

(No Model.)

E. VIARENGO.
METHOD OF MANUFACTURING COPPER WIRE.

No. 506,957.

Patented Oct. 17, 1893.

Fig. 1.

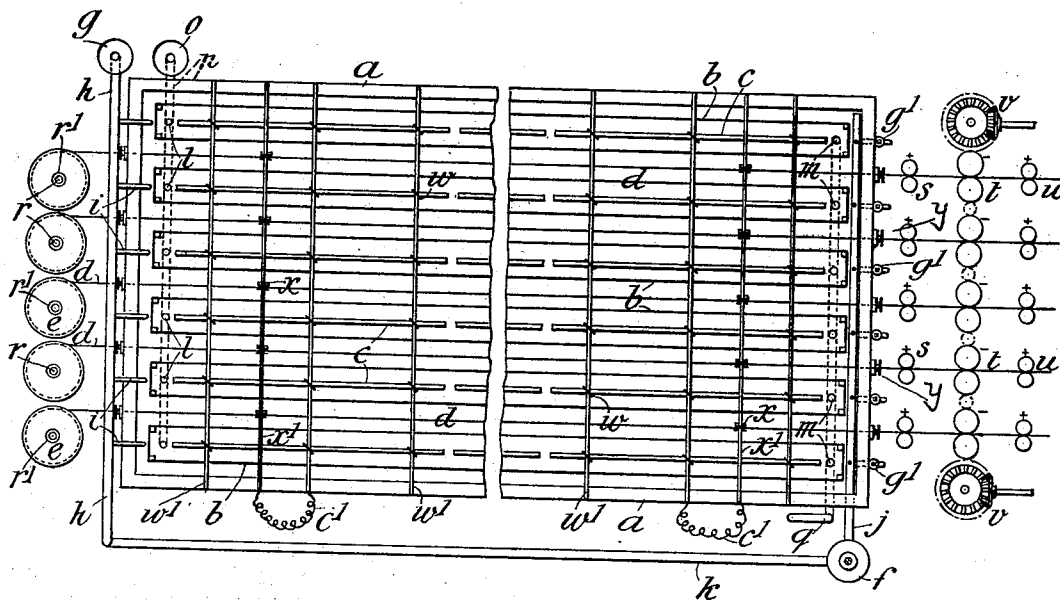


Fig. 2.

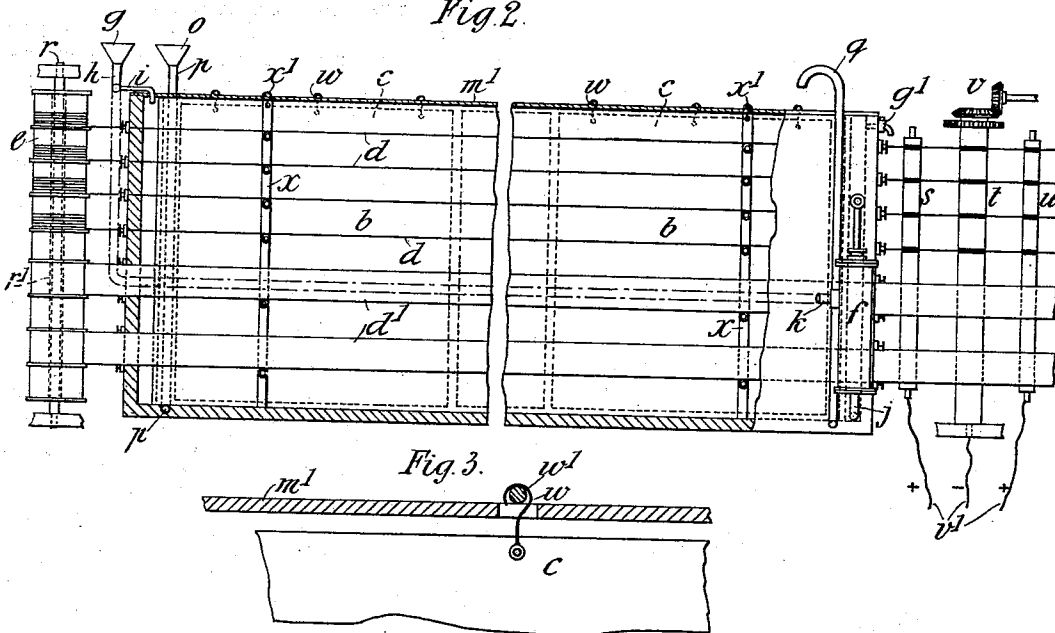
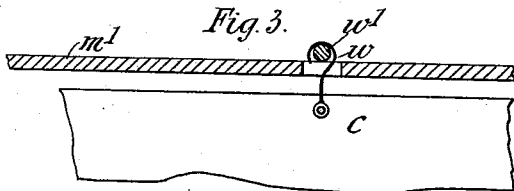


Fig. 3.



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METHOD OF MANUFACTURING COPPER WIRE.

SPECIFICATION forming part of Letters Patent No. 506,957, dated October 17, 1893.

Application filed April 5, 1892. Serial No. 427,913. (No specimens.)

To all whom it may concern:

Be it known that I, EMILE VIARENGO, a subject of the King of Italy, residing at Turin, Italy, have invented new and useful Improvements in the Manufacture of Copper Wire, Strips, Sheets, and the Like, of which the following is a specification.

