

Plate I.
 Assembly Drawing of Parachute Flare,
 Mark I.

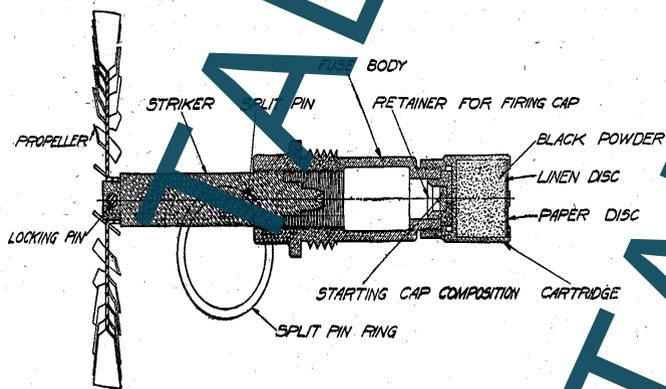


Plate II.
 Details of Igniting Device.

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AEROPLANE FLARE, MARK I.

The *Aeroplane Flare, Mark I*, is an illuminating device which is dropped from an aeroplane at night to obtain illumination of the ground. It is provided with a mechanism which ignites the illuminating composition at some distance below the plane; a parachute serves to suspend the burning flare in the air. The time of burning is not less than seven minutes, with an average candle power of 350,000.

The flare consists of three major parts: (a) the outer case, (b) the igniting device and (c) the inner case with illuminant and parachute.

(a) The Outer Case.

The *outer case* consists of the body, the front end of body, the nose, the nose collar, the brackets, the front collar, the rear collar, the front hanger button, the rear hanger button, the retainers for rear hanger button, the rear end cap, the rear cap disc and the stabilizers.

The *BODY* is a cylinder of No. 29 gauge tin plate, 36 inches long and 4.375 inches in diameter (inside). The two ends of the plate are clinched together in a flat lapped joint .25 of an inch wide. The rear edge of the body is turned back for .125 of an inch to form a reinforcing fold on which the rear cap is fitted.

The *FRONT END OF BODY* is a hemispherical cap of No. 29 gauge tin plate, which is clinched onto the body. A hole is punched in the center, the flange of which is turned outward for a short distance to support the nose. The cap is 2.03 inches long and 4.375 inches in diameter, except for the portion which is peened over the body. This is 4.421 inches in diameter.

The *NOSE* is a brass bushing 1.578 inches in diameter and .390 of an inch long, tapering to a diameter of 1.109 inches to fit into the flanged hole in the front end, where it is soldered in place. It is tapped on the inside to receive the threaded portion of the fuse body.

A *NOSE COLLAR* of 20 gauge sheet steel, 4.421 inches in diameter, is soldered in the joint between the body and the front end. A hole 3.156 inches in diameter is punched in the center of the collar with the edges bent slightly forward. The collar serves to hold the inner case in its proper position in relation to the firing mechanism.

Two **BRACELETS** of 29 gauge tin plate, 1.395 inches wide, are soldered around the body, one 6.968 inches from the nose and the other 11.391 inches from the rear. Two annular corrugations, .171 of an inch from each edge and 4.687 inches in diameter, form a channel in the center of each bracelet, .515 inches wide and 4.531 inches in diameter which serve to locate the front and rear collars.

The **FRONT COLLAR** is made of .078 of an inch steel plate, .5 of an inch wide, except for a distance of .312 of an inch, midway between the ends, where the width is increased to .812 of an inch. In the center of this square surface is a hole, .281 inches in diameter, in which the front hanger button is riveted. The collar is bent into a circle with a diameter of 4.531 inches. The two ends, in each of which a $\frac{1}{4}$ inch hole is drilled, are bent outward to face each other; a 10x24 fillister head machine **SCREW**, .5 of an inch long, is inserted in the two holes and, with its hexagon **WASHER**, serves as a means of clamping the collar on the bracelet.

The **REAR COLLAR** is similar to the front collar except that the widened surface, intended to support the rear hanger button, is 1.937 inches wide and .375 of an inch long, with rounded corners and has two .218 of an inch holes, drilled 1.187 inches apart, to receive the rivets which secure the retainer for the rear hanger button to the collar.

The **FRONT HANGER BUTTON** is a steel cylinder of irregular shape, measuring 1.187 inches long and .625 of an inch at the point of largest diameter. The base is turned down to a diameter of .25 of an inch for a distance of .187 of an inch, to form a stud whereby the button is riveted to the front collar. At a point .25 of an inch from the base, a recess with rounded corners is turned to a diameter of .25 of an inch, and .437 of an inch in width to fit into the $\frac{1}{2}$ of the release mechanism. The remaining section is .5 of an inch long and conical in shape, tapering from a diameter of .593 of an inch to a rounded point at the top. The lower corners of the cone are also rounded off.

