May 8, 1934. W. H. CONVERS 1,957,942

WIRE COATING MACHINE

Filed Oct. 4, 1930

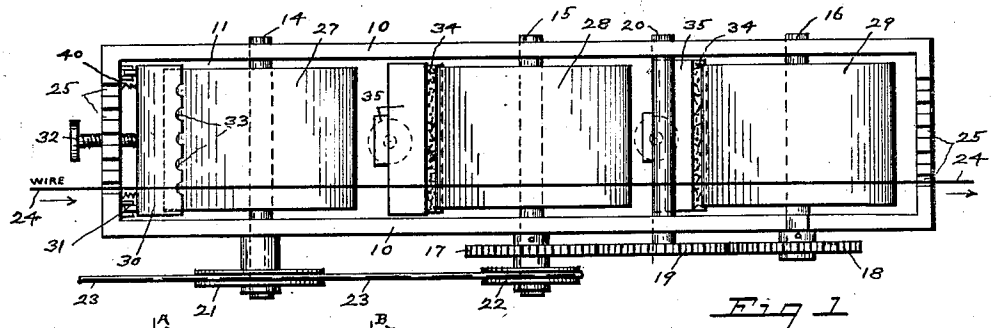


Fig 1

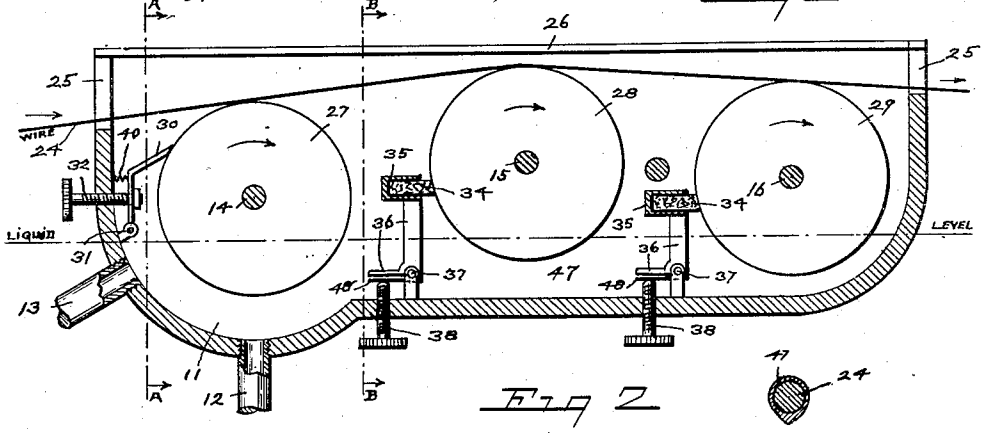


Fig 2

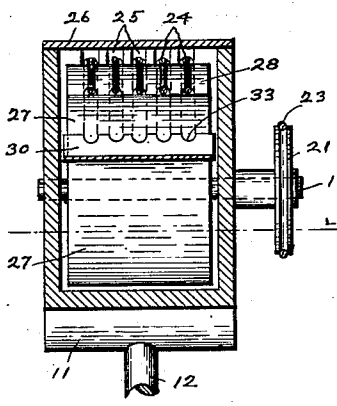


Fig 3

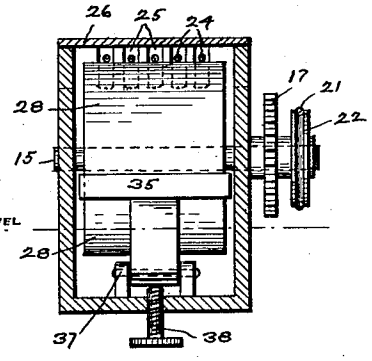


Fig 4

Fig 5



Fig 6

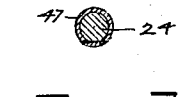


Fig 7

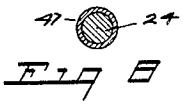


Fig 8

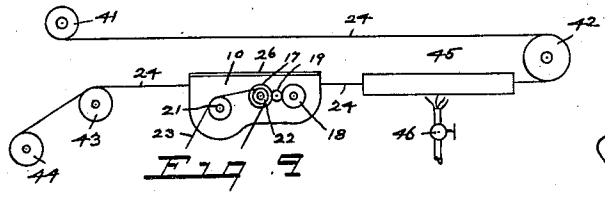


Fig 9

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Patented May 8, 1934

1,957,942

UNITED STATES PATENT OFFICE

1,957,942

WIRE COATING MACHINE

Wilber H. Convers, Poughkeepsie, N. Y.

Application October 4, 1930, Serial No. 486,313

9 Claims. (Cl. 91—55)

The subject matter of this invention is a novel method of applying suitable liquids to the surface of wires or wire insulating coverings, such as spaghetti, tubular sleevings, circular loom, braided fabrics, and conductors and wires which have previously been covered with fabric or rubber for the purpose of insulating them, and various kinds of fluid insulating solutions may be employed, such as varnish, lacquers, etc., which when baked or dried upon the wire, due to their nature act as a perfect insulating coating.

