EDWIN MARTIN.

ASSIGNOR to self *Samuel W. Porter and James F. Cranston*

IMPROVEMENT IN METALLIC CARTRIDGES

111856 PATENTED FEB 14 1871

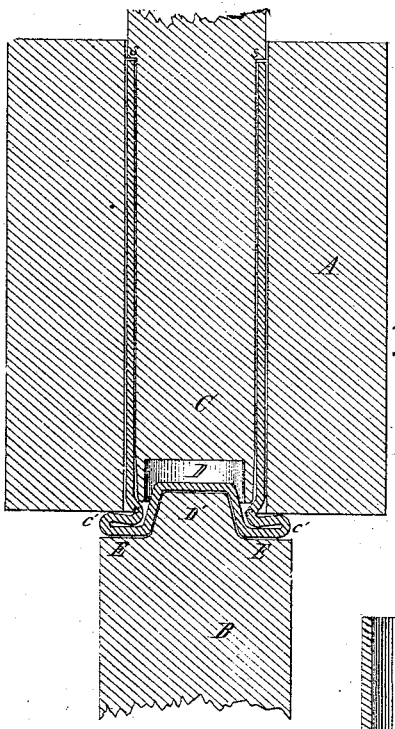

Fig. 1

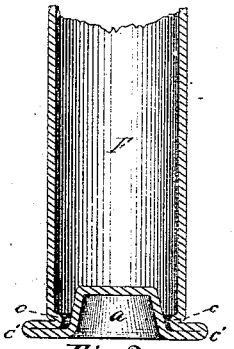

Fig. 2

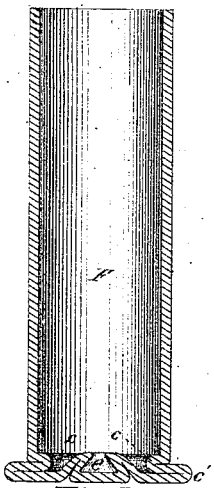

Fig. 3

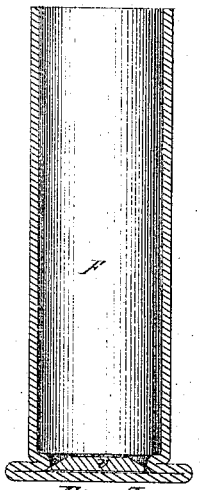

Fig. 4

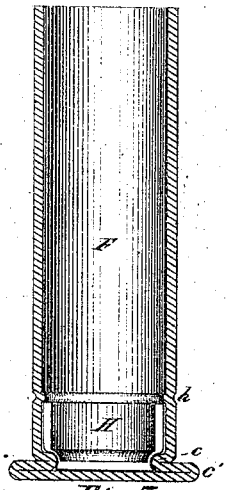

Fig. 5

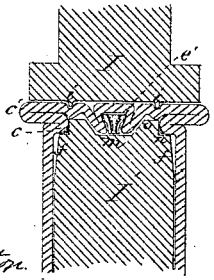

Fig. 6

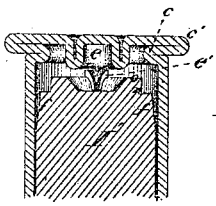

Fig. 7

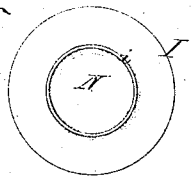

Fig. 9

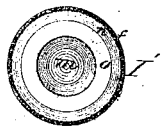

Fig. 8

Fig. 10

Witnesses. M. L. Boynton. H. D. Miller

Inventor. Edwin Martin By J. A. Curtis, his atty

United States Patent Office.

EDWIN MARTIN, OF SPRINGFIELD, MASSACHUSETTS, ASSIGNOR TO HIMSELF, SAMUEL W. PORTER, AND JAMES F. CRANSTON, OF SAME PLACE.

Letters Patent No. 111,856, dated February 14, 1871.

IMPROVEMENT IN METALLIC CARTRIDGES.

The Schedule referred to in these Letters Patent and making part of the same.

To whom it may concern:

Be it known that I, EDWIN MARTIN, of Springfield, in the county of Hampden and State of Massachusetts, have invented a new and useful Improvement in Metallic Cartridges; and I do declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawing making a part of this specification, and to the letters of reference marked thereon, in which—

Figure 1 is a longitudinal section through the center of the shell, die, and the inside and outside heading tool, showing the process of forming the head and the fold around the head;

Figure 2 is a longitudinal section of the shell after the head is formed;

Figure 3 is a similar section, showing the shell after the pocket for the fulminate has been formed in the head;

Figure 4 is a longitudinal section, showing an anvil secured within the shell by means of the fold at the head;

Figure 5 represents a shell with a reinforcing-cup secured therein, showing the use of the fold in filling up the cavity between the reinforcing-cup around the bottom and the head of the shell;

Figure 6 is a longitudinal section of a shell, with the priming and reducing-tool and the crimping-tool, showing the shell as it is primed and crimped;

Figure 7 is a similar section of a shell with the priming and reducing-tool, showing the operation of introducing and securing the conical anvil within the pocket in the head of the shell;

Figure 8 is an end view of the priming and reducing-tool;

Figure 9 is an end view of the crimping-tool; and

Figure 10 is a section and end view of the conical anvil.

My invention is an improvement upon the device for which Letters Patent were granted me dated March 23, 1869, and consists of a fold formed at the juncture of the head with the cylindrical part of the shell, said fold projecting into the interior of the shell and pressed firmly up against the head on the inside, thus making the head of the shell at this part of three distinct thicknesses of metal, giving it much additional strength, and also serving to prevent, much more effectually, any gas from being driven into the fold of the flange at the explosion.

