

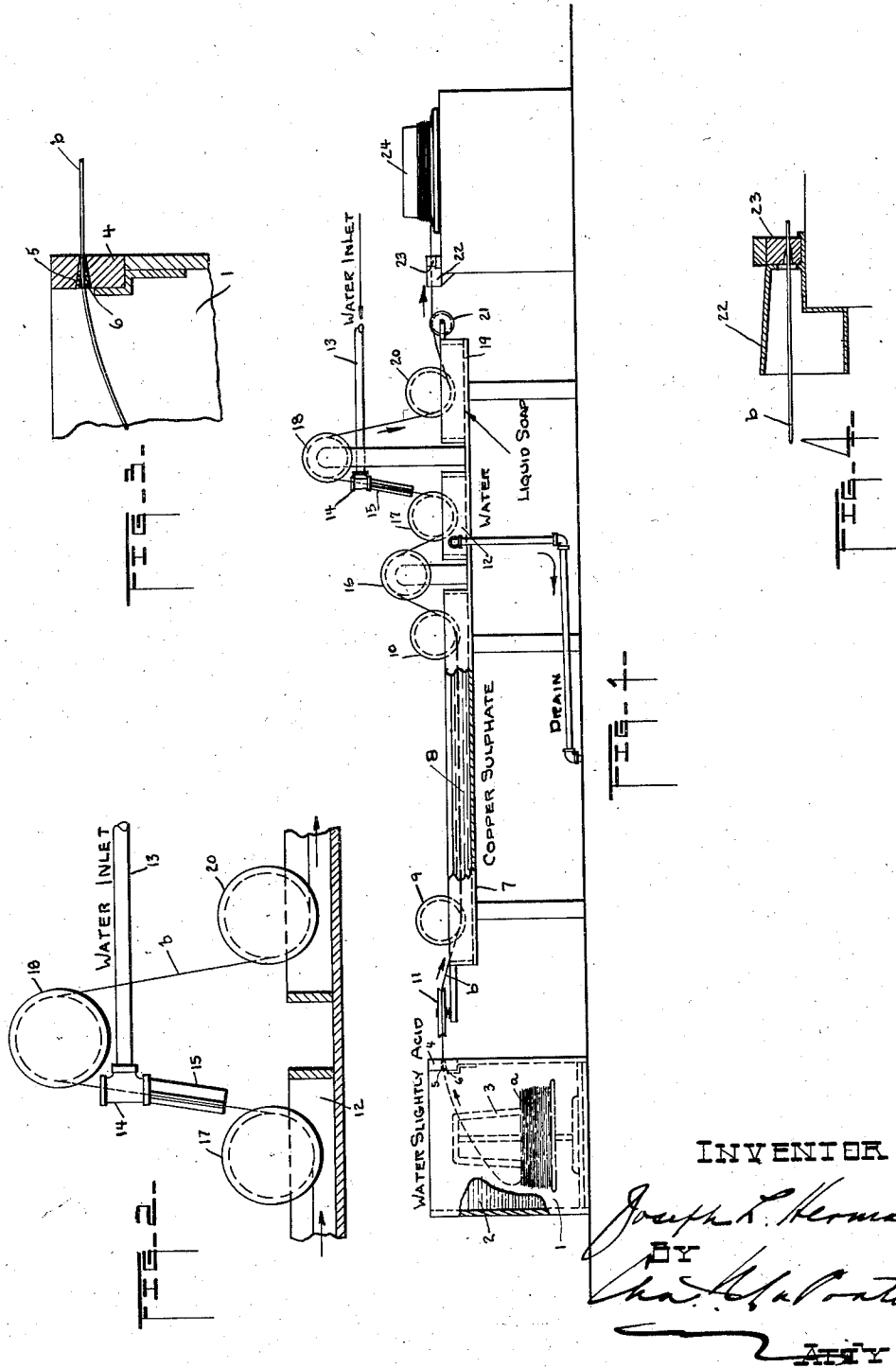
June 5, 1934.

