J. H. GILL.

METALLIC CARTRIDGE.

No. 190,208. Patented May 1, 1877.

Fig. 1.

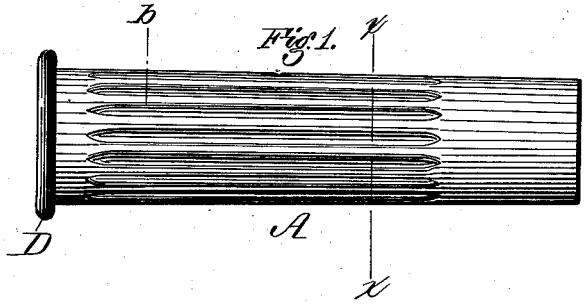

Fig. 2.

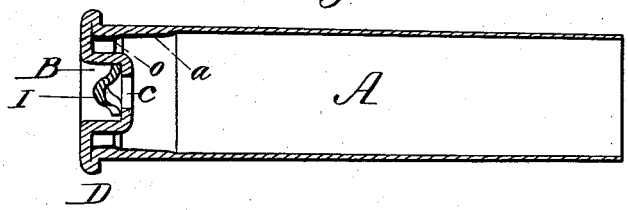

Fig. 3.

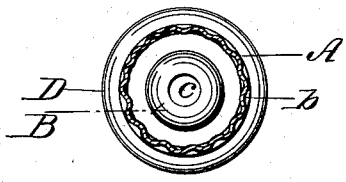

Fig. 6.

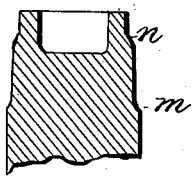

Fig. 4.

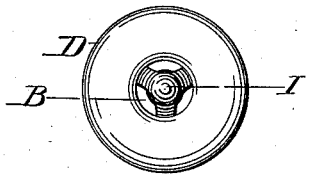

Fig. 5.

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UNITED STATES PATENT OFFICE

JABEZ H. GILL, OF PHILADELPHIA, PENNSYLVANIA.

IMPROVEMENT IN METALLIC CARTRIDGES.

Specification forming part of Letters Patent No. **190,208**, dated May 1, 1877; application filed February 19, 1877.

To all whom it may concern:

Be it known that I, JABEZ H. GILL, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain Improvements in Metallic Cartridges, of which the following is a specification:

My invention consists in making metallic cartridge cases or shells with longitudinal corrugations or grooves, and with a re-enforced or thickened wall at the extreme rear end, and in providing the same with an anvil of peculiar construction, all as hereinafter more fully set forth.

Figure 1 is a side elevation of my improved cartridge-shell; Fig. 2, a longitudinal section, and Fig. 3 a transverse section, of the same, on the line *x x* of Fig. 1. Fig. 4 is a rear-end view, showing the anvil in place, and Fig. 5 is a perspective view of the anvil detached; and Fig. 6 a section of the punch used to form the shell.

In the manufacture of metallic cartridge-shells copper is preferable, for some reasons, to brass, inasmuch as it is softer and easier to work, and can be procured of more perfect uniformity as to quality or condition; but, on the other hand, it has not the elasticity of brass, and is therefore more liable to stick in the chamber of the gun when expanded by the explosion of the charge, thus rendering it more difficult of extraction. For the same reason, also, the ordinary copper shell cannot be refired so many times as the brass shell without being resized, by being inserted in a die. In addition to this, the copper, being a softer metal, is more liable to be cut or sheared off by the pressure of the gases forcing it laterally against the shoulder or sharp angle at the rear end of the chamber of the barrel. Now, the object of my invention is to enable a shell to be made of copper and still possess the advantages of the brass shell—that is, to prevent it from sticking in the chamber, and be easy of ejection, strong enough to resist the pressure of the gases, and capable of being repeatedly reused without subjecting it to the action of a die to reduce its diameter; and the means by which I accomplish these objects or results are as follows:

