Dec. 2, 1930. C. D. JOHNSON 1,783,429

APPARATUS FOR COATING WIRE

Filed June 22, 1929

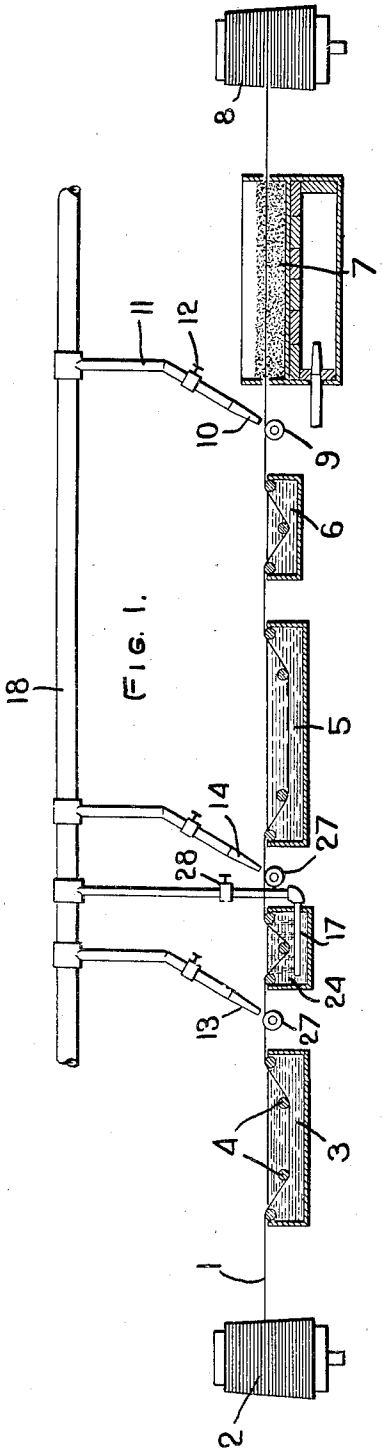



FIG. 1.

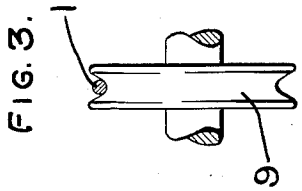



FIG. 3.

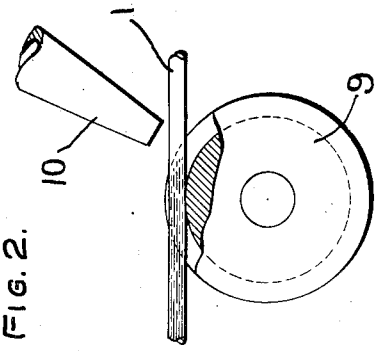



FIG. 2.

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# UNITED STATES PATENT OFFICE

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## APPARATUS FOR COATING WIRE

Application filed June 22, 1929. Serial No. 372,962.

This invention relates to the coating of wire and especially to the application of a coating of copper or similar metal to wire by drawing the wire through a coating bath.

A method of coating wire which is now commonly used involves the drawing of the wire through an acid bath for the purpose of cleaning it, thence through a washing bath to wash off the acid, thence through a coating bath by which the metallic coating is applied to the wire and finally through a second washing bath to make sure that the wire is perfectly clean and to wash off any surplus coating material.

It has also been proposed to pass the coated wire from the second bath through a body of heated granular material for the purpose of drying the wire and giving it a polishing effect.

In carrying out this method it has been customary to employ wipers for wiping the wire after it comes out from the acid bath and also after emerging from each washing bath. These wipers are commonly of absorbent material and may conveniently be in the form of a length of cotton rope or cord, loosely twisted, which is looped or twisted about the wire so that it has frictional contact with the wire as it is drawn through the coating apparatus.

This form of wiper is not entirely satisfactory, however, partly because each wiper eventually becomes saturated with the liquid drawn into it by the wire and thus loses its wiping effect to a great extent, and partly because unless the wiping elements are properly looped or twisted about the wire there is apt to be generated an undue friction between the wiper and the wire which will injure the coating.

It is one of the objects of my present invention to provide a novel apparatus for coating wire by which the surplus water can be effectively removed from the wire after it comes from each bath without in any way injuring the wire or coating.

In accordance with my invention I remove the water from the wire and dry the same by means of an air blast which is directed against the wire in a novel way, such air blast not only blowing any free water off from the wire, but also evaporating any film of water remaining on the wire so as to effectively dry it.

In order to give an understanding of the invention I have illustrated in the drawings a selected embodiment thereof which will now be described after which the novel features will be pointed out in the appended claims.

Fig. 1 is a more or less diagrammatic view showing a wire-coating apparatus embodying my invention;

Fig. 2 is a fragmentary view on a larger scale illustrating the manner in which the air blast performs its function of drying the wire;

Fig. 3 is an edge view of the roller supporting the wire while the air blast is directed against it.

