

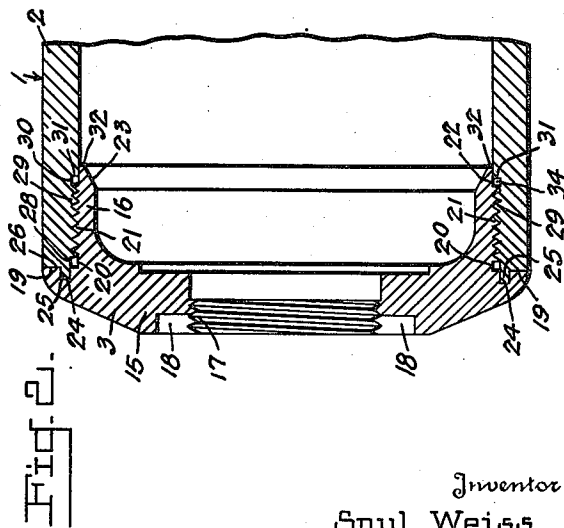
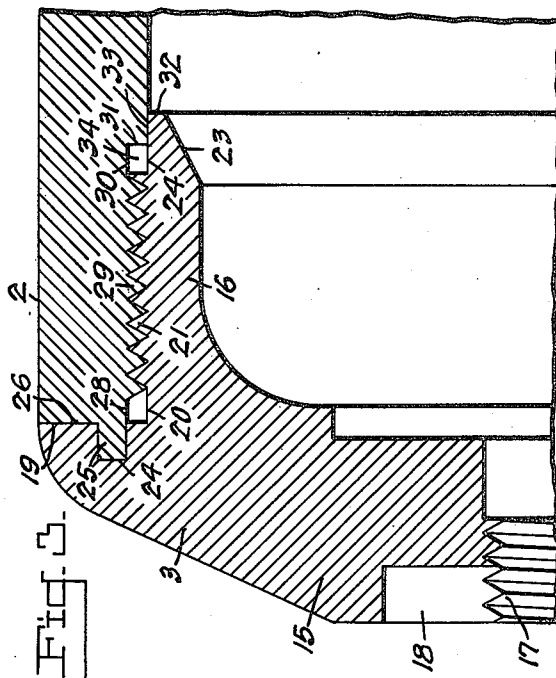
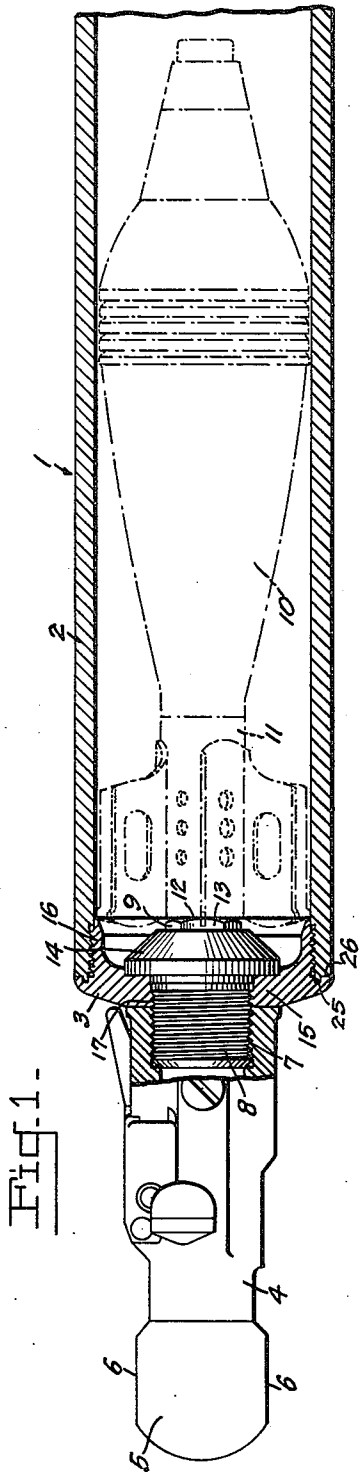
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MORTAR TUBE WITH PLUG TYPE BASE CAP

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MORTAR TUBE WITH PLUG TYPE BASE CAP

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3 Claims. (Cl. 89-1)

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The invention described in the following specification and claims may be manufactured and used by or for the Government for governmental purposes without the payment to me of any royalty thereon.

