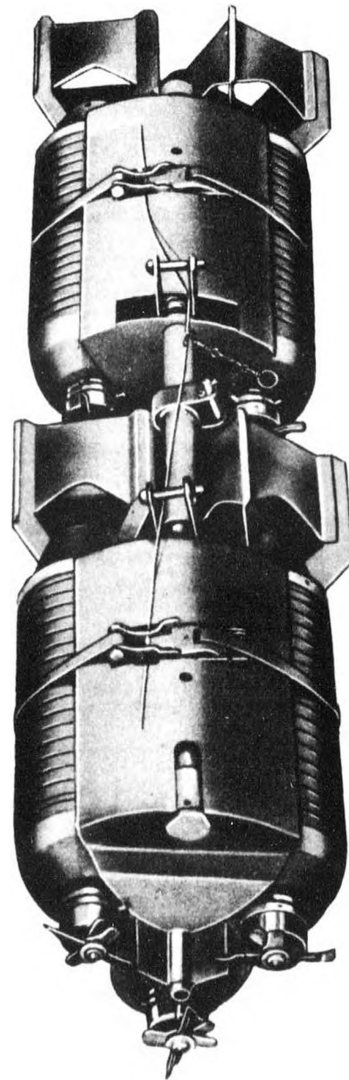


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Figure 1—CLUSTER, fragmentation bomb, TB—Delay Opening

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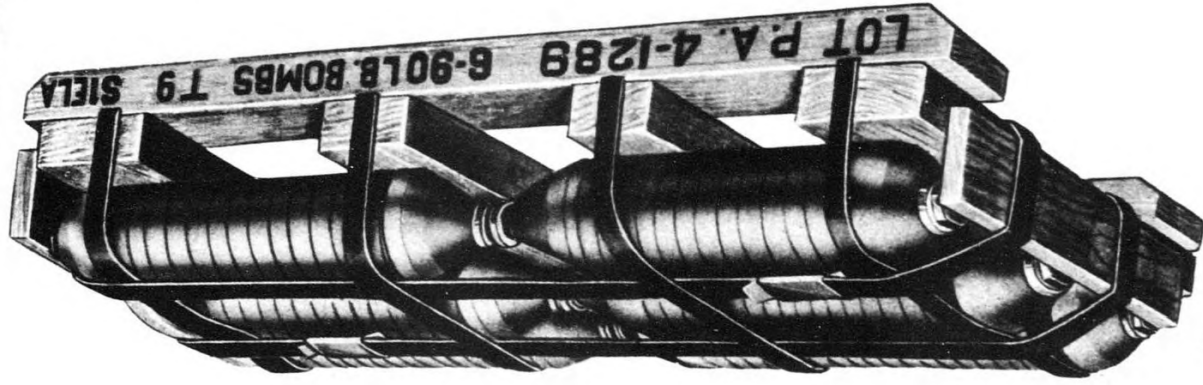


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Figure 2—CLUSTER, fragmentation bomb, T8—Immediate Opening

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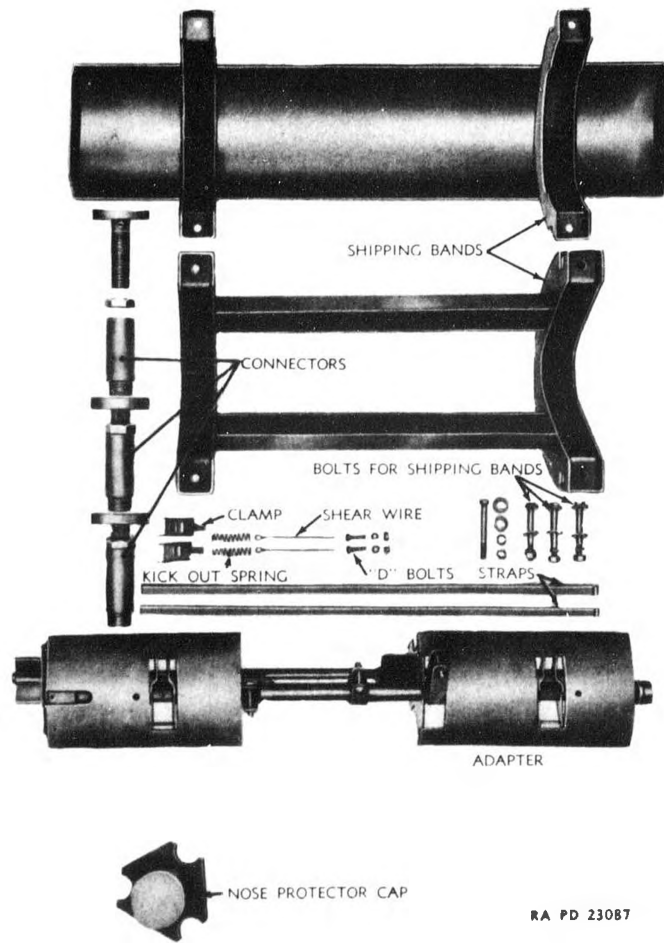


