

No. 776,859.

PATENTED DEC. 6, 1904.

W. A. LOW, JR.

PROCESS OF MAKING COMPOUND INGOTS FOR SEAMLESS GOLD PLATED WIRE.

APPLICATION FILED MAY 13, 1904.

NO MODEL.

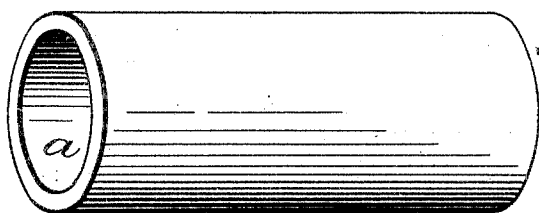


FIG. 1.



FIG. 2.

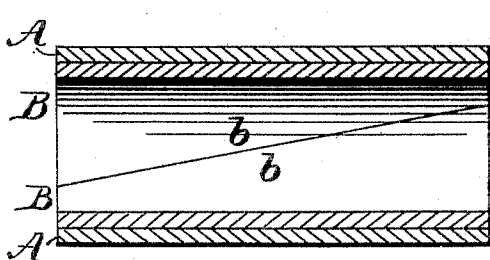


FIG. 3.

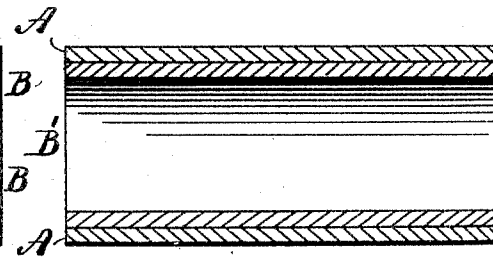


FIG. 4.

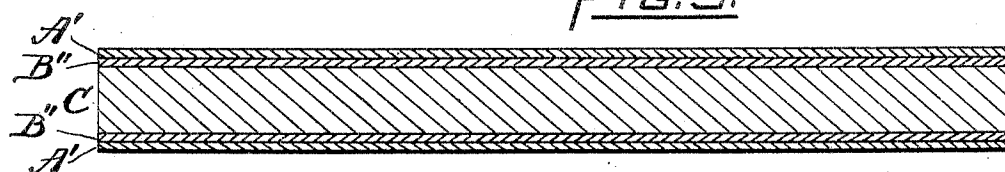


FIG. 5.



FIG. 6.

WITNESSES.

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PROCESS OF MAKING COMPOUND INGOTS FOR SEAMLESS GOLD-PLATED WIRE.

SPECIFICATION forming part of Letters Patent No. 776,859, dated December 6, 1904.

Application filed May 13, 1904. Serial No. 207,765. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM A. LOW, JR., a citizen of the United States, residing at Cranston, in the county of Providence and State of Rhode Island, have invented certain new and useful Improvements in Processes of Making Compound Ingots for Seamless Gold-Plated Wire, of which the following is a specification, reference being had therein to the accompanying drawings.

Like letters indicate like parts.

Figure 1 is a perspective view of a seamless gold tube. Fig. 2 is a perspective view of one of the tapering longitudinal sections of a tube of solder used in the manufacture of my improved ingot for seamless gold-plated wire. Fig. 3 is a view in longitudinal section of a compound tube of gold and solder before fusing. Fig. 4 is a view in longitudinal section of the same after fusing. Fig. 5 is a view in longitudinal section of the said compound tube after it has been reduced and elongated and a cylindrical core or plug of base metal has been inserted therein and welded to form a complete ingot for seamless gold-plated wire. Fig. 6 is a longitudinal section of the compound tube shown in Fig. 4 after it has been reduced and elongated, but before the said core or plug of base metal has been inserted therein.

My invention relates to processes of making compound ingots for the manufacture of seamless gold-plated wire and to the compound ingot so produced; and it consists of the novel combinations, as hereinafter described, and specifically set forth in the claims.

My invention relates particularly to that class of ingots known in the art as "double-plated" and to the methods of manufacturing the same. Double-plated ingots are those which have a solid core of base metal with a comparatively very thin seamless covering of gold. These ingots are used in the manufacture of wire adapted as material for cheap jewelry, in which only a very little quantity of gold is provided, though sufficient to stand an acid test.

In making double-plated ingots for such wire the common method of manufacture has been to form, first, a compound tube consist-

ing of two parts—an outer seamless gold tube and a tube of base metal inserted in said gold tube and united thereto by solder. This compound tube is swaged or reduced by any suitable means to the required diameter. Thus the compound tube, which at first is comparatively short—say twelve inches—is reduced to a compound tube of considerable length—say eight or ten feet. This lengthened tube is then divided into short sections—say twelve inches long—and into each of said sections a core or wire of base metal is inserted and fused thereto, after which the whole is drawn down into marketable wire of the desired diameter. If, for instance, it is desired to make a gold-plated wire of the quality known as "one-hundredth" plate—that is, a wire of which the gold plate thereon is equal in weight to only one one-hundredth of the total weight—it is evident that it would be practically difficult, if not impossible, to make a gold tube sufficiently light and thin to endure the operations to which the gold tubes are subjected in the usual processes of manufacture of seamless gold-plated wire. Therefore it is necessary to provide the gold tube with an inner backing of an inferior metal for a lining or support to give body and rigidity to the gold tube and when this has been reduced or drawn down to a proper degree to cut the same into sections, as already explained. The core or plug of base metal is inserted in such section, and the whole is subjected to a drawing operation until the wire is of the requisite size.

