June 6, 1950 W. G. AXTELL ET AL 2,510,056

BOMB SALVAGE

Filed Feb. 12, 1945

FIG. 1.

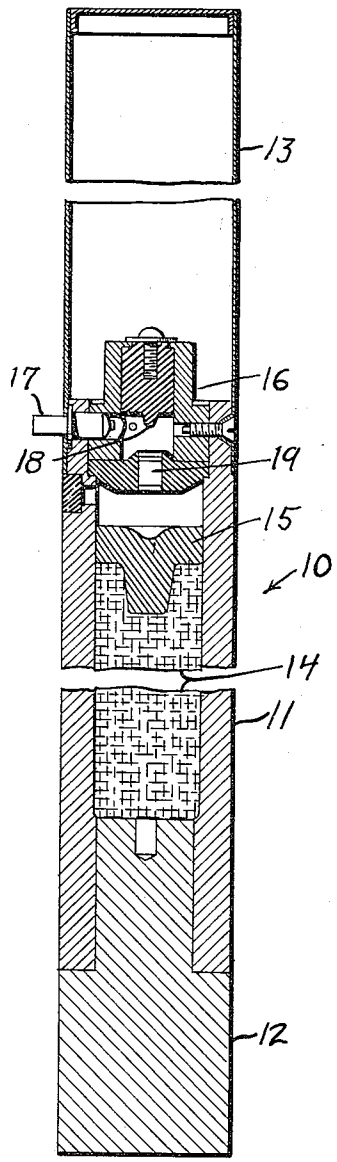


FIG. 3.

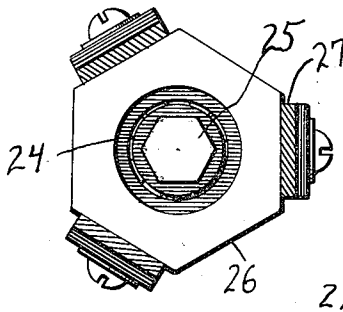


FIG. 5.

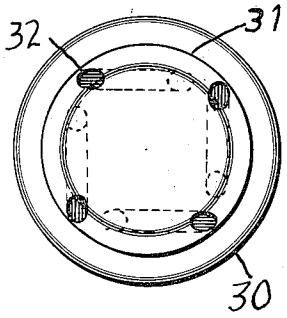


FIG. 4.

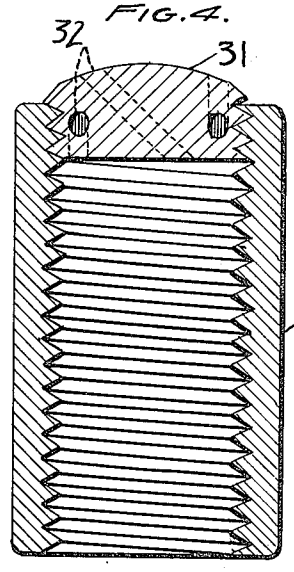
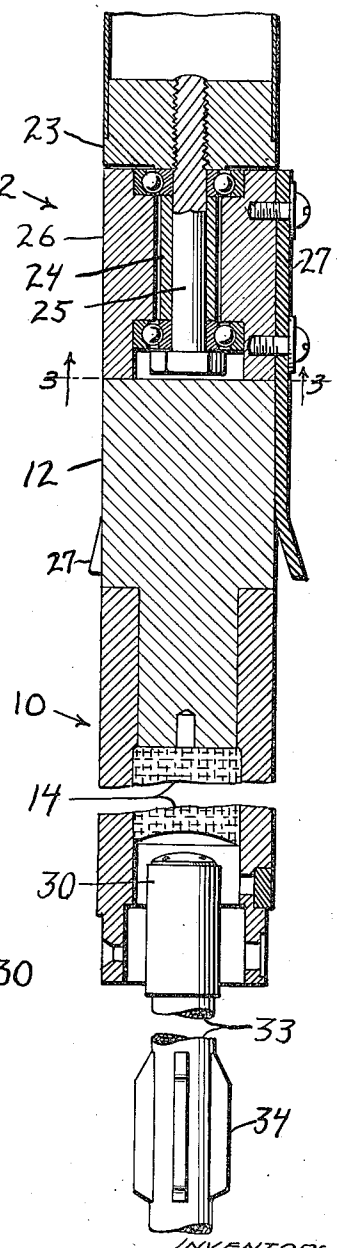


FIG. 2.