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Figure 3—BOMB, fragmentation, 90-lb., T9—as Shipped

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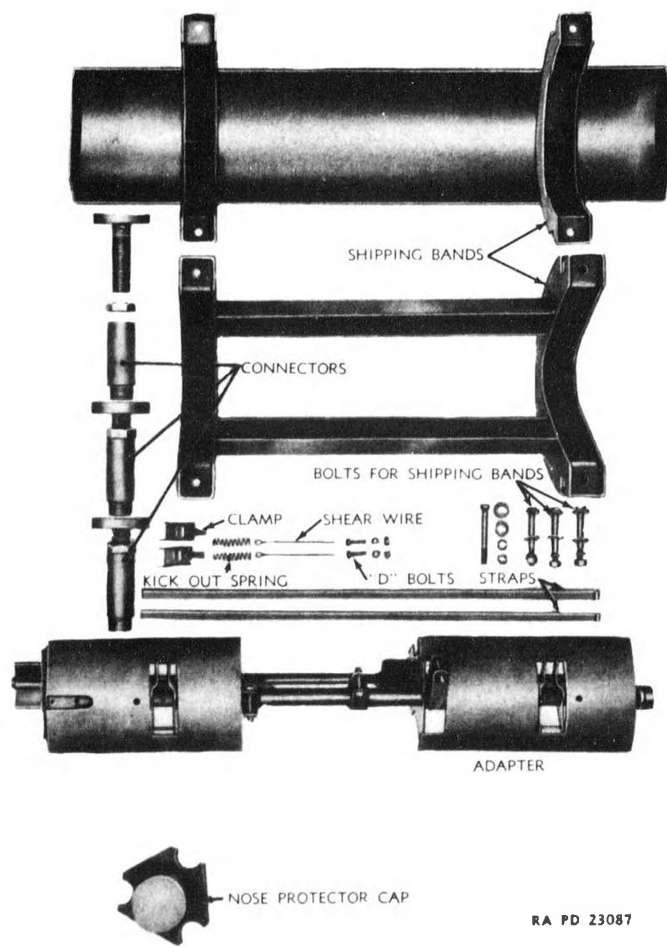


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Figure 4—ADAPTER, cluster, T3. Components and Packing

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Figure 4—ADAPTER, cluster, T3, Components and Packing

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steel tubes to which are welded four sheet steel plates which form nose and tail supports for two banks of three bombs each. The lower member serves as backbone for the cluster and carries a fuze vane stop for each bank of bombs. The upper member carries a pair of suspension lugs, a hoisting lug, two buckles for holding and releasing steel straps holding the bombs in the cluster, and adapters for nose and tail fuzes.

b. The suspension and hoisting lugs consist of U-shaped shackles with bolt held in place by a cotter pin. The shackles are located by washers welded to the upper member. A long cotter pin passes through each lug to hold it in position. When suspension from single-hook racks is desired, the hoisting lug is removed and replaced by one of the suspension lugs.

c. The release mechanism consists of a toggle type buckle which is held closed as follows:

(1) For storage and handling, by a cotter pin which is removed only after the arming wire is installed.

(2) For carrying in the plane, by a branch of the arming wire, which is withdrawn when the cluster is released from the plane armed or, if the cluster is not dropped, by the cotter pin which has been replaced.

