No. 625,116. Patented May 16, 1899.

E. MARTIN.

MANUFACTURE OF COMPOUND WIRE.

(Application filed Feb. 24, 1898.)

(No Model.)

Fig. 7.

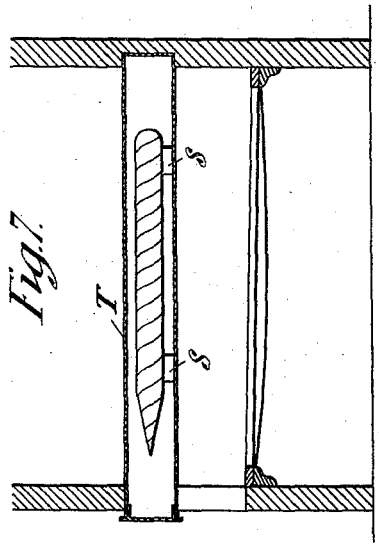

Fig. 8.

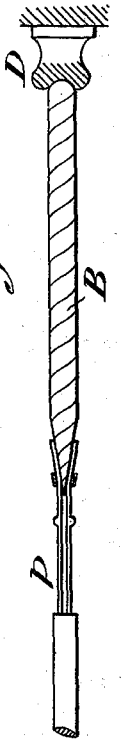

Fig. 4.

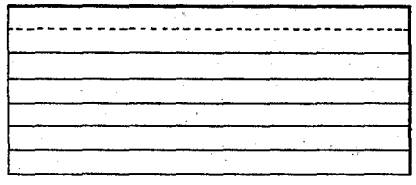

Fig. 3.

Fig. 6.

Fig. 1.

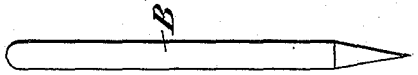

Fig. 2.

Fig. 5.

Witnesses:
A. M. Comm
C. E. MacKown.

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by Bakewell & Bakewell
his attys.

UNITED STATES PATENT OFFICE.

EDOUARD MARTIN, OF PARIS, FRANCE.

MANUFACTURE OF COMPOUND WIRE.

SPECIFICATION forming part of Letters Patent No. 625,116, dated May 16, 1899.

Application filed February 24, 1898. Serial No. 671,502. (No specimens.)

To all whom it may concern:

Be it known that I, EDOUARD MARTIN, a citizen of France, residing at 46 Rue de Dunkerque, Paris, France, have invented a certain new and useful Manufacture of Compound Wire of Steel and Silver, of which the following is a specification.

In the accompanying drawings, Figure 1 is a side elevation showing the steel bar operated upon. Fig. 2 is a cross-section of the same after the copper coating is applied. Figs. 3 and 4 are detail views showing the manner of applying the foil. Fig. 5 is a cross-section of the bar with the foil applied. Fig. 6 is a side elevation showing the bar after wound with the band. Fig. 7 is a section of a heating apparatus containing the covered bar, and Fig. 8 shows the manner of withdrawing from this furnace.

My invention relates to a manufacture of compound wire having a steel core and an outer coating of silver, the two metals being intimately combined with each other, so as practically to form a solid compound metal wire. For this purpose I proceed as follows:

I take a bar of steel of any desired dimensions, but preferably of from forty to fifty millimeters in diameter and about eighty centimeters in length. This bar is in the first instance turned in a lathe in order to obtain a very perfect metallic surface, and it is formed with the one end rounded and the other end pointed, as indicated at Fig. 1 on the accompanying drawings. These bars are then carefully pickled, after which I produce by electrolytic deposit a thin coating of copper thereon, as indicated at the cross-section at Fig. 2. I may also deposit by the same means a thin coating of zinc or tin, this being deposited either before or after the copper coating. I then place the bars in a bath of water and the operative rubs them energetically with a compound of cyanid of silver and cream of tartar. By this means the copper becomes slightly silvered. The bars are then washed, cleansed, and dried.

