BOX NUMBER 33

SUPPLEMENT

TO

DESCRIPTION AND INSTRUCTIONS
ON THE USE OF

HIGH-CAPACITY DROP BOMBS

MARK I, II, AND III

(To be used in connection with War Department Document No. 724)

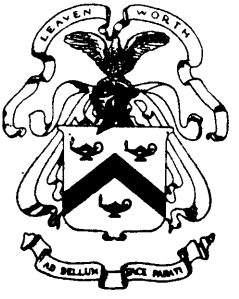


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HIGH-CAPACITY DROP BOMBS, MARK I, II, AND III.

Several changes in the design of the high-capacity drop bombs have been found necessary some time after the completion of the attached handbook. The required changes and addenda are described in detail below.

Where corrections in the original text have been made the page number in the handbook has been specially indicated.

Table of weights and dimensions.

	Weight of shell.	Weight of charge.[1]	Total weight.	Length.	Diameter.	Thickness of front shell.	Thickness of rear shell.	Length of safety wire.
	Pounds.	*Pounds.*	*Pounds.*	*Inches.*	*Inches.*	*Inch.*	*Inch.*	*Inches.*
Mark I.....	55	50	105	47.25	7.87	2/3	1/8	26.625
Mark II.....	13	10	23	28.25	4.72	1/4	1/16	14.25
Mark III.....	25	25	50	36.64	6.10	11/64	1/8	18.89

[1] Basis of 1.33 loading density.

DESCRIPTION OF HIGH-CAPACITY DROP BOMB, MARK I.

ERRATA AND ADDENDA.

THE FRONT BUSHING R. (Pages 7–8.)

The corrected dimensions of the front bushing are—

3¾ inches in diameter.
2 inches inside diameter.
⅝ of an inch high.

THE REAR CAP AA. (Page 8.)

The hole which traverses the flat surfaces of the rear cap AA, and is intended to receive the release pin AB, is ¼ of an inch in diameter. The gasket cup V has been omitted.

THE BOOSTER CUP SLEEVE D. (Page 9.)

The booster cup sleeve D is a steel cylinder $1\frac{5}{16}$ inches long and 2⅛ inches in diameter, with walls $\frac{1}{16}$ of an inch thick. The rear end is threaded on the inside for a distance of $\frac{5}{16}$ of an inch to screw over the ribs of the booster cup (C). The opposite end is lipped over ⅛ of an inch to fit on the shoulder of the booster cup.

THE BOOSTER CUP TUBE E. (Page 9.)

The booster cup tube E, is a brass cylinder $4\frac{5}{16}$ inches long and 1 inch in diameter, with walls $\frac{1}{32}$ of an inch thick. From a point 2¼ inches from the front end it tapers out from a diameter (inside) of 0.940 of an inch to an inside diameter of $1\frac{1}{32}$.

THE FIRING PIN P. (Page 9.)

The firing pin P is a cylinder ⅝ of an inch long.

THE SAFETY PIN AD. (Page 9.)

The safety pin AD is made of lead, 0.303 of an inch long. The head of the pin is $\frac{9}{64}$ inch in diameter and 0.05 of an inch long; the remaining length, $\frac{11}{32}$ of an inch, is $\frac{1}{16}$ of an inch in diameter for insertion in the lug on the firing pin P. The 10–32 screw AF serves to hold it in place.

THE DETONATOR SLEEVE M. (Page 9.)

The detonator sleeve M is made of brass.

THE DETONATOR K. (Pages 9–10.)

The detonator K is an irregularly shaped cold rolled steel cylinder $3\frac{5}{16}$ inches long, with a maximum diameter of 0.936 of an inch. Its front end is recessed to receive the .22 caliber McAdam rifle grenade primer (G) and the black powder (W). The middle section is turned to a diameter of 0.498 of an inch and threaded to receive the detonator washers (N) and the fulminate case (T). A hole $\frac{1}{8}$ of an inch in diameter is drilled in this surface to meet the recess leading from the front end and intended for the black powder (W). From a point $\frac{13}{16}$ of an inch from the rear end it is threaded for a distance of $1\frac{3}{32}$ inches to receive the detonator nut L. The rear end is turned to a diameter of $\frac{3}{8}$ of an inch for a distance of $\frac{13}{16}$ of an inch. A $\frac{7}{32}$ of an inch hole is drilled $\frac{3}{16}$ of an inch from the rear end to receive the release pin AB.

THE DETONATOR NUT L. (Page 10.)

The detonator nut L is a cold-rolled steel cylinder $\frac{13}{16}$ of an inch long and 0.934 of an inch in diameter. It is drilled and tapped to a diameter of 0.468 to screw on the detonator K. One end is tapered for $\frac{1}{4}$ of an inch to a 45° angle, to fit the detonator washer N; the other is tapered for $\frac{1}{8}$ of an inch at a 30° angle.

The *detonator washers N* are 0.925 of an inch in diameter, $\frac{7}{32}$ of an inch long, and made of hard rubber or fiber. The under shoulder of one is rounded to fit the rounded shoulder of the detonator; the other is chamfered at a 45° angle to fit the detonator nut L.

The *fulminate case T* is a pressed copper shell 0.925 of an inch in diameter and $\frac{1}{2}$ of an inch long, with an inside diameter of $\frac{1}{2}$ of an inch to fit on the detonator K. It is made of 0.02 of an inch stock, with one end rounded, the other end open; it contains about 80 grains of fulminate and is held in position by the two detonator washers N.

THE GASKET CUP V. (Page 10.)

The gasket cup V has been entirely omitted from the accepted design. See next paragraph.

THE RELEASE PIN AB. (Page 10.)

