Dec. 22, 1953 H. G. TOWNER 2,663,068

METHOD OF COLD EXTRUDING A PROJECTILE WITH A ROTATING BAND

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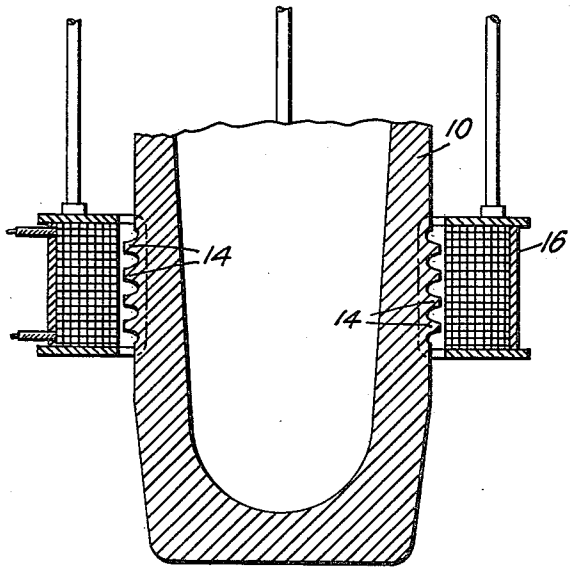


Fig. 1.

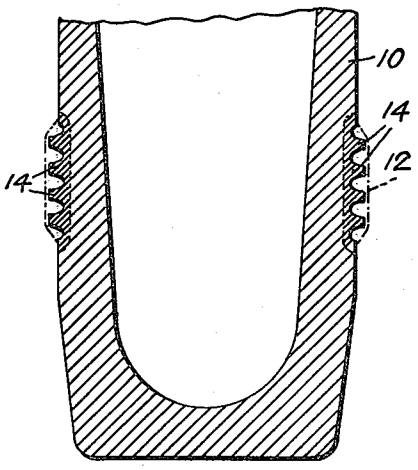


Fig. 2.

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METHOD OF COLD EXTRUDING A PROJECTILE WITH A ROTATING BAND

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5 Claims. (Cl. 29—1.2)

(Granted under Title 35, U. S. Code (1952), sec. 266)

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

This invention relates to the integral formation of rotating bands on shell or projectile bodies of the type driven through a rifled gun bore.

It is a principal object of this invention to disclose a simple procedure for providing shells or projectiles formed by the cold extrusion method with a zone or section that may satisfactorily serve as a rotating or driving band.

Referring to the drawing:

Fig. 1 is a fragmentary vertical sectional view showing the cold extruded base portion of a shell body disposed within an induction heating coil.

Fig. 2 is a fragmentary vertical sectional view showing the same shell body portion after the rotating or driving band zone thereof has been suitably softened.

As shown in Fig. 2 the shell or projectile portion 10 is cold extruded from a blank of relatively low carbon steel such as cast or wrought steel so as to provide a zone 12 indicated in dotted outline from which the rotating or driving bands 14 may be formed for a purpose well understood in the art.

Although several advantages accrue from the cold extrusion of shell or projectiles, such as the practical elimination of scrap losses, increasing the physicals of a relative low carbon unalloyed steel to those heretofore obtainable only by heat treated alloyed steels and reduction of equipment required in a production line, certain of these advantages would be lost if the rotating or driving bands were applied in the conventional manner.

In order to preserve all of the advantages gained by cold extrusion I have formed the rotating band integral with the shell or projectile body portion by or in the cold extrusion process, however, the high physicals of the rotating band so formed are objectionable in that it would be necessary to preengrave the band before it would become practical or economical to drive the same through a rifled gun bore.

For the purpose of obviating the objectionably high physicals of the rotating band acquired through the formation thereof by the cold extrusion process I subject the zone 12 to a controlled and localized softening or annealing process by means of a high frequency induction heating source 16 so as to soften the zone 12 to a controlled degree as indicated in Fig. 2.

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In the claims, where reference is made to heating or annealing the rotating bands or band means, it will be understood that this includes also the annealing of the metal in a zone of the projectile proper at the base of the bands, as indicated by the more densely shaded areas of Fig. 2.

What is claimed is:

1. The method of forming a rotating band upon a steel projectile which comprises the steps of cold extruding the rotating band integral with the projectile and subsequently annealing the area only of said rotating band to an extent adapted to be engraved by the rifling of a gun bore.

2. That method of producing a one-piece projectile for a rifled gun, comprising, cold-extruding a blank of low-carbon steel to produce a hollow projectile having integral rotating bands, and subsequently annealing said bands only.

3. The method of producing an ordnance projectile for a rifled gun comprising cold-extruding a steel blank to form a casing having integral rotating bands, and subsequently heating by a predetermined, readily controllable amount the area of said bands only to anneal the same.

4. The method of producing a projectile for a rifled gun from a low-carbon steel blank comprising the steps of forming said blank by cold extrusion into a hollow projectile having circumferentially outstanding rotating band means for cooperation with the rifling of the gun, and heating only the area of said band means to a predetermined depth, to anneal the same.

5. The method of producing a projectile for a rifled gun from a low carbon steel blank comprising the steps of forming said blank by cold extrusion into a hollow projectile having circumferentially protruding rotating band means for cooperation with the rifling of the gun, and induction heating only the area of said band means to a predetermined extent, to anneal the same.

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