The wire which is to be coated is indicated generally at 1 and it is shown as being withdrawn from a spool or reel 2. 3 indicates an acid bath through which the wire is drawn for the purpose of cleaning it, said wire being held submerged in the bath by passing under a roll 4. From the bath 3 the wire is taken through a washing bath 24 containing water by which it is washed and thence it passes into the coating bath 5 which is of such a character that a metallic coating will be deposited on the wire as it passes through the bath. From the coating bath 5 the wire passes through another washing bath 6 containing water and by which the coated wire is washed clean. From the coating bath the wire passes through a drier 7 and thence may be wound onto a spool 8. The drier 7 is shown as a bed of heated sand or gravel through which the wire is drawn, the heat serving to completely evaporate any moisture on the wire and the granular nature of the material having a polishing effect on the wire.

The coating operations as thus far described are similar to those disclosed in my Patent No. 1,771,379, dated July 22, 1930.

In the coating of wire by this process it is essential that the wire should be thoroughly dried before it is wound up on the spool 8.

As stated above it has heretofore been the

practice to employ wipers of absorbent material through which the wire passes as it emerges from the washing bath 6, these wipers being intended to remove surplus free water from the wire and partially dry it, the complete drying being accomplished in the drier 7. These absorbent wipers are frequently in the form of short lengths of loosely twisted cord of cotton or other absorbent material which are looped or twisted about the wire. Wipers of this nature soon become saturated with water and thus lose their wiping effect and unless the workman adjusts them very carefully they are apt to bind on the wire with sufficient friction so as to injure the thin metal coating which is applied to the wire as it passes through the bath 5. When this occurs imperfect coating of the wire will result.

This invention provides a substitute for the wipers which operates more satisfactorily. Such substitute is in the nature of a jet or blast of air which is directed against the wire as it emerges from the washing bath 6 and which serves not only to blow off from the wire any free water but also to practically dry the wire by evaporation of any film of water remaining thereon. The wire is shown as passing over a grooved roll 9 as it leaves the washing bath 6 and the air jet is delivered against the wire by means of a nozzle 10 on the end of a pipe 11 that is connected to any suitable source of compressed air. The nozzle is preferably provided with a valve 12 so as to regulate the amount of the air discharged.

The nozzle 10 is shown as having an inclined direction and it is so placed that the air jet will impinge on the wire just as it passes out of contact with the roll 9. The roll is shown as a grooved roll and the air jet which is delivered from the nozzle 10 impinges on the wire and then strikes on the surface of the roll immediately beneath the wire, the air being deflected by the roll back onto the wire again. The air is thus directed against all sides of the wire. The air may be delivered under any desired pressure and may be heated if desired. I have found from practice that this air jet not only blows any free water off the wire but evaporates any surface film of moisture which may remain on the wire so that the wire leaves the jet in an apparently dry condition. The wire is then carried through the bed 7 of heated sand or gravel by which the drying operation is completed and which also subjects the wire to a polishing action as described in my above-mentioned Patent No. 1,771,379, dated July 22, 1930.

There is an advantage in drying the wire as completely as possible immediately after it leaves the water bath 6 because this reduces the opportunity for oxidation of the wire.

As soon as the wire comes from the washing bath 6 into the atmosphere there is tendency for oxidation of the wire to begin and by placing the roll 9 relatively near the bath 6 and treating the wire to the air jet as above described the interval between the time when any portion of the wire emerges from the bath 6 and the time when it is dried is materially reduced.

I have herein shown the apparatus as provided with air jets 13 and 14, one of which is situated to act on the wire after it leaves the acid bath 3 and the other of which acts on the wire after it leaves the washing bath 24, these air jets taking the place of wipers which are usually employed at these points. The wire is arranged to pass over a roller 27 adjacent the point where it is acted on by the air jet and these air jets serve thus to substantially dry the wire after it comes from each bath.

After the wire comes from the acid bath there is apt to be more or less of a free deposit on the wire which it is desirable to remove. This may be done by drawing the wire over a mass of absorbent material which wipes any deposit from the wire.

In order to assist in thoroughly cleaning the wire before it is taken to the coating bath I propose to introduce compressed air into the washing bath 24 which causes a boiling or agitation of the water that will be effective in washing any deposit off from the wire. This is herein accomplished by introducing into the bath 24 a perforated pipe 17 which may be connected to the supply pipe 18 leading to the compressed air tank or other source of compressed air. This pipe 17 is shown as provided with a valve 19 by which the delivery of air from the pipe may be controlled. The air which is discharged through the perforations of the pipe 17 causes a violent boiling or agitation of the water in the bath 4 which will be effective in washing the wire free from any deposit thereon.

With this invention it is not necessary to subject the wire to any frictional action for wiping it and the coating which is deposited on the wire as it passes through the coating bath is, therefore, undisturbed and is not injured by any wiping action.

I claim.

1. An apparatus for coating wire comprising an acid bath, a coating bath, a washing bath, means for drawing the wire through the baths successively, a roll over which the wire passes as it leaves the washing bath, and means to direct an air jet against the wire in the direction of the roll just as it leaves the latter, whereby the air will be deflected from the surface of the roll against the roll-engaging surface of the wire.

2. An apparatus for coating wire comprising an acid bath, a coating bath, a washing bath, means for drawing the wire through

the baths successively, a grooved roll over which the wire passes as it leaves the washing bath, and means to direct an air jet against the wire in an inclined direction toward the roll just after the wire passes out of contact with the roll in order to dry said wire, the air jet being directed into the groove of the roll and being deflected thereby back onto the roll-engaging side of the wire.

In testimony whereof, I have signed my name to this specification.

CHARLES D. JOHNSON.