My invention relates to the manufacture of copper-wire, strips, sheets and the like by the electro-deposition of copper upon a mother-wire or core and consists in improvements on the invention described in the specification of Tavernier & Howell's application, Serial No. 411,952, filed on or about the 17th of October, 1891. In manufacturing such wire or the like according to the said specification the mother-wire is passed in endless lengths round rollers mounted in an electrolytic tank, to which rollers motion is imparted so as to cause the wire to travel around the same until they have been coated with an electro-deposit of the required thickness. The ends are then disconnected and the wires are passed in a heated condition through rolls and draw-plates in order to render the deposit homogeneous. I have found that the curving or bending, to which the coated wire is subjected by its passage round the rollers before it reaches the rolls, is very prejudicial to the manufactured article, the deposit being liable to slit or crack, notwithstanding the subsequent rolling and drawing process. This method of manufacture has also the disadvantage that the wire or the like can only be made in short lengths. According to my invention I obviate these objections by causing the wire or the like to pass in a continuous or unlimited length through the electrolytic tank in a straight line to the rolls and draw-plates, the travel of the wires or cores being so regulated that by the time they leave the tank they are of the required thickness and dimensions, thus producing wire, strip or the like of continuous length and without bending or curving until they have been rolled and drawn.

In order to enable my invention to be fully understood I will describe how it can be carried into practice by reference to the accompanying drawings, in which—

Figure 1 is a plan with the cover removed; and Fig. 2 is a longitudinal section of an apparatus illustrating the manufacture of copper-wire and strip according to my invention. Fig. 3, is a view of part of the same drawn to a larger scale.

Similar letters in all the figures indicate similar parts.

a is the tank of the apparatus having within it a series of cells *b* composed of vegetable parchment, thin wood, clay or other suitable porous material.

In the tank *a* and surrounding the cells *b* I place a solution of sulphate of copper and in the cells *b* a solution of sulphate of iron or sulphate of zinc. In each of the porous cells I suspend a plate *c* of wrought or cast-iron or of zinc according to whether the solution in such cells is sulphate of iron or sulphate of zinc; and in the bath and between the cells, I pass the mother-wires or cores *d*, *d'* upon which the electro-deposition is to take place. The metallic plates *c* (which form the anode) are placed in electrical connection by means of wires *c'* with the mother-wires or cores *d*, *d'* which form the cathode. A current will thereby be produced and at the same time a deposition of copper from the solution of sulphate of copper will take place upon the mother-wires or cores, whereby the diameter or dimensions of such wires or cores will be increased. The wires or cores *d*, *d'* are wound upon reels or bobbins *e* outside the depositing tank *a*, and enter the tank at one end and pass out at the other end through stuffing-boxes *y* or the like so that the liquid of the bath cannot escape. The travel of the wires or cores *d*, *d'* through the tank is therefore in a straight line and must be regulated as hereinbefore stated so that by the time the wires or cores leave the tank they are of the required thickness or dimensions.

f is a pump for causing the liquids in the tank *a* to be of uniform density at all parts by drawing the liquid from the bottom of the tank and delivering it again at the top in the following manner: The liquid introduced through a funnel *g* flows through a tube *h* and through branch-tubes *i* into the tank *a*. When the required level has been reached

the pump *f* is set in action, so that it draws the solution through a tube *j* placed at the bottom of the tank at the opposite end to the inlet and forces it through a tube *k* into the tube *h* which delivers it again at the surface or inlet and so on until the solution has become sufficiently weakened. A solution of the original strength is then allowed to flow through the funnel *g* and the overflow through taps *g'* opened at the other end of the tank. These weakened solutions may be used for effecting the lixiviation of cupreous ashes.

l and *m* are small openings for the introduction and outlet of the liquid which acts upon the anodes and *m'* is the cover of the tank. This liquid is introduced through a funnel *o* and passing through a pipe *p* reaches the cells through the openings *l* and leaves through the openings *m* and through the overflow *q*; the circulation being constant in consequence of the constant introduction and egress of the liquid. The reels or bobbins *e* are fitted on small fixed shafts *r* on which they are caused to turn by the traction of the rolls, three sets only of which are shown at *s*, *t*, *u*. The reels or bobbins are provided with a brake such as an india-rubber bush *r'* or the like interposed between their interior and the shafts *r* in order that the wire or strip may be kept taut when entering the tank *a*.

v is the driving-gear for giving motion to the rolls through which the wire or strip heated by an electric current is passed, the said current being transmitted through the said rolls to the wire or strip by wires *v'* from any suitable source of electricity. After leaving the draw-plates, not shown in the drawings, the wire is wound upon suitable reels or bobbins and is ready for use.

w, *w* are copper hooks as clearly shown in

Fig. 3 by which the anodes *c* are suspended on metallic bars *w'* in the cells *b*. The wires *d* and strips *d'* are supported at intervals upon brackets or supports *x*, *x*, also connected by hooks to metallic bars *x'*. These bars, hooks and brackets together with the wires *c'* serve as conductors for communicating the electric current.

In manufacturing strips I produce a wire as hereinbefore described and then flatten the same. For making flat bands, bars or the like, I take a thin mother-strip, either of lead or copper, one side of which is coated with a material which will prevent copper from being deposited thereon. This strip is passed through the tank *a* in the same manner as the wires and similarly supported at intervals upon brackets which at the same time serve as contacts for communicating the electric current.

Having now particularly described and ascertained the nature of my said invention and in what manner the same is to be performed, I declare that what I claim is—

The manufacture of copper-wire, strip, sheets or the like by passing a mother-wire or strip of continuous or unlimited length in a straight line through an electrolytic tank to rolls and draw-plates, so as to avoid curving or bending the wire or the like during its passage through the tank and before its passage through the rolls and draw-plates, the said wire or the like being heated during its passage through the rolls and draw-plates, substantially as hereinbefore described.

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