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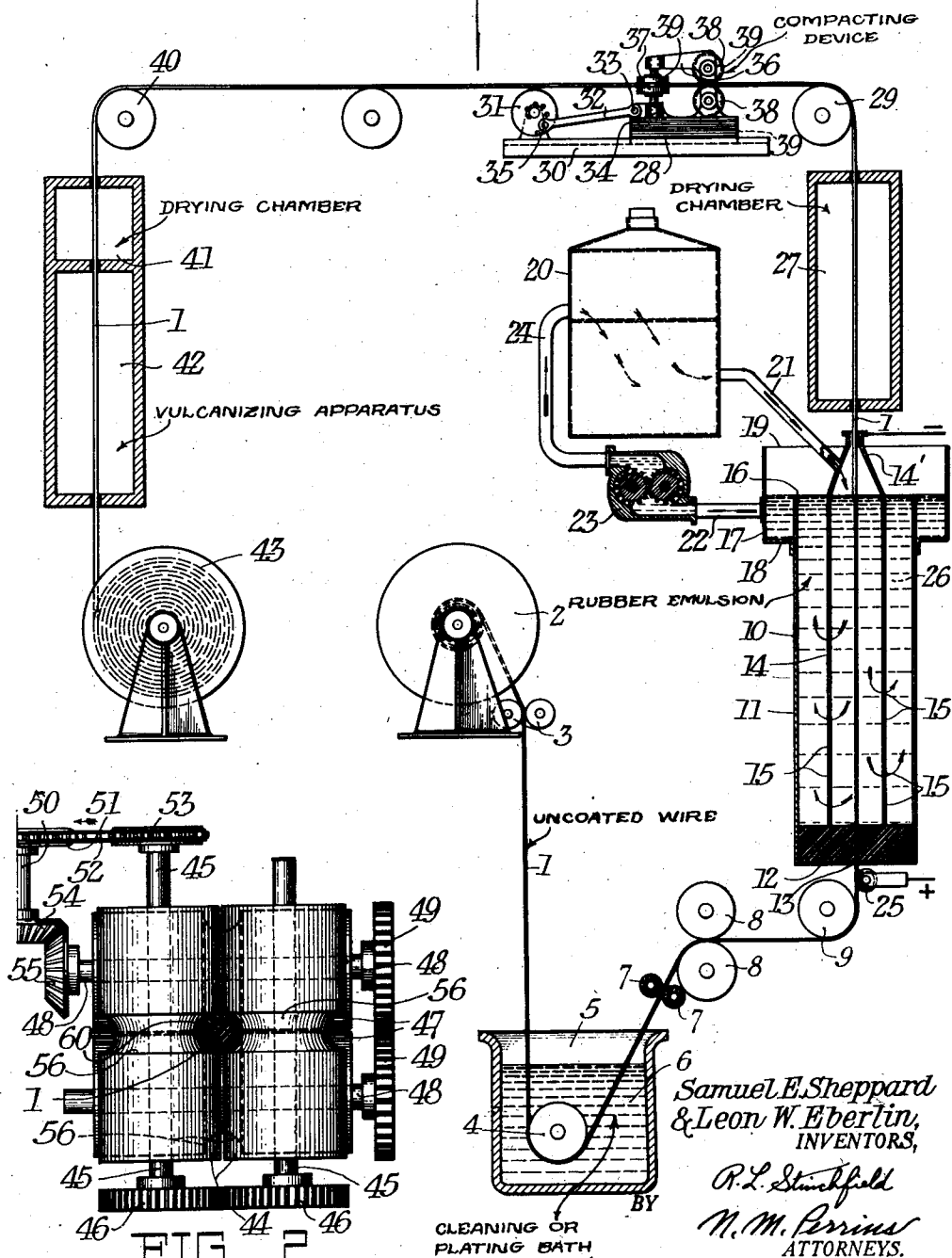
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PROCESS OF ELECTRODEPOSITING RUBBER UPON A METAL WIRE

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FIG. 1.