That others skilled in the art may be able to make and use my invention I will now proceed to describe its construction and mode of operation.

In the drawing—

A, fig. 1, represents the heading-die, and

C, the inside heading-tool, having an annular shoulder at *s*, against which the end of the shell impinges when it is placed upon the tool C and driven against the tool B.

That part of the heading-tool C below the shoulder *s* is made of a size to fit well the inside of the shell, which, being placed upon the tool C, fits well the interior of the die A.

The shell, after being drawn, is cut at the open end, so that the shell is somewhat longer than that part of the tool C below the shoulder *s*, and the tool C is tapered at the end and has a cavity, D, therein, as is seen in fig. 1.

The outside heading-tool B has a projection, D', upon the end somewhat less in diameter than the cavity D, and to form the head and fold, the drawn shell is placed upon the tool C, the open end of the shell abutting against the annular shoulder *s*, and the closed end of the shell projecting somewhat beyond the end of the tool C, which, with the shell thereon, is then inserted into the die A, so that the die covers the end at the shoulder *s*, and the end of the tool C lacking, about the thickness of the shell, or a little less, of passing through the die.

The outside heading-tool B is then driven up smartly against the closed end of the shell, and the surplus metal is thus flattened upon the end and pressed out at the side, forming the flange *c'*. This part of the operation, however, I do not claim as new.

As the tool B, however, continues to press up the metal the tool C, being tapered at the end, the surplus metal, which still remains to be disposed of, being prevented by the die A from being pressed outward, is forced inward, as shown at *c*, in fig. 1, as there is nothing to prevent it, and this begins the formation of the fold *c*.

When the metal, in being pressed inward, reaches the tapered end of the tool C, it remains in that position, while that part of the fold *c* below the end of the tool C continues to be pressed in a little more, and is pressed firmly together, completing the fold, and, as the tool B reaches its nearest point to the die A, the outside fold *c'* is pressed firmly together, forming the flange, and, at the same time, the end of the tool C presses the inner fold *c* firmly and tightly against the interior of the head.

The projection of the fold *c* into the shell, whether more or less, may be regulated by the excess in the length of the drawn shell over that of the tool C below the shoulder *s*, whether more or less. This part of the process I claim as novel.

At the same time this is done the cup *a* in the head of the shell is formed by the projection D' forcing the metal into the cavity D in the tool C. This brings the shell into the condition shown in fig. 2.

The pocket for the fulminate and anvil is then formed by driving back a portion of the metal at the base of the cup *a*, and reducing it, as explained in the before-mentioned Letters Patent granted to me, and as shown in fig. 3.

This inside fold *c* may also be used to hold in place

a large anvil, as shown in fig. 4, and is particularly useful in filling up the space between the corner of the reinforcing-cup, when it is desirable to use one, and the flange *c'* of the head of the shell, although it is the object in using the fold *c* to obviate the necessity of using any reinforcing-cup in all ordinary gun-cartridges.

The anvils *e'*, figs. 6 and 7, may be punched from sheet-metal of desirable thickness with a punch and die, and are inserted and secured in place by means of the tools shown in figs. 6, 7, 8, and 9, and in the following manner: I' represents the inside priming and reducing-tool, having an annular shoulder at *n* and a conical-shaped cavity, *m*, in the end.

The shell being left with the pocket *e* in a cylindrical form, as shown clearly in fig. 7, the anvil *e'* being previously filled with fulminate, is placed, with its largest end upward, in the cavity *m* of the tool, and the tool is then forced into the shell, and, as it approaches the head of the shell, the anvil *e'* is first forced into the pocket *e*, and the tool I' being forced still farther in the conical form of the cavity *m* in said tool, gives a corresponding conical form to the walls of the pocket *e*, closing them firmly around and upon the conical anvil *e'*, as shown more clearly in fig. 6; and when the tool I' is in the position shown in fig. 6, the tool I, having an annular fillet, *i*, upon its face, is driven up smartly against the outside of the head of the shell, and the fillet *i* forces in the metal, pressing it in firmly against the inner edge of the fold *c*.

The head of the shell is thus corrugated throughout most of its part, and very much greater strength or capacity of resisting the explosion is obtained, while, at the same time, the cavity in the flange or head is perfectly closed, and there is no possibility of the head of the shell being broken or burst off at the flange by the force of the gas at the explosion.

The greatest and most manifest advantage of this invention is that while these conical anvils may be made cheaper, taking much less stock in their manufacture, the whole process of forming the fold and introducing and securing the anvil within its pocket requires no extra operation over those gone through with in the manufacture of the shell or cartridge, as explained in the before-mentioned Letters Patent granted to me, dated March 23, 1869.

As the firing-pin of the arm is generally pointed or conical upon its end, when a flat anvil is used, but a very small part of the fulminate is actually operated upon by the firing-pin in exploding it; but in this device, as the anvil is conical and the fulminate is compressed between the pin and the interior of the anvil upon all sides, or all around, the ignition of the fulminate is more full and thorough than when a common flat anvil is used.

Having thus explained my invention,

What I claim as new, and desire to secure by Letters Patent, is—

1. A metallic cartridge-shell, having the fold *c* made therein, making the shell of three distinct thicknesses at the juncture of the head with the cylindrical part, all constructed substantially as and for the purposes herein described.

2. An annular fillet or corrugation upon the interior of the head of the shell, in combination with the fold *c*, all constructed substantially in the manner and for the purposes specified.

Witnesses:
T. A. CURTIS,
M. L. BOYNTON.

EDWIN MARTIN.