June 14, 1927. 1,632,147

E. J. W. RAGSDALE

DUMMY BOMB

Filed March 6, 1926 2 Sheets-Sheet 1

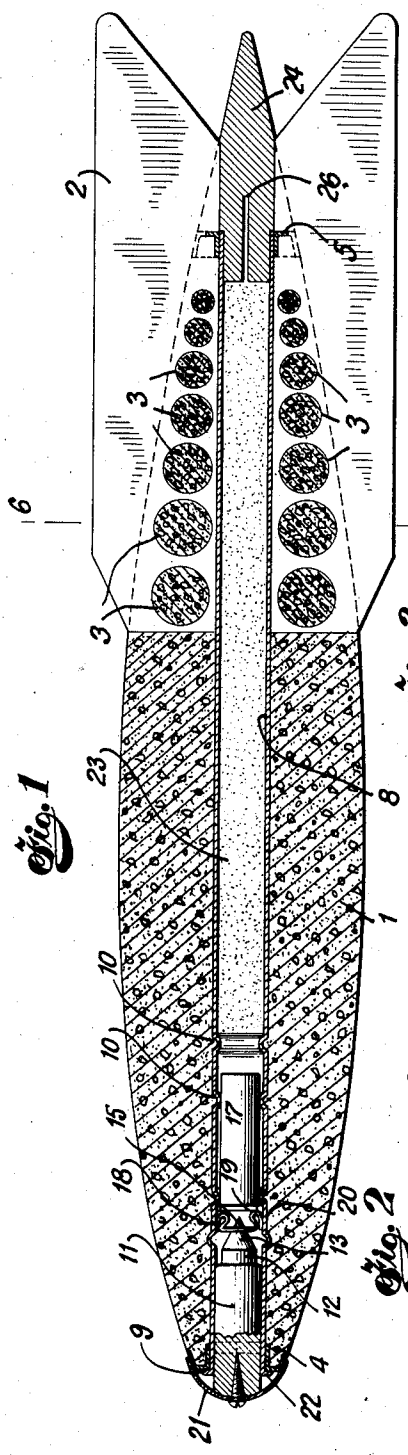


Fig. 1

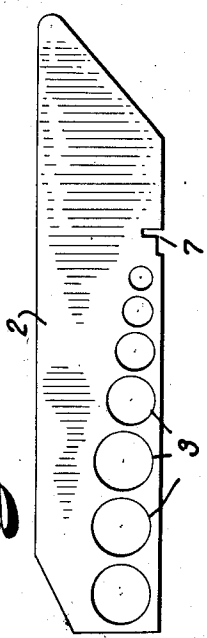


Fig. 2

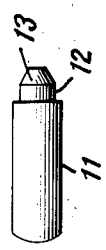


Fig. 3



Fig. 4

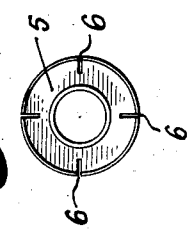


Fig. 5

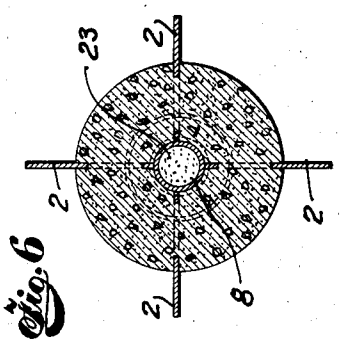


Fig. 6

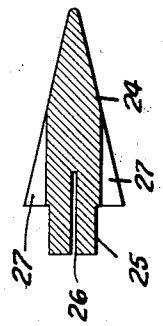


Fig. 7

Inventor

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DUMMY BOMB

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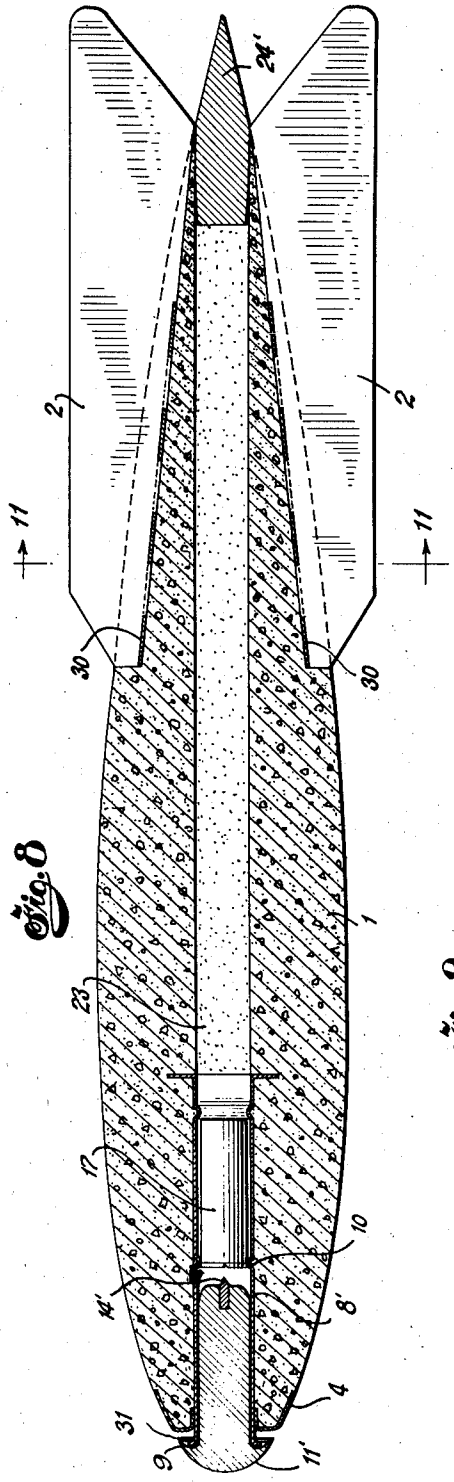



Fig. 8

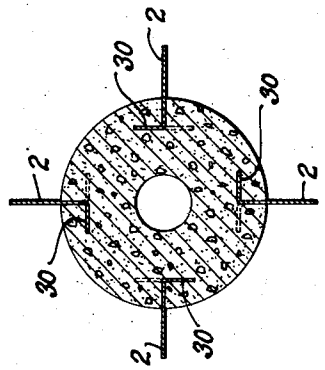



Fig. 11

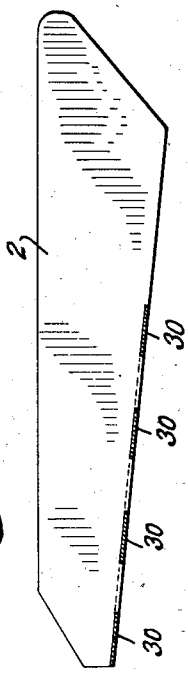



Fig. 9

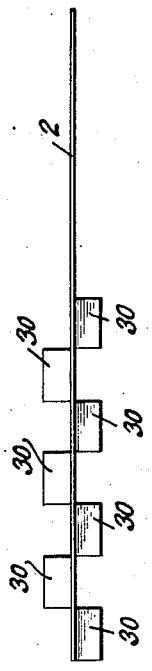



Fig. 10

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Patented June 14, 1927. 1,632,147

# UNITED STATES PATENT OFFICE.

EARL J. W. RAGSDALE, OF NORRISTOWN, PENNSYLVANIA, ASSIGNOR TO SECRETARY OF WAR DWIGHT F. DAVIS.

## DUMMY BOMB.

Continuation of original application filed October 13, 1919, Serial No. 330,480. This application filed March 6, 1926. Serial No. 92,976.

(GRANTED UNDER THE ACT OF MARCH 3, 1883; 22 STAT. L. 625.)

The invention described herein may be used by the Government, or any of its officers or employees in prosecution of work for the Government, or by any other person in the United States, without payment of any royalty thereon.

The present application is filed as a continuation of an application filed by me on October 13, 1919, Serial Number 330,480, which said application is still pending.

