

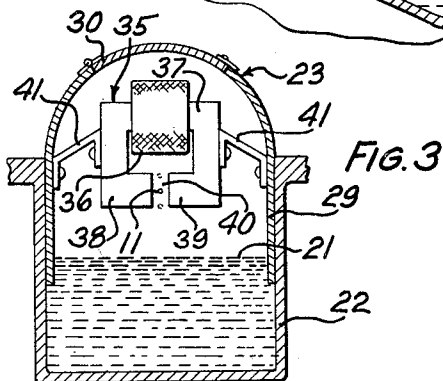
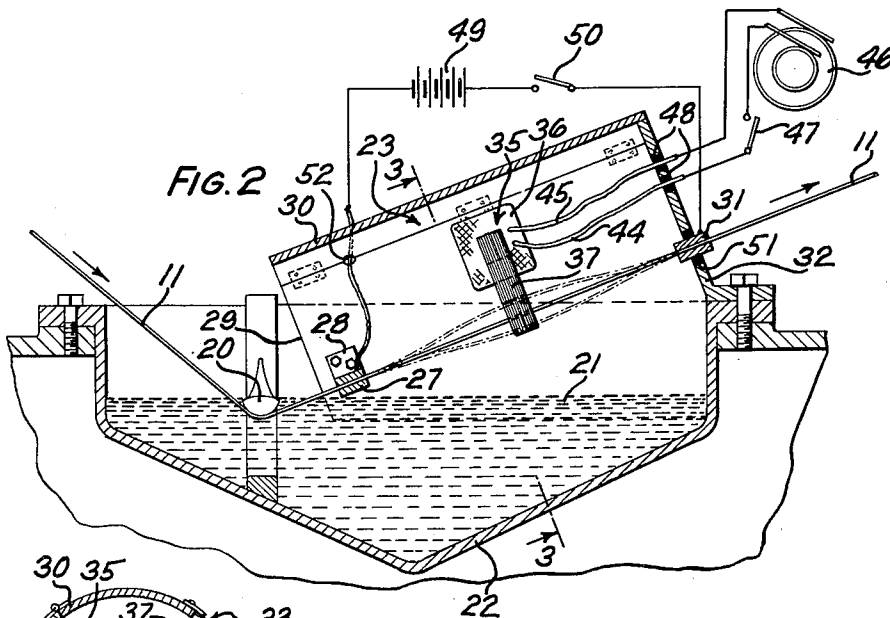
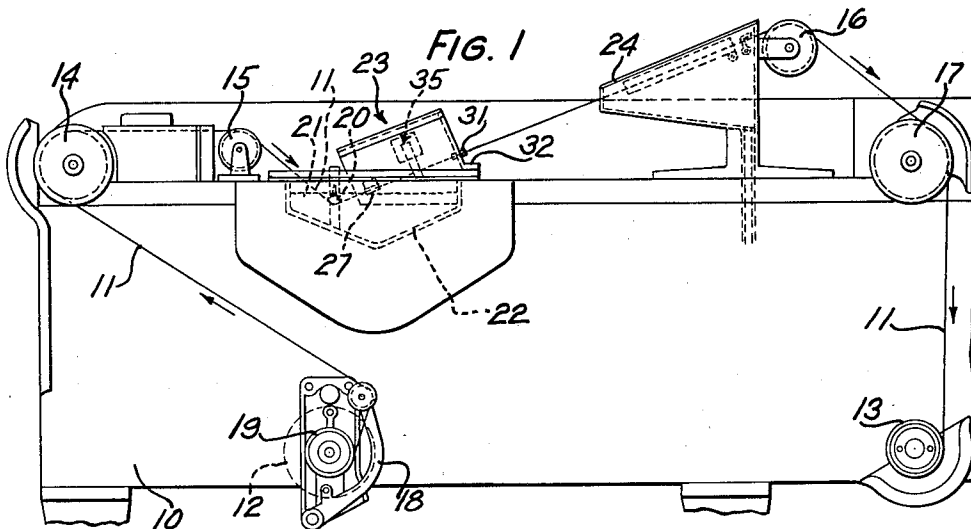
May 18, 1937.

F. MARTINDELL

2,080,494

METHOD OF AND APPARATUS FOR COATING STRANDS

Filed June 1, 1933



INVENTOR
F. MARTINDELL

BY *H. A. Whitcomb*

ATTORNEY

UNITED STATES PATENT OFFICE

2,080,494

METHOD OF AND APPARATUS FOR COATING STRANDS

Frank Martindell, Western Springs, Ill., assignor to Western Electric Company, Incorporated, New York, N. Y., a corporation of New York

Application June 1, 1933, Serial No. 673,858

16 Claims. (Cl. 91—59.1)

This invention relates to a method of and apparatus for coating strands, and particularly to a method of and apparatus for coating wire.

Heretofore, in many instances, wire has been coated with tin by passing the wire through a bath of molten tin and then drawing the coated wire through a die to remove the excess of the coating of tin.

Objects of this invention are to provide an economical and efficient method of and apparatus for coating a strand.

