(No Model.)

L. L. BURDON.

METHOD OF MAKING COMPOUND INGOTS.

No. 381,527. Patented Apr. 24, 1888.

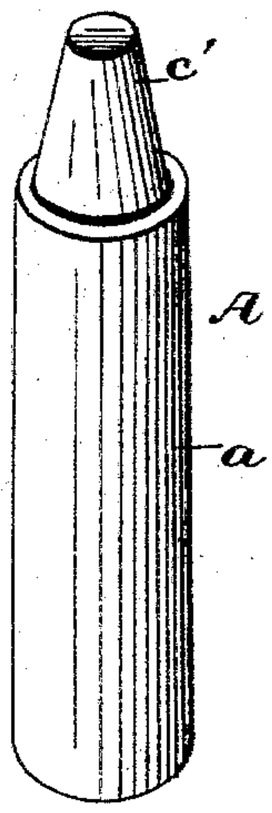

FIG. 1.

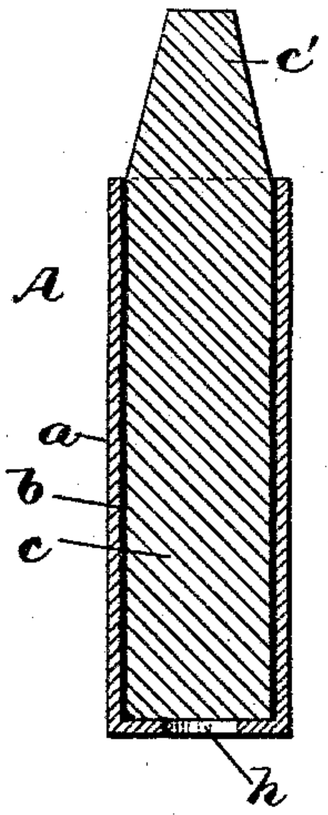

FIG. 2.

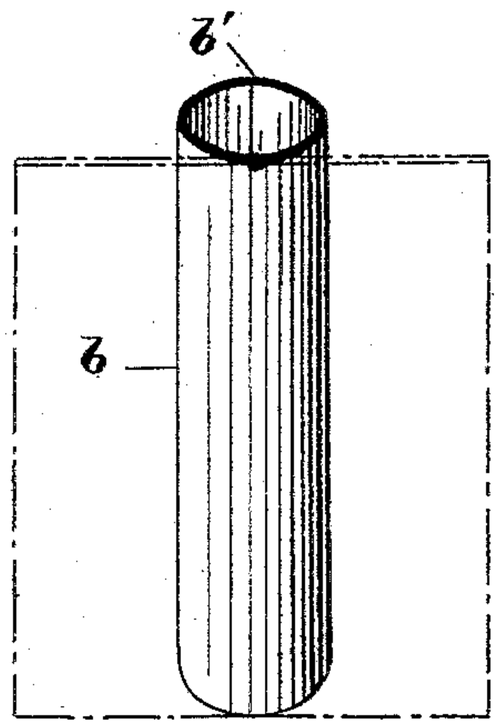

FIG. 3.

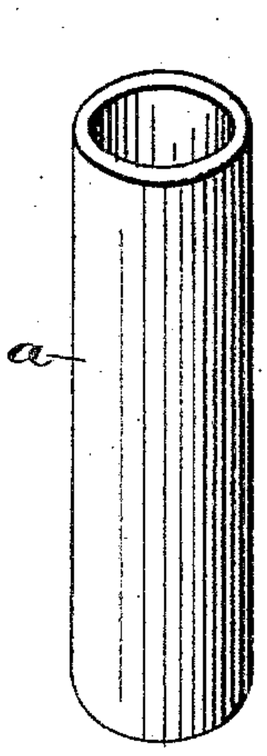

FIG. 4.

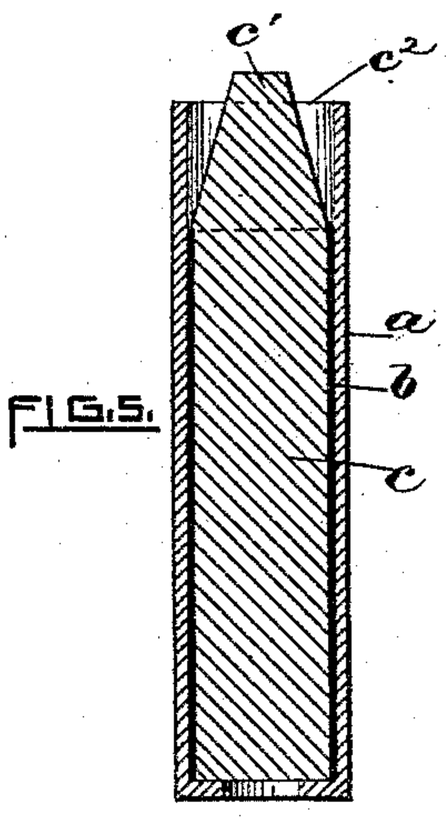

FIG. 5.