(3) For delayed opening of the cluster, by a shear wire which passes through the tongue of the clamp and the upper member of the cluster. When it is desired that the cluster discharge the individual bombs, immediately upon release from the plane, the shear wire is cut off after the arming wire is installed. When delayed action is desired, the shear wire is left in place. At the time set, the fuze functions to drive a steel slug through the upper member, shearing the wire and allowing the buckle to open.

d. **The Fuze Adapters.** A fuze adapter for the mechanical time fuze which is used for delayed cluster opening is assembled to the forward end of the upper member. A set screw and lock nut, for holding the fuze in place, are shipped in an envelope inside the fuze adapter. A steel slug for cutting the shear wires of the release mechanism is wired in place in the upper member just inside the fuze adapter. A fuze adapter for the rear end of the member is supplied separately with the cluster adapter.

e. **Arming Wire.** The arming wire assembly for the cluster consists of a swivel loop assembly and four branches of wire, of which two are fine (0.036-in. diam) and two are heavy (0.064-in. diam). The fine branches are for the cluster time fuzes and, when either or both fuzes are omitted, the corresponding length of wire is cut off. The heavy branches are for the release mechanism.

f. **Shipping Bands.** The shipping band (figs. 4 and 8) for the cluster consists of an upper and a lower member. Each consists of

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two semicircular channels joined by sheet metal troughs. The upper member has, in addition, extensions to protect the nose and tail of the cluster. When the cluster is placed in shipping bands, a nose protector cap and three connectors are installed. The nose protector cap is a flanged cup which fits over the forward vane stop of the adapter and is held in place by the fuze hold plugs of the forward bank of bombs. The connectors are small screw jacks which are screwed into the fuze adapter of each of the bombs in the rear bank and butt against the cones of the corresponding bombs in the forward bank.

**g. Packing.** The ADAPTER, cluster, T3, is packed one, complete, per box with shipping bands for the assembled cluster. *NOTE: The upper and lower wooden cradles used to pack the adapter and shipping bands may be conveniently used to build an assembly cradle (fig. 5).*

**4. ASSEMBLY OF CLUSTER FOR STORAGE AND SHIPMENT.**

**a. Cluster.** The preliminary assembly of the cluster is carried out as follows (fig. 6):

(1) Place four bombs, pointing in the same direction, on an assembly cradle such as that illustrated in figure 5.

(2) Fit adapter over bombs and align bombs to fit the nose and tail supports.

(3) Thread a shear wire through each of the two holes in the upper member between the side plates of the release mechanisms.

(4) Assemble remaining two bombs to adapter.

(5) Attach formed end of straps to release mechanisms with "D" bolts, assembling lock washer and nut loosely.

(6) Pass straight ends of straps around bombs and attach clamp to strap. *NOTE: To attach clamp to strap, pass straight end of strap through the wide slot in the clamp from the top. Place the clamp in approximate position in release mechanism and mark place for bending. Let the clamp slide down the strap and form a hairpin bend at the point marked. Bring the clamp back up the strap and pass the free end of the strap through the narrow slot. Pull up the clamp and, if necessary, seat it by tapping with a wood block.*

(7) Place kick-out spring over each shear wire.

(8) Place strap clamp on release mechanism, threading shear wire through clamp. Fasten clamp in position with cotter pin and tag, and spread ends of cotter pin.

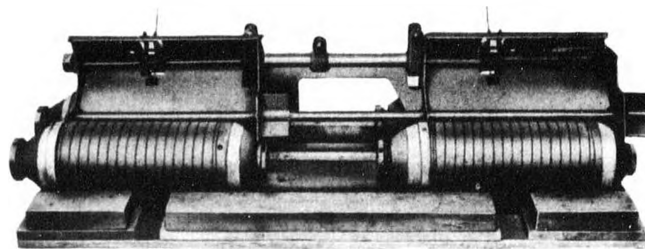
(9) Tighten strapping around bombs by rolling strapping on "D" bolts with open-end wrench. When proper tension is obtained, tighten nut. *NOTE: The strap should be tight enough so that all slack is taken up, and tapping the strap with a wrench will*



