T. G. BENNETT.

Manufacture of Cartridge-Shells.

No. 224,765. Patented Feb. 24, 1880.

Fig. 1.

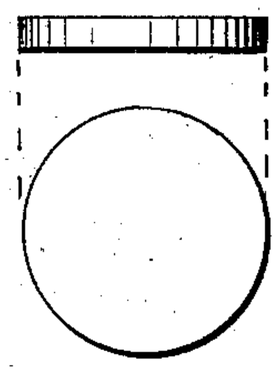


Fig. 2.

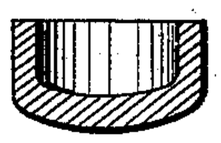


Fig. 3.

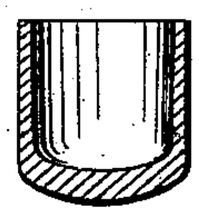


Fig. 4.

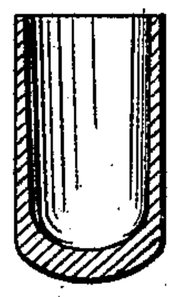


Fig. 5.

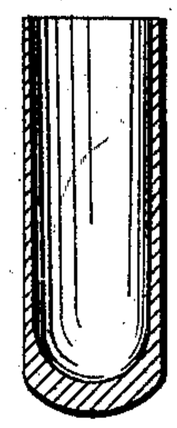


Fig. 6.

Fig. 7.

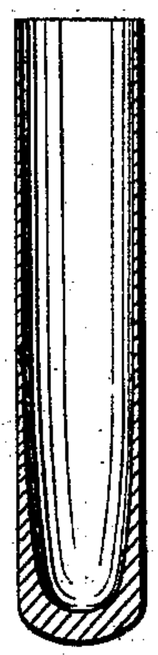


Fig. 8.

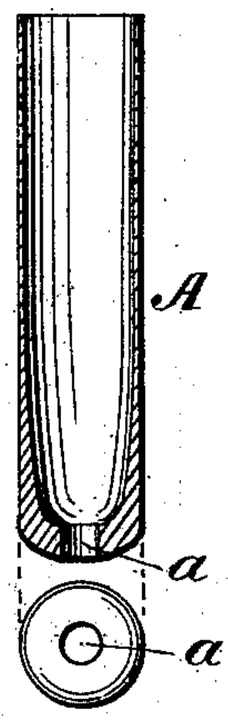


Fig. 9.

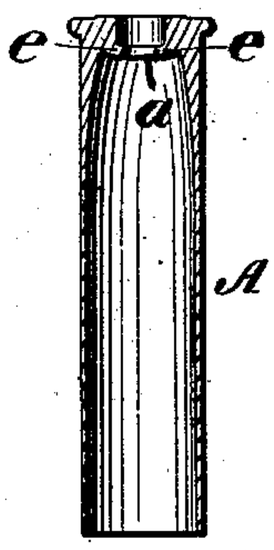


Fig. 10.

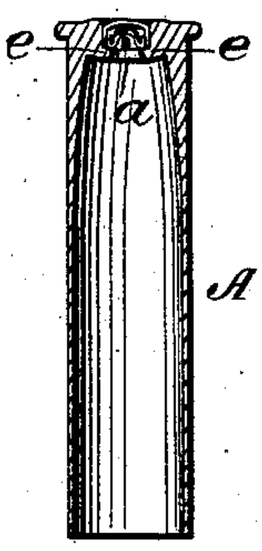


Fig. 11.

