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WIPER FOR COATING MACHINES

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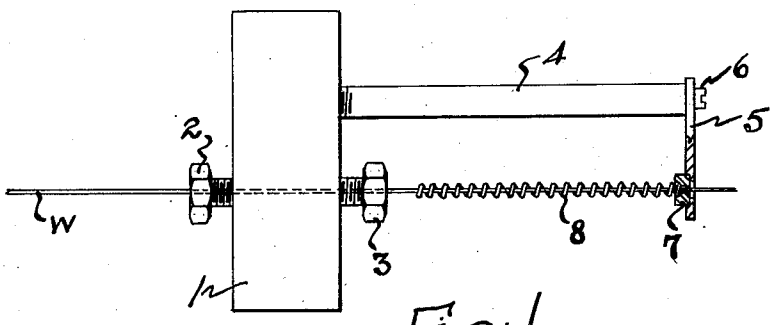


Fig. 1.

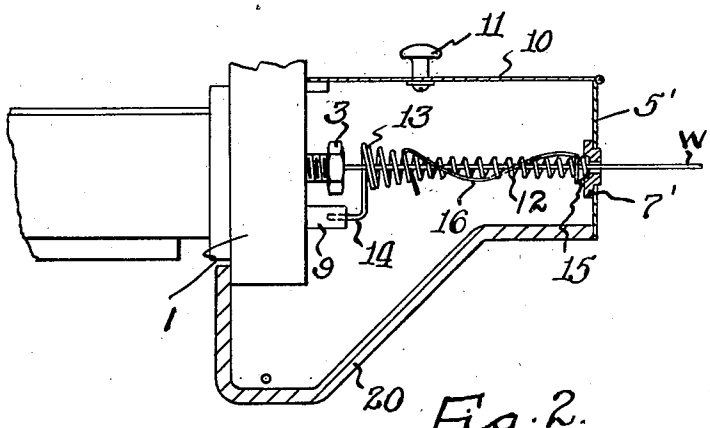


Fig. 2.

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WIPER FOR COATING MACHINES

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4 Claims. (Cl. 91—59.4)

This invention is concerned with a wiping device for removing the excess coating from strands, wires, and the like, and for cleaning, smoothing and polishing strands or wires and the like which have been coated with a molten metal such as in tinning.

The detailed objects of the invention will be apparent from the following description when taken in connection with the attached drawing.

This invention resides substantially in the combination, construction, arrangement and relative location of parts, all as will be explained in detail below.

This application is a division of my co-pending application Serial No. 251,759, filed January 19, 1939, entitled Methods and apparatus for continuously heat treating and/or coating strands.

In the accompanying drawing,

Figure 1 is a side elevational view of one form of the invention with some parts in cross-section.

Figure 2 is a similar view showing a modified arrangement.

In the coating of strands, and particularly metal strands such as wire, as for example in the art of tin plating copper wire, it has been common practice to move the wire after it is plated and while the coating is still molten in engagement with a wiping device. The function of the wiping device is to remove the excess metal and produce as near as possible a uniformly thin coating on the wire, to remove the scale when the coating is a molten metal, and to smooth and polish the coating.

Many forms of wiping devices have heretofore been employed but the most common arrangements have been those employing felt or rubber which obviously have not proved satisfactory because of the fact that the rapidly moving wire tended to wear the wiping surface so that a uniform coating did not result. Many efforts have been made to overcome this difficulty.

Furthermore, wipers of the previously known types have not been effectively removing the scale or dross which is always present when coating with a molten metal. The small particles of scale or dross become embedded in the molten coating and are incompletely removed by these wipers.

Furthermore, these wipers are not effective in polishing and smoothing the coating to the desired degree.

In accordance with this invention all of these difficulties have been completely eliminated by means of a wiping device which is at the same time simple and inexpensive, and which is capable of accurate adjustment to give a coating of the desired thickness while insuring the complete removal of foreign particles and the production of an extremely smooth and highly polished surface.

An important feature of the wiper of this invention is that it maintains its adjustment for relatively long periods of time so that a uniformly thin coating results.

Referring to the drawing, the invention is shown in one form as applied to a coating machine 1 which is diagrammatically illustrated. It is emphasized that this invention may be used for all types of coating and hence the coating machine illustrated at 1 may be a machine capable of applying a plastic coating, an enamel or lacquer coating, or a coating of molten metal as in the case of tinning.

