

UNITED STATES PATENT OFFICE.

CHAUNCEY C. BALDWIN, OF PERTH AMBOY, NEW JERSEY, ASSIGNOR TO STANDARD UNDERGROUND CABLE COMPANY, A CORPORATION OF PENNSYLVANIA.

METHOD OF MAKING COMPOUND METALLIC ARTICLES.

1,122,675.

Specification of Letters Patent.

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No Drawing.

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To all whom it may concern:

Be it known that I, CHAUNCEY C. BALDWIN, residing at Perth Amboy, in the county of Middlesex and State of New Jersey, a citizen of the United States, have invented or discovered certain new and useful Improvements in Methods of Making Compound Metallic Articles, of which improvements the following is a specification.

My invention relates to improvements in method of making compound metallic articles.

In the following specification I shall describe my improvement applied in the production of copper-clad wire, but it will be understood that the method which is thus exemplified is a method which is capable of application not merely to the specific materials, and not merely to the specific shape of components used, in making copper-clad wire, but is generally applicable in the union of metals having like properties, more or less, and in making articles of various shapes.

One method of manufacturing copper-clad wire is to proceed (having previously provided a solid core of steel and a solid tube of copper) to properly clean the surfaces; to drive the closely fitting sleeve over the properly cleaned core; and finally to heat the blank so compounded and to reduce it, first by rolling, and then by drawing, to the ultimate form of wire. It is a desideratum in this operation and indeed in all operations which involve the uniting of different metals, surface to surface, that the greatest care be taken to get an intimate union of the components of the blank over clean surfaces.

A refinement upon the method just stated in outline (and applicable in the practice of my invention, if desired) is this: to coat the steel core, after it has been cleaned and before the sleeve of copper is applied to it, with an electro-plating or chemically deposited coating of copper or other suitable metal. Other coating methods are of course permissible, as, for example, dipping in molten metal.

In the manufacture of copper tubes as now commonly practised, the tubes are first cast; then they are reduced in diameter and thickness and elongated, by forcing through dies and upon mandrels introduced at the same time with the bore. Ordinarily such

a reducing operation is repeated a number of times on each tube.

My improvement resides in employing as the mandrel upon which the last step of the tube-making operation is performed, the steel core with which the tube is to be compounded to form the blank from which the wire is produced. That is to say, instead of forming the copper tube apart from and independently of the core and when it has been formed applying it to the core, to bring the copper tube as such to its ultimate form directly upon the core. In this way, not only will an intimacy of contact be afforded such as is of manifest value, but also there will be the less opportunity for the undesirable effects of the oxidation of contacting surfaces which, so far as it may be present, tends to prevent intimacy of union. The core may, according to well recognized practice, be initially coated with metal, after the manner indicated above. In other respects the operation of making this wire is well known. Of course the core is most carefully cleaned by pickling, blasting, washing, or like operations, preparatory to its employment as the mandrel to receive the copper; of course the copper coating if applied is applied with due care by such methods as are found desirable; of course the copper of the sleeve is most carefully adapted for the intended purpose, particularly as to its purity; of course proper care is taken as to the condition of the surface of the bore of the tube before it is drawn down upon the surface of the core-mandrel; and of course the copper-shaking means are most carefully adapted to the end in view, so that a bright, clean copper surface shall be laid down on a clean core surface. The further operations are familiar: the heating of the compounded blank; the rolling in rod mills; the drawing in wire-drawing machines. When the blank has been compounded, its ends may be coated in the manner known in the art with a liquid preparation of silicate of soda or like material before being introduced into the heating furnace.

It will be observed of this method that it relates itself to, and is dependent upon the property of malleability which copper possesses. Accordingly, in general, the method applies to metals which possess this property of malleability, that they may be spread

while still in solid state against another solid surface, and shape themselves closely to the surface upon which or against which they are crushed or otherwise shaped.

5 By proceeding in the way which I have described, the manufacturer will, in comparison with the earlier operation alluded to, gain in two respects: He will simplify his operation, and he will eliminate from
10 his operation conditions which tend to the formation of undesirable corrosion upon the surfaces to be united after they have been shaped and before contact has been effected.

15 I have said at the beginning of this specification that this method which I have now described is not in its application limited to any specific shape of the articles in the treatment of which it is employed. I here
20 note, briefly, a few variations in the shape of the articles treated; and it will be understood that these notes are illustrative merely, and do not exhaust the subject of permissible variation.

25 Instead of extending a sleeve of one metal upon a solid core of another metal, the core itself may be tubular, and the tube may be empty or it may be filled—as, for instance, with a rod of copper. In such case
30 the resulting wire will include a hollow cylinder of the harder metal which may be either empty or filled with a core of another metal. Again, a tube of one metal may by expansion be extended upon the inner wall

of a tube of another metal, and the com- 35
pounded tube (either empty or filled) reduced.

I claim as my invention:

1. The method herein described of making compound metallic articles which con- 40
sists in extending one body of metal upon the surface of another rigid body of metal and then extending both bodies of metal, when so compounded, in unison.

2. The method herein described of mak- 45
ing compound metallic articles which consists in extending a body of relatively malleable metal upon the surface of a body of relatively hard metal, heating the blank so compounded and extending the heated blank 50
as an entity.

3. The method herein described of making bimetallic wire which consists in drawing down upon the surface of a relatively hard core an enveloping sleeve of relatively 55
malleable metal and in reducing the blank so compounded.

4. The method herein described of making bimetallic wire which consists in extending a tube of malleable metal upon a core of 60
hard metal as a mandrel, and forming the blank so compounded into a wire.

In testimony whereof I have hereunto set my hand.

CHAUNCEY C. BALDWIN.

Witnesses:

E. J. WARING,

F. J. TOMASSON.