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BOMB SALVAGE

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2 Claims. (Cl. 86—1.5)

(Granted under the act of March 3, 1883, as amended April 30, 1928; 370 O. G. 757)

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The invention described herein may be manufactured and used by or for the Government, for governmental purposes, without the payment to us of any royalty thereon.

This invention relates broadly to a method and apparatus for removing packed, granular fillings from containers, and has particular relation to a method and apparatus for removing packed, granular, incendiary fillings from incendiary bombs.

During the present war, incendiary bombs of the Thermit-type have been made up in the millions. Thermit-type incendiary bombs, in general, contain a Thermit-type charge or filling packed in a bomb body which is preferably made of magnesium, but which may be made of other metals or plastics. The other main type of incendiary bomb is that containing a fluid or gelled incendiary charge such as gasoline, oil, or gelled gasoline and oil.

Very large numbers of incendiary bombs of the Thermit-type at times become built up in storage, and often it is desirable to replace the incendiary fillings of these bombs, either because improved types of incendiary fillings had been made available, or because the fillings with which the bombs were originally provided have deteriorated over long periods of storage.

Accordingly, the object of this invention, generally stated, is to provide a method and apparatus whereby the packed, Thermit fillings can be safely and economically removed from the bomb bodies, thereby permitting large numbers of these bombs to be salvaged and refilled with improved or fresh fillings.

Other and more specific objects of the invention will, in part, be obvious, and will, in part, appear hereinafter.

For a more complete understanding of the nature and scope of this invention, reference may be had to the following detailed description thereof taken in conjunction with the accompanying drawing, in which:

Figure 1 is a vertical, sectional view of a representative type of an incendiary bomb of the Thermit-type;

Figure 2 is a partial, vertical, sectional view showing the incendiary bomb body of Figure 1 disposed in apparatus for removing the incendiary filling;

Figure 3 is a sectional view taken on line 3—3 of Figure 2;

Figure 4 is an enlarged, vertical, sectional view of a nozzle shown in Figure 2, forming a part

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of the apparatus for removing incendiary fillings; and

Figure 5 is a top plan view of the nozzle shown in Figure 4.

Referring to Figure 1 of the drawing, an incendiary bomb is designated, generally, at 10 comprising a hexagonally shaped body 11 provided with a cast iron nose 12 at its lower end and a sheet metal tail 13 at its upper end. The bomb body 11 is filled with an incendiary charge 14 of a Thermit-type composition consisting essentially of granular aluminum and iron oxide, together with an oxidizing material such as barium nitrate.

The filling 14 is loaded or packed into the body 11 under substantial pressure. For example, the charge 14 may be packed in four equal increments under a dead load pressure of about 6000 to 7000 pounds per square inch.

A first fire mixture 15 is pressed into the upper end of the charge 14. The first fire mixture is adapted to be ignited from an igniter assembly indicated generally at 16. For present purposes the details of the construction of the igniter 16 are not important. Briefly, the igniter is provided with a safety pin 17 which assumes the armed position, as shown, when an individual bomb 10 separates from the cluster in which this type of bomb is normally dropped. Upon impact of the bomb 10, the firing pin 18 strikes a primer 19 which flashes into the first fire mixture 15, which in turn ignites the incendiary charge 14.

As indicated above, large stores of incendiary bombs of the type shown in Figure 1, have been stored up and have become more or less obsolete either because their incendiary filling 14 has deteriorated, or improved types of filling have been developed. As stated, this invention is primarily concerned with efficient, safe, and economical method and apparatus for removing incendiary fillings, such as the filling 14 shown in Figure 1.

