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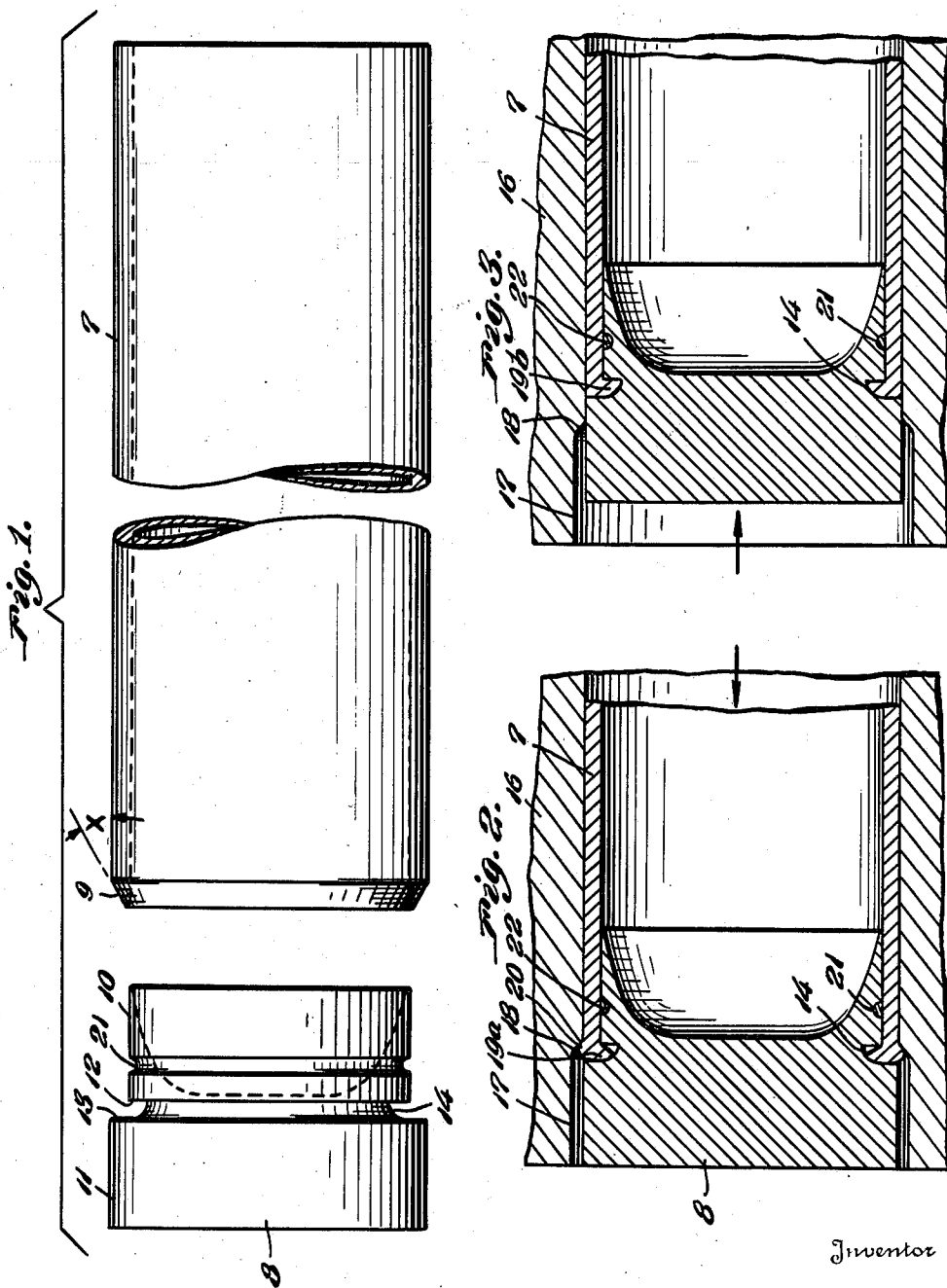
J. F. BABBITT