This invention relates to a dummy bomb for practice use by aviators, and is designed with the following desirable objects, inter alia, in view, namely: extreme simplicity in construction, making possible easy and expeditious assemblage of the parts; cheapness of manufacture, insuring economy in construction and in use; and reliable smooth and perfect working of the parts ensuring entire satisfaction to the user.

Subordinate, but by no means unimportant objects, since they go to make up the ultimate perfection of the bomb as an entirety, may be specifically mentioned as follows, namely:

1. To provide a body portion formed of a certain material, the selection of which is exceedingly felicitous since it is inexpensive as compared with metal, gives the necessary weight to the bomb and provides extremely tenacious securing means for the bomb vanes, thus serving a dual function.

2. To provide novel securing means for the bomb vanes of great simplicity and of substantial strength.

3. To provide novel means disposed in a novel manner for normally preventing movement of the firing-pin toward the percussion cap of the cartridge and accidental or unpremeditated explosion thereof.

4. To provide novel means for positioning and holding a cartridge in the cylindrical metal core.

5. To provide novel means for positioning the smoke producing charge in said core and limiting movement thereof in one direction.

6. To provide a novel tail-piece, normally closing the rear end of said core and ejective by the explosion of the smoke producing charge.

7. To provide the bomb with means for giving a visual signal, said signal being preferably an effusion of smoke emanating from a smoke producing charge carried by the bomb.

The invention in its preferred form is disclosed in the accompanying drawings, in which like reference characters identify corresponding parts throughout the several views. Briefly described:

Figure 1 is an axial section through a bomb, constructed in accordance with my invention;

Figure 2 is a detached detail view in side elevation of one of the vanes;

Figure 3 is a detached detail view in side elevation of the firing-pin plunger or carrier;

Figure 4 is a detached detail view in side elevation of the firing-pin.

Figure 5 is a detached detail view in end elevation of the rear end piece;

Figure 6 is a sectional view on the line 6—6 of Figure 1;

Figure 7 is a detached detail view in longitudinal section of the tail-piece;

Figure 8 is an axial section through a modified form of a bomb constructed in accordance with my invention;

Figure 9 is a detached detail view in side elevation of one of the vanes of modified form shown in Figure 8;

Figure 10 is a top plan view thereof; and

Figure 11 is a sectional view on the line 11—11 of Figure 8.

Referring now in detail to the drawings and particularly to Figures 1 to 7 inclusive:

1 designates the body portion of the bomb which is preferably formed from a suitable plastic or liquid material which becomes hard when set and which may be concrete or a composition similar thereto, as possessing the requisite strength, as being relatively inexpensive, and as presenting tenacious securing means for the vanes as hereinafter described. The body portion is preferably annular in cross section and gradually tapers from the longitudinal center thereof toward both ends, and is provided with an axial bore as shown. The body portion may be painted, if desired, and for this purpose black asphaltum paint may be sprayed on its surface.

My invention comprehends the use of a vane, or vanes. In this instance, I have shown a plurality thereof, preferably designated by the referance numeral 2, of suitable

material, preferably sheet steel. Conveniently, each vane in the form shown in Figures 1 and 2 is provided with a longitudinally extending series of apertures 3, appropriately of progressively increasing diameter from the rear end of the vane to the front end thereof. While I have shown and described one series of such openings in each vane, it is to be understood that this is merely exemplary and that several series thereof may be provided, and that such openings may be staggered instead of being disposed in a straight line.

In making the bomb, the vanes are disposed in proper relative position and the material by which the body portion 1 is formed, while in a liquid or plastic state, poured around the vanes and for this purpose the body may be formed in a mold. The material by which the body is formed passes into the openings 3, whereby when such material hardens or sets, integral locking keys are provided disposed in such openings and securely holding the vanes in position. It will thus be seen that the body 1 and the vanes 2 are provided with co-acting vane-locking means,—specifically, the locking keys and the openings 3. While such form of co-acting locking means is very efficacious and practical, and is probably the best from such a standpoint, other forms of vane-locking means may obviously be used, if preferred. For example, the form of vane shown in Figure 9 may be used. Referring to Figure 9 it will be seen that a number of lugs 30 extend from the lower edge of the vane alternately in opposite directions. These lugs may be conveniently formed by slitting the metal along the edge at right angles thereto and then bending the portions between the slits alternately to opposite sides until the same stand at the desired angle to the plane of the vane. Herein the plane of the lugs is 90° from the plane of the vane.