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PROCESS OF ELECTRODEPOSITING RUBBER UPON A METAL WIRE.

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Our invention relates to an improved method of electroplating strip material such as metal wire or ribbon with rubber.

More specifically we have discovered that if the freshly coated material, while the coating is but partially dried and is still in an eminently plastic condition, is submitted to a firm, even, pressure without much rubbing or friction, it will be compacted or consolidated into a layer of even density and surface, eliminating any chance local pinholes and slight surface irregularities and resulting, after complete drying and vulcanization in a firm even coating. The rollers are preferably so shaped and spaced that they constitute gauges by which the thickness of the coated wire or ribbon is accurately predetermined.

Fig. 1 is a diagrammatic showing of apparatus for carrying out our improved process.

Fig. 2 shows another embodiment of the conditioning rollers.

The strip material such as metal wire is wound on a suitable supply reel 2 from which it is drawn through guide rolls 3 around a roller 4 in a tank or trough 5 containing a cleaning, pickling or plating bath 6, such as an alkali cleaner, an acid or acid salt, or molten metal, between wiping or squeegee rolls 7 and buffing rolls 8 to a guide roll 9 beneath the coating tank 10.

The tank 10 has a cylindrical side wall 11 with a bottom 12 of rubber or other suitable material centrally apertured at 13 and fitting snugly around the wire. A tubular electrode 14 sits on the bottom 12 and is shown as tapered at the top at 14' where it extends considerably above the top of the cylindrical wall 11. There are numerous perforations 15 in this tubular member 13 at points well below the top 16 of the wall 11. An annular trough 17 is secured around the top of the cylinder 11; the bottom 18 being lower and the top 19 of the trough being higher than the top 16.

A tank 20 is mounted above the apparatus and a supply pipe 21 leads therefrom to an aperture in the conical top 14' whereby liquid material will run from the tank down into the interior of the cylindrical electrode 14. A return pipe 22 leads from the trough 17 at a level below the top 16 to a pump 23 from which a pipe 24 leads up to the tank

20. Liquid material will thus be circulated through the system as indicated by arrows in the drawing. The top 16 acts as a dam over which the liquid flows into the trough. Just below the tank 10 the wire contacts an anode, here shown as a roller 25. The liquid material 26 in the circulatory system described is of the type disclosed in our Patent No. 1,476,374, granted Dec. 4, 1923, comprising preferably rubber, soap, sulfonated castor oil, sulfur, aniline sulfate and lamp black, reference being made to the patent for a fuller description of the material and its various modifications.

The wire 1, after passing through the top of cathode 14 enters a drying chamber, indicated conventionally at 27 where the coating is partially dried, that is, to a point where, while still eminently plastic, it is coherent. It then passes to a compacting apparatus 28, being guided, if necessary, by rolls such as 29. The compacting apparatus comprising means for exerting a smooth, even pressure without rubbing.

In the form shown a support 30 carries a disc 31 rotated by any suitable means and having pivoted thereto a pitman 32, the other end of which is pivoted at 33 to block 34 slidable on the support. The pivotal connection 35 of the pitman and disc is adjustable as shown to vary the length of stroke. The block carries in a suitable framework 36 two pairs of rolls, one pair 37 being mounted on vertical axes, and the other pair 38 on horizontal axes. These rolls have peripheral grooves 39, and the wire passes between the rolls of the two pairs. As they oscillate, they run on the wire with a smooth even pressure compacting and consolidating the coating. The wire then passes over rolls 40, which may be driven, to a final drying chamber 41 and vulcanizing chamber 42 shown conventionally, and then a suitable wind-up reel 43.