2,349,840

METHOD OF MAKING CARTRIDGE CASES

Filed July 9, 1942

2 Sheets-Sheet 1



Inventor

John F. Babbitt

Spear, Donaldson & Hall
Attorneys

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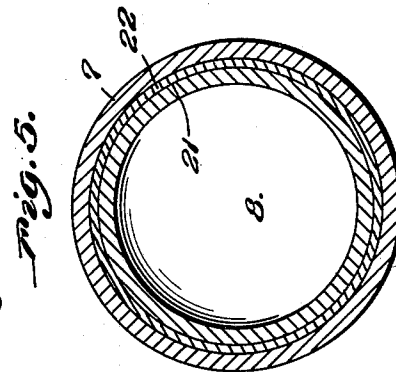
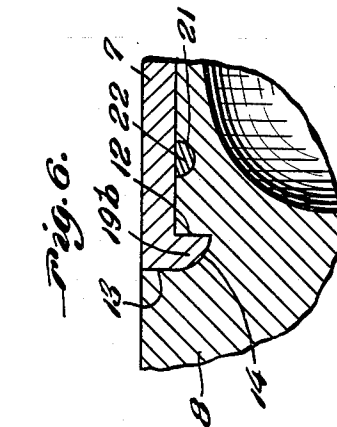
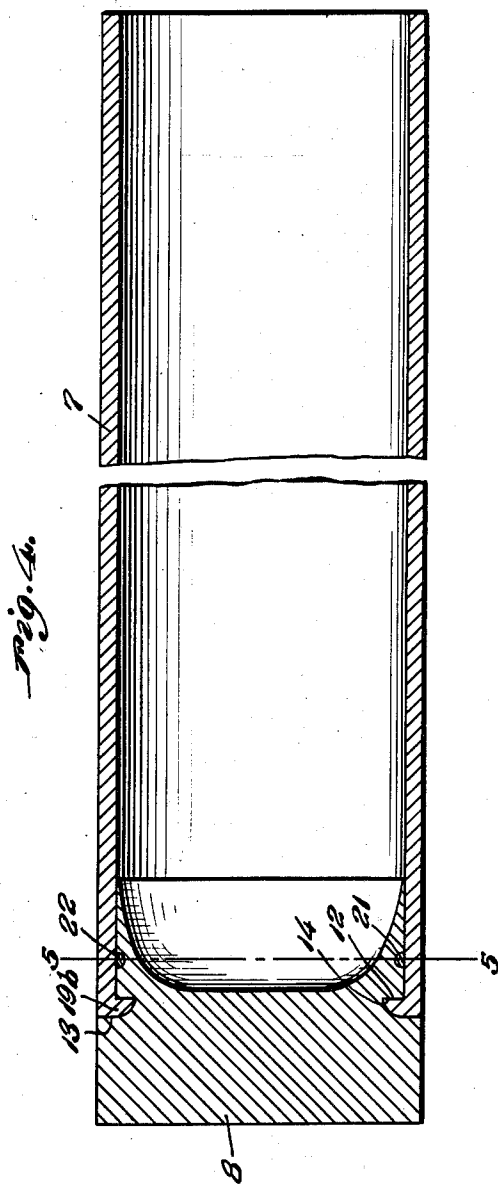
J. F. BABBITT

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2 Sheets-Sheet 2



Inventor

John F. Babbitt

By *Spear, Donaldson & Hall*
Attorney

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METHOD OF MAKING CARTRIDGE CASES

John F. Babbitt, Louisville, Ky., assignor to J. V. Pilcher Mfg. Co., Louisville, Ky., a corporation of Kentucky

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6 Claims. (Cl. 29—1.3)

This invention relates to a method of making a cartridge case, and more particularly concerns a cartridge case having a two-part construction.

Cartridge cases have commonly been constructed of a copper composition, and because such a substance may be readily worked, the cartridge case has been conveniently formed largely by a drawing operation. It is not readily possible, however, to make a cartridge case by this same procedure if the material employed is steel, for the reason that steel may not be readily worked into a final desired shape by a drawing operation.

With the present invention a cartridge case may be constructed of steel and this is made possible by making the case up as an assembly of two elements.

In the accompanying drawings, illustrating a preferred embodiment of the invention:

Fig. 1 is a side elevation of the two elements of the cartridge case prior to their assembly.

Fig. 2 shows an initial step in the assembly of the elements to construct a cartridge case, the parts being in section.

Fig. 3 shows a succeeding step in the construction of the cartridge case, the parts being in section.