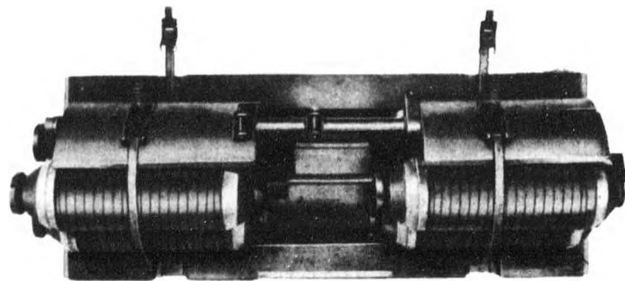


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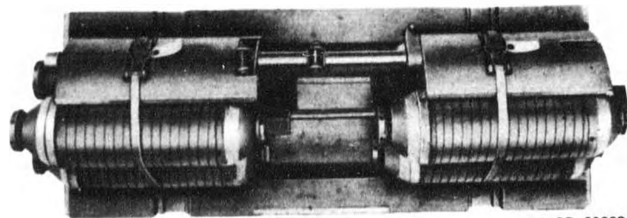
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FIT ADAPTER OVER ALINED BOMBS



PREPARE STRAPPING



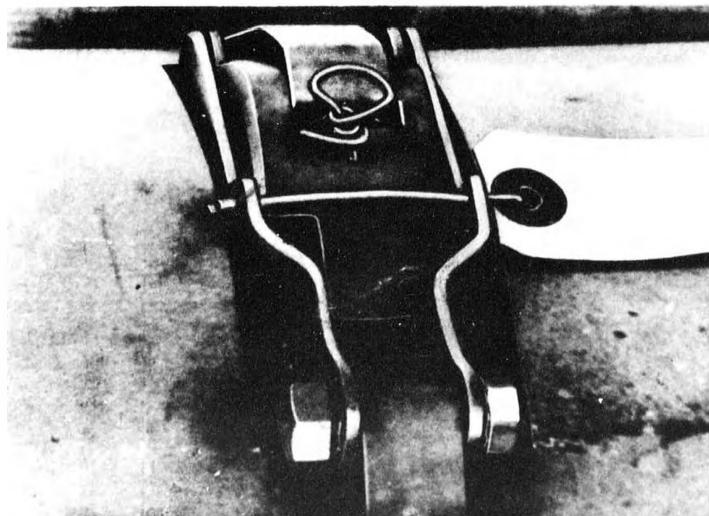
COMPLETE

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Figure 6—Steps in Assembly

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Figure 7—Shear Wire Assembly

cause it to rebound. However, it should not be so tight that the strap clamp cannot be depressed by thumb pressure.

(10) Form a loop in each shear wire, similar to the preformed loop at the other end (fig. 7). *NOTE.* If available, Nicopress sleeves may be used to fasten shear wire, by crimping two sleeves to the shear wire first with crimping pliers, then with special crimping tool. Another piece of wire is placed in the empty channel of the sleeve to insure tight crimp.

**b. Connectors.** Connectors are assembled as follows (fig. 8):

(1) Remove nose plugs of bombs in rear bank and replace with tubular connector assembly.

(2) Screw extension out until the cup is against the cone of the bomb in the forward bank, wrenchtight.

(3) Holding the extension, tighten lock nut.

**c. Nose Protector Cap.** Nose protector cap is assembled as follows:

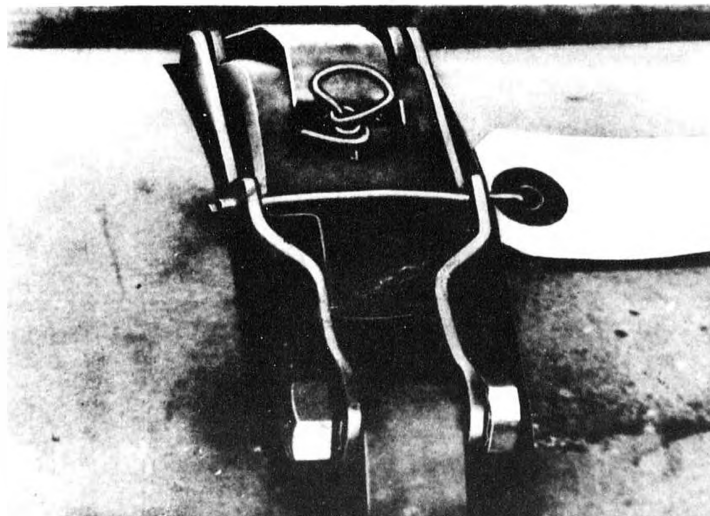
(1) Remove nose plugs from the forward bank of bombs.

