

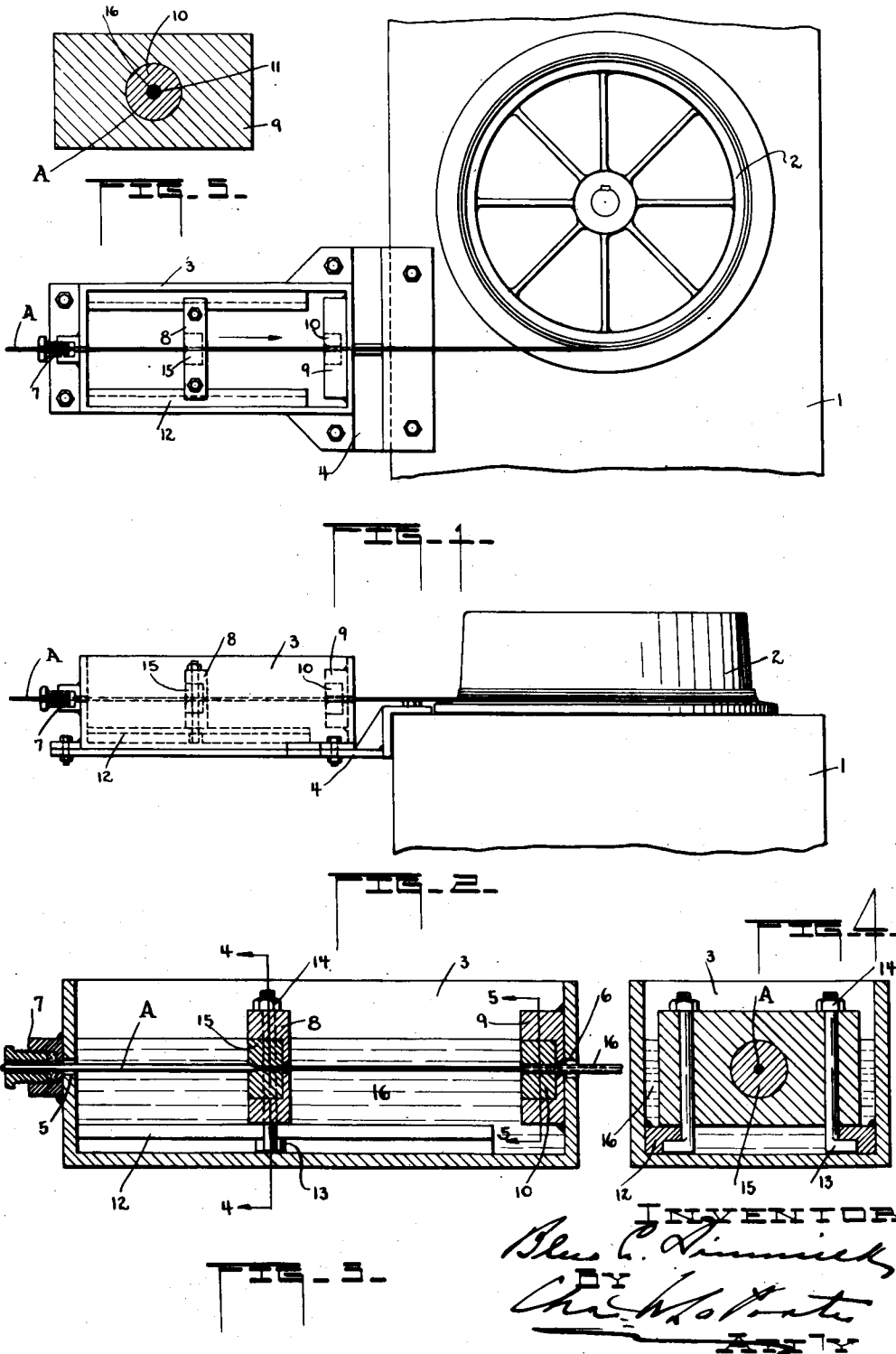
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METHOD AND APPARATUS FOR DRAWING AND COATING WIRE

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METHOD AND APPARATUS FOR DRAWING
AND COATING WIREElias C. Dimmick, Peoria, Ill., assignor to Key-
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This invention has reference to a method and apparatus for drawing and coating iron or steel wire.