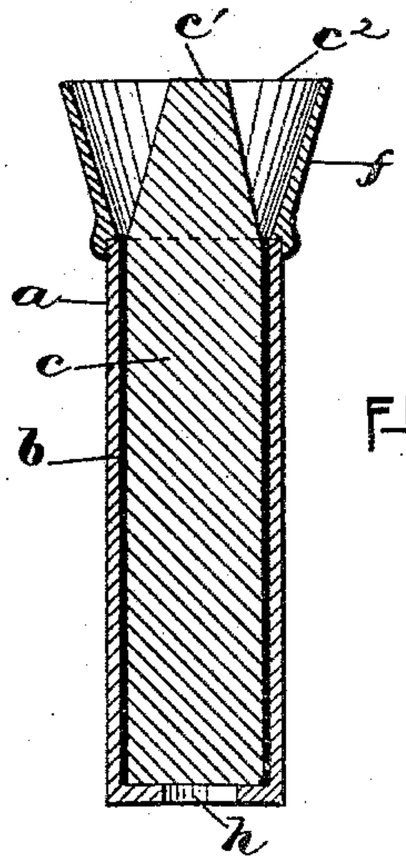

FIG. 6.

WITNESSES.

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METHOD OF MAKING COMPOUND INGOTS.

SPECIFICATION forming part of Letters Patent No. 381,527, dated April 24, 1888.

Application filed October 4, 1887. Serial No. 251,399. (No model.)

To all whom it may concern:

Be it known that I, LEVI L. BURDON, a citizen of the United States, residing at Providence, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in the Manufacture of Compound Ingots; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to letters or figures of reference marked thereon, which form a part of this specification.

In the manufacture of jewelry or other articles in which plated stock is employed, the quality of the goods produced, especially when plated wire is used, depends in a great degree upon the care exercised by the workman in concealing as far as possible the longitudinal seam, which latter has generally been considered unavoidable in the making of plated wire heretofore. This seam results from the manner in which the ingot from which the wire is subsequently produced is made, the ingot being composed of a strip of base metal of suitable dimensions, rectangular in cross-section, and having a thin strip of gold of the desired quality and thickness soldered to one side thereof. The ingot is then repeatedly passed between rolls which reduce it to a convenient thickness, after which it is "crimped" longitudinally, so as to enter the draw-plate. Now, by means of suitable mechanism, the plated strip is drawn through the draw-plate a number of times, the stock at each pass being drawn through a smaller opening, or in a decreasing ratio, thereby gradually bending the strip from a U-shape form until the two edges meet and form a comparatively large wire, round in cross-section and having a central space, the drawing operation being further continued until the necessary or desired size of wire is produced. The wire, as before stated, will have a seam extending throughout its length. The seam, however, is sometimes soldered; but this obviously adds to its cost. It may be unnecessary to observe that in reducing the ingot to finished wire it is subjected to an annealing process several times.

The object of my present invention is to produce a soldered compound ingot adapted to be drawn down into seamless wire, the latter being freer from "blisters" and other imperfections as developed in wire produced from ingots as heretofore usually made. To this end I preferably take a core of base metal of suitable dimensions and wrap a thin layer or unbroken sheet of solder around it. I next place the same within and snugly fitting a seamless tube or shell of fine metal, adding at one end of the ingot, if desired, a chamber in which to place loose solder. The whole is then submitted to the action of heat to fuse the solder, thereby producing a compound ingot in which the core and seamless shell are united by an unbroken film of solder, as will be hereinafter set forth and claimed.

A manner of producing an ingot having a seamless exterior shell soldered to the core of the ingot is shown and claimed in my United States patent of October 6, 1885, No. 327,655.

In the annexed sheet of drawings, illustrating an improved method of making compound ingots, Figure 1 represents a perspective view of the complete ingot having the seamless shell soldered to the interior core of base metal and ready to be rolled and drawn down into seamless filled wire. Fig. 2 is a longitudinal sectional view thereof. Fig. 3 is a perspective view of a piece of solder of uniform thickness rolled into tube form, adapted to be interposed between the core and outer shell. Fig. 4 is a similar view of a seamless tube of gold or other suitable metal. Fig. 5 is a longitudinal sectional view of the ingot, wherein the shell extends somewhat above the end of the solder tube to form a chamber. Fig. 6 is a similar view, the extension, however, being produced by a removable annular cone-frustum.