Fig. 4 is a longitudinal section through the resulting assembly of the two initial elements.

Fig. 5 is a section on the line 5—5 of Fig. 4.

Fig. 6 is an enlarged section at the joint between the two assembled elements.

The elements from which is made the cartridge case of the invention include a cylindrical sleeve 7 which forms the side wall of the case, and a base plug 8 which partly enters and closes an end of the cylindrical sleeve. These two elements are separately fabricated as shown in Fig. 1, prior to their assembly. The cylindrical sleeve 7 may be merely a cut off portion of a seamless steel tube. Its one end should first be beveled on the exterior as shown at 9, and it has been found preferable that the angle α be on the order of 55°.

The base plug 8 may be readily fabricated from steel by turning it out from bar stock by a lathe operation. This involves the reduction of one end portion 10 to a smaller diameter so that it will tightly fit within the bore of the cylindrical sleeve 7. Both this smaller diameter portion and the larger diameter portion 11 should be of cylindrical formation. The larger diameter portion 11 should be of the same diameter as the outside of the sleeve 7.

At the junction of the larger and smaller di-

ameter portions a groove is formed in the base plug 8. The side wall 12 of this groove which is adjacent the smaller diameter portion 10, lies in a plane which is perpendicular to the axis of the base plug 8. The side wall 13 of the groove which is adjacent the larger diameter portion of the base plug should preferably be substantially at right angles to the axis of the base plug so that it will present a shoulder against which the beveled end of the cylindrical sleeve 7 will abut in the assembly operation. The bottom wall 14 of the groove should be curved so that it merges gradually into the side wall 13, but it may meet sharply with the other side wall 12.

In assembling these two elements the beveled end 9 of the cylindrical sleeve 7 is passed over the reduced portion 10 of the base plug 8 until the beveled end 9 strikes the side wall 13 of the groove. The cylindrical sleeve 7 is then urged in the direction of the arrow with such force against the end wall 13 that the beveled end 9 is upset and enlarged as shown in Fig. 2. Any suitable press or other means may be employed to force the sleeve 7 axially, the base plug 8 being necessarily backed up during this pressing operation.

In this upsetting operation it is desirable that the cylindrical sleeve 7 be located within the bore of a forming block 16 so that the cylindrical sleeve will not become deformed under the endwise force which is applied to it. The bore through the forming block 16 is enlarged at 17 at the portion thereof which lies outwardly from the enlarged part 11 of the base plug 8. A curved formation 18 connects the large bore 17 with the small bore through the block 16 and this curved formation is outwardly from the groove in the base plug 8 during the upsetting action.

The upsetting of the beveled end 9 of the cylindrical sleeve 7 causes this end to turn inwardly and form an internal flange 19a which partly fills the groove of the base plug 8, and also causes an outward bulging action so that an exterior peripheral ridge 20 is formed upon the cylindrical shell. The enlarged bore 17 of the forming block permits the outward bulge of the material to form this exterior ridge 20. The curved formation of the bottom wall 14 of the groove and the beveling of the end of the sleeve at 9 facilitates the in-turning of the beveled end of the cylindrical sleeve 7 to form the flange 19a.

In the succeeding operation the base plug 8 is forced in the direction of the arrow into the interior of the forming block 16 to the position shown in Fig. 3. During this action the move-

ment of the sleeve 7 with the base plug 8 is not resisted. Such inward movement causes the exterior ridge 20 upon the cylindrical sleeve to be forced radially inwardly by the camming action of the surface 18 of the forming block 16. This radially inward movement not only forces the flange 19a deeply into the groove of the base plug 8 but moreover serves to turn the flange against the side wall 12 of the groove. The resulting flange 19b therefore fills the groove in the base plug 8 and seats flat against the side wall 12.

Inasmuch as the best results are obtained if the final flange 19b fills the groove in the base plug 8, this result may be achieved by upsetting the beveled end 9 to such an extent that the combined volume of the ridge 20 and flange 19a is substantially equal to the volume of the final flange 19b. This may be accomplished in practice because it has been found that in the upsetting action the flange 19a is first formed and thereafter the sleeve bulges outwardly to form the ridge 20. The upsetting force is therefore applied until this outward bulge results in a ridge 20 of the size necessary to cause the groove in the base plug 8 to be filled when the ridge 20 is subsequently urged radially inwardly.

