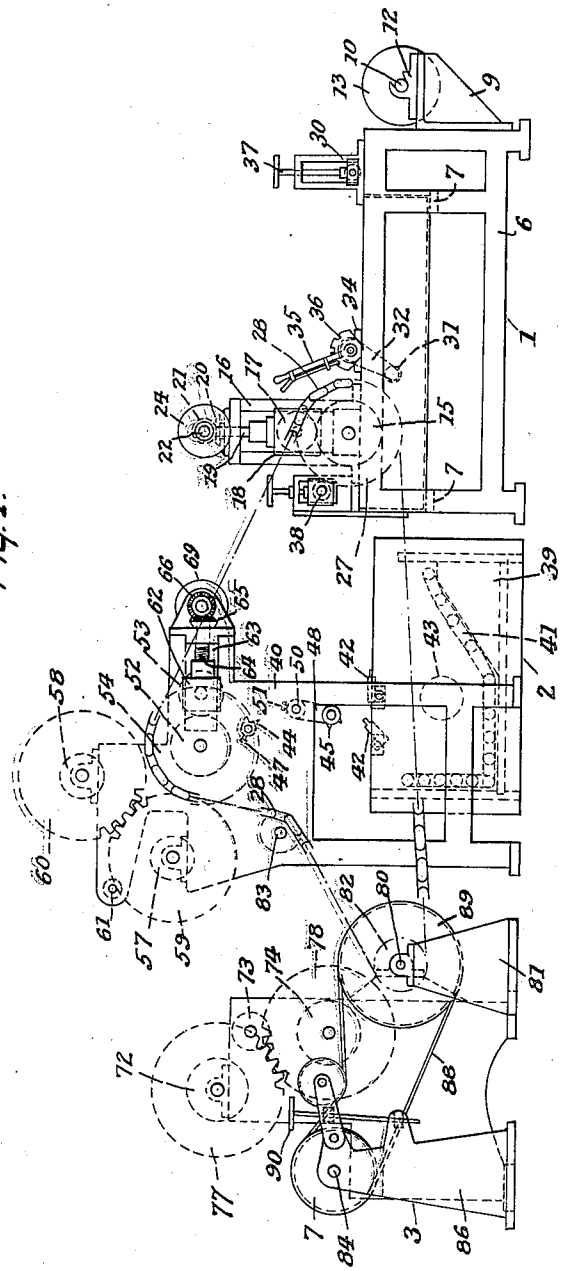
Sept. 27, 1932. W. J. EISNER 1,880,078

APPARATUS FOR COATING

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FIG. 1.



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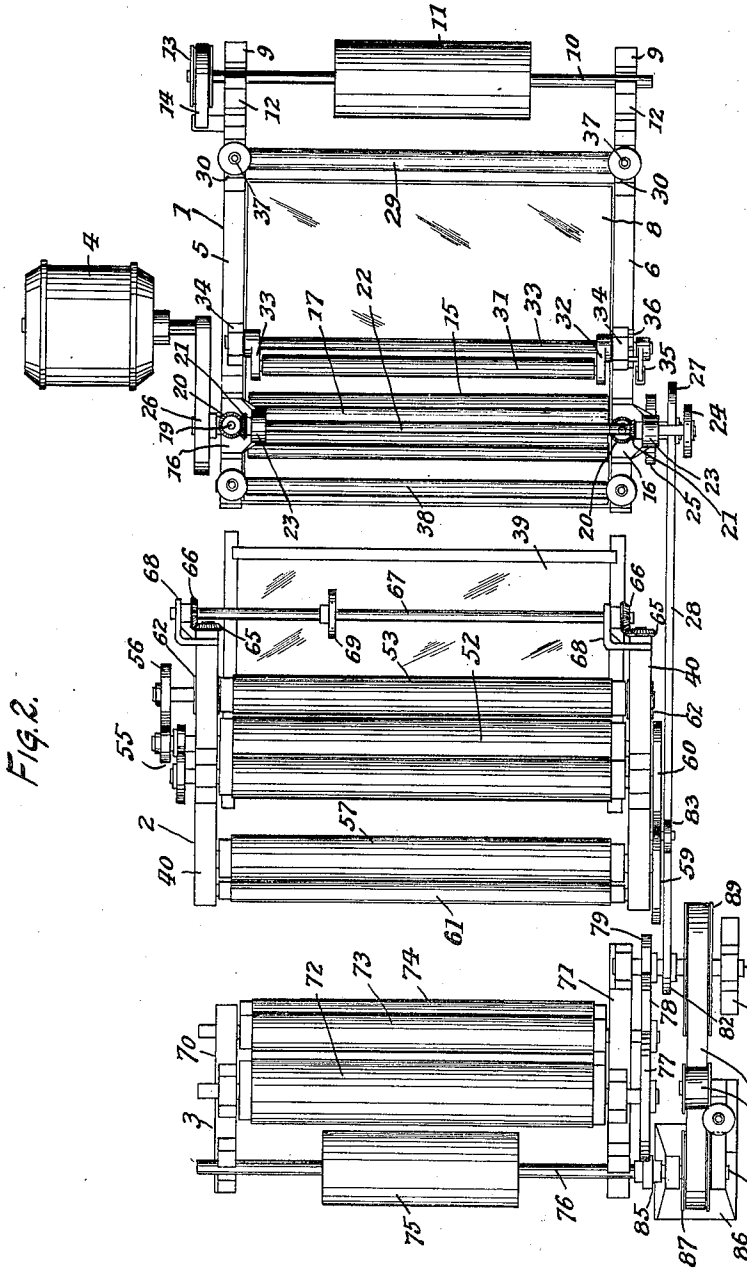