Again referring to the drawings, A designates the improved ingot as a whole, the upper end of the core being extended and reduced, as at *c'*, to facilitate the entrance of the ingot between reducing-rolls.

a indicates a seamless shell of gold or other suitable metal or alloy formed from a blank by the use of plungers or in any other manner. The lower end of the tube may be partially closed, as shown at *h*, or open, as desired.

b designates a tube of solder, although silver or other suitable metal may be used that will fuse and unite the core and outer shell. As drawn, the tube *b* is represented as formed

from the rectangular-shaped blank, (see broken lines,) the vertical edges meeting and forming the joint *b'*, Fig. 3. It is obvious, however, that it may be drawn from a disk-like blank by the use of plungers, &c., substantially as just stated with reference to the outer or gold shell *a*, thereby producing a seamless tube of solder.

I would state here that the thickness of the walls of the solder tube as drawn is considerably exaggerated. So, also, are the walls of the outer shell made somewhat thicker than would be used in ordinary practice. In Fig. 5 the upper end of the gold shell extends beyond the end of the solder tube, thereby, in connection with the conical portion *c'* of the core, forming the annular chamber c^2. This chamber serves as a reservoir, from which is supplied any additional solder that may be required, due to the expansion of the outer shell during the operation of soldering it to the core. By thus extending the shell at the upper end that portion thereof is necessarily of little or no value to the ingot proper, as it is removed before the ingot is reduced. A similar chamber is produced by the addition of a cone-shaped piece, *f*, adapted to engage the upper portion of the gold shell, as shown in Fig. 6. The piece *f* may be made of inferior metal or material, thereby reducing the percentage of waste stock as compared with the arrangement shown in Fig. 5.

The core *c*, of base metal, is turned off true to the desired size, (or slightly less than the interior diameter of the shell,) and its surface suitably prepared or covered with borax. The interior surface of the gold shell *a* is also in like manner prepared or covered with borax, and the core then placed centrally therein, thereby forming an annular space between the adjacent surfaces of the said parts. A shell or tube, *b*, of solder is then forcibly inserted into the annular space to the lower end of the core, and the whole then subjected to the action of heat exceeding the fusing-point of the solder.

Practically I obtain the best result by vertically suspending the ingot and revolving or twisting it around while in the furnace, thereby uniformly heating its surface. After the ingot is removed from the furnace it is found that the contiguous surfaces of the shell and core are united throughout their length by a uniform thickness or film of solder. Solder loosely placed in the chamber c^2 serves to insure the filling of the annular space therewith as the fusing progresses.

In lieu of forcing the tube of solder into position, as before described, it may be first inserted within the gold shell and the core then placed in position therein and forced home under a light pressure without departing from the spirit of the invention.

After the ingot is withdrawn from the furnace or place of welding, the metal surrounding the chamber c^2 being first removed, it is then adapted to be rolled and drawn into seamless filled wire by the means usually employed in reducing ingots of this class.

By means of the use of a tube of solder the union of the parts forming the ingot is assured, so that when reduced to wire no blisters appear on its surface, thereby reducing the percentage of waste.

What I claim is—

1. The improved method herein described of making compound ingots, the same consisting, first, in preparing the surfaces of the base-metal core and the seamless gold shell to unite with solder; next, introducing the core within said shell, thereby forming an annular space between them, then inserting a sleeve of solder into said annular space, and finally subjecting the whole to a high temperature, which fuses the solder and unites the core and shell with a uniform thickness of the same.

2. The improved method of making compound ingots, which consists in inserting a cylindrical base-metal core having a slightly-reduced diameter within the outer or gold shell, the surfaces thereof having been previously prepared to be united by solder, and having a chamber, as c^2, formed at the upper end, then inserting a thin sleeve of silver or other suitable solder between the core and shell and placing loose solder in said chamber, and finally placing the whole within a suitably prepared and heated furnace, thereby fusing the solder and uniting the core and outer shell with a uniform thickness of the same, the ingot after withdrawal from the furnace being adapted to be rolled and drawn down to produce seamless filled plated wire.

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

LEVI L. BURDON.

Witnesses:
CHARLES HANNIGAN,
GEO. H. REMINGTON.