This invention relates to improvements in artillery and more particularly in trench and field mortars of the type adapted to be assembled, disassembled, manually transported and reassembled in the shortest possible time.

It has long been recognized by those skilled in the design and production of mortars, that they must be made of the lightest possible construction capable of withstanding the concussion and shocks incidental to employment in battle. Consequently this art is crowded and it is now exceedingly difficult to reduce by a single ounce the weight of a modern mortar without increasing the hazard of it exploding in action. Despite this situation, it is a major purpose of the present invention to provide a mortar of lighter but equally dependable construction.

Another object is the provision of a mortar having self-sealing means whereby the gas pressure and the heat energy generated during the firing of the mortar may be utilized to prevent the escape of the gases from the rear end portion of the mortar tube.

The additional objects, advantages and novel features of this invention will become apparent as the specification proceeds and from the construction, arrangement and combination of parts illustrated in the accompanying drawings, in which:

Figure 1 is a fragmentary, partly elevational, partly cross-sectional view of a mortar embodying a preferred form of this invention,

Figure 2 is a cross-sectional view showing the construction of the mortar cap and adjacent portions of the mortar tube, and

Figure 3 is an enlargement of an upper portion of Figure 2.

Referring now to the above-mentioned drawings, the mortar, generally indicated by the numeral 1, includes among other elements a mortar tube 2, a base cap 3 and a firing mechanism housing 4. The rear portion of the housing terminates in a ball 5 having opposite flats 6 whereby the ball is adapted to be mounted in a socketed plate (not shown) which serves as the base of the mortar.

The upper end of this housing is internally recessed and threaded at 7 to receive an externally threaded adapter 8. This adapter is in turn internally threaded to receive a bushing 9 in

which there is slidably mounted a firing pin (not shown) whereby the percussion cap (not shown) of the mortar projectile 10 is detonated when the mortar is fired. The extreme front end of this bushing is preferably of sufficient area to completely support the tubular rear end portion 11 of the projectile and is provided with a smooth flat surface 12 extending in a plane at right angles to the longitudinal center line of the tube in order that the projectile may be mounted flush with this flat surface and in a more complete alignment with the longitudinal axis of the mortar tube when the mortar is fired.

Referring again to Figure 1, it will also be seen that the front end portion 13 of the bushing extends inwardly into the mortar tube beyond the forward end portion 14 of the adapter and is formed polygonally or nut-shaped to permit the bushing to be tightly screwed in its assembled position on the adapter with any suitable socket wrench.

The mortar base cap 3 consists of a circular base portion 15 and a circular wall portion 16 formed integrally with each other. This base portion has a central threaded open portion 17 whereby the cap may be threadedly connected to the adapter. The base portion is, for convenience in assembling, preferably provided with diametrically opposed recessed portions 18 which are provided for the purpose of receiving the pins of a pin wrench (not shown) whereby the cap base may be screwed on the adapter. For purposes which will become more apparent as this specification proceeds, the cap wall 16 (see Figure 2) is machined to provide a shoulder 19, a cut down portion 20, a raised threaded portion 21, a second cut down portion 22, and an internally beveled end portion 23.

The shoulder 19 is recessed to provide an annular slot 24. The slot 24 is adapted to snugly receive an annular projection 25 extending rearwardly from the rear edge 26 of the mortar tube. This rear end portion of the tube is machined internally to provide a cut-away portion 28, a raised threaded portion 29, a second cut-away portion 30 and an adjacent shoulder 31.

