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SPRING CLIP FOR MORTAR CHARGES

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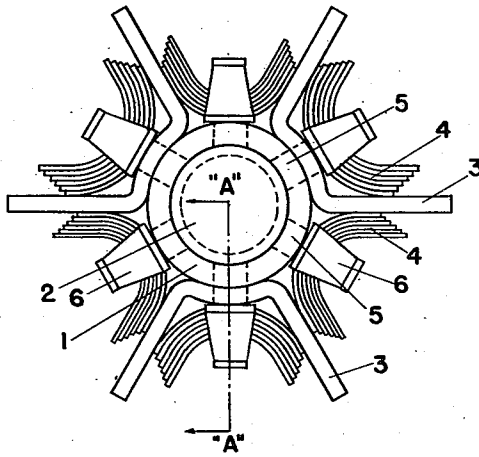


FIG-1

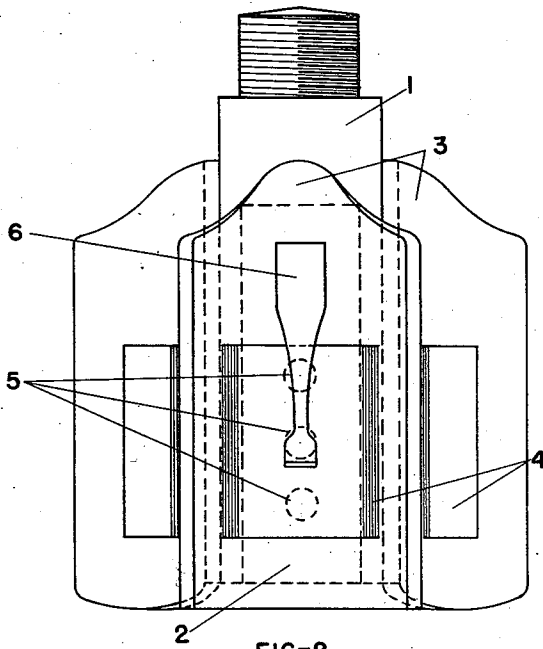


FIG-2

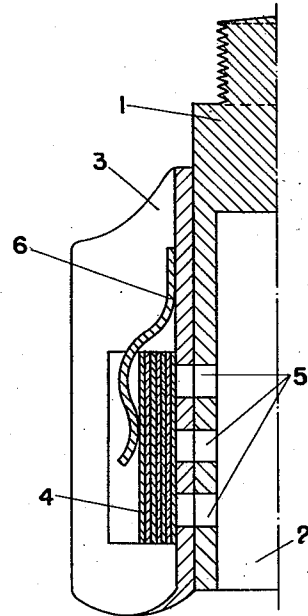


FIG-3

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## SPRING CLIP FOR MORTAR CHARGES

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3 Claims. (Cl. 102—12)

This invention relates to an improvement in the construction of a trench mortar projectile and more particularly to an improved method of maintaining the propellant powder charge of the projectile in position.

The trench mortars now in use are muzzle loading weapons that fire projectiles which are designed and constructed in a manner that provides means whereby the propellant powder charge in the form of increments may be attached adjacent to the breech end of the projectile. The trench mortar projectile is often equipped with fins at its breech end which increase the stability of the projectile in flight. The usual method of positioning the propellant powder increments on the projectile has been to slot the fins and place the opposite edges or corners of the propellant increments in the slots of adjacent fins. This method necessitates rigid control of the size and design of the propellant increments, to prevent them from being shaken from their position during handling or transportation. Further, unless the size and design of the increments are closely controlled, it is found that when inserting increments in the slots from both sides of the fins it is sometimes difficult to load one increment without knocking the adjacent increment from its position.

A modification of a finned projectile includes fins with longitudinal ribs in place of slots. The propellant powder increments are butted against these ribs and thus held in place, but this type projectile needs increments of exact size to prevent the accidental removal of the increments by jarring or any other sudden motion of the projectile.

The presence of slots in the fins or of ribs on the fins detract from the streamlining and cause poorer stability in flight than solid fins.

The propellant increments now in use consist either of a capsule filled with granulated smokeless powder or of a bundle of sheets of smokeless powder. The size and design of each of these two types of propellant increments are based upon the type of fins, size of projectile and ballistics required of the trench mortar.

The object of this invention is to provide a method of attaching propellant powder increments to a trench mortar projectile by which the increments will be firmly held in place.

A further object is to provide a method of holding these propellant increments in place that allows the easy attaching or detaching of the increments to the projectile so as to vary the range at any time.

A still further object is to provide a method of holding the propellant increments in place which will not detract from the stream-lining of the projectile. Other objects will appear hereinafter.

Now in accordance with this invention the method of positioning propellant powder increments upon the breech end of a trench mortar projectile has been improved by the addition of a spring clip or clips to hold each increment in place. The firmly held increments may be easily removed or replaced under the spring clip with a minimum of trouble and effort. Further, the increments during storage and transportation will not be shaken from their position as is often found to be the case when the powder increments are held in place by the use of slotted or ribbed fins.