The **REAR HANGER BUTTON** is similar to the front hanger button except that the stud on the base, which serves to secure the button to the collar, has been omitted, the overall length of the rear button is therefore but 1 inch. The base, which is .062 of an inch high, is intended to fit into the slots in the retainer.

The **RETAINER FOR REAR HANGER BUTTON** is a steel plate, 1.687 inches long, .843 of an inch wide and .078 of an inch thick. Two .25 of an inch holes, 1.187 inches apart, are provided for the .187x.312 of an inch rivets and washers by means of which it is secured to the rear collar. The two sides of the plate have been bent over in such a manner as to leave a slot, .687 of an inch wide at the bottom, .375 of an inch wide at the top and .781 of an inch long, in which the base of the rear hanger button moves. The heads of the rivets, securing the retainer to the collar, limit the movement of the button and prevent it from falling out of the slot.

The **REAR END CAP** is a convex shape of 29 gauge tin plate, 4.343 inches in diameter and 1.562 inches long, which is soldered over the closed end of the rear cap disc.

The **REAR CAP DISC** is a stepped, truncated cone of 29 gauge tin plate. The section of largest diameter is .218 of an inch wide and 4.562 inches in diameter (inside) and is intended to fit over the rear end of the body, where it is lightly crimped in place. The section of smallest diameter (4.132 inches, outside measurement), is intended to fit into the rear end cap. Upon explosion of the expelling charge, the disc, with the rear end cap, is forced off by the pressure exerted against the parachute and inner cast.

The four **STABILIZERS** are trapezoids of .031 of an inch sheet steel, with an overall length of 9.765 inches and a width of 1.109 inches. The inner edge of each is bent at right angles to the stabilizer surface, forming a lug .087 of an inch high, by means of which the stabilizer is soldered to the rear of the body.

(b) The Igniting Device.

The **igniting device** consists of a sheet steel plate, .031 of an inch thick and 3.546 inches in diameter. The edge of the plate is slotted to form 28 vanes, which are twisted to a 15 degree angle, left hand helix, to cause rotation of the plate in the air. A .362 of an inch hole is punched in the center of the propeller, with the inside edge flanged to form a collar .187 of an inch long.

The end of the striker is pressed into this hole; a steel pin, .087359 of an inch, is then inserted in the hole through the collar and striker, to secure them in place.

The **STRIKER** is a solid brass rod, measuring 2.916 inches in length and .562 of an inch at the point of largest diameter, where it is threaded for a distance of .39 of an inch to fit into the fuse body. The front end is turned down to a diameter of .359 of an inch for a distance of .234 of an inch, to fit into the propeller; a hole, .116 of an inch in diameter, is drilled through this section, .125 of an inch from the end, to receive the steel locking pin.

The remaining portion above the threaded section is 1.734 inches long and .484 of an inch in diameter. Here two surfaces, diametrically opposite each other, are flattened to a diameter of .312 of an inch, for a distance of .593 of an inch above the threads, to fit into the prongs of the spring guide on the release mechanism. A .116 of an inch hole is drilled through these surfaces to receive the split pin.

Below the threaded section the diameter is reduced to .312 of an inch, for a distance of .234 of an inch, to pass through the lower recess in the fuse body. From this point the striker is turned to a diameter of .203 of an inch for a distance of .156 of an inch and then tapers to a diameter of .125 of an inch at the end. Two V notches, perpendicular to each other, are cut in the end of the striker, to form four sharp points for the firing pin.