(2) Place nose protector cap in position and fasten in place by replacing nose plugs.

**d. Shipping Bands.** Shipping bands are assembled as follows:

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RA PD 23090

Figure 7—Shear Wire Assembly

cause it to rebound. However, it should not be so tight that the strap clamp cannot be depressed by thumb pressure.

(10) Form a loop in each shear wire, similar to the preformed loop at the other end (fig. 7). *NOTE: If available, Nicopress sleeves may be used to fasten shear wire, by crimping two sleeves to the shear wire first with crimping pliers, then with special crimping tool. Another piece of wire is placed in the empty channel of the sleeve to insure tight crimp.*

**h. Connectors.** Connectors are assembled as follows (fig. 8):

(1) Remove nose plugs of bombs in rear bank and replace with tubular connector assembly.

(2) Screw extension out until the cup is against the cone of the bomb in the forward bank, wrenchtight.

(3) Holding the extension, tighten lock nut.

**c. Nose Protector Cap.** Nose protector cap is assembled as follows:

(1) Remove nose plugs from the forward bank of bombs.

(2) Place nose protector cap in position and fasten in place by replacing nose plugs.

**d. Shipping Bands.** Shipping bands are assembled as follows:

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- (1) Brace the lower half of the shipping band assembly to prevent it from moving.
- (2) Place the cluster into shipping band so that strapping is aligned properly within the bands.
- (3) Place upper half of shipping band assembly over cluster and assemble bolts, washers, and lock washers.
- (4) Examine assembly to see that bands bear properly against the bomb bodies.

**5. PREPARATION FOR USE.**

a. The cluster, partially assembled as described above, is prepared for use by assembling the fins and fuzes to the individual bombs and adjusting the adapter for immediate or delayed opening on release.

**b. Assembly of Bombs.**

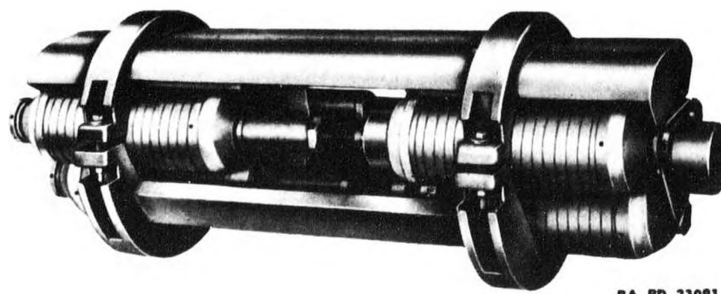
- (1) Remove cluster from shipping bands.
- (2) Remove nose plugs and nose protector cap.
- (3) Release lock nuts and remove connectors.
- (4) Remove fin lock nuts from all bombs.
- (5) Inspect fuze cavities and threads.
- (6) Assemble fins to bombs. Be careful that fins are located so that they will not interfere with each other and will not be damaged when the cluster is installed in the plane (fig. 11).
- (7) Unpack six FUZE, bomb, AN-M103 (fig. 10). Inspect for serviceability. Discard the vane assembly supplied with the fuze.
- (8) Set each fuze for superquick action by pulling out the setting pin and turning it so that the locating pin seats in the shallow slot.
- (9) Screw a fuze into the nose of each bomb, handtight. If necessary, transfer the safety cotter pin so that it will be accessible from the outside of the cluster.
- (10) Cut and remove the fuze seal wire. Assemble the short (4.6 in.) vane supplied with the fin assembly.
- (11) Remove the safety cotter pin and turn the vane each way to be sure that the adapter vane stop will prevent the fuze vane from rotating.

c. **Preparation for Delayed Opening.** To prepare the cluster for delayed opening after release, prepare bombs as described above, then:

- (1) Remove plug from nose end of upper member (fuze adapter) and remove envelope containing set screw. Inspect to see that the cavity is clear.
- (2) Unpack FUZE, flare, mechanical time, M111A2 (fig. 9), and inspect for serviceability. Remove and replace the striker stop to be sure that the safety block will not fall out.