In the assembled mortar, the above described arrangement provides an extremely efficient means whereby the highly heated gases are prevented from escaping between the mortar tube and the cap. Referring now particularly to Figure 3, it will be seen that the front part 32 of the beveled portion 23 contacts the adjacent inside surface of the mortar tube at 33 while the mid-portion of the beveled portion is opposite to a

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cavity 34 provided by the machined down portions in the tube and the cap immediately in rear of the shoulder 31. When the projectile is being fired from the mortar, an exceeding high but momentary hot high gas pressure is, of course, generated in the rear of the projectile and this pressure forces the weakened beveled portion outwardly toward the cavity and that portion of the inside surface of the tube opposite the front part 32 of the internally beveled circumferential portion of the wall of the cap. Since the air in this cavity cannot effectively oppose this internal pressure, this pressure is transmitted to the front part 32 of the beveled portion where it is added to the force exerted outwardly against the front part 32 and causes that part to press with a substantially greater force against the adjacent inner surface of the tube. This arrangement, therefore, provides a uniquely effective gas pressure-operated seal which prevents the heated gases from escaping outwardly past the beveled portion 23.

Reference is now made (see Figure 3) particularly to the annular projection 25 of the tube in the annular slot of the mortar cap and to the well known fact that, during firing, the rear half portion of a mortar tube is more highly heated than the cap portion. Because of this more highly heated condition of the tube, its projection 25 is both pressed downwardly into the slot 25 and outwardly against the adjacent portion of the cap and thereby provides an effective thermally operated seal whereby a second barrier is presented to the high pressure gas seeking to escape between the tube and the cap.

From the foregoing it will become apparent that the present invention provides both a pressure operated and a thermally operated sealing means whereby the mortar is greatly strengthened where the high pressure gases are most likely to escape from the rear end portion of the mortar tube. It is also apparent that the mortar cap can safely be made both smaller and lighter because the cap is operatively connected to the inside wall portion of the mortar tube instead of being secured in the conventional manner to the outside of this tube. The connecting of the cap to the inside wall instead of the outside wall also provides the additional advantage that no raised externally threaded portion is required on the outside wall of the tube for threadedly connecting an internally threaded cap to the tube. The elimination of this necessity for providing this raised externally threaded portion on the mortar tube also eliminates the necessity for reducing the outside diameter of the rest of the tube as is done in conventional mortar construction.

It will of course be understood that only a preferred form of the present invention is herein disclosed and other modifications may be made within the spirit of this invention and the scope of the appended claims.

I claim:

1. A mortar of the class described, said mortar including a hollow metallic tube, a rear end portion and a cap, said cap having a circular base

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portion and a circular longitudinally extending wall portion, said base portion being threadedly secured to said rear end portion, said extending wall portion being threadedly connected by an integral external threaded portion to the inside surface of said tube and being spaced apart from said tube at either end of the threaded portion, said wall portion terminating inside of said tube in an internally beveled end portion extending from one end of said threaded portion to the inside surface of said tube and forming a circular inclosed annular recess between the wall and the cap.

2. A mortar of the class described, said mortar including a hollow metallic tube, a rear end portion and a cap, said cap having a base portion and a longitudinally extending wall portion, said base portion being threadedly secured to said rear end portion, said wall portion being threadedly connected by an integral external threaded portion to the inside surface of said tube and being spaced apart from said tube at either end of the threaded portion, said wall portion terminating inside of said tube in an internally beveled end portion extending from a position parallel to one end of said threaded portion to the interior surface of said tube and forming a weakened section coincident with the portion spaced apart from said tube, said cap having an annular radially projecting shoulder provided with an annular longitudinally and rearwardly extending slotted portion, said tube having an annular end portion extending into said slotted portion.

3. In a mortar of the class described, a rear end portion, a cap rigidly secured to said rear end portion and being provided with an outwardly projecting external threaded portion, and a tube having an inwardly projecting internal threaded portion, said cap and said tube being threadedly connected together by said threaded portions and forming hollow ring adjacent either end of said threaded portions, said cap extending inwardly into said tube and terminating beyond said rings, the portion of said cap terminating beyond said rings being provided with an internal bevel extending rearwardly and inwardly to the rear of one of said rings.

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