The assembled cartridge case which results from this procedure may not be readily separated because the internal flange 19b which is so formed extends perpendicularly within the cylindrical sleeve 7 and engages in flat contact against the end wall 12 of the groove in the base plug 8. The sleeve 7 is therefore in effect hooked into the base plug 8, by the flange 19b. To separate the two parts it will consequently be necessary to shear off this internal flange 19b and inasmuch as the shearing strength of steel is considerable, a strong interlocking connection is established.

Although for purpose of explanation, the side wall 12 of the groove has been shown and described as lying in a plane perpendicular to the axis of the base plug 8, this side wall 12 may be inclined so that it is undercut. With such an undercutting of side wall 12, the flange 19b will be turned inwardly more than 90 degrees to be flat against the wall 12. With such a construction, the sleeve 7 will be more securely hooked to the base plug 8.

As a further feature of the invention, to prevent separation of the two elements of the cartridge case, a channel 21 may be formed in the periphery of the reduced portion 10 of the base plug 8. A brazing wire 22 will be located in this channel 21 before the cylindrical sleeve is passed thereover. After the assembly of the two elements has been completed, sufficient heat is applied to the cartridge case to melt this brazing wire and cause it to flow outwardly between the meeting faces. The two elements will thereby be brazed together to further resist their separation.

The succeeding steps which are performed upon the cartridge case will be the usual ones to give it the desired form and to prepare it for the projectile and firing means.

I claim:

1. The method of making a metallic cartridge case which comprises positioning an end of a cylindrical sleeve in registration with a peripheral groove of a base plug, applying an axially

directed force to upset said end of the sleeve and form an internal flange entering said groove, and applying a radially inwardly directed force to carry said internal flange deeply into said groove and against a side wall of the groove.

2. The method of making a metallic cartridge case which comprises upsetting an end of a cylindrical sleeve adjacent a peripheral groove in a base plug to an extent to form an internal flange partly filling said groove and to form an external peripheral ridge outside of said internal flange, and applying pressure to said ridge to force said flange deeply into said groove.

3. The method of making a metallic cartridge case comprising forcing one end of a cylindrical sleeve over a reduced diameter portion of a base plug and against a shoulder presented by the larger diameter portion of the base plug until said end of the cylindrical sleeve is upset by said shoulder and forms an internal flange partially entering a peripheral groove in the base plug at said shoulder and also forms a ridge around the exterior of the cylindrical sleeve portion outwardly from said groove, and then applying a force directed radially inwardly of the cylindrical sleeve upon said exterior ridge to turn the internal flange against the side wall of the groove which is adjacent the reduced diameter portion of the base plug.

4. The method of making a metallic cartridge case which comprises beveling an end of a cylindrical sleeve, forcing said beveled end axially against a shoulder of a base plug to turn said end inwardly into a peripheral groove of the base portion, said force being applied until the beveled end of the cylindrical sleeve portion partly fills the groove and also until a peripheral ridge is formed exteriorly of the cylindrical sleeve, and then applying to said exterior ridge a force directed radially inwardly of the cylindrical sleeve to turn the internal flange and cause it to abut against a side wall of the groove which is perpendicular to the axis of the base plug.

5. The method of making a metallic cartridge case which comprises, applying an axially directed force to a cylindrical sleeve to upset an end of the sleeve, said upset forming an internal flange partly filling a groove of a base plug in registration therewith and also forming an external peripheral ridge outside of said internal flange, and then applying pressure in an axial direction along said ridge in a direction toward the upset end of the sleeve to exert a camming action forcing the internal flange deeply into said groove and turning the flange against a side wall of the groove.

6. The method of making a metallic cartridge case comprising locating a brazing element within a peripheral channel in a base plug, passing the end of a cylindrical sleeve over said brazing element until said end of the sleeve overlies a peripheral groove in said base plug, upsetting said end of the sleeve to form an internal flange entering said groove, applying a force directed inwardly of said groove to carry said flange deeply into said groove, and heating the cartridge case to cause the brazing element to melt and flow about the junction of the cylindrical shell and the base plug to braze them together.

JOHN F. BABBITT.