J. L. HERMAN

1,961,148

MACHINE FOR COPPER COATING WIRE

Filed Sept. 25, 1931



INVENTOR

Joseph L. Herman
BY
Chas. H. [unclear]
ATTY

UNITED STATES PATENT OFFICE

1,961,148

MACHINE FOR COPPER COATING WIRE

Joseph L. Herman, Peoria, Ill., assignor, by mesne assignments, to The National City Bank of Cleveland, Cleveland, Ohio, a corporation, and John A. Chapman, Chicago, Ill., trustees

Application September 25, 1931, Serial No. 565,049

2 Claims. (Cl. 91—18)

This invention has reference to a new and improved method of coating iron or steel wire with copper.

The invention has for its principal object to provide a method for continuously copper coating iron or steel wire in an efficient manner and by an apparatus which is simple in construction and economical to operate, with the result that the finished copper coating is strong, bright and even throughout.

The method comprehends a saturated solution of copper sulphate; an efficient rinse after the coated material leaves the coating solution and a light draft of the coated material, whereby to provide a uniform bright coat in the finished product.

Preferably, the steps of the method include drawing the wire from a coil or bundle which is contained in slightly acidulated aqueous solution whereby to prevent oxidization of the wire; then after drying the wire, by passing the same through a suitable wipe, continuously passing the same through a saturated solution of copper sulphate, the latter being maintained at saturation by the addition, from time to time, of crystals of copper sulphate; then passing the copper coated wire through a rinse of running water to insure the removal of all copper sulphate which has not adhered to the wire; then passing the coated wire through an aqueous lubricant and finally passing the lubricated and coated wire through a die for giving a light draft to the coppered wire to insure a uniform and bright coat of the copper coating.

I am familiar with various efforts which have been made to copper coat iron or steel wire, but I am not aware of any which provide for the maximum amount of copper, where a uniform and even coat may be applied to the wire throughout and where the finished wire has a uniform and bright coat, such as can be produced by passing the wire, first through a saturated copper sulphate solution which is maintained constant; by the addition from time to time of crystals of copper sulphate, then after a thorough cleansing by passing the coppered wire through running water, the coated wire is passed through a lubricant and then reducing the gauge of the wire by a light draft, whereby to give to the coating a uniform and bright finish. The most common practice in coppering wire, is to dip the coils of wire in vats of copper sulphate. This method is unsatisfactory since a uniform and strong coating cannot be obtained, nor can a proper polish of the coating be had,

due to the coils in the bundles adhering to one another and the bundles cannot be dipped uniformly to avoid drippings in and on the bundles of wire.

That the invention may be more fully understood reference is had to the accompanying drawing forming part of this description, illustrating a preferred embodiment of the invention, in which:—

Fig. 1 is a side elevation, partly in section, showing a diagrammatic outline of an apparatus by which the method of the present invention may be practiced;

Fig. 2 is a detail view of the rinsing means;

Fig. 3 is a detail of the means for wiping the wire before it enters the copper sulphate solution, and

Fig. 4 is a detail of the die means for giving a light draft to the wire after the coating has been applied.

Like characters of reference denote corresponding parts throughout the figures.

In the carrying out of my method the wire to be copper coated is preferably drawn to within one-half ($\frac{1}{2}$) gauge of the finished product. Such drawing is by the usual method and thereafter the bundles or coils of wire are thoroughly cleaned and are preferably deposited in a container or containers filled with an aqueous acidulated solution to prevent oxides from forming.

In the preferred form of the apparatus there is provided a tank or container 1 which is partly or nearly filled with an aqueous acidulated solution 2 and supported within this tank is a reel 3 on which is placed a bundle of wire *a* and from which is unreel the wire *b* to be copper coated. At the point where the wire *b* leaves the tank 1 there is provided a wipe for drying the wire as it leaves the tank and this wipe includes the preferably steel block 4 provided with a tapered opening or hole 5 therethrough, the smaller end of the hole being at the outside, see Fig. 3, and within this tapered opening or hole there is packed a suitable waste 6 which is wrapped around the wire and as the wire is drawn through the block this waste will pack within the tapered opening and thoroughly dry the wire as it leaves the tank 1 and before it enters the copper sulphate solution.