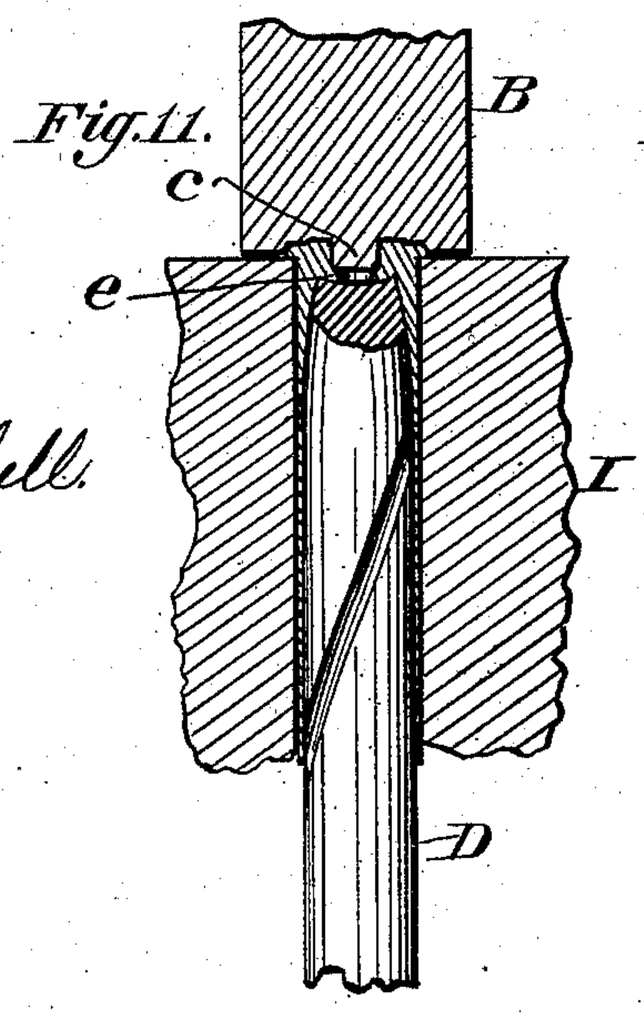
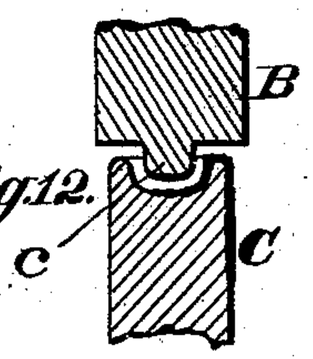


Fig. 12.



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by Dodger & Son.

Attys.

UNITED STATES PATENT OFFICE.

THOMAS G. BENNETT, OF NEW HAVEN, CONNECTICUT, ASSIGNOR TO THE WINCHESTER REPEATING ARMS COMPANY.

MANUFACTURE OF CARTRIDGE-SHELLS.

SPECIFICATION forming part of Letters Patent No. 224,765, dated February 24, 1880.

Application filed June 23, 1879.

To all whom it may concern:

Be it known that I, THOMAS G. BENNETT, of New Haven, in the county of New Haven and State of Connecticut, have invented certain Improvements in the Manufacture of Metallic Cartridge-Shells, of which the following is a specification.

My invention relates to the manufacture of metallic cartridge-shells; and the invention consists in punching or otherwise removing the metal from the closed end of the shell before forming the pocket for the primer, so as to provide a space for the flowage of any excess of metal in the head, thereby relieving the punch and bunter from the excessive strain to which they are ordinarily subjected, and at the same time securing more perfect uniformity in the size of the heads, as hereinafter more fully explained.

In the drawings, Figures 1 to 10, inclusive, represent the shell in its various stages of manufacture from the original blank to the finished and primed shell. Fig. 11 is a vertical section of the tools operating to form the head and pocket of a shell on my plan; and Fig. 12 is a vertical section of the punch and bunter as ordinarily used in making solid-headed shells.

The adoption of heavy charges for small-arms has necessitated greater strength in the heads of the metallic shells now generally used, and various plans have been adopted for securing increased strength, the plan generally used being to make the shells with what are known as "solid heads." These shells are usually formed with a central depression or cavity, termed a "pocket," for the reception of the primer, in the exterior face of the head. This pocket has usually been formed by compressing the solid metal of the closed end of the shell between a bunter, B, and a punch, C, of the form shown in Fig. 12.

It will be seen that the end of the punch C is cupped or provided with a central recess in its end, into which the teat *c* of the bunter B presses the metal to form the pocket, and as the solid metal is displaced by the pressure between the teat *c* and the end of the punch it is forced up around the sides of the teat *c* and between it and the surrounding wall of the cup in the end of the punch, and thence outward radially to form the flange.