The form of vane just described may be assembled with the body portion 1 of the bomb in much the same way as the vane shown in Figure 2. The material of the body portion will be formed around and firmly engage the lugs 30 so as to effectively fasten the vanes to the body portion.

Preferably, a flanged nose-piece 4 is anchored in the body 1, at the front end thereof, and in Figure 1 a rear cup or flanged ring 5 is similarly anchored in the body 1, at the rear end thereof. Both pieces 4 and 5 are preferably steel stampings, suitably shaped to fit the front and rear ends of the body 1. The ring 5 is necessarily slotted radially as shown at 6, and each vane 2 is provided along its shorter longitudinal edge with a cutaway portion 7. When the vanes are disposed in the proper position with reference to the ring, the slots register, permitting the vanes to seat on said ring. The flanged ring 5 thus forms auxiliary securing means for the vanes.

Seated in the axial bore of the body 1 is a metallic tube 8, preferably upset or lipped at one end or at both ends thereof, as shown at 9. In Figure 1 this tube 8 is shown extending throughout the length of the body 1 while in Figure 8 the tube 8′ extends only part way. The tube is also provided toward the forward end thereof with one or more circumferential grooves 10, forming annular shoulders or projections interiorly of the tube for a purpose presently appearing. Disposed in the forward end of the tube 8 is a normally restrained plunger or firing-pin carrier 11 preferably formed from wood and comprising, as shown in Figure 1, a cylindrical body, a neck 12 and a truncated cone-shaped nose 13. Obviously, the construction of the plunger may be varied, as described. For example, a firing-pin carrier 11′ of slightly different construction is shown in Figure 8. Therein the outer end of the carrier is mushroom shaped for purposes which will later appear.

Advantageously, the firing-pin shown in detail in Figure 4 preferably comprises a body 14, pointed extremities 15, 15, and a collar 16 disposed between the base of one of said extremities and said body. The firing-pin is driven into the free end of the truncated cone-shaped portion 13 of the firing-pin carrier 11. A simpler form of firing-pin 14′ is shown in Figure 8.

Suitable yielding or deformable means are provided for normally spacing the firing-pin from the percussion cap of the cartridge 17 and preventing unpremeditated movement of the firing-pin and its carrier toward the cap. While such means may, of course, take a variety of forms, I have, in this instance, shown in Figure 1 a leaf spring 18, which is provided with an opening intermediate its length of a diameter to admit the body 14 of the firing-pin. The member 18 also prevents the cartridge 17 from moving forward against the firing pin and thus holds the cartridge away from the plug 11. In assembling the parts, the firing-pin is first projected through the opening in the spring 18 until the collar 16 rests against said spring, and the pointed extremity 15 farthest removed from said collar is, together with the body 14, then driven into the truncated cone-shaped portion 13 of the firing-pin carrier 11, whereby the spring is tightly clamped between said collar and the free end of said truncated cone-shaped portion.

The spring 18 is bent so as to provide offset portions 19, 19 bearing against the cartridge cap, and the terminals 20, 20 are bent so as to frictionally bind against the interior surface of the wall of the tube 8.

In the construction shown in Figure 8

the mushroomed end of the firing-pin carrier bearing against a collar 31 fast to the end of the tube 8 spaces the firing-pin from the percussion cap of the cartridge 17. Upon impact the force of the blow will drive the firing-pin carrier back into the tube. A resilient spur or detent 18' is formed by cutting and bending inwardly a portion of the wall of the tube 8' and so located with respect to the circumferential groove 10 that the cartridge 17 will be held in position thereby and prevented from moving forward against the firing pin 14' of the plug 11'. The cartridge 17 may nevertheless be quickly and easily put in place because the spur 18 will spring upwardly to let the rim of the cartridge pass it; springing back in place as shown in Figure 8.