7 designates a tank of suitable length, height and width in which is contained a saturated solution of copper sulphate 8. In order that this solution be fully saturated crystals of copper sulphate are added and are always present which will assure a saturated and constant solution.

Two guiding rollers or sheave wheels 9 and 10 are provided at the inlet and exit ends, respectively, of the tank 7 to receive and guide the wire b into, through and from said tank, whereby the wire is immersed in the copper sulphate solution 8. The wire b leaving the tank or container 1 is guided to the tank 7 by a guiding roller or sheave wheel 11. With the arrangement of the rollers or sheave wheels 9 and 10, as shown, there will be a maximum amount of copper coated on the wire and this amount may be varied by an adjustment of the roller or sheave wheel 9 toward the roller or sheave wheel 10.

12 designates a tank for running water. Water is conveyed to this tank through an inlet pipe 13 connected with a suitable source of supply and with an elbow or coupling 14 from which depends a rinse pipe 15, having its discharge end immediately above the tank 12. The wire b as it leaves the tank 7 passes over a roller or sheave wheel 16 and thence into and through the water discharged into and passing into and out of the tank 12, being guided in its passage through the water in the tank 12 by a roller or sheave wheel 17 and from the tank 12 the wire b passes up and through the rinse water pouring down through the pipe 15, thence through the coupling 14 and over a roller or sheave wheel 18. Water leaves the tank 12 through a drain pipe 19 and is carried off, so that the wire b will pass through a rinse of clear clean water in the tank 12. This rinse will remove all copper sulphate that has not adhered to the wire. If this were not done and any of the copper sulphate was carried into the lubricant tank, to be described, it would prove injurious to such lubricant. The lubricant tank is designated 19 and preferably contains a liquid soap lubricant. The wire b leaving the roller or sheave wheel 18 is guided through the lubricant by a roller or sheave wheel 20. The wire b on leaving the lubricant tank 19 is guided by a roller or sheave wheel 21 to and through a suitable drawing grease in a housing 22 with which is associated preferably a "carboly" die 23, through which the wire passes for a light draft and for polishing the coating and is then wound on a block 24. The movement of the wire is continuous from the tank 1 to and around the block 24. The resultant wire after being reduced in size, following the copper coating step is strong, uniform and even throughout and bright. The light

draft which is given the coated wire has a tendency to slightly upset the copper coating but use has demonstrated that it is not injurious. I have been practicing the foregoing method and by an apparatus such as disclosed, for a considerable length of time and with never failing success.

I have stated that the showing of the apparatus in Fig. 1 is more or less diagrammatic and I am therefore not concerned with the detailed construction of the various elements constituting the same or their manner or means of support, except of course that the arrangement and relation of the parts shall conform somewhat to the showing and which will provide for a continuous movement of the wire b through a saturated solution of copper sulphate; an efficient rinse of the material after coating and a light draft of the wire to polish the same.

What I claim is:—

1. A device for coppering wire, which includes a rinsing tank for cleansing fluid having a drain, a substantially vertical pipe forming a guide for receiving wire therein having open ends the lower of which discharges into the rinsing tank for supplying fluid thereto, a T-coupling having one leg arranged vertically and connected at the lower end of said leg to the upper end of the pipe and having its other leg arranged horizontally, means connected to the horizontal leg of the coupling for supplying fluid to the coupling at a point between its ends, means for guiding the wire into the rinsing tank and for submerging the wire in the rinsing tank prior to the latter entering the pipe and for guiding the wire out of the upper end of the pipe, and means for continuously drawing the wire through the tank and pipe.

2. A device for rinsing coated wire and the like which includes a rinsing tank for containing cleansing fluid, a substantially vertical conduit forming a guide for the wire disposed above the tank and having open ends, the lower of which latter discharges into the tank, means to move the wire through the conduit, and combined means for supporting the conduit and for supplying cleansing fluid to the upper portion thereof, including a tubular member which has one end connected to the conduit at a side of the latter and having unrestricted communication with the conduit interior to supply cleansing fluid thereto.

JOSEPH L. HERMAN.

55
60
65
70
75

80
85
90
95
100
105
110
115
120
125
130
135
140
145
150