I prepare sheets or foils of silver of one thousand fine or of silver alloy about one-fortieth of a millimeter thick and about nine centimeters wide. I cut these foils of the same length as the bars—namely, eighty centimeters—and as their width would not be sufficient to envelop the bar and maintain it rolled around the same I take five or six such strips of silver-foil placed side by side in such manner as to overlap each other by about one-half of their width, as shown in the cross-section and plan at Figs. 3 and 4, so as to produce an envelop sufficiently wide for wrapping two or three times around the bar. This envelop being laid upon a table covered with cloth, I place the bar thereon and roll it up therein, so as to form a covering, as shown in the cross-section at Fig. 5. By this means I provide the bar with the desired amount of silver in proportion to the weight of the bar, which proportion may vary from five to one hundred grams of silver per kilogram of steel. When the bar has been thus enveloped in the silver covering, I wind a hempen band of about twenty centimeters width helically around the silver-covered bar, as indicated at Fig. 6, this covering having for its object to prevent the heat to which the bar is afterward subjected from causing the separation of the silver therefrom. I then place the covered bars in a heating apparatus, such as is shown in vertical section at Fig. 7, consisting of a number of iron tubes T of about one hundred millimeters diameter and ninety centimeters long, supported over a fire-grate and serving to receive the bars B, prepared as above described. Supports *s s* for the bars are provided within the tubes, so as to maintain the bars out of direct contact therewith. The tubes being then hermetically closed, they are heated by the fire to from 500° to 600° centigrade. When this temperature has been attained, the bars are withdrawn by a suitable tongs *p*, as at Fig. 8, so that they may not drop, and the tongs being supported on a stand the bar is pushed with its rounded end against a block D, so as to keep it horizontal, and while still hot is then turned around first in one direction and then in the other while operating upon it energetically with burnishing-tools, so as to obtain a first adherence of the silver to the steel. When this has been done, the bars while still hot are introduced into a furnace heated with wood fuel. The bars are maintained at the desired temperature and are immediately while hot subjected to a preliminary rolling operation in rolls with round grooves for com-

pleting the perfect adhesion of the two metals. The rolling may be continued until the bars are reduced from fifty millimeters to about thirty-five millimeters diameter. Immediately after this preliminary rolling the bars are without reheating passed through a rolling-mill having grooves of an oval, round, or other desired known form, where they are rolled down to a wire of four millimeters thickness.

After the rolling and pickling of this compound metal wire of steel and silver it is subjected to the drawing operation, special care being taken not to deteriorate the silver coating.

The above-described compound wire is applicable to a great number of industrial purposes—such, for example, as telegraph and telephone wires, wire-gauze, hooks and eyes for garments, wiring for bottles, wire rings, metallic brushes, and generally for all purposes for which brass or copper wire is used.

I have already described in my application of even date herewith the manufacture of compound steel and silver bars, plates, or ingots by combining sheets or foils of silver with one or more surfaces of the steel bar, &c., through the medium of a copper or other coating, and I do not therefore claim such manufacture as forming part of my present invention.

Having thus described the nature of this invention and the best means I know of carrying the same into practical effect, I claim—

1. The method of making silver-coated steel wire, consisting in first producing an electrodeposit of copper upon a steel bar, providing the copper coating with a thin film of silver, wrapping silver-foil around the coated bar, applying a protective covering to the wrapped bar, heating the same out of direct contact with the heat currents, then burnishing to effect the adhesion of the silver-foil and then heating and rolling the bar; substantially as described.

2. The method of making silver-coated steel wire, consisting in electrolytically coating a steel bar with copper, silvering such coating by treatment with cyanid of silver and cream of tartar, wrapping the coated bar with overlapping sheets of silver-foil coiled in a helical direction, heating the wrapped bar out of contact with the products of combustion, burnishing the coated bar and then heating the bar again and subjecting it to a series of rolling operations; substantially as described.

3. The method of making silver-coated steel wire consisting in producing an electrodeposit of copper upon a steel bar, coating the copper with a thin film of silver by treatment with cyanid of silver and cream of tartar, wrapping the coated bar with a number of overlapping sheets of silver-foil coiled in a helical direction, wrapping the bar in a protective covering of hemp or similar material, inserting the bar in an externally-heated tube and out of contact therewith, burnishing the bar to effect the adhesion of the silver-foil, and then heating and rolling the bar; substantially as described.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

EDOUARD MARTIN.

Witnesses:
ANTONIO GOUTELIE,
CELESTUS LAMBERT.