A modified form of compacting device is shown in Fig. 2. The rolls here shown are fixed in position by suitable bearings, not shown, one pair of rolls 44 having their shafts 45 parallel in one direction and intergeared at 46, and the other pair 47 having their shafts 48 parallel and perpendicular to the first and intergeared at 49. A driven shaft 50 has a sprocket 51 driving, by chain 52, a sprocket 53 on one of shafts 45, and a

bevel gear 54 intermeshing with and driving a bevel gear 55 on one of shafts 48. The rolls have registering grooves 56 in their periphery, through which the wire 1 with its coating 60 passes. The peripheral speed of the rollers is the same as the speed of the wire so that there is substantially no rubbing between the rolls and the coating, but the latter is firmly and evenly pressed.

The rolls also serve as gauges determining the final size or calibre of the wire.

It is to be understood that additional operations of any desired character may be incorporated in the processing and that the coated wire may be subjected after vulcanization to other processes. Numerous forms of apparatus may be designed for accomplishing the processes here described and we do not in any way limit ourselves to the forms indicated here by way of example.

Having thus described our invention, what we claim as new and desire to secure by Letters Patent is:

1. The process of coating metal that comprises electrodepositing thereon a coating of vulcanizable rubber composition, partially drying such coating, compacting the coating by uniform pressure, and then further drying the coating.

2. The process of continuously coating metal strip material that comprises passing it continuously through an apparatus wherein a vulcanizable rubber composition is electrodeposited therein, then through a drier where it is partially dried, then passing it between rolls whereby it is uniformly compacted and then completely drying it.

3. The process of continuously coating metal wire that comprises passing it continuously through an apparatus wherein a vulcanizable rubber composition is electrodeposited thereon, then through a drier where it is partially dried, then between rollers shaped to fit around the coated wire and so spaced as to compact the coating and reduce it to a predetermined definite size and then completely drying the coated wire.

4. In the process of forming a permanent coating on metal strip form that comprises the successive electrodeposition thereon of a coating comprising rubber in a vulcanizable condition and the vulcanization of such rubber the step of compacting such coating by submitting to an even pressure by rolling prior to vulcanization.

5. In the process of forming a permanent coating on metal strip form that comprises the successive electrodeposition thereon of a coating comprising rubber in a vulcanizable condition, and the vulcanization of such rubber, the step of compacting such

coating and reducing the material to a definite predetermined size that comprises passing it between suitably shaped and spaced rollers.

6. In the process of forming a permanent coating on a long strip of metal that comprises passing the strip continuously through an apparatus wherein a coating of a vulcanizable rubber composition is electrodeposited thereon, and then through a vulcanizing apparatus, the step that comprises compacting such coating by submitting it to an even pressure by rolling prior to vulcanization.

7. In the process of coating metal wire that comprises passing such a wire continuously through an apparatus wherein a coating of a vulcanizable rubber composition is continuously electrodeposited thereon, and then through a vulcanizing apparatus, the step that comprises passing the wire prior to vulcanization between rolls of definite predetermined size and spacing whereby the coating is uniformly compacted and reduced to a definite predetermined size.

8. In the process of coating metal strip material that comprises passing such a strip continuously through an apparatus wherein a coating of a vulcanizable rubber composition is continuously electrodeposited thereon, and then through a vulcanizing apparatus, the steps prior to vulcanization of partially drying the coated material and then compacting the coating by submitting it to even pressure by rolling.

9. The process of coating metal strip material that comprises electrodepositing thereon a vulcanizable rubber composition, partially drying the coating, compacting the coating by rolling, and vulcanizing it.

10. The process of continuously coating metal strip material that comprises passing it continuously through an apparatus wherein a vulcanizable rubber composition is electrodeposited thereon, then through a drier where it is partially dried, then between rollers whereby it is uniformly compacted, and then through a vulcanizing apparatus.

11. The process of continuously coating metal wire that comprises passing it continuously through an apparatus wherein a vulcanizable rubber composition is electrodeposited thereon, then through a drier where it is partially dried, then between rolls so shaped and spaced as to compact the coating uniformly and reduce it to definite predetermined size, then through another drier and then through a vulcanizing apparatus.

Signed at Rochester, New York this 16th day of November, 1925.

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