In one embodiment of the invention the strand or wire to be coated is drawn through a bath of molten tin, and a direct current passed through the wire, and as the coated wire emerges from the bath it passes through an alternating magnetic field which produces a vibration of the wire and a removal of the excess coating of tin therefrom.

The invention will be more fully understood from the following description taken in connection with the appended drawing, in which

Fig. 1 is a fragmentary longitudinal view of a tinning machine embodying features of the invention for removing excess molten tin from a coated wire and which may be employed for practicing the improved method;

Fig. 2 is an enlarged, fragmentary vertical sectional view of the tinning machine shown in Fig. 1, illustrating in detail the excess tin removing apparatus, electric circuit diagrams being shown in association therewith; and

Fig. 3 is a vertical sectional view taken on the line 3—3 of Fig. 2.

Referring to Fig. 1, the numeral 10 indicates the framework of any ordinary and suitable tinning machine for tinning a wire 11 extending from a supply spool 12 to a suitably driven take-up spool 13 by way of guide pulleys 14, 15, 16, and 17. A resiliently adjustable tension arm 18 and a brake 19 cooperating with the supply spool 12 maintain a suitable tension in the wire 11. A hook 20 directs the wire 11 through a molten bath of tin 21 maintained within a suitably heated container 22. From the bath 21 the wire 11 passes through a device designated generally as 23 for producing a uniform tin coating, then through a water bath 24, and finally on to the takeup spool 13.

The device 23 for producing the uniform tin coating on the wire 11 includes a guide 27 carried on a bracket 28 fixed to a hood or guard 29 having a hinged cover 30 mounted over the device 23, the guide 27 receiving the wire immediately after it is drawn from the molten tin

bath 21. Also forming a part of the device 23 is a second guide 31 suitably spaced from and in axial alignment with the guide 27, the guide 31 being fixed to a bracket 32 secured to the right end of the container 22. The bracket 32 in addition to supporting the guide 31 serves to support the guard 29, the latter also being fixed to the container 22. Arranged intermediate the guides 27 and 31 is an electromagnet 35 comprising a coil 36, and a U-shaped core 37 (Fig. 3) of suitable magnetic material, which includes parallel extending arms or pole pieces, the free ends of which are provided with right angle extensions 38 and 39 directed toward and spaced from each other to provide an air gap 40. The electromagnet 35 is supported from the inner opposed walls of the guard 29 by brackets 41 and is so positioned relative to the wire 11 that the wire in its travel between the guides 27 and 31 passes centrally through the air gap 40 formed between the extensions 38 and 39 of the electromagnet pole pieces. Terminals 44 and 45 of the coil 36 are connected to an electrical circuit which includes a suitable source of alternating electrical current 46 and a switch 47. The terminals 44 and 45 extend through apertures in the bracket 32 and are electrically insulated therefrom by suitable insulating bushings 48. The guides 27 and 31 through which the tinned wire 11 travels, in electrical contact therewith, are connected to an electrical circuit which includes a suitable source of direct current 49 and a switch 50. An insulating bushing 51 electrically insulates the guide 31 from the bracket 32. An aperture 52 formed in the guard 29 and the hinged cover 30 permits the circuit to be connected to the guide 27 arranged inside the guard.

It will be apparent that when the switches 47 and 50 are closed to complete the electrical circuits through the coil 36 and the ever changing portion of the traveling wire 11 extending between the guides 27 and 31, respectively, an alternating magnetic field is set up in the air gap 40 formed between the extensions 38 and 39 of the electromagnet pole pieces, and the wire 11 centrally disposed in the magnetic field will be put in rapid vibration in a plane passing through the length of the wire. In operation the device 23 involves the principle of violently vibrating or oscillating the freshly tinned ever changing portion of the wire 11 extending between the guides 27 and 31 to project the excess of the coating of tin therefrom by a rapid acceleration and deceleration of the wire. A constant tension is maintained in the vibrating portion of the wire 11 by

the adjustable tension arm 18 and brake 19 cooperating with the supply spool 12 during the complete rapid motion back and forth of the wire, the extent of its motion being indicated in dotted outline in Fig. 2. The violent vibratory motion imparted to the freshly coated wire 11 as it passes between the guides 27 and 31 serves to remove the excess of the coating of tin and causes a uniform coating of tin to be left on the wire. It will be obvious that by varying the frequency of the current through the coil 36 and thereby the rate of vibratory motion imparted to the wire 11, the amount of tin thrown off the wire and consequently the thickness of the tin coating may be controlled. The herein described method of removing the excess of the coating of tin from the wire by a rapid acceleration and deceleration thereof in a plane passing through its length without the use of dies produces a uniform coating in an obviously economical manner.

In the disclosure an electromagnet 35 energized from a source of alternating electrical current 46 and the ever changing portion of the wire 11 between the guides 27 and 31 connected to a direct current supply 49 has been shown, but it will be understood that a permanent magnet with the wire connected to an alternating current supply could be employed to impart a vibratory motion to the wire.

It will be understood that the nature and embodiment of the invention herein described is merely illustrative and that many changes and modifications may be made herein without departing from the spirit and scope of the appended claims.