It has been noted in the coating of wire that when the rate of application of fluid coating to the wire reached a certain point that the fluid would form beads or lumps, thus producing unsatisfactory results, and it is for the purpose of overcoming this, that comprises the object of this invention herein contained, that is, that high coating speed may be reached without the attendant evils of beading, etc.

It has been found that if the wire when covered with an excess amount of fluid material was brought into contact with a surface which was slightly moistened with the same fluid or its solvents or similar components, that the excess would flow from the wire to the surface thus moistened, relieving the wire of its excess, and the present invention employs this principle for its operation and by repeating the process of bringing the wet wire into successive contacts with moist blotting surfaces the coating remaining on the wire can be held to definite limits of thickness, keeping in mind that the solution be of a certain viscosity.

The average insulating solution is by its nature viscous; therefore the blotting will not take off all of the solution but the solution will after each blotting flow or envelop the wire and each time it is blotted it will again seal or envelop the wire, but each time the amount or circumference will decrease and if enough transfers or blottings are employed a point will be reached where further drainage will cease due to the surface tension. Knowing the viscosity of a given solution the diameter and speed of the wire travel it is possible to determine accurately how many blottings are necessary to have a true concentric coating and when this point is reached the wire can be passed into the oven where the momentarily elevated temperature will increase the flowability and allow the solution to seal any wire surface which may be deficient in coating thickness.

Means are also provided so that a clean moist surface is constantly presented to the wire, by returning the excess collected by the surfaces to the fluid supply and wiping the surfaces clean, leaving only a trace of moist coating material upon the surface which is being continually presented to the wire.

The object of the present invention is to provide a simple device designed to be mounted in a suitable wire coating machine in the path of travel of the wire, and in such a manner that the wire will travel through it several times, receiving a coat of insulating material each time it passes therethrough.

Another object of the invention is to provide a device that shall be automatic, requiring little attention on the part of the operator, and being mechanical in its action.

Still another object is to provide a device comprising few parts, and of simple adjustment.

With these and other objects in view, my invention consists in certain construction and combination of parts that will hereinafter be fully described and claimed, and illustrated in the accompanying drawing in which like figures of reference refer to corresponding parts in all of the views, and it is understood that slight changes may be made without departing from the spirit of the invention.

In the drawing:—

Figure 1 is a top plan view of the device with the cover removed to expose the working parts.

Figure 2 is a longitudinal sectional view, showing the parts in detail.

Figure 3 is a cross sectional view on the line A—A.

Figure 4 is a cross sectional view on the line B—B.

Figure 5 is an enlarged cross sectional view of the wire and coating material, showing the same as it passes over the drums, as drum 27.

Figure 6 is a similar view, but showing the relative positions of wire and coating on the finished product as it passes over drum 28.

Figure 7 is a similar view showing the condition as it passes over the drum 29.

Figure 8 shows the condition of the finished product.

Figure 9 is a diagrammatic view showing the application of the device to a wire covering machine.

Referring to the drawing:—

It is understood that the device is to be mounted in a suitable wire insulating machine having means for imparting movement or travel to the wire to carry it through the machine a number

of times to receive a number of coats of the insulation material, and as the construction and operation of such machines is well known in the art, it will only be necessary herein to describe the coating device and its cooperation with the machine.

The device comprises a tank 10 of any suitable material and adapted to be mounted as before stated in the path of travel of the wire; and this tank 10 is formed with a sump 11, having a drain pipe 12, and a feed pipe 13 through which the coating solution is supplied from a stock tank, and its level in the tank 10 kept about as indicated by any suitable means in the supply line such as a float valve.

With the side walls of the tank 10, are rotatably mounted the shafts 14, 15 and 16; the shafts 15 and 16 having secured on their outer ends the gears 17 and 18, which are in mesh with an idler gear 19 mounted on a shaft 20, also rotatably mounted in the side walls of the tank 10; the object of the idler gear 19 being to rotate the shafts 15 and 16 in the same direction.

The shafts 14 and 15 are provided with the pulleys 21 and 22, connected by a belt 23 from a motor or other power, thus rotating the shafts 14, 15 and 16 all in the same direction, but owing to the ratio of the pulleys 21 and 22 the shafts 15 and 16 will rotate at slightly higher speed than the shaft 14.

It being desirable that the shafts 16 and 15 rotate at a higher speed than the speed of travel of the wire and considerably slower than the speed of the shaft 14, which speed will depend on the viscosity of the coating solution employed, and it is intended that these gears be geared with the machinery for moving the wire so that they rotate at a constant fixed speed in relation to the wire travel.

The ends of the tank 10 are formed with a series of spaced slots 25 to allow of the passage of the wire 24, and said tank is also provided with a cover plate 26 to protect the same and to prevent evaporation of the solution.

Upon each of the shafts 14, 15 and 16 is secured a drum or series of drums or rollers of suitable material and of the width of the tank, and each of these drums 27, 28 and 29 is rotated with its lower portion submerged in the solution; and the drum 27 is provided with a blade 30 which is hinged to the end of the tank 10 as at 31, and provided with an adjusting screw 32 threaded into the wall of the tank, rotatable in the blade 30 and held therein by a washer; a spring 40 being provided to exert pressure on the blade 30.