FIG. 2.

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Fig. 4.

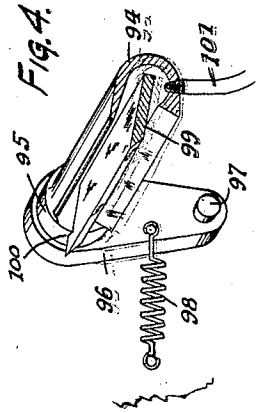
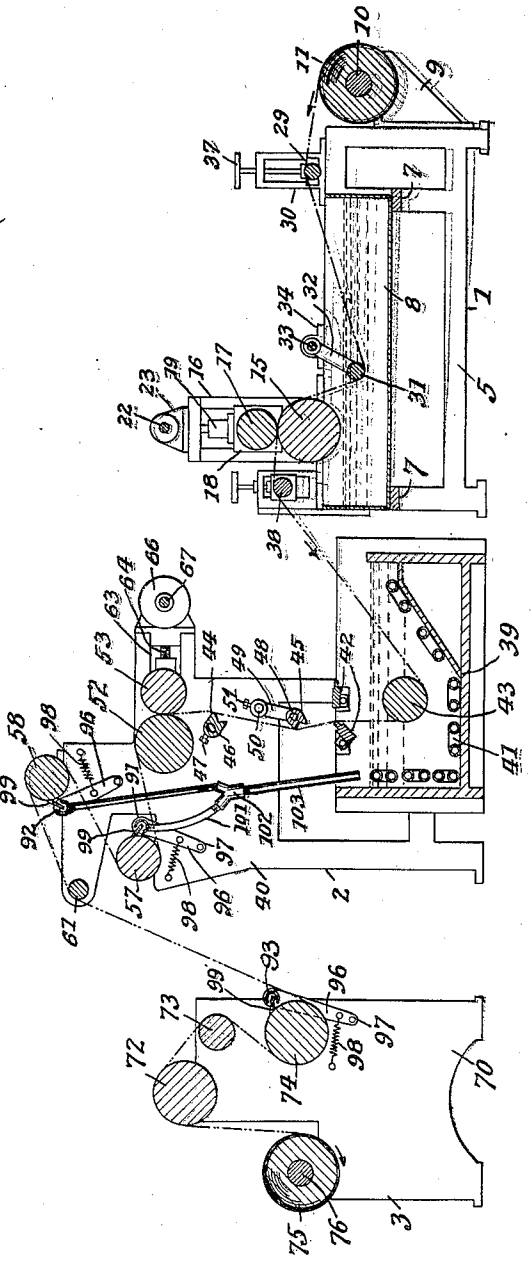


Fig. 3.



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UNITED STATES PATENT OFFICE

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APPARATUS FOR COATING

Application filed September 11, 1931. Serial No. 562,362.

This invention relates to coating and more particularly to a method and apparatus whereby a strip of paper, fabric, leather and other material may be very effectively coated with paraffine, wax, gum, solvents, sizings, colorings, clay, resin, and like preservative material or any other material or combination thereof suitable to the material or the purpose for which the coated material is to be used.