I draw the shell of copper in the usual manner, and form the flange D thereon by folding the metal over, by pressure in a heading-die, in such a manner as to press the surfaces of the folded portions snugly together, as represented in Fig. 2. In this operation I use a punch, which is reduced in diameter at two points, as shown in Fig. 6, the shoulder *m* being used to prevent the metal from flowing back or up around the punch as the pressure is brought to bear on the closed end of the shell, and which reduction of the size of the punch has the effect of leaving the walls of the shell thicker at the part indicated by *a*, Fig. 2, this thickening of the wall being already common; and in this case it is merely an incidental result of using the punch with a shoulder, *m*, to prevent the backflow of the metal, and thereby enable me to make the shell at its extreme rear end, where the body joins the flange, of a still greater thickness of metal, as shown at *o*, Fig. 2. As shown in Fig. 6, the punch has another shoulder, *n*, formed by reducing the diameter of the punch from that point to its end, and thus forming an annular recess, into which the metal flows or is forced by the pressure on the closed end of the shell, and in this way I produce the thickened wall or re-enforce *o* at that point of the shell where it is forced by the explosion of the charge against the sharp angle or corner at the rear end of the chamber of the gun. By this means the shell is rendered much stronger, sufficiently so to overcome the danger of its being sheared or cut through at that point, and which is quite likely to happen in those guns in which the breech-block does not enter a recess at the rear of the chamber, or which have a space left between the face of the breech-block and the end of the barrel.

In order to render the shell more elastic, and prevent it from sticking in the chamber, I corrugate it lengthwise, as shown in Figs. 1 and 3, the corrugations *b* extending nearly the whole length of the shell, there being, however, a portion at its open end left smooth and cylindrical, by having the corrugations stop a little distance from the end, for the purpose of preventing the gases from entering between the shell and the walls of the chamber, as it would if the corrugations extended to the extreme end of the shell. The effect of thus corrugating or fluting the shell, and which may be done by

means of a suitably-prepared die, either at the time the shell is tapered or before, is to render it more elastic, so that when expanded by the pressure of the gases within it, it will react as soon as relieved from the pressure and resume its original size, or so nearly so as to enable it not only to be easily extracted, but also to be used many times without subjecting it to the operation of a reducing-die.

It is equally important, in order that the shell may be repeatedly used, that it shall have an anvil that will remain in proper condition to perform its functions with certainty, and to this end I make the anvil as represented in Fig. 5. It is formed by punching a blank from copper or other sheet metal, with a central solid portion, having three radially-projecting arms, *t*, the spaces between which are cut oval or circular, as shown in Figs. 4 and 5. This blank is pressed into the form shown in Fig. 5 by means of a suitable die—that is to say, its central solid portion is pressed or struck up so as to form an arch or dome shaped head, *r*, on which the fulminate of the primer is ignited by the blow of the firing pin or hammer, while the arms *t* are curved so as also to have an arched form, except at their ends, where they are left flat, so as to have a firm rest or bearing on the bottom of the pocket B of the shell, when set therein. When thus finished the anvil is to be of a diameter to correspond with that of the pocket B, so that when pressed therein the ends of its arms *t* will press against the sides of the pocket with sufficient force to retain it in place, while the under face of these arms rest firmly upon the bottom of the pocket, thus affording it a firm support. By thus constructing the anvil it will be seen that more space is allowed for the passage of the flame from the primer to the powder, inasmuch as it is supported at the ends of its arms or feet *t*, thus allowing a larger hole, *c*, to be made in the bottom of the pocket, and its arched form throwing its central portion away from the bottom of the pocket, as shown in Fig. 2, thereby leaving much more space for the passage of the flame than is usually the case.

In using this anvil there is also another advantage, which is that the rim or edge of the primer will rest on the three projecting arms *t*, near their extremity, and thus the primer is prevented from being tipped over sidewise, or being displaced, as sometimes happens, by the firing having a considerable lateral play in its seat or bearing, and thus hitting the primer near one edge instead of centrally, as it should, this looseness of the firing-pin being adapted to prevent it from rusting or sticking fast. The arched form of the anvil enables it to retain its position under repeated blows, it being thereby rendered somewhat elastic, so that when relieved from the pressure of the firing pin or hammer, it resumes immediately its former position, or nearly so; and thus it can be used many times before it is disabled.

By these improvements I am enabled to produce a cartridge-shell made of copper, and capable of being recharged and fired many times. It is, of course, obvious that either feature of my invention may be applied separately to cartridge-shells, and used without the others; but I prefer to combine them all in one and the same shell, as I am thereby enabled to produce a more perfect shell.

I am aware that a cartridge has been described in which the shell has overlapping folds formed on its sides, and also one having its body corrugated from near its base to its extreme front end, and therefore I do not claim such; but,

Having described my invention, what I do claim is—

1. A metallic cartridge-shell, having longitudinal corrugations formed in its body, and having its front end left smooth and cylindrical, substantially as shown and described.

2. The anvil I, composed of the dome-shaped central body *r*, and the arched and latterally-projecting arms *t*, three or more in number, substantially as shown and described.

JABEZ H. GILL.

Witnesses:
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