Said blade 30 is formed upon its edge with a series of notches 33 which register with the notches or slots 25 and with the wires 24; the object of this blade 30 and notches 33 is to allow the viscous coating solution 47 to be forced through the notches 33, thus allowing a considerable amount of the solution to form a series of rings upon the surface of the drum in the path of travel of the wire and envelop the wire with solution; and it may be noted that in order to insure a perfect contact between the wire 24 and the surface of the three drums, that the drum 28 is mounted slightly higher than the other drums, so that the wire travels upward and then downward from one drum to the other.

It is understood that the drums could be divided up into sections or rolls just wide enough for presenting a surface to the wire, and that each roll could have an individual wiper thus avoiding the necessity of cleaning the entire width of the roller or drum as shown and it is possible also to have a supply drum 27 in a distinctly different compartment and also that instead of the drum, the wire could be drawn through a bath of the coating material by passing under a roll or sheave wheel or other means of flooding the surface of the wire, also it is possible to arrange the wire to be drawn vertically instead of horizontally as shown and arrange the transfer drums on each side of the vertical wire to blot off the excess coating solution and it is with the above in mind and other changes which could be made without departing from the scope of the invention that the appended claims are drawn.

The other two drums 28 and 29 are each provided with a wiper 34 of suitable material such as felt, fiber, leather, etc., which is mounted in a holder 35 mounted on the upper end of a bell-crank 36 which is pivoted as at 37 to the tank 10, and provided with a spring 48 and an adjustable screw 38 threaded into the tank, so that the tension of the wiper may be regulated as desired.

These wipers remove from the drums all of the excess solution, but allow the drums to remain slightly wet or moist, and as they rotate in the solution the coating material which has been transferred to them by the wire is added to the tank contents and goes back into the stock solution, but yet have only a wet film upon their surfaces to present to the wire, and as the drums travel slightly ahead of the wire they will take off the excess material by transfer or blotting action or surface tension and relieve the excess coat which would cause beading; any number of these transfer drumes could be employed, but for the sake of clearness I have shown two in the drawing.

In Figures 5, 6, 7 and 8 of the drawing are shown sectional views of the wire and coating, showing the condition of the same after leaving each of the drums.

The application of the device to the usual wire coating machine is shown in Figure 8; in which the numeral 41 indicates a take-up; 42 and 43 the pulleys over which the wire 24 travels; 45 a heater or oven through which the wire travels; and 44 the supply spool.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:—

1. In a machine for coating wire with insulating coatings, means for imparting travel to the wire, means for applying coating material to the wire in an excessive amount, means moving in contact with said wire at a differential speed in accordance with the speed of travel of the wire and the adhesive properties of the coating to remove the excess from the wire in a series of steps until the coating material envelopes the wire or covering in a uniform concentric coat.

2. In a machine for coating wire, means for imparting a movement to the wire, means for immersing the wire in the coating material, means whereby a predetermined amount of coating material is returned from the wire to the supply by transfer members which are mechanically timed in relation to the movement of the wire so as to move at a different speed, and a drier through which the wire passes.

3. In a machine for coating wire with insulating coating, means for imparting movement to the wire, a drying oven, a supply of coating material, means for coating the wire or wire covering with an excess of said coating material,

mechanically driven blotting members arranged in the path of travel of the wire, the surfaces of said blotting members being driven at a higher speed than the travel of the wire, means to return the excess coating material to the supply, means to clean the blotting members and to continuously present to the wire a receptive blotting surface, and means to pass the wire through said oven after the excess material has been removed.

4. The process of coating a wire with insulating material which comprises moving said wire longitudinally in contact with a supply of viscous insulating material, and bringing surfaces moistened with said material into contact with the lower side of said wire to remove excess material.

5. The process of coating a wire with insulating material, which comprises moving said wire longitudinally in contact with a supply of viscous insulating material, and bringing surfaces moistened with a thin coating of said material into contact with the lower side of said wire to remove excess material.

6. The process of coating a wire with insulating material, which comprises moving said wire longitudinally in contact with a supply of viscous insulating material, bringing surfaces moistened with said material into contact with the lower side of said wire to remove excess material, and passing said wire through a heated zone to dry the coating.

7. The process of coating a wire with insulating material, which comprises moving said wire longitudinally in contact with a supply of viscous insulating material, and bringing surfaces moistened with said material into contact with the lower side of said wire at a differential speed to remove excess material.

8. The process of coating a wire with insulating material, which comprises moving said wire longitudinally in contact with a supply of viscous insulating material, bringing surfaces moistened with said material into contact with the lower side of said wire to remove excess material, passing said wire through a heated zone to dry the coating, and repeating the operation to provide a plurality of coats of insulating material.

9. The process of coating a wire with insulating material, which comprises moving said wire longitudinally in contact with a supply of viscous insulating material, and bringing a pluralty of surfaces moistened with said material into contact in succession with the lower side of said wire to remove excess material.

WILBER H. CONVERS.