One object of the invention is to provide a method and apparatus whereby a strip of material may be evenly coated while in constant motion through the apparatus and the coating material after being applied quickly sets by passing the coated strip through a water or other fluid bath which serves very effectively as a setting agent and retains the coating in an evenly distributed condition upon the strip of material.

Another object of the invention is to permit the water to be removed from the coated strip after it passes out of the water or other fluid bath, thereby causing the coated strip to quickly dry.

Another object of the invention is to provide improved scrapers for removing water from rollers engaged by the coated strip and so construct the scrapers that as water is removed from the rollers it may be returned to the water compartment for reuse and thereby eliminate the necessity of refurnishing the water supply except after comparatively long intervals of time.

Another object of the invention is to provide a machine of this character wherein the strip of material is trained about idler rollers so arranged that the strip will be caused to travel a sufficient distance after leaving the water bath to permit water adhering to the strip to be removed and the strip thoroughly dried before the coated strip is formed in a roll at the delivery end of the apparatus.

Another object of the invention is to provide an apparatus of this character consisting of cooperating units which may be set up in proper relation to each other. Therefore, the apparatus may be easily set up and also conveniently moved from one place to another.

Another object of the invention is to so locate rollers about which the strip of material is trained after being coated that the strip will move in a tortuous path from one roller to another and move in an arcuate path about each roller, thereby setting up a series of centrifugal forces which will greatly assist in drying the strip.

The invention is illustrated in the accompanying drawings, wherein:

Figure 1 is a side elevation of the improved coating apparatus.

Figure 2 is a top plan view of the same.

Figure 3 is a sectional view taken longitudinally through the coating apparatus.

Figure 4 is a fragmentary perspective view illustrating the construction of scrapers which engage rollers forming part of the apparatus.

This improved coating apparatus is employed as means for coating a moving strip of material with a coating which is in a liquid state when applied to the strip and is set by being passed through a water bath, the water being then removed from the coated strip and the coated strip when thoroughly dried delivered from the apparatus in a roll or sheet of any size desired.

This improved apparatus consists of three cooperating units indicated in general by the numerals 1, 2 and 3, the unit 1 constituting a coating unit, the unit 2 a setting and drying unit and the unit 3 a delivery unit in which a final drying operation takes place and the coated strip is formed in a roll or sheet. The three units are disposed in end to end relation to each other and motion transmitted from one unit to another so that rollers of the units will be rotated. A motor 4 which may be an electric motor or any other type desired and is mounted adjacent to unit 1 constitutes the source of power. By this arrangement the rollers of the three units will operate in proper timed relation to each other and since all of the rollers with which the strip of fabric or other material engages are positively driven, drag upon the strip will be eliminated and also power necessary to operate the apparatus will be reduced to a minimum.

The unit 1 has a frame including side members or uprights 5 and 6 between which ex-

tend cross bars 7 serving as a support for a pan or reservoir 8 in which a suitable quantity of coating material is placed as shown in Figure 3. Brackets 9 extend from the outer end or front end of the frame and serve as a support for a shaft 10 carrying a roll of material to be coated as shown at 11. By referring to Figure 1, it will be seen that end portions of the shaft 10 are engaged in bearings 12 carried by brackets 9 and it will also be seen that the bearings are of such construction that the shaft may be easily removed when necessary but will not be liable to accidentally slip out of place. A pulley 13 for engagement by a drive belt 14 is provided at one end of the shaft 10 in order that rotary motion may be imparted to the shaft and the strip of material to be coated easily unwound from the shaft.

A feed roller 15 extends transversely in the frame adjacent the inner or rear end thereof and has pinions at its ends rotatably engaged in bearings at the lower ends of standards 16 rising from the uprights 5 and 6. Above the roller 15 is a pressing roller 17 rotatably mounted in bearing blocks 18 slidably mounted in the standards 16 and the blocks are provided with stems 19 which extend upwardly and carry beveled gears 20 meshing with beveled gears 21 carried by a shaft 22. This shaft is rotatably mounted in bearings 23 fixed upon the standards 16 and at one end carries a hand wheel 24 by means of which the shaft may be rotated and rotary motion imparted to the stems 19 in order to vertically adjust the blocks 18. Therefore, the roller 17 may be adjusted towards and away from the roller 15 and pressure applied to the strip of material to be coated controlled. Companion gears 25 may be provided in order that rotary motion may be transmitted from the roller 15 to the roller 17. A belt 26 is engaged about pulleys upon the shaft of the motor 4 and the shaft at one end of the roller 15 serves to impart rotary motion to this roller. The spindle or shaft at the other end of the roller 15 carries a sprocket wheel 27 for engagement by the main drive chain 28 through the medium of which rotary motion is to be transmitted to rollers of the units 2 and 3.