In my improved process of making ingots I use a seamless tube of gold (designated as A in the drawings) having a bore *a*. B B are two pieces of solder, together constituting a single tube, but split longitudinally in a diagonal direction. These diagonally-directed edges are indicated as *b* in the drawings, and when the two sections B B are placed together properly said edges *b b* abut each other, as shown in Fig. 3, said two sections so placed together forming a split tube of equal diameter throughout its entire extent.

The interior of the gold tube A is thoroughly cleaned and coated with borax or other suitable flux. Then one of the solder semi-

tubular sections B, Fig. 2, is inserted into the bore *a* of the gold tube A, and next the other of said sections B, oppositely directed, is inserted into said bore *a* and driven or crowded with sufficient force to cause the ends of said solder-sections B B (which sections are of the same length as the gold tube A) to be flush or even with the respective ends of the tube A. As these sections B are practically wedge-shaped, the edges *b b* thereof move on each other with great power, and in this manner the two sections (whose diameter when they are thus assembled is exactly equal to the diameter of the bore *a* of the gold tube A) force each other by this wedge action into absolute contact throughout their entire extent with the inner surface of the gold tube A. Fig. 3 illustrates the parts A B B so assembled and locked in position by the pressure of the inclined edges *b b* upon and against each other. These parts so assembled are then subjected to heat in an oven or furnace in the usual manner, with the result that the sections B B are fused or welded to the inner surface of the gold tube A and the seam or abutment *b b* disappears, the edges of the sections B B fusing and flowing together. Fig. 4 represents this compound tube so formed, consisting of the seamless gold tube A and the seamless solder tube B, welded and united thereto throughout the whole extent of their contiguous surfaces. This welded compound tube A B', Fig. 4, is then operated upon in a swaging-machine and reduced to the requisite length, as illustrated in Fig. 6. The gold tube A is thereby greatly reduced, as seen at A' in Fig. 6, and so, also, is the solder tube, which in its thinned condition is shown at B'' in said figure. This elongated reduced solder-lined gold tube is then cut into sections of proper length. A cylindrical wire or core C, of base metal, properly cleaned and coated with borax or other flux, is inserted through one of these sections of the compound tube A' B'', as shown in Fig. 5, and subjected to the action of heat in an oven or furnace, as before described, and as a result is united to the inner surface of the solder tubular lining B''. This constitutes the completed ingot, which is reduced by successive operations through a draw-plate, as usual, until a wire of the required size has been produced, which wire has a very thin but seamless covering of gold-plate.

Broadly stated, the novelty of my said improved method, in view of the prior art, is that I use a solder-lined gold tube instead of a compound tube, consisting of, first, a gold tube; second, a tube or sleeve of solder, and, third, a tube of base metal, in the preliminary reducing process.

It is immaterial in what manner the solder-lined gold tube is produced. The method shown in Figs. 2 and 3 is the one which I prefer; but the one shown in my pending appli-

cation for Letters Patent, Serial No. 199,775, gives satisfactory results, and other modes of making the same may be used without departing from the essential principle of my invention.

It is evident that seamless gold-plated hollow wire can be made in the same manner by using a tube of base metal instead of the solid cylindrical core C.

I claim as a novel and useful invention and desire to secure by Letters Patent—

1. The improved process of making compound ingots for the manufacture of seamless gold-plated wire herein described, consisting of the following steps, cleaning a seamless gold tube and covering the inner surface or bore thereof with a suitable flux, then inserting in the bore of the gold tube a tube of solder which snugly fits said bore, then subjecting said gold tube and said solder tube so in position to a sufficient heat to unite said two tubes together to constitute a solder-lined gold tube, then reducing or swaging said solder-lined gold tube to a greater length and a smaller bore, then cutting said elongated reduced tube into sections, then inserting a cleaned and fluxed core of base metal into a section of said reduced elongated solder-lined gold tube, then subjecting the whole so in position to a sufficient heat to unite said base-metal core with said reduced elongated solder-lined gold tube, and then drawing the whole to the required size, substantially as specified.

2. The improved process of making compound ingots for the manufacture of seamless gold-plated wire herein described, consisting of the following steps, cleaning a seamless gold tube and covering the inner surface or bore thereof with a suitable flux, then inserting in the bore of the gold tube successively the two sections of a longitudinally-divided solder tube, whose longitudinal edges are diagonally directed thus rendering said two sections capable of wedge action upon and against each other respectively until said split tube of solder snugly fits the bore of the gold tube, then subjecting said gold tube and said solder tube so in position to a sufficient heat to unite said tubes together to constitute a solder-lined gold tube, then reducing or swaging said solder-lined gold tube to a greater length and a smaller bore, then cutting said elongated reduced tube into sections, then inserting a cleaned and fluxed core of base metal into the bore of a section of said reduced elongated solder-lined gold tube, then subjecting the whole so in position to a sufficient heat to unite said base-metal core with said reduced elongated solder-lined gold tube, and then drawing the whole to the required size, substantially as specified.

3. The improved solder-lined gold tube herein described, consisting of the combination of a gold tube and a tube of solder adapted to

fit tightly in the bore of the gold tube and
split into two longitudinal sections with ta-
pering edges and capable thereby of a wedge
action to force the solder tube into contact
5 with the gold tube throughout the entire ex-
tent of their contiguous surfaces, substantially
as specified.

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

WILLIAM A. LOW, Jr.

Witnesses:

SAMUEL S. STONE,
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