A wind shield or nose 21 is disposed over the forward end of the bomb and is preferably a semi-globular shell as shown. In this instance, it is shown as secured to the firing-pin carrier 11 by a tack 22, but it may, of course, be otherwise secured.

I preferably use in connection with my bomb, a cartridge 17 which may be a standard No. 10 gauge shot gun shell.

I also use a smoke producing charge which may be a solid stick of combustible material, or loose powder 23, packed into the tube 8.

Closing the rear end of the tube 8 is a tail-piece or plug, ejective upon explosion of the powder 23. Advantageously this tail-piece may comprise, as shown in Figure 7, a tapering body portion 24 and an axial reduced stem 25. The stem and a portion of the body 24 are slotted longitudinally, as shown at 26, so that in inserting the plug into the rear end of the tube 8, the slit portions of the plug may be flexed toward each other so as to permit the plug to be inserted into the tube end. By this means the tail-piece is frictionally held in the tube and exerts a substantial resistance against removal except in the intended manner,—that is, by the ignition of the powder, which forcibly expels the plug from the tube. While I have shown one slot 26, it is to be understood that two or more longitudinally extending and intersecting slots may be used.

In inserting the plug into the tube end, it will be noted that inward movement thereof is limited by contact of the larger end of the body portion 24 with the ring 5.

The body portion 24 toward the larger end thereof is provided with longitudinally extending grooves 27 in which seat one of the edges of the vanes 2, as shown in Figure 1.

A slightly different form of plug 24' is shown in Figure 8.

In assembling the parts of the bomb constructed in accordance with Figures 1 to 7 inclusive, the composition body 1 is cast around the vanes 2 and the tube 8. The ring 5 is fitted over the rear end of the body and is preferably welded or soldered to the tube 8. The tail-piece 24 is inserted in the tube. The nose-piece 4 is fitted in place and preferably soldered or welded to the tube 8. The spring 18 is secured to the smaller end of the firing-pin carrier 11 by means of the firing-pin as heretofore described. The wind shield 21 is tacked to the outer end of the carrier 11 by the fastener 22. If desired the wind shield may also be secured to the nose-piece by welding or in any other manner. The assembly of the modified form of bomb shown in Figures 8 to 11 inclusive will be similarly effected.

To load the bomb shown in Figures 1 to 7 inclusive, the following procedure is outlined:

Withdraw the wind shield 21 with the firing-pin carrier 11 and attachments from the front end of the tube 8. Insert the cartridge 8 in the tube from the front end thereof until the rim of the cartridge catches on the internal annular shoulder 10, as shown in Figure 1, thus limiting inward movement of the cartridge. The two annular shoulders which engage the cartridge, preferably frictionally bind thereagainst. Then insert the firing-pin carrier 11 with its attachments. Withdraw the plug 24 from the rear end of the tube 8. Insert the smoke producing charge (which may be a solid stick of explosive material) pushing it gently down the tube until its inward movement is arrested by contact of one end thereof with the annular shoulder 10, as shown in Figure 1, the shoulder thus forming a limiting stop. Then replace the tail-piece 24. The loading of the modified form of bomb may be similarly effected.

In operation the bomb, when released as from an aeroplane, falls vertically, nose downward. Upon striking the ground, the end of the carrier is broken, thus driving the firing-pin against the cartridge or the deformable wind shield is bent and the carrier 11 with the firing-pin driven toward the cartridge 17, causing the spring 18 to flex or yield and permitting the firing-pin to pierce the percussion cap of the cartridge. This fires the cartridge which ignites the smoke charge 23. The plug 24 is thereupon expelled from the tube with an effusion of smoke constituting a visual signal, indicating to the aviator the spot where the bomb has struck.

Having thus fully described my invention, what I claim as new and desire to secure by Letters Patent is:

1. A practice bomb, comprising an axially bored body portion, a readily expelled tail-piece closing one end of the bore of the body portion, and having peripheral grooves, and vanes seated in said grooves.

