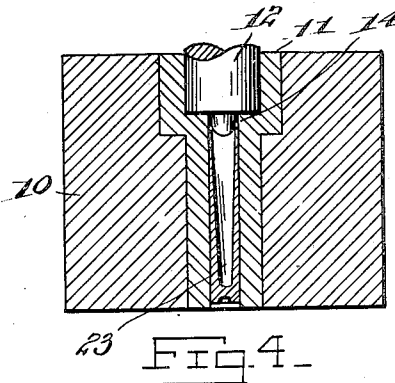
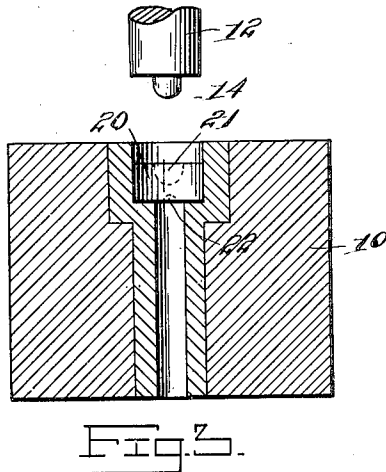
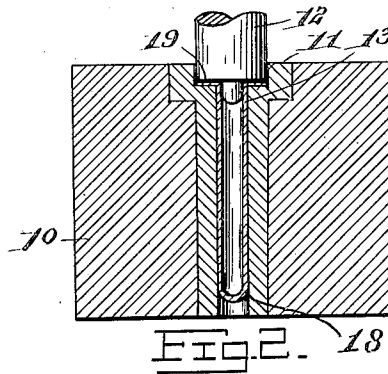
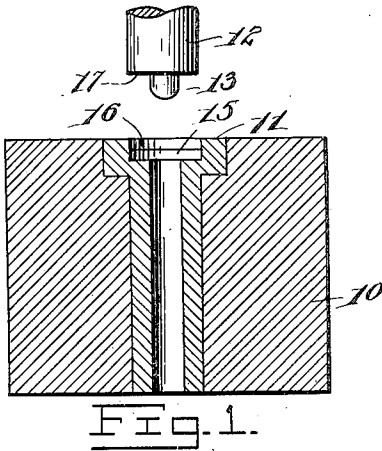


No. 822,285.

PATENTED JUNE 5, 1906.

G. W. LEE.
METHOD OF MAKING TUBULAR ARTICLES.
APPLICATION FILED APR. 15, 1905.



Witnesses

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METHOD OF MAKING TUBULAR ARTICLES.

No. 822,285.

Specification of Letters Patent.

Patented June 5, 1906.

Application filed April 16, 1905. Serial No. 255,837.

To all whom it may concern:

Be it known that I, GEORGE W. LEE, a citizen of the United States, residing at Binghamton, in the county of Broome and State of New York, have invented new and useful Improvements in the Methods of Making Metal Tubular Articles, of which the following is a specification.

My invention relates to a method of making metal tubular articles, and is more particularly designed for the manufacture of cartridge-shells, although it is not limited thereto.

The object of my invention is to produce a cartridge-shell or other tubular article of aluminium or other metal in a very much simpler and more expeditious manner than has ever before been possible and the walls of which will be of uniform thickness throughout the periphery of the shell. By this I do not mean that the walls are necessarily of uniform thickness throughout the length of the shell, for they may be made tapering, but that they will not be thicker on one side than on the other.

It has been heretofore proposed to make cartridge-shells by forcing a circular blank into a die by a plunger, and thereby cause the metal of the blank to flow upwardly around the plunger. I have found that while this method may suffice for the production of a limited number of shells the result will eventually be that the shell-walls will not be of uniform thickness, owing to the springing or getting out of center of the plunger.

The present invention obviates the above-noted objection in that the plunger forces the metal from beneath it into a tubular die, the plunger being of the same diameter as the blank and having only a short projecting reduced portion to cup the blank and determine the inside diameter thereof.

The process will be best understood by reference to the accompanying drawings, in which—

Figure 1 is a section of the die, showing the plunger and a blank in position before the operation commences. Fig. 2 is a similar view showing the result of the operation. Fig. 3 is a view like Fig. 1, showing a different kind of blank in position to be acted upon by a modified form of plunger. Fig. 4 is a simi-

lar view showing a rimless cartridge-shell formed from the blank of Fig. 3.

In the views, 10 represents the die, and 11 the hardened bushing therein.

12 represents the plunger, which in Figs. 1 and 2 has a short cylindrical former 13 projecting downwardly therefrom, while in Figs. 3 and 4 the former 14 is tapered, as will be hereinafter described.

If the shell is to have walls of uniform thickness, the plunger having the straight former 13 is used, and the blank 15 is a plain circular disk, which just fits the recess 16 in the bushing 11, as does also the plunger 12. As the plunger descends the former 13 cups the blank—that is, forces the center thereof down into the bore of the bushing. When the shoulder 17 of the plunger commences to compress the blank, it forces the metal from under it down into the bore, thereby elongating the partially-formed tube into the form shown in Fig. 2. The thickness of the walls of the shell so partially formed are of course determined by the diameter of the former 13, and since it is necessarily always truly centered by reason of the plunger 12 fitting exactly in the recess 16 the thickness of the walls of the shell is necessarily uniform throughout. The result when a solid blank is used is a closed-end tube, as shown at 18 in Fig. 2, having a flange 19, the thickness of which is determined by the distance to which the plunger 12 is driven down.

The operation illustrated in Figs. 3 and 4 differs in that the result is a cartridge-shell with tapering walls and with its head already formed on the lower end. As before stated, the only change in the apparatus is that the former 14 is tapered, so as to uniformly and progressively diminish the thickness of the walls of the shell during its formation. The blank shown at 20 is, however, considerably thicker than the blank 15 and has previously formed in its upper side as it is placed in the die an initial recess 21 and in its lower side the depression 22 for the primer. The largest diameter of the former 14 is substantially equal to the diameter of the die—that is, to the bore of the bushing 11—so that when the plunger is brought down, as shown in Fig. 4, substantially all the metal is forced into the bore and the walls of the shell 23 are

tapered down to a fine edge, any remaining fin or flange being subsequently dressed off.

Having thus described my invention, what I claim is—

5 1. The method of making a closed-end metal tube which consists in placing a circular blank in a die of equal diameter therewith and having a central cylindrical bore, depressing the central portion of the blank into
10 said bore without perforating the same and finally compressing the annular portion of the blank in the die and obstructing the flow of metal toward the center thereof so as to
15 cause the metal thereof to flow into the walls of the depressed portion.

2. The method of making a metal tube with walls of tapering thickness which consists in peripherally confining a circular
20 blank in a die having a cylindrical bore, depressing the center portion of said blank into said bore by means of a tapering former projecting from a plunger adapted to fit said die

and continuing the movement of said plunger so as to compress the annular portion of the blank and force the metal to flow inwardly against said tapering former and then
25 into the walls of the depressed portion.

3. The method of making a metal tube with walls of tapering thickness which consists in forming a tapering depression in the
30 center of a circular blank, compressing the resultant annular portion so as to force the metal thereof to flow toward the center and into the walls of the depressed portion and simultaneously progressively diminishing the
35 thickness of the metal where the annular portion joins the said walls.

In testimony whereof I have affixed my signature in presence of two subscribing witnesses.

GEORGE W. LEE.

Witnesses:

JAMES G. CLONNEY,
MARGARET C. LEE.