The invention has for its principal object to provide a method and apparatus useful in carrying said method into practical effect in drawing wire and immediately following the drawing operation, applying a fluxing material to the reduced portions of the wire for producing welding electrodes; and in the provision of means for controlling or regulating the thickness of the fluxing material on the wire core. While the apparatus has been designed for applying, preferably a fluxing material to an iron or steel core, it will be found useful in applying any coating material, regardless of its constituency, and also for applying a lubricant, as for example—oil to a drawn wire.

A further object of the invention is to provide a method and an apparatus wherein a drawing operation may be accomplished and which is immediately followed by an application of a coating of fluxing material on the drawn body or wire. Furthermore, it is to be understood that the heat generated through the wire drawing operation is sufficient to provide the required heat to immediately dry the coating on the wire, as it leaves the controlling die and the coated wire is being wound up on the take-up block. It has been found that the heat of the wire, due to the drawing operation, increases its ability to pick up the flux.

It is well known that fluxes of different chemical and physical characteristics will have their characteristics modified in the presence of heat and it is therefore a further object to utilize the heat generated in the wire drawing operation in the manner best suited to the particular chemical or physical characteristics of the flux used.

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 plan view, on a greatly reduced scale, showing my combined die-stand and flux-box in association with a drawing-bench and a take-up block;

Fig. 2 is an elevation of Fig. 1;

Fig. 3 is a longitudinal sectional view through the die-stand and flux-box, on a somewhat larger scale, showing both the wire drawing step and subsequent coating step on the drawn wire;

Fig. 4 is a cross-section, as the same would appear if taken on the line 4—4 of Fig. 3, and

Fig. 5 is a cross-section, as the same would appear if taken on the line 5—5 of Fig. 3.

Like characters of reference denote corresponding parts throughout the figures.

In the drawing a section of a wire drawing bench is designated 1 having mounted for rotation thereon a take-up block 2. The bench and take-up block may be of any well known construction and the block driven in any approved manner.

3 designates, what I have chosen to refer to as a combined die-stand and flux-box which is supported by a bracket or support 4 secured to and extending laterally from one side of the bench 1. This box is of suitable length and width for the work intended and is so disposed in relation to the take-up block 2 that the drawn and coated wire may be taken up by the block and wound thereon, as the coated wire leaves the box. In the instance of a wire being coated with a flux material for purposes of producing welding electrodes, the coated wire is straightened and cut into suitable electrode lengths.

The front and rear walls of the box 3 are provided with aligned openings 5 and 6, respectively. The wire A entering and leaving the box in the direction of the arrow, as shown in Fig. 1, being drawn through the box by the take-up block 2, to which the front end of the wire is connected, in a manner well known to those skilled in the art of wire drawing. The wire entering the box passes preferably through a stuffing box 7.

8 and 9 designate, respectively, spaced die-holders. The latter being preferably welded or brazed to the inside of the rear wall of the box 3, with its wire passage in axial alignment with the opening 6. This holder is arranged to receive and hold a die-member 10 having an opening 11 therethrough of a diameter normally greater than the diameter of the drawn wire, pulled through by the take-up block; such opening 11 permitting the wire A to take-up a predetermined amount of flux material or coating, while at the same time preventing any excess amount of coating material being drawn out of the box. The die-member 10 may be replaced as occasion may require. The holder 8 may be of a width less than the width of the box 3, in which case I prefer that it be adjustably supported so that it may be moved away from or toward the holder 9. If adjustable, it is mounted so as to slide on rails 12 and secured in adjusted positions by clamping members 13 and nuts 14. The position of the holder 8 in its relation to the holder 9 determines the amount of coating material taken up by the drawn wire,