The release pin AB is an irregularly shaped cold-rolled steel cylinder $3\frac{5}{32}$ inches long, $\frac{7}{16}$ of an inch at its largest diameter. This section is $\frac{1}{16}$ of an inch long and serves as the upper seat for the coiled spring AK. For a distance of $1\frac{1}{4}$ inches the pin is turned down to a diameter of $\frac{5}{16}$ of an inch, to fit into the spring AK. The remaining section is $1\frac{27}{32}$ inches long, with a diameter of $\frac{3}{16}$ of an inch, for insertion through the spring seat, the rear cap, and the detonator, except for a distance of $\frac{1}{8}$ of an inch from the end, where it tapers to a point. A $\frac{3}{32}$ of an inch hole is drilled $\frac{9}{64}$ of an inch from the point to receive the safety wire.

The *spring AK* is made of about 12 coils of 0.052 music wire, with an inside diameter of $\frac{13}{64}$ of an inch and a normal length of $2\frac{1}{2}$ inches.

The *spring seat* is a built-up cylinder of steel $\frac{3}{8}$ of an inch long, with a maximum diameter of $\frac{7}{16}$ of an inch. For a distance of $\frac{1}{4}$ of an inch from one end it is turned down to a diameter of $\frac{13}{64}$ of an inch, to serve as a bearing for the spring AK.

Two *felt gaskets* are used on the release pin. They are $\frac{1}{16}$ of an inch thick, $\frac{7}{16}$ of an inch in diameter, with a $\frac{3}{16}$ of an inch holes, and are soaked in paraffin for waterproofing.

A *steel washer* is placed over the end of the release pin and under the safety wire. It is $\frac{3}{16}$ of an inch long, $\frac{7}{16}$ of an inch in diameter, and has a hole of an inch in diameter.

The spring *AK*, the spring seat, and a felt gasket are slipped over the end of the release pin AB in the order mentioned, and the pin is then inserted through the holes in the rear cap and the hole in the detonator, which has been placed inside the rear cap. Another felt gasket is then placed over the end of the release pin AD, followed by the steel washer. The end of the safety wire is then passed through the hole in the release pin and is seated on the steel washer.

The steady plate is a sheet steel rectangle, with rounded corners, 0.92 by 1.31 inches, with a raised bead $\frac{1}{4}$ of an inch high running lengthwise through its center. The bottom is curved to fit the shell to which it is riveted by means of four tubular rivets at a point 17.5 inches from the front end of the bomb. This plate is intended to fit into the channel of the release mechanism and serves to steady the bomb during flight.

The *safety wire* is a piece of 0.065 music wire, 26⅝ inches long, one end of which is passed through the safety pin. The other end is bent back for a distance of 1 inch to pass under the strap.

The *strap* for the safety wire is an irregularly shaped piece of sheet steel, 3/32 of an inch thick. It is bent to permit the passage of the safety wire, and to fit the surface of the shell to which it is riveted at a point 20.4 inches from the front end of the bomb.

The *safety wire release* consists of an oiled and braided fish line with a ½ of an inch loop at one end, and a 1/16 by ½ inch steel cotter pin tied to the other, the whole to have an overall length of about 2 inches. The loop is fastened to the safety strap. The cotter pin is set in one of the radially drilled holes in the segment of the release mechanism, which engages the safety wire when the bomb is dropped armed.

THE EXPLOSIVES (C). (Page 10.)

The explosive features consist of the .22-caliber McAdam rifle grenade primer, held in the recess provided for it in the front end of the detonator; the black-powder train leading from the above-mentioned recess to the fulminate case; the fulminate of mercury, carried in the fulminate case on the detonator; the booster charge, carried in the booster cup; and the bursting charge, carried in the shell or body of the bomb.

OPERATION OF THE BOMB.

(Page 11.)

When the bomb is released from the plane a pin on the release mechanism is caught in the loop of the safety wire, thus withdrawing the other end from the hole in the safety pin. The action of the spring throws off the safety pin, which releases the detonator. As soon as the bomb has assumed a vertical position the detonator slides forward. Its forward movement, however, is retarded by the cushion of air underneath it, there being but little clearance between the detonator and the booster cup tube. In this manner the detonator is seated gently on the lead safety pin. When the bomb comes in contact with any object the detonator is driven forward by inertia, the lead pin is bent or crushed, and the primer strikes

the firing pin. The flash from the primer ignites the black-powder train, this explodes the fulminate, which is now inside the booster cup. The booster charge is thus detonated, in turn detonating the main charge.

SPECIAL NOTE ON HIGH-CAPACITY DROP BOMB, MARK II.

The high-capacity drop bomb, Mark II, is provided with a special front cap and auxiliary safety wire, in order that it may also be used in connection with the vertical release mechanism.

The *shell cap* is similar in shape to those on the Mark I and Mark III. It is a steel cone, $\frac{15}{16}$ of an inch high and 2.13 inches at its largest diameter. A cylinder $\frac{3}{16}$ of an inch long projects from the base of the cone, and is threaded to a diameter of $1\frac{3}{4}$ inches to fit into the front bushing. At a point $\frac{1}{2}$ inch from the front end a recess is cut around the conical portion, $\frac{1}{4}$ of an inch wide and 1 inch in diameter, to receive the jaws of the release mechanism. A hole $\frac{3}{16}$ of an inch in diameter and $\frac{1}{4}$ of an inch deep is drilled into this surface to provide a grip for a wrench.

The *auxiliary safety wire* is a soft iron wire with a small loop at both ends. The overall length of the wire bent in this fashion is about 13.1 inches. The front loop is intended to receive the lug on the release mechanism; the rear loop is hooked into the safety wire.

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