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CARTRIDGE CASE AND METHOD OF MAKING SAME

Filed June 12, 1940

Serial No.
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Fig. 1

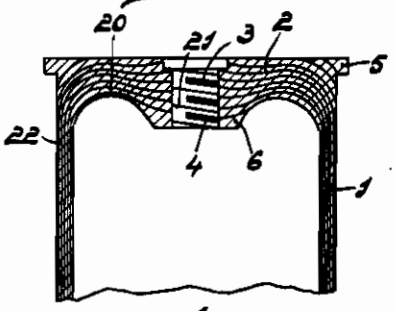


Fig. 2

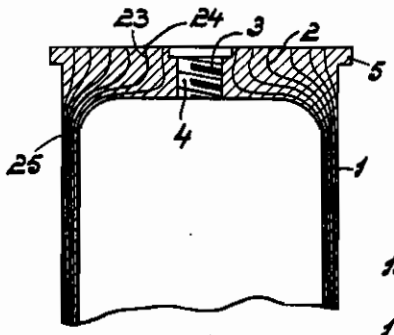


Fig. 3

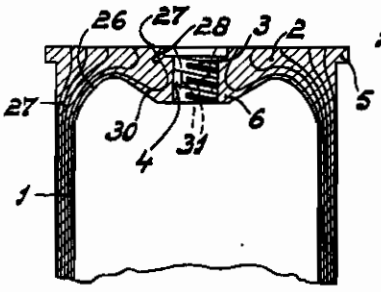


Fig. 4

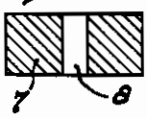
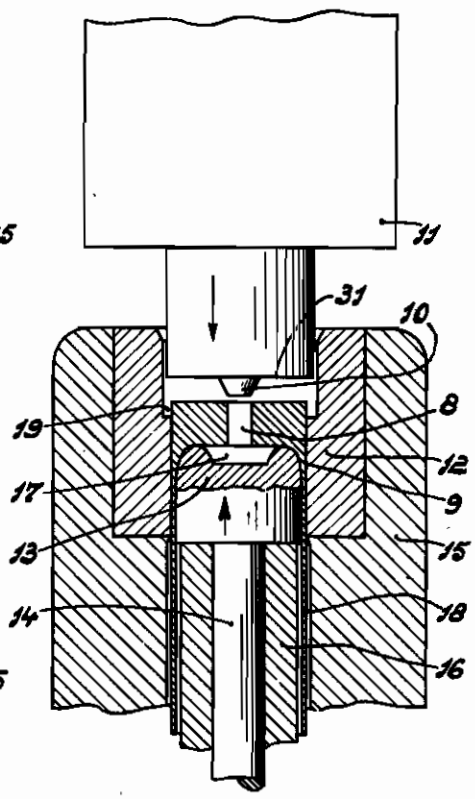


Fig. 5



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ALIEN PROPERTY CUSTODIAN

CARTRIDGE CASE AND METHOD OF MAKING SAME

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My invention relates to cartridge cases which are provided at their bottom with a central aperture for receiving a primer, and to a method of making such cases and reconditioning the same.

Such cases, which are used, for example, for cartridges having a diameter greater than about 2 cms., are subjected during the firing to pressures exceeding about 2,000 kgs. per sq. cm. Although the case fits snugly into the bore of the gun, it must be capable of resisting the deformation forces exerted on it during the firing and also must be so resilient that it does not become jammed in the bore due to permanent deformation.

It has been the general practice to form such cases by subjecting a brass plate to a series of drawing operations to thereby form a cup-shaped body having a flat or slightly-curved bottom, and then pressing the end to produce an internal boss and an outer rib. The bottom portion was then provided with a central threaded hole to receive the primer. In cases made in this manner the flow-lines of the metal have one of their ends at the surface of the central hole and then extend substantially parallel to the outer surface of the bottom of the case toward the side surface of the case.

The main object of my invention is to improve the mechanical properties of such cases.

A further object is to provide an improved method of making such cases in mass production.

A still further object is to provide a case which can be readily and inexpensively reconditioned.

Further objects and advantages of my invention will appear as the description progresses.

In accordance with the invention I so form the case that the flow-lines of the metal, as taken in a section through the longitudinal axis of the case, have one end at the outer surface of the bottom of the case and extend through the bottom portion and then through the side portion with their other ends in this latter portion.

When the cartridge case of my invention has the same shape as the cases at present used, i. e. has an internal boss surrounding the central hole in the bottom, I prefer to so form the case that the flow-lines of the metal in the bottom portion when taken in a plane through the longitudinal axis of the case, have an S shape. More particularly, these lines have one end at the outer surface of the bottom portion, curve down into the part of the boss adjoining the hole, then curve in the other direction through the outer portion of the bottom between the boss and the peripheral surface of the case, and have their other ends in the side wall of the case.

I prefer to form the case according to the invention by a pressing process at a low temperature in which a pre-shaped case having a flat bottom provided with a central hole is pressed to form the boss on the inner surface of the bottom. The pre-shaped case may be extruded from a thin circular plate. The material used for the case depends upon the conditions under which it will be used, but I have found that in most instances very satisfactory results are obtained not only with brass, zinc or the like, but also with light metals such as aluminium and alloys thereof.