additionally controlled by the size of the opening 11 in the die-member 10. The holder 8 may be a fixed member and secured by being welded or brazed to the walls of the box 3. The holder 8 carries a die-member 15, the opening through which and the corresponding passage in the holder 8 being preferably in axial alignment with the axes of the die-member 10 and its holder 9. This die-member 15, like the die-member 10, may be replaced as occasion may require. The die-member 15 is a wire reducing die and therefore its opening is suited to the gauge to which the wire is to be reduced, as will be understood. The heat which is generated by the wire-drawing operation facilitates the application of the flux to the reduced wire and, furthermore, tends to immediately dry the coating on the wire. The production of the coated wire by this apparatus and method could be speeded up by setting the reducing die 15 towards or from the die member 10, thereby permitting the wire to have a shorter or longer period of immersion in the flux. In the arrangement shown the box is filled to a proper depth with a suitable flux material 16, or other coating material, as may be desired, with the dies preferably immersed or submerged in the coating material, as shown. In this instance the flux material, which has lubricating qualities, precludes the necessity of using any of the well known lubricants employed in wire drawing operations. However, if the holder 8 is employed additionally as a dam across the box, a lubricant may be employed in front of the die 15 and the flux material or other coating placed in the box between the holders 8 and 9, as will be understood.

In operation, a wire A being threaded through the box 3 and the die-member 15 and 10 and secured to a take-up block 2, the latter is rotated drawing the wire to and winding the same onto said block. During this operation the wire is first lubricated, then reduced to a predetermined size and subsequently coated with the flux or other coating material and caused to pass out of the exit end of the box with a proper amount of coating applied to the wire; the thickness of the coating being regulated by the die-member 10, which is not a wire reducing die, but functioning solely to regulate the thickness of the coating. As previously pointed out, the heat generated by the drawing operation facilitates the picking up of the flux by the wire and also is sufficient to provide the necessary heat to immediately dry the coating on the wire as it leaves the coating die and is wound on the take-up block 2. The distance from die 15 to die 10 may obviously determine the amount of heat absorbed from the wire by the mass of flux surrounding it in box 3. Consequently the temperature at which the wire leaves the box 3 through die 10 is determined by the distance noted. In view of the possible physical and chemical characteristics of various fluxes that may be used, it will be apparent that by means of proper spacing of the dies the heat available for drying the coating on the wire after it leaves box 3 may be regulated in accordance with the characteristics noted. In the instance of the production of welding electrodes, the flux coated wire is straightened and electrode lengths severed, as may be required.

What I claim is:—

1. In an apparatus of the character described, the combination of a coating material containing receptacle arranged for the passage of a wire therethrough and through the coating material

contained therein, a drawing die-member for reducing a wire to a predetermined gauge, and a die-member at the exit end of said receptacle through which the coated wire is drawn for regulating the thickness of the coating material on the wire as it emerges from said receptacle and which also prevents an excess amount of coating material being drawn out of the receptacle with its wire core.

2. In an apparatus of the character described, the combination of a coating material containing receptacle arranged for the passage of a wire therethrough and through the coating material contained therein, a drawing die-member for reducing a wire to a predetermined gauge, a die-member at the exit end of said receptacle for regulating the thickness of the coating material on the wire as it emerges from said receptacle and which also prevents an excess amount of coating material being drawn out of the receptacle with its wire core, and means for supporting said reducing die-member to permit of its being adjusted toward and from said regulating die-member.

3. In an apparatus of the character described, the combination of a coating material containing receptacle arranged for the passage of a wire therethrough and through the coating material contained therein, a pair of die-holders disposed in spaced relation within the receptacle and having aligned openings, one of such holders located at the exit end of the receptacle, a die-member for each holder, one comprising a wire reducing die for reducing a wire to a predetermined gauge, the other comprising a member through which the coated wire is drawn for regulating the thickness of the coating material on the wire as it emerges from said receptacle and which also prevents an excess amount of coating material being drawn out of the receptacle with its wire core.

4. In an apparatus of the character described, the combination of a coating material containing receptacle arranged for the passage of a wire therethrough and through the coating material contained therein, a pair of die-holders disposed in spaced relation and having aligned openings, one of such holders located at the exit end of the receptacle, a die-member for each holder, one comprising a wire reducing die for reducing a wire to a predetermined gauge, the other comprising a member for regulating the thickness of the coating material on the wire as it emerges from said receptacle and which also prevents an excess amount of coating material being drawn out of the receptacle with its wire core, and means for supporting the reducing die-holder to permit of its being adjusted toward and from said other holder.