It will at once be seen that this displacement of the solid metal produces great strain and wear both on the teat *c* and on the annular projecting end of the punch, and as the machines are run at the greatest practicable speed, the result is, that by this gradual but constant strain and wear of these parts the size and proportions of these parts of the head of the shell become correspondingly changed before the attendant is aware of it.

Another difficulty growing out of this method of forming the head is that of securing perfect uniformity in the size of the head, because if there be the least variation in the quantity of the metal to be displaced, it follows that there will be a corresponding variation in the size of the head, an excess of metal producing a head either too thick or too wide; or, if the bunter and die be so formed as to prevent the excess from flowing outward, so as to enlarge the flange, then there must necessarily be an excess of strain on the tools and the machine that operates them.

It is to obviate these difficulties that my present invention is designed, and the manner in which I do it is as follows: The blank is first punched from a thick sheet of metal in the form of a disk, as shown in Fig. 1, after which it is cupped and drawn in the usual manner, as represented in Figs. 2, 3, 4, 5, 6, and 7. It is then cut to the proper length, after which I make a hole, *a*, at the center of the closed end of the shell, as shown in Fig. 8, this hole being slightly smaller than the pocket is to be when finished. I then provide a punch, D, the end of which is flat or slightly concave, and somewhat reduced in diameter at and for some little distance from its end, as shown in Fig. 11. The bunter B, as before, is provided with the central teat or projection, *c*, of the proper size to form the pocket, and, as shown in Fig. 11, it has also an annular recess of proper size and shape to form the exterior of the head. The shell in the condition shown in Fig. 8, with the hole *a* in it, is then placed on the punch D in the die I, and the bunter B brought down upon it in the usual manner. As the bunter

descends the teat *c*, which is somewhat larger than the hole *a*, forms the pocket for the primer, and the surplus metal is forced inward around the hole *a*, between the end of the punch D and the teat *c*, thereby forming an annular shoulder or internal flange, *e*, at the bottom of the pocket, as shown in Figs. 9, 10, and 11. This flange *e* forms a support for the primer when inserted in the pocket, as shown in Fig. 10, Fig. 9 representing the shell completed as it is when removed from the die, ready to be primed and loaded.

It will thus be seen that by making the hole *a* before forming the pocket, or before heading the shell, I provide a space into which the surplus metal can flow, and that thereby I greatly lessen the strain and wear on the tools and the machine, and at the same time secure perfect uniformity in the heads, both as to diameter and thickness of flange.

Another advantage of this method of constructing the shell is, that instead of the annular recess around the walls of the pocket in the side of the shell the solid metal extends inward below the bottom of the pocket, thus making the head or base of the shell unusually strong and solid. The hole that is left after the flange *e* is formed at the bottom of the pocket serves as the vent for the flash from the primer, and any excess of metal that there may be in the head in the ordinary course of manufacture will never be sufficient to entirely close the hole, and whether it be a little larger or smaller will make no difference so long as care is taken to have sufficient metal in the flange *e* to support the primer when struck by the hammer or firing-pin of the arm in which the cartridge is to be used.

It is obvious that instead of forming the head and the ledge *e* in the bottom of the pocket both at one operation the flange or head may be formed, first, by using a flat-faced bunter, or one without the central teat or projection, *c*, and then forming the ledge *e* at another operation, and this plan may be desirable when very large and thick shells are to be manufactured, as it will afford less obstruction to the inward flow of the surplus metal; but in practice I have not found it necessary in the manufacture of ordinary-sized shells.

Having thus described my invention, what I claim is—

1. As an improvement in the art of manufacturing metallic cartridge-shells, first forming a hole in the closed end of the shell to provide a space for the surplus metal to flow into as the head is being formed and then forming the head by pressure, substantially as described.

2. As an improvement in the art of forming the pocket in a solid-headed cartridge-shell, the process consisting of, first, forming a hole in the closed end of the shell, and then forcing the metal inward or downward around the sides of said hole to produce the internal flange, *e*, to support the primer, substantially as set forth.

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