In order that my invention may be clearly understood and readily carried into effect, I shall describe the same in more detail in comparison with the prior art and with reference to the accompanying drawing in which:

Figure 1 is a sectionized view of a portion of a cartridge case according to the prior art,

Fig. 2 is a sectionized view of a portion of a cartridge case according to my invention,

Fig. 3 is a sectionized view of a portion of a cartridge case according to another embodiment of my invention,

Fig. 4 is a sectionized view of a slug for making a cartridge case, and

Fig. 5 is a sectionized view of a pressing device for producing the bottom-piece of the cartridge cases according to the invention.

The prior art cartridge case illustrated in Fig. 1 has a slightly tapering side-wall portion 1 with cylindrical contours, and a bottom portion 2 provided with a boss 6. The portion 2 is provided at its center with a bore 3 having internal screw threads 4 for the attachment of a primer or percussion cap (not shown).

The flow-lines of the metal at the section shown are made visible in known manner by etching the polished surface for example with nitric acid, hydrochloric acid or hydrofluric acid. As shown, the flow-lines of the metal have one end at the surface of bore 3, extend through portion 2 substantially parallel to the outer surface thereof, and then down through the side-wall 1. More specifically, line 26 starts at point 21 on the surface of bore 3 and at a point 22 merges with the remaining flow-lines to extend through the side-wall 1.

The cartridge case shown in Fig. 1 was made, for example, by drawing a sheet of boss into a cup-shaped body and then pressing the bottom of this body to form the boss 6 and a rib 5.

A cartridge case of the structure shown in Figure 1 has the disadvantage that after it has been used, the reconditioning of the same is complicated and expensive. More particularly, when being reconditioned it is necessary to press the case into its correct shape and when this is done the threads 4 are pressed out of shape and it is necessary to re-tap the hole 3. As will be explained in more detail hereinafter this difficulty is not present with the cases of the present invention, because when reshaping such cases the screw threads 4 automatically assume their correct shape and retapping is unnecessary.

Figures 2 and 3 illustrate cartridge cases according to the invention and in these figures the same parts are indicated by the reference numerals used in Figure 1. The case shown in Figure 2 has a shape which is similar to that of Fig. 1 except that the bottom portion 2 has substantially parallel surfaces. As shown the flow lines of the metal have one of their ends at the outer surface of portion 2 and extend outwardly through this portion with their other ends in the side wall 1. More specifically, the line 23 has one end at point 24 on the bottom surface of the case and merges with the other flow lines at a point 25. After a cartridge having such case has been fired, the case can be pressed back into its correct shape and the threads 4 can be used without re-tapping.

The case shown in Fig. 3 has the same shape as the prior art case illustrated in Fig. 1 and has the advantages described in connection with Fig. 2. In Fig. 3 the flow lines of the metal in the section shown have an S shape. More particularly, a flow line 28 has one end at point 27, a curved portion 30 in the boss 6 and a second curved portion 26 in an outer part of the bottom portion 2 and merges at point 27 with the other flow lines. The case shown in this figure can be reconditioned merely by pressing the same into its correct shape and without re-tapping the hole 3.

The method of making the case shown in Fig. 3 will be explained with reference to Figs. 4 and 5. The starting material is a slug 7 (see Fig. 4) provided with a central aperture 8 which slug may be of brass, zinc and the like, of a lighter metal such as aluminium, or alloys thereof. This slug is extruded by means of a suitable extruding machine (not shown) into a cup-shaped body 9 (see Fig. 5). The aperture 8 in the slug serves to center the slug in the extruding machine.

The cup-shaped body 9 is then given the shape of the case shown in Fig. 3 by means of the mould shown in Fig. 5. This mould comprises a matrix 12 supported in a stationary block 15, an upper die 10 having a projection and mounted on a plunger 11 adapted to move in the direction of the arrow, and an ejector 13 supported by a stationary cylindrical member 16. The ejector 13 has a circular rib 17 on its upper surface for the purpose of forming the boss 6 (see Fig. 3).

In operating the device the cup-shaped body 9 provided with the central aperture 9 is arranged in the mould, with its side wall 19 interposed between the peripheral surface of ejector 13 and the inner surface of matrix 13, the inner surface of the bottom of the cup-shaped body 9 engaging the top surface of ejector 13. The upper die 10 is then lowered in the direction of the arrow to press the bottom of the cup-shaped body into the desired form. Thus the edge 5 of the case (see Fig. 3) is formed in the recess 19 and the boss 6 which surrounds the aperture 6 in the bottom of the case is formed in the space within the circular rib 17. When the case had been formed the upper die 10 is raised to such extent as to permit ejector 13 to force the finished case from the top of the matrix. During the formation of the raised edge 5 the material in the bottom portion will be compressed so that the hole 8 will be reduced in size. The shape which the hole 8 assumes during the extrusion is indicated by dotted lines 31 in Fig. 3. The excess material can be removed, for instance by boring or drilling or reaming, to form the hole 3 which is then tapped.

The reconditioning operation of a case may be performed in a press which is partially identical with that shown in Fig. 5. Eventually the surface may be somewhat convex, whereas the circular rib 17 may be somewhat deeper.

Although I have described my invention with reference to specific examples and applications I do not desire to be limited thereto because obvious modifications will present themselves to one skilled in this art.

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