

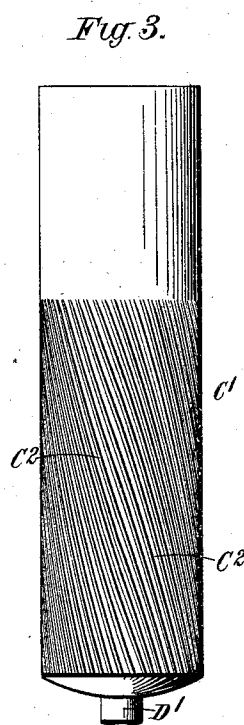
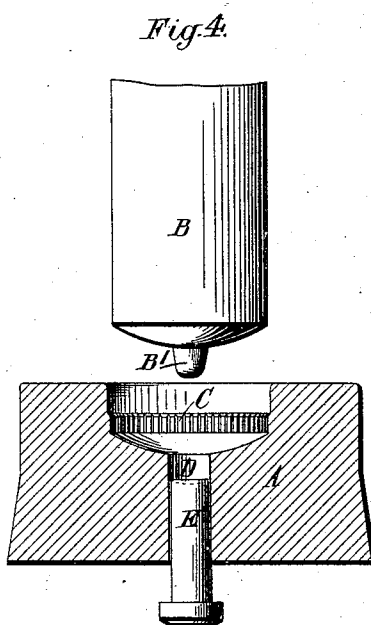
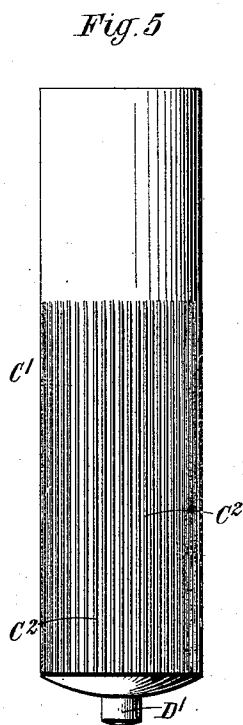
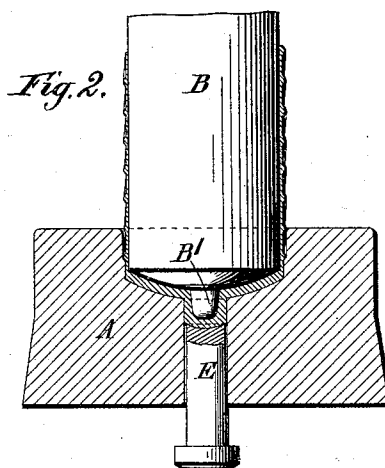
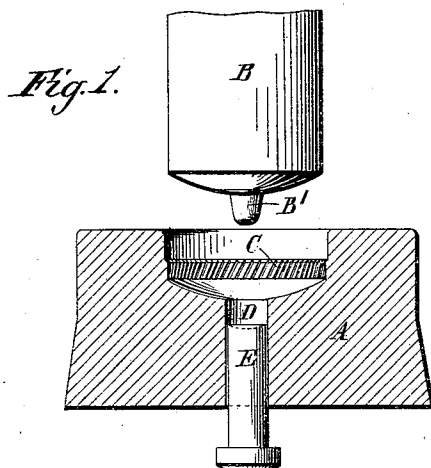
(No Model.)

H. C. SANDERS.

PROCESS OF MANUFACTURING COLLAPSIBLE TUBES.

No. 478,525.

Patented July 5, 1892.



Witnesses.

Harry Daly.
Robert Everett.

Inventor.

Henry C. Sanders.

By

James L. Norris.
Atty.

UNITED STATES PATENT OFFICE.

HENRY CONRAD SANDERS, OF LONDON, ENGLAND.

PROCESS OF MANUFACTURING COLLAPSIBLE TUBES.

SPECIFICATION forming part of Letters Patent No. 478,525, dated July 5, 1892.

Application filed May 26, 1891. Serial No. 394,230. (No model.) Patented in England January 3, 1890, No. 3,243.

To all whom it may concern:

Beit known that I, HENRY CONRAD SANDERS, collapsible-tube manufacturer, a subject of the Queen of Great Britain, and a resident of London, England, have invented certain new and useful Improvements in the Process of Manufacturing Collapsible Tubes, (for which I have obtained a patent in Great Britain, No. 3,243, bearing date January 3, 1890,) of which the following is a specification, reference being had to the accompanying drawings.