What is claimed is:

1. In an apparatus for coating strand material, a container having a bath of coating substance through which the material is drawn, and means for producing a fluctuating field of force and for applying it to the material a substantial distance from any point of contact of the material with the apparatus after it has been drawn through the coating substance for vibrating the material in a plane passing through its length to remove an excess of the coating substance on the material.

2. In an apparatus for coating strand material, a source of current connected to the material, a container having a bath of a coating substance, means for drawing the material through the coating substance, and means providing an alternating magnetic field through which the material passes for magnetically vibrating the material after it has been drawn through the coating substance to remove an excess of the coating substance on the material.

3. In an apparatus for coating strand material, a container having a bath of molten metal through which the material is drawn, a source of direct current connected to the material, a source of alternating current, and means connected to said last source providing a magnetic field through which the material travels after it has been drawn through the molten metal for producing a vibratory motion thereof to remove an excess of the molten metal on the material.

4. In an apparatus for coating strand material, a source of current connected to the material, a container having a bath of molten metal, means for drawing the material through the molten metal, spaced guides for directing the material out of the container and for determining the course of the material, means for main-

taining a tension on the material, and means providing an alternating magnetic field through which the material passes for magnetically vibrating the material after it has been drawn through the molten metal to remove an excess of the molten metal on the material.

5. In an apparatus for tinning wire, a source of current connected to the material, a container of molten tin through which the wire is drawn, spaced guides for directing the wire out of the molten tin, and means providing an alternating magnetic field through which the material passes for magnetically vibrating the portion of the wire between the guides to throw off an excess of the molten tin on the wire.

6. In an apparatus for tinning wire, a container of molten tin through which the wire is drawn, spaced guides for directing the wire out of the molten tin, an electrical circuit including said guides and the wire therebetween connected to a source of direct current, a source of alternating current, and an electromagnet connected to said last source providing a magnetic field through which the wire travels between said guides for producing a rapid vibratory motion thereof to remove an excess of the molten tin on the wire.

7. In an apparatus for coating strand material, a container having a bath of molten tin through which the material is drawn, means providing a magnetic field through which the material travels after it has been drawn through the molten tin for producing a vibratory motion thereof to remove an excess of the molten tin on the material, and sources of alternating and direct current, one of said sources being connected to the material and the other to said means.

8. In an apparatus for coating strand material, a container having a bath of molten tin through which the material is drawn, and means for producing a fluctuating field of force and for applying it to the material a substantial distance from any point of contact of the material with the apparatus for laterally accelerating and decelerating the material in a plane passing through its length after it has been drawn through the molten tin to remove a portion of the molten tin on the material.

9. A method of coating strand material having a current therein, comprising immersing the material in a bath of molten metal, and then magnetically accelerating and decelerating the material by passing it through an alternating magnetic field to remove an excess of the molten metal on the material.

10. A method of tinning wire having a current therein, comprising advancing the wire through a bath of molten tin, maintaining a tension on the wire between spaced points after its advance through the molten tin, and accelerating and decelerating the wire between the points in a plane passing through its length by passing it through an alternating magnetic field to remove a portion of the molten tin on the wire and produce a uniform coating of tin thereon.

11. A method of coating strand material having a current therein, comprising coating the material with a metallic substance, magnetically accelerating and decelerating the material by passing it through an alternating magnetic field to remove an excess of the substance on the material, and varying the frequency of the magnetic force to control the amount of substance removed from the material.

12. In an apparatus for coating strand ma-

terial, a source of current connected to the material, a container having a bath of a coating substance, means for drawing the material through the coating substance, means providing a magnetic field through which the material passes for magnetically vibrating the material after it has been drawn through the coating substance to remove an excess of the coating substance on the material, a source of current for generating said magnetic field, one of said two sources of current being an alternating current source.

13. In an apparatus for coating strand material a container having a bath of coating substance through which the material is drawn, spaced guides for directing the material out of the bath, and means for producing a fluctuating field of force and for applying it to the material a substantial distance from any point of contact of the material with the apparatus and intermediate the guides for vibrating the portion of the material between the guides in a plane passing through the length of the material to remove an excess of the coating substance on the material.

14. A method of coating strand material, comprising coating the material with a molten metal, guiding the material in a definite path between spaced points after being coated, and then laterally accelerating and decelerating an ever changing portion of the material in a plane passing

through its length by applying a fluctuating field of force to the material without physical contact therewith at an unsupported point intermediate the spaced guide points to remove a portion of the molten metal.

15. A method of coating strand material, comprising coating the material with molten metal, guiding the material in a definite path between spaced points after being coated, and laterally accelerating and decelerating the material in a plane passing through its length after it has advanced through the molten metal by applying a fluctuating field of force to the material without physical contact therewith at an unsupported point intermediate the spaced guide points to remove a portion of the molten metal.

16. A method of coating strand material, comprising longitudinally advancing the material through a bath of molten metal, guiding the material in a definite path between spaced points after being coated, and vibrating the material in a plane passing through its length after its advance through the molten metal by applying a fluctuating field of force to the material without physical contact therewith at an unsupported point intermediate the spaced guide points to remove a portion of the molten metal.

FRANK MARTINDELL.