

L. E. HOOKER.
METHOD OF MAKING CLOSED END TUBES.
APPLICATION FILED NOV. 20, 1908.

934,174.

Patented Sept. 14, 1909.

Fig. 1.

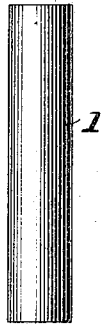


Fig. 2.

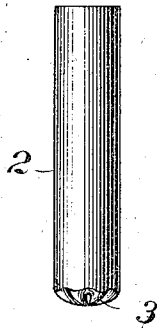


Fig. 4.



Fig. 3.



Fig. 5.

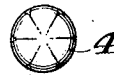


Fig. 6.

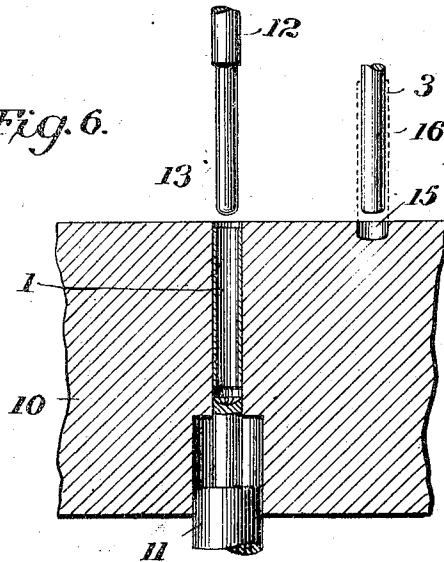
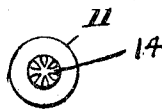


Fig. 7.



Witnesses
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UNITED STATES PATENT OFFICE.

LESLIE E. HOOKER, OF PAWTUCKET, RHODE ISLAND.

METHOD OF MAKING CLOSED-END TUBES.

934,174.

Specification of Letters Patent. Patented Sept. 14, 1909.

Application filed November 20, 1908. Serial No. 463,581.

To all whom it may concern:

Be it known that I, LESLIE E. HOOKER, a citizen of the United States, residing at Pawtucket, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Methods of Making Closed-End Tubes, of which the following is a specification.

My invention relates to the manufacture of closed-end tubes, by which I mean tubes which have one end closed and which are adapted for various uses, for example, as detonator tubes or blasting caps, and consists in an improved method of making such tubes. These tubes or caps are short metal tubes, closed at one end to contain the fulminate, and attached to the fuse at the open end, and are set into the end of a dynamite or other blasting cartridge. Heretofore, they have been made by a succession of drawing operations, the metal being sometimes weakened near the junction of the wall and the closed end so that the latter will be blown off when the fulminate is exploded.

My invention consists in closing the end of an open tube by crimping in the wall at that end and then compressing the crimped or fluted portion so as to make the end smooth with no perceptible break in the continuity of the metal but yet leaving it so it will readily open outward under internal pressure.

In the accompanying drawing, Figures 1-5 inclusive show the different steps of the method. Figs. 6, and 7 show dies in which said method may be carried out.

I take thin copper tubes, preferably made by the extrusion method, and saw them up into suitable lengths, thus obtaining the tube 1, open at both ends, shown in Fig. 1. I place this tube in the die 10, shown in Fig. 6, the end of the tube resting on the plunger 11, the top of which is crimped or fluted, as shown at 14 in Fig. 7. The punch 12 is then brought down into the tube, its shoulder 13 engaging the top of the same, and forces the lower end downwardly onto the

plunger 11, causing it to assume the shape, or rather the reverse of the shape of the top 14 of said plunger. The tube is then in the condition illustrated in Figs. 2 and 3, its end being nearly closed by the crimped portion 3. The tube 2 is then removed from the die and placed with its crimped end in the smooth, shallow recess or die 15, and the correspondingly-shaped punch 16 is brought down inside it. Of course the tube may instead be first slipped on the punch and then the latter brought down into the recess or die 15. By the pressure between this punch and die, the crimps 3 in the end of the tube are compressed or flattened out, the metal being forced to assume a smooth flat condition, in fact, flowing both radially and inwardly, the latter flow completely closing the central aperture. The end of the tube thus produced, see Figs. 4 and 5, is practically air-tight, without being actually welded, so that it is in condition to open outwardly under internal pressure when the charge of fulminate contained therein is ignited, thus letting the explosion pass directly into the dynamite of the cartridge.

Other uses of my improved tube will readily suggest themselves.

Having thus described my invention, what I claim, is:—

The method of making a closed-end tube, which consists in taking an open-ended tube and first crimping in one end of it by forcing said end into a concave, crimped or fluted die, and secondly, smoothing out said crimped end by pressure between a smooth concave die and a smooth convex punch, whereby said end is tightly closed but is in condition to readily open outwardly under internal pressure.

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

LESLIE E. HOOKER.

Witnesses:

HARRY A. YETTEE,
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