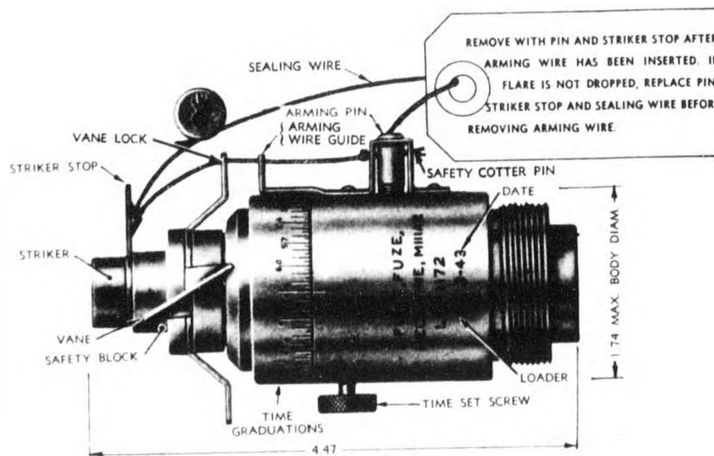
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Figure 8—Cluster With Shipping Bands



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Figure 9—FUZE, flare, mechanical time, MIIIA2

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(3) Set the time desired on the fuze. (See precautions, paragraph 6 f.) Loosen the thumbscrew in the side of the fuze body, turn the head of the fuze until the index line is opposite the number of seconds desired, and tighten thumbscrew.

(4) Screw the fuze handtight into the fuze adapter. Assemble set screw and lock nut loosely. Back off the fuze until the arming pin points up, that is, away from the lower member. Tighten the set screw and lock nut.

(5) Thread a heavy and a fine branch of the arming wire through the forward suspension lug. Thread the heavy branch through the vacant holes in the release mechanism. Thread the fine branch through the inner holes of the fuze arming pin, arming wire guide, and vane tab so that about 2.5 inches protrudes beyond the vane tab. Place a safety clip (Fahnestock) on each branch of the wire.

(6) Thread the remaining branch of heavy wire through the rear suspension lug and through the holes in the rear release mechanism. Place a safety clip (Fahnestock) on the wire. Cut off the unused branch of fine wire close to the swivel loop attachment.

(7) Cut and remove fuze seal wire with safety cotter pin and striker stop.

(8) Install cluster in plane.

(9) Remove safety cotter pins from both cluster release mechanisms and from all six bomb fuzes.

(10) If cluster is not dropped, disassemble and return components to storage by reversing the above steps.

**d. Preparation for Immediate Opening.** To prepare cluster for opening immediately on release, prepare bombs as described in subparagraph b, above, then:

(1) Thread a heavy branch of the arming wire through each suspension lug and through the holes in the corresponding release mechanism. Place a safety clip (Fahnestock) on each branch.

(2) Cut off both branches of fine wire close to the swivel loop attachment.

(3) Cut the shear wire in each release mechanism close to the clamp.

(4) Install the cluster in the plane.

(5) Remove safety cotter pins from both release mechanisms and from all six bomb fuzes.

(6) If the cluster is not dropped, replace all cotter pins and tie a conspicuous tag to the release mechanism to indicate that the shear wire has been cut and the cluster cannot be used for delay opening.