Now having indicated in a general way the nature and purpose of this invention there follows a more detailed description of preferred embodiments thereof, with reference to the accompanying drawing in which:

Figure 1 is a plan view of the breech end of a trench mortar projectile.

Figure 2 is an elevation view of the breech end of the trench mortar projectile shown in Figure 1.

Figure 3 is a half sectional view along AA' of the breech end of the trench mortar projectile shown in Figures 1 and 2.

The figures of the drawing show only the breech end of a complete trench mortar projectile but the following description will refer at times to the entire projectile. A complete projectile would consist of a shell body loaded with a high explosive; into the top end of this shell body would be screwed a fuse while into the bottom end of the shell body would be screwed the breech end depicted in the drawing of this application and to which this invention relates.

The breech end of the trench mortar projectile is comprised of a tubular piece of metal 1 with a central bore 2 of sufficient diameter to allow the insertion of a 12 gauge shot shell loaded with smokeless powder. Equally spaced about this tube 1 is attached six fins 3 to assure stability of the projectile in flight. The propellant powder charge for the projectile is placed in increments 4 between the fins 3 spaced about the tubular breech 1. The ignition of these powder increments 4 is accomplished by the firing of a shot shell inserted in the central bore 2 of the tubular breech 1. The shot shell fires when the projectile after being dropped into the muzzle of a trench mortar reaches the breech of the mortar

and strikes a stationary firing pin. The smokeless powder in the shot shell produces flames which flash through ignition holes 5 in the tubular breech 1 and ignite the propellant powder increments 4.

The number of propellant powder increments 4 control the range of the projectile and are held in place on the tubular breech 1 by spring clips 6 located between the fins 3 and in such a position that the powder increments 4 are held directly over the ignition holes 5. The general shape of the clip 6 may be as shown in the drawing, but any convenient size and shape that may be desirable to efficiently hold the powder increments 4 in place is contemplated. We may use, for example, a spring clip made of wire like piano wire thus further insuring streamlining of the projectile or we may use flat spring stock of any desirable width and thickness.

The use of the spring clip presents many advantages among which are the positive attachment of the powder increments to the projectile; the ease of attaching and detaching the increments; the lack of necessity for slots or ribs on the fins, thus improving streamlining; the possibility of using powder increments that may be irregular or somewhat off size; and the better control of the increments position in regard to the ignition holes.

The use of either capsules of powder or bundles of sheet powder is made much easier with these clips. The sheet powder is easier to attach to the projectile and also has more efficient storage properties than the capsules of powder, due to the possibility of the capsules cracking, breaking, and spilling the granulated powder. The use of sheet powder is gradually replacing the use of capsules of powder and the design of the clip of the invention is primarily for use with sheet powder.

The fastening of the clip to the projectile may be accomplished in any of numerous ways such as staking or wedging in drilled holes, spot welding, riveting, soldering, or other suitable means readily apparent to one skilled in the art.

Modifications of the position of the clip on the projectile may be made and such modifications are to be understood to be within the scope of this invention, for example, we may provide more than one clip to hold a powder increment by locating clips on either or both the tubular body or fins then inserting the opposite edges of the increment under the clips; further, the clip or clips may be attached near the bottom of the tubular breech so as to necessitate putting the powder increments in from the top thereby preventing any chance of the increment being brushed out from under the clip.

The clips described hereinbefore have all been made of resilient stock but by proper shaping and

positioning of the clip, I have found that clips of non-resilient stock may be used to hold the propellant powder increments in position on the projectile. While non-resilient clips may be used, I prefer to use spring clips as they afford a more positive attachment of the increment to the projectile.

The spring clips of this invention are particularly advantageous in positioning powder increments between the fins of finned trench mortar projectiles, but they may also be used to position the powder increments upon or about the breech end of a trench mortar projectile without fins. Therefore it is to be understood that I contemplate locating clips upon any trench mortar projectile at any suitable place, said location being controlled by the position in which it is desirable to attach the propellant powder increments.

Examples of a few weapons of the trench mortar type which may use this invention are the 3" Stokes, the 81 mm. trench mortar, and the 4.2" chemical mortar.

It will be understood that the details and examples given hereinbefore are illustrative only, and in no way limiting on my invention as broadly described hereinbefore and in the appended claims.

What I claim and desire to protect by Letters Patent is:

1. In a trench mortar projectile having a tubular breech end, a clamping member for positioning a propellant charge, which comprises a strip of resilient material extending adjacent the breech, said strip having one end thereof fixed to said breech and its other end in resilient contacting relation with respect to said breech and adapted to retain a propellant charge.

2. In a trench mortar projectile having a tubular breech end, a clip comprising a strip of resilient material extending substantially longitudinally with respect to said breech end, said strip having one end secured to the exterior of said breech and having its other end in resilient contacting relation with said breech and adapted to engage a propellant charge and retain it against the said breech.

3. In a trench mortar projectile having a tubular breech end, a clip comprising a resilient metal strip extending substantially longitudinally with respect to said breech, said strip having one end securely attached to said breech and having its other end freely projecting along said breech in clamping relation therewith and adapted to maintain a propellant charge of powder between said breech and said strip.

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