If it be assumed, for example, that the coating machine 1 is considered to be a tin pot in which there is a bath of molten metal, it will be apparent that the strand which may be a wire, as indicated at W, enters the tin pot through a threaded plug 2 mounted in the wall of the pot and having a central passage through which the wire W may move in the direction of its length. At the other side of the tin pot is a similar threaded plug 3 through which the wire W passes as it emerges from the tin pot. It then passes axially of and through a coiled spring 8 the internal diameter of which is such in relation to the external diameter of the wire that a coating of the desired thickness will remain on the wire after it issues from the spring.

In order to prevent the spring from moving with the wire it abuts against an apertured member 7 supported by a depending arm 5 which is secured by means of screw 6 to a supporting bracket 10 mounted on the tin pot. Since the wire W moves from left to right in Figure 1 it will be seen that it holds the spring 8 snugly against the member 7 as the wire issues from the tin pot. The tin coating thereon is in a molten state and hence the spring acts to form a coating of uniform thickness on the wire while removing the excess tin, scale and dross. It has been found from experience that the spring also acts to give the coating an exceedingly smooth surface and substantially polish it to a high degree so that a very acceptable commercial product results. By using a spring of the proper internal diameter a coating of the desired thickness can be secured, even to the extent of getting a very thin coat, that is, one much thin-

ner than can normally be obtained by the usual forms of wiping devices.

The arrangement of Figure 2 differs from that of Figure 1 in several respects. The coating machine 1 has associated with its discharge end a casing 20 having an end wall 5' on which is hingedly mounted a cover 10 and a raising handle 11. A supporting member 7 is mounted on the front wall 5' and has secured thereto at 15 one end of a coil spring 12 which is similar in shape and has the same functions as the spring 8 of Figure 1. At its entering end, that is its left hand end, it is modified however as indicated at 13 so that it flares outwardly toward that end. The result is that the passage through the spring is of gradually decreasing diameter from the end through which the wire W enters down to the desired final diameter which determines the thickness of the coating to remain on the wire.

The terminal end 14 of the spring cooperates with a fixed stop 9 on the coating machine so that as will be apparent the internal diameter of the spring can be varied by increasing the torsional strain thereon. The end 14 may be disengaged from the stop 9 and given one or more turns and then reengaged with the stop 9 to enlarge or decrease the size of the passage through the spring, depending upon the direction in which it is rotated.

In this arrangement there is also shown an additional spring 16 which encircles the spring 10 and creates an additional pressure on the wire for the purpose of intensifying the action of the spring in cleaning and polishing the wire.

It may be noted that it is preferable, or at least desirable, to make the wiping spring of metal such as spring steel but it is, of course, apparent that other resilient materials will be equally effective.

From the above description it will be apparent to those skilled in the art that this invention may be incorporated into other physical forms without departure from the novel scope or subject matter hereof. I do not, therefore, desire to be strictly limited to the disclosure as given for purposes of illustration but rather to the scope of the claims granted me.

What I seek to secure by Letters Patent of the United States is:

1. In a device for wiping excess coating material from a coated strand moving in the direction of its length, the combination including a support for guiding the strand while moving in the direction of its length, a wiping member comprising a coiled spring through which said strand moves in engagement therewith, and a second spring bearing on said first coiled spring to increase the pressure of engagement thereof on the strand.

2. In a device for wiping a coated strand, the combination including a support, a coiled spring mounted on said support to form a passage through which the strand may be moved in contact with the convolutions of the spring forming the passage, and means cooperating with one end of the spring by which it may be adjusted to vary the diameter of the passage therethrough.

3. In a device for wiping a coated strand, the combination including a support, a coiled spring mounted on said support to form a passage through which the strand may be moved in contact with the convolutions of the spring forming the passage, means cooperating with one end of the spring by which it may be adjusted to vary the diameter of the passage therethrough, and resilient means bearing on said spring to increase the pressure of contact thereof with the strand.

4. In a device for wiping excess coating material from a coated strand, the combination including a support having an aperture therethrough, a coiled spring attached at one end to said support so that the passage through the spring is in alignment with said aperture, said spring having a portion with convolutions of uniform diameter and a portion with convolutions of gradually increasing diameter at the free end to form a conical entrance thereto, and a resilient member bearing on said coiled spring to cause it to firmly engage the surface of a coated strand passing longitudinally through the spring.

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