5. In an apparatus of the character described, the combination with a wire drawing bench and a take-up block, of a combined die-stand and coating material containing box comprising a support supported from said bench, a receptacle on said support for containing coating material arranged for the passage of a wire therethrough and through the coating material contained therein, a drawing die-member removed from the exit end of said receptacle adapted for reducing a wire to a predetermined gauge, and a die-member at the exit end of said receptacle through which the coated wire is drawn for regulating the thickness of the coating material on the wire as it emerges from said receptacle and which also prevents an excess amount of coating material

being drawn out of the receptacle with its wire core.

6. In an apparatus of the character described, the combination with a wire drawing bench and a take-up block, of a combined die-stand and coating material containing box comprising a support supported from said bench, a receptacle on said support for containing coating material arranged for the passage of a wire therethrough and through the coating material contained therein, a drawing die-member removed from the exit end of said receptacle adapted for reducing a wire to a predetermined gauge, a die-member at the exit end of said receptacle for regulating the thickness of the coating material on the wire as it emerges from said receptacle and which also prevents an excess amount of coating material being drawn out of the receptacle with its wire core, and means for supporting said reducing die-member to permit of its being adjusted toward and from said regulating die-member.

7. In a device for reducing a wire to a predetermined gauge and for coating such reduced wire with a flux for producing welding electrodes, the combination of a receptacle for containing a flux material, a pair of die-members supported within said receptacle, one adapted to reduce a wire drawn therethrough to a predetermined gauge and the other through which the coated wire is drawn adapted to regulate the thickness of the flux coating applied to such reduced wire, the latter being located at the exit end of said receptacle.

8. In a device for reducing a wire to a predetermined gauge and for coating such reduced wire with a flux for producing welding electrodes, the combination of a receptacle for containing a flux material, a pair of die-members supported within said receptacle, one adapted to reduce a wire drawn therethrough to a predetermined gauge and the other adapted to regulate the thickness of the flux coating applied to such reduced wire, the latter being located at the exit end of said receptacle, and means for supporting said reducing die-member to permit of its being adjusted toward and from said regulating die-member.

9. In a device of the character described, the combination of support, a receptacle on said sup-

port for containing a flux material, a pair of die-members in said receptacle, means on the support for pulling a wire through said die-members and the flux material contained in said receptacle and for coiling said coated wire, one of said die-members adapted to reduce such wire to a predetermined gauge and the other of such die-members through which the coated wire is pulled adapted to regulated the thickness of the flux material applied to the wire.

10. The method of drawing and coating wire consisting of reducing the gauge of the wire by a drawing operation, immediately submerging the drawn wire while hot into a bath of flux, and controlling the thickness of the coating on the wire in accordance with the length of the time of submergence of the hot wire in the flux.

11. The method of drawing and coating wire consisting of reducing the gauge of the wire by a drawing operation, immediately submerging the drawn wire while hot into a bath of flux, and controlling the length of time of submergence of the hot wire in the flux in accordance with the thickness of coating to be applied.

12. The method of drawing and coating wire consisting of reducing the gauge of the wire by a drawing operation, immediately submerging the drawn wire while hot into a bath of flux and controlling the length of time of submergence of the wire in the flux in accordance with the heat generated in the drawing operation.

13. The method of drawing and coating wire consisting of reducing the gauge of the wire by a drawing operation, immediately submerging the drawn wire while hot into a bath of flux and controlling the length of time of submergence of the hot wire in the flux in accordance with the physical and chemical characteristics of the flux.

14. The method of drawing and coating wire consisting of reducing the gauge of the wire by a drawing operation, immediately submerging the drawn wire while hot into a bath of flux and controlling the length of time of submergence of the hot wire in the flux and the heat available for drying the coated wire, in accordance with the physical and chemical characteristics of the flux.

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