Referring particularly to Figure 2 of the drawing, the bomb 10 of Figure 1, with tail and igniter assembly removed, is shown held in a rotatable holder or chuck, indicated generally at 22. The chuck 22 consists of a stationary support member 23 underneath which a rotatable bearing 24 is held in place by a screw 25, as shown. A hexagonally shaped rotatable collar 26 is supported on the outer portion of the bearing 24 so that it may be freely rotated about its longitudinal axis.

Three equally spaced clips 27 are secured to the sides of the collar 26 as shown in Figures 2 and 3. The three clips 27 extend beneath the

lower end of the member 26 so as to grip and hold the nose 12 of the bomb 10 in the inverted position, as shown.

The incendiary filling removal apparatus is completed by a nozzle 30 shown in operating position in Figures 4 and 5. The nozzle 30 is provided with a removable end 31 which has four orifices or holes 32 extending therethrough from top to bottom at an angle of about 45°, as shown in Figures 4 and 5. The angle can be varied, but should preferably be substantially less than 90°. The holes or orifices 32 are so disposed that fluid jets emerge therefrom at an upward angle and also tangentially to a family of circles whose planes are normal to the longitudinal axis of the bomb whose centers lie on said axis and whose circumferences lie in the surface of a right circular cone co-axial with said surface. Fluid under pressure, such as water, air, or oil, is delivered to the nozzle 30 through a conduit 33. Immediately below the connection of the conduit 33 with the lower end of the nozzle 30, it may be provided with flutes 34 which serve to scrape or remove small deposits of the incendiary filling from the sides of the bomb body.

In operation, the nozzle 30 is brought up to the lower end of the packed incendiary filling 14 and fluid under pressure is supplied thereto. The four jets of fluid, preferably water, which may or may not be heated, emerge at high velocity at the end of the nozzle 30 and impinge on the incendiary filling. The force with which the streams or jets hit the packed filling 14 is sufficient to eat into and simultaneously remove and wash away the filling. The position of the nozzle 30 is progressively raised as the filling is removed and the flutes 34 remove any remaining small patches of the filling from the interior of the bomb body 11.

The tangential impact of the emerging jets upon the filling 14 is sufficient to cause rotation of the bomb 10, thereby promoting removal of the filling. Additional rotation can be obtained by rotating the nozzle 30. As another embodiment, the bomb 10 may be held in a non-rotatable chuck or holder and the nozzle or cutting head 30 may alone be rotated.

The invention as outlined above, has been used on a large scale for reclaiming incendiary bombs that would otherwise have to be scrapped. The method and apparatus provided by this invention have proved to be safe and economical. It will be understood that the invention is not necessarily limited to the removal of incendiary fillings of the type described, but that it can be used in a number of other applications.

We claim:

1. The method of removing a longitudinally shaped, highly packed, granular incendiary filling from a longitudinal bomb body, which comprises, directing a plurality of high velocity fluid jets onto said filling at an angle substantially less than 90° and in a direction tangential to a family of circles whose planes are substantially normal to the longitudinal axis of the bomb body whose centers lie in said axis and whose circumferences lie in the surface of a right angular cone, co-axial with said axis, providing relative rotation between said filling and said jets, and advancing said fluid jets toward the face of said filling as the same is removed.

2. The method of removing a longitudinally shaped, highly packed, granular incendiary filling from a longitudinal bomb body, which comprises, directing a plurality of high velocity fluid jets onto said filling at an angle of about 45° and in a direction tangential to a family of circles whose planes are substantially normal to the longitudinal axis of the bomb body whose centers lie in said axis and whose circumferences lie in the surface of a right angular cone, co-axial with said axis, providing relative rotation between said filling and said jets, and advancing said fluid jets toward the face of said filling as the same is removed.

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