2. A practice bomb, comprising a body portion, a slotted flanged ring disposed over the rear end thereof and vanes having cut-away portions in one edge thereof registering with said ring-slots so as to position said vanes on said ring.

3. In a practice bomb, the combination, with an axially-bored body portion, of a plunger within said bore, a firing-pin carried by said plunger, and a spacing-spring secured to said plunger by said firing-pin.

4. In a practice bomb, the combination, with an axially-bored body portion, of a plunger within said bore, a firing-pin carried by said plunger, and a spacing-spring secured to said plunger by said firing-pin and having portions adapted to contact with the base of a cartridge inserted in said bore and terminals frictionally engaging the wall of said bore.

5. In a practice bomb, the combination, with an axially-bored body portion, of a tail-piece closing the rear end of the bore, and comprising a tapering body portion, carrying a stem frictionally engageable with the bore.

6. In a practice bomb, the combination, with an axially-bored body portion, of an easily expelled tail-piece closing the rear end of the bore, and comprising a peripherally-grooved, tapering body carrying a stem frictionally engageable with the bore, and vanes disposed with one of their edges in said grooves of the tapering body.

7. A practice bomb, comprising a body portion, a ring disposed over the rear end thereof, and vanes having a locking engagement with said ring.

8. A practice bomb, comprising a body portion, a slotted ring disposed over the rear end thereof, and vanes engaging said ring-slots.

9. In a practice bomb, the combination, with a body portion having an axial bore, of a member within said bore having a circumferential recess, forming an internal annular projection to engage a cartridge inserted in said bore.

10. In a practice bomb, the combination, with an axially bored body portion, of a tube within the bore of said body portion and having a circumferential recess, forming an internal annular projection to engage a cartridge inserted in said bore.

11. In a practice bomb, the combination, with an axially bored body portion, of a firing-pin plunger disposed in said bore at the front end thereof, and a wind-shield disposed over the front end of said firing-pin plunger and over the front end of said body portion.

12. A practice drop bomb comprising, in combination, a body portion of moldable plastic material and stabilizing vanes partially embedded in the material of the body portion.

13. A practice drop bomb comprising, in combination, a body portion of moldable plastic material and stabilizing vanes, said vanes being provided with fastening means extending into the body portion for engagement by the material thereof.

14. A practice drop bomb comprising, in combination, a body portion of moldable plastic material and stabilizing vanes, said vanes having deformed portions embedded in and engaged by the plastic material of the body portion of the bomb.

15. A practice drop bomb comprising, in combination, a body portion of moldable plastic material having an axial bore, stabilizing vanes attached to said body portion, signal producing means within said bore and means to expel the same upon impact.

16. A practice drop bomb comprising, in combination, a body portion of moldable plastic material having an axial bore, a smoke producing charge within said bore and means to ignite and expel said charge upon impact.

17. A practice drop bomb comprising, in combination, a body portion of moldable plastic material having an axial bore, a cartridge, means to retain the same in said bore and means to detonate said cartridge.

18. A practice drop bomb comprising, in combination, a body portion of moldable plastic material having an axial bore, a frictional retained closure for the rear end of said bore, a cartridge and means to retain same adjacent the forward end of said bore and a firing pin projecting from the forward end of said bore.

19. A practice bomb for use on aircraft, comprising a body composed of a hard setting molded composition and an internal cartridge casing of thin metal around which the said composition is molded.

20. A practice bomb for use on aircraft, comprising a body of cement and an internal cartridge casing of thin metal around which the said cement body is molded.

21. In a practice bomb as in claim 19, a nose plug fitting in the open nose end of the bomb and a striker mounted upon the inner end of said plug.

22. In a practice bomb as in claim 19, a nose plug fitting in the open nose end of the bomb and a resilient cartridge support adjacent the inner end of said plug to hold the cartridge away from the plug.

In testimony whereof, I have signed my name to this specification this 23 day of Feb. 1926.

EARL J. W. RAGSDALE.