My invention relates to the manufacture of ornamental tubes from soft-metal blanks by causing the metal while cold to flow through an annular space between a punch or plunger and a die having a grooved or tooth-like or corrugated wall, the punch being forced into the blank while the latter is held in the said die.

The main object of my said invention is to manufacture ornamental tubes, which can be made into receptacles of the kind known as "collapsible" tubes or into cylindrical receptacles for various purposes. Tubes for these purposes have been heretofore made with plain or smooth surfaces by forcing a punch into a metal blank held in a die having a smooth or plain operative edge. By my invention, moreover, I am enabled to produce a soft-metal tube which by reason of the tooth-like projections or grooves or corrugations formed thereon or therein is considerably stronger and more rigid, weight for weight, than soft-metal tubes heretofore manufactured.

In the accompanying drawings, Figure 1 is a vertical central section of a die having inclined grooves such as I use in the manufacture of my improved soft-metal tubes, a portion of the punch or plunger being shown in elevation above the die. Fig. 2 is a sectional view of the die, a portion of the punch or plunger being shown in elevation in its lowest position and the soft-metal case or tube in section around the punch. Fig. 3 is an elevation of a soft-metal case or tube, as formed in the aforesaid die. Fig. 4 is a vertical central section of a die having longitudinal grooves and a portion of the punch above the same, and Fig. 5 is an elevation of a soft-metal case such as would be formed in this die.

Like letters indicate corresponding parts throughout the drawings.

In carrying my said invention into practice I form upon the inner face of the die A, in which the soft metal is compressed by the punch B, a series of tooth-like projections C, corresponding in number and arrangement with the grooves it is desired to form upon the finished case or tube. By forming these projections inclined, as shown in Fig. 1, the respective grooves produced thereby in the surface of the soft-metal case or tube will be formed spirally, the inclination of the spirals corresponding to that of the tooth-like projections in the die, while by causing them to be straight or parallel to the axis of the die the grooves formed in the tube will be longitudinal or parallel to the axis thereof, as shown in Fig. 5. In these figures C' is the tube and C² C² are corrugations or ridges formed on the surface thereof.

In the manufacture of soft-metal tubes according to my invention I place the soft-metal blank in the die A, and I then force down upon the same the plunger B, which is slightly smaller in diameter than the interior of the die. The metal is thereby squeezed out of the die through the annular space between the die and the plunger, and a tube is thus formed, as shown in Fig. 2, the surface of which is corrugated or grooved by the aforesaid projections. Sufficient metal is left in the die after the pressing of the punch into the same to form a closed end to the tube. This end may serve as the head of a collapsible tube or receptacle and be bored through and provided with a screw-cap or other suitable cover; or the said closed end may be partially removed, so as to leave an internal flange, which serves to strengthen the tube and to which a metal plate or disk may be secured to form the bottom of a box or other receptacle. It is obvious that if the metal before being pressed fills the die to a higher level than the top of the grooves or corrugations the upper part of the formed tube will be plain, as shown in Figs. 3 and 5.

The die is provided with an axial perforation D, into which a plug E is inserted to partially fill the same before the insertion of the soft-metal blank from which the tube is to be

formed. Into the remaining or upper portion of the said perforation a part of the soft metal is squeezed by the plunger, thereby forming a neck D', Figs. 4 and 5. When the tube is 5 formed, the plug E is forced inward from the bottom of the die to eject the tube. I prefer to provide an extension B' on the punch B for hollowing out the neck D'.

The length of the projections C, although 10 usually small, may be varied with advantage, according to the degree of their inclination to the axis of the die, the length being preferably greatest where there is most inclination. If desired, the grooves may extend to 15 the top of the die.

What I claim is—

1. The herein-described method of making an ornamental collapsible tube or soft-metal tubular case, consisting in placing a soft-metal 20 blank in a cold state into a die having grooves or corrugations around its operative wall or edge and then forcing a punch into the metal in the die, so as to squeeze the said metal out

through the annular space between said punch and the grooved wall or edge of the die, substantially as described. 25

2. The herein-described method of making an ornamental tube, consisting in placing a soft-metal blank in a cold state into a die having grooves or corrugations around its operative edge and then forcing a punch into 30 the metal in the die, so as to squeeze the said metal out through the annular space between the said punch and the grooved wall or edge of the die, leaving sufficient metal in the die 35 to form a closed end to the tube, which, if desired, can be afterward partially removed to form an internal flange, substantially as described.

In testimony whereof I have hereunto signed 40 my name in the presence of two subscribing witnesses.

HENRY CONRAD SANDERS.

Witnesses:

DAVID YOUNG,

HARRY GEORGE HOWARD.