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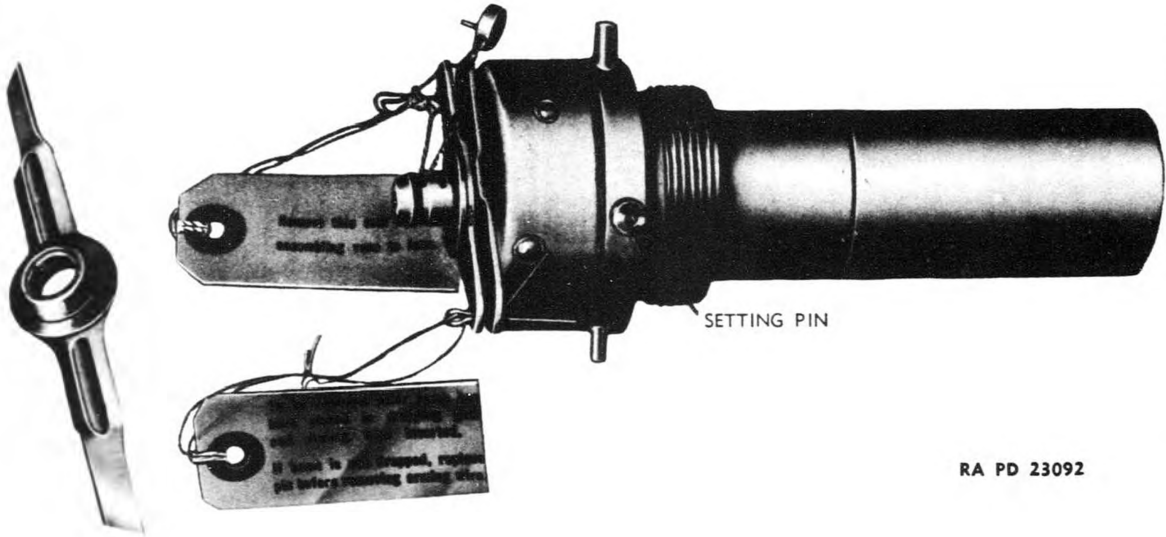
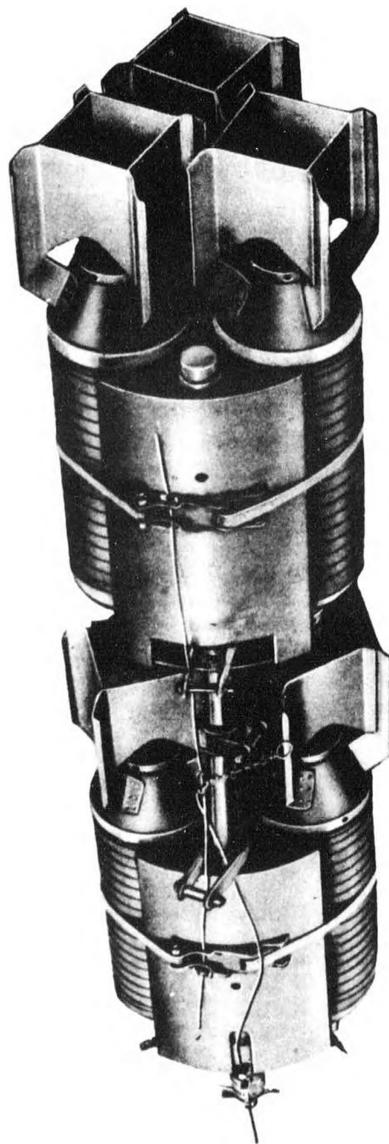


Figure 10—FUZE, bomb, AN-M103 (nose), With Short Arming Vane



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DA PD 21093

Figure 11—Cluster—Rear View

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**6. PRECAUTIONS.**

- a. The general precautions for handling bombs, clusters, and fuzes will be observed (TM 9-1980).
- b. Time fuze will crush and function if cluster is dropped on it.
- c. If immediate opening is desired and no fuze used, shear wire must be cut or cluster will not open.
- d. If delay opening is desired, shear wire must be left intact and fuze installed and set.
- e. Cluster must open at altitude of 1,000 feet minimum, to allow bomb fuze to arm.
- f. Immediate opening of the cluster produces the most favorable impact pattern. At openings greater than 10 to 12 seconds (approx. 2,000 ft of fall), range errors increase appreciably.

[ A.G. 300.5 (8 May 1944)  
O.O. 300.5/5642 ]

BY ORDER OF THE SECRETARY OF WAR:

**G. C. MARSHALL,**  
*Chief of Staff.*

OFFICIAL:

**J. A. ULIO,**  
*Major General,*  
*The Adjutant General.*

**DISTRIBUTION:** As prescribed in par.9.a., FM 21-6; R and H 1 (6); Bn 1 (10); IC 3 (5), 9 (3); Ord Decentralized Sub-O (3); PE "Mark for Ord O" (5); Holding and Reconsignment Points (5); Ord Dist O (5); Ord Regional O (3); Ord Dist Br O (3); Ord Establishments (5); Ord Tk Dep (3); Ord O, 1st thru 15th AF including Tactical (10); ASC Dep (5).

IC 3—T O 3-417, Cml Storage Co, Avn  
T O 3-418, Cml Dep Co, Avn  
T O & E 3-457, Cml Co, Air Opns Hv, M & L  
9—T O 9-17, Ord Am Co, Avn  
T O & E 9-57, Ord Dep Co, Avn

(For explanation of symbols, see FM 21-6.)