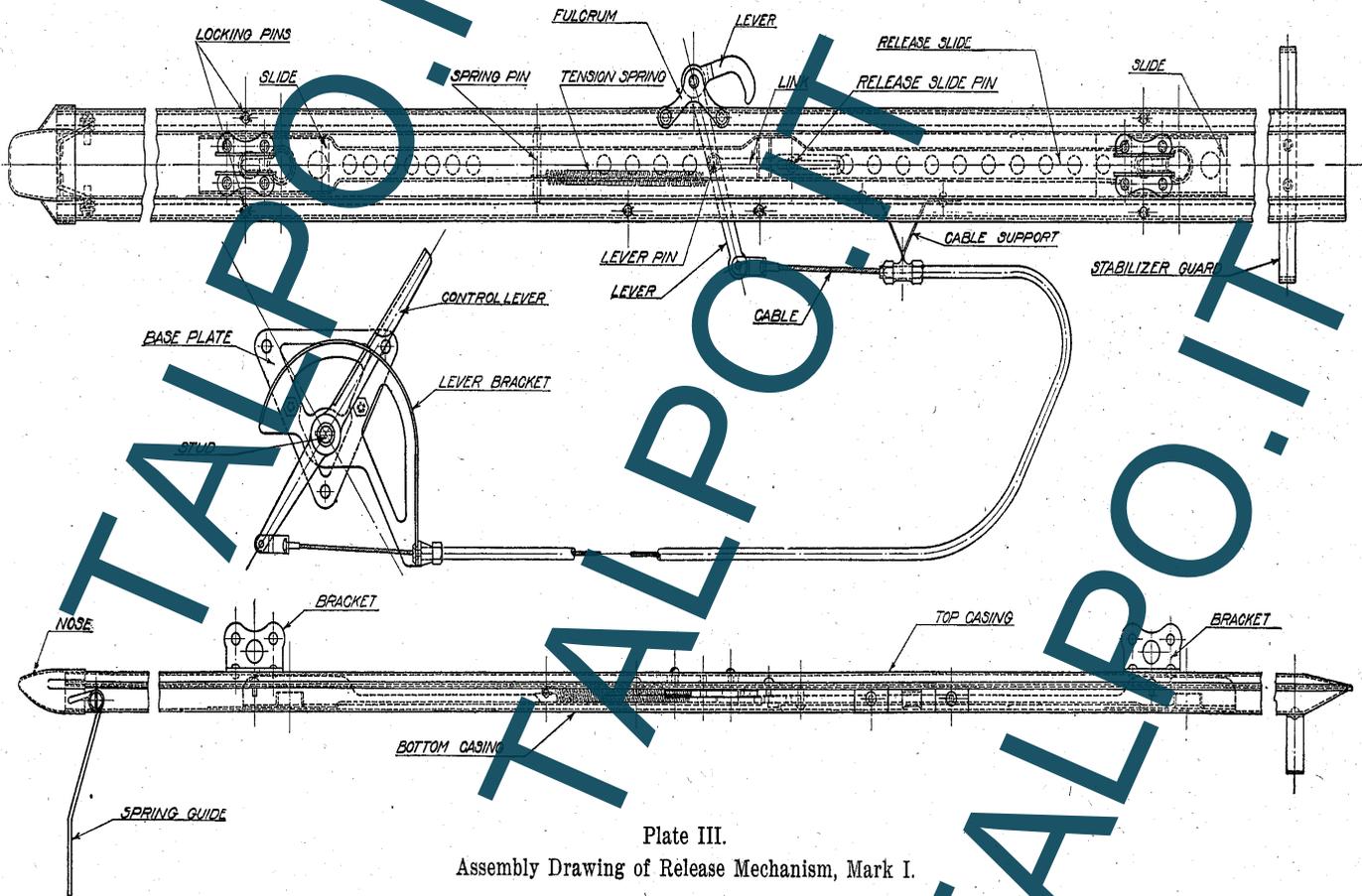


Plate III.
 Assembly Drawing of Release Mechanism, Mark I.

holes, extending for a distance of .937 of an inch toward the nose. The slides are thin pieces of metal, similarly drilled and slotted, which are welded to the bottom casing, to reinforce it at these points and also to act as bearing surfaces for the release slide. The hanger buttons are inserted in the holes in the bottom casing and the release slide and the flare is pushed forward about 1 inch, carrying the release slide with it. The buttons are now at the narrow end of the slots in the loaded position and the flare remains suspended with the shoulder of each button hanging on its respective slide.

The *LEVER* is provided with a rounded hook at one end, when the flare is in the trap and the release slide is in the loaded position, the end of this hook engages a projection on the release slide in such a manner that the latter cannot be moved until the lever is pulled.

The *STABILIZER GUARD* is a flat piece of sheet metal, so shaped that its two ends fit between the stabilizers when the flare is in the trap. It is bolted to the bottom casing and acts as a rear support for the flare.

The *SPRING GUIDE* is a fork of steel wire, the ends of which are bent and fastened to the casings by means of two screws. The wire is bent in the center to form two prongs which fit over the flattened surfaces of the striker and thus prevent it from revolving before release from the plane.

A *CONTROL MECHANISM* is provided which consists of a base plate, lever bracket and lever with the necessary washers, studs, etc. The base plate is fastened in a convenient position in the fuselage, a length of cable is attached to the lever and passed through the cable support to the end of the lever on the release mechanism.

To Load.

Pull the operating lever to full firing position and return to its normal position. Place the flare in the trap by inserting the hanger button in their respective holes, at the same time making certain that the prongs of the spring guide are fitted over the flattened portion of the striker. Now slide the flare forward into loaded position until the hanger buttons are at the bottom of the narrow grooves in the bottom casing. This may be tested by attempting to slide the flare back, if in the correct position it cannot be moved without pulling the release lever.

Remove the cotter pin from the striker of the flare.