The strip of material to be coated is engaged over a guide roller 29 mounted in bearings 30 at opposite sides of the frame near the front end thereof, and then extends down into the container 8 in engagement with the roller 31 before passing between the rollers 15 and 17. The roller 31 is supported by arms 32 fixed upon a shaft 33 extending across the frame midway the length of the container 8 and rotatably mounted in bearings 34. One end of the shaft 33 projects outwardly from the frame and carries a latch lever 35 for engagement with a rack 36 and therefore the roller 31 may be vertically adjusted and movement of the strip of material through the container guided. By vertically adjusting the roller 29 through the medium of the adjusting screws 37 tension may be applied to the portion of the strip of material between the roll 10 and the roller 15 and wrinkles prevented from forming. There has also been provided a tensioning roller 38 at the rear or inner end of the unit 1, which is vertically adjustable in order that the portion of the strip of material passing from the unit 1 to the unit 2 may be held under tension.

By referring to Figure 3, it will be seen that when the apparatus is in use the strip of material to be coated passes from the roll 11 over the roller 29 and then downwardly beneath the roller 31 and upwardly between the rollers 15 and 17 from which it passes over the roller 38. The position of the roller 31 controls movement of the strip of material through the container 8 and insures movement of the strip through the coating material in the container. Therefore, the strip of material will have both surfaces coated with the coating material. After leaving the container 8 the strip of material passes between the rollers 15 and 17 which serve to evenly distribute the coating material upon the strip and also serve as pressing rollers to remove surplus coating material from the strip. This coating material, of course, flows back into the container. If the strip is formed of absorbent material the pressure applied by the rollers 15 and 17 will cause the strip to become impregnated with the coating material.

After leaving the unit 1 the strip of coated material moves to the unit 2 where it moves through a bath consisting of water in a container 39 mounted between the upright or side members 40 of the frame of the unit 2. A coil 41 in the container or tank 39 serves to control temperature of the water. Wipers 42 for engagement by the strip extend across the open top of the tank 39 and through the tank below the water level thereof extends a guide roller 43 serving to insure passage of the strip through the water bath in order that the coating material will be set. Additional scrapers 44 and 45 are provided above the tank, the wiper 44 being mounted upon a rod 46 and held in a set position by a suitable number of set screws 47 and the wiper 45 being mounted upon a rod 48 having arms pivotally mounted at their upper ends as shown at 50 and releasably secured in such position by set screws 51. The strip of material after leaving the water bath passes upwardly in engagement with the wipers and then passes between rollers 52 and 53 serving as feed rollers. By properly adjusting the wipers as shown in Figure 3 the portion of the strip between the roller 43 and the rollers 52 and 53 will be placed under tension and the wipers

which are formed of rubber are similar to a squeegee in construction will serve very effectively to wipe water from opposite faces of the strip although the water may not be entirely removed by these wipers. A pintle or stub axle at one end of the roller 52 carries a sprocket wheel 54 over which is trained the upper flight of the sprocket chain 28 and the stub axle at the other end of this roller carries a gear 55 meshing with a larger gear 56 upon the shaft of the roller 53. Therefore, the two rollers will be positively driven. Rotary motion is also transmitted from the shaft of the roller 52 to a roller 57 and from the roller 57 rotary motion will be transmitted to another roller 58 by gears 59 and 60. The rollers 57 and 58 are therefore positively driven and motion will be imparted to the portion of the coated strip which is trained about these rollers and then extended downwardly across an idler roller 61 towards the unit 3. It is desired to have the strip pressed firmly against the roller 52 and therefore the roller 53 is rotatably mounted in blocks 62. These blocks are slidably engaged in slots or openings 63 formed horizontally in the uprights 40 and provided with threaded stems 64 having gears 65 at their ends meshing with gears 66 upon a shaft 67 extending transversely of the unit 2 and rotatably mounted in bearing brackets 68. When the shaft 67 is rotated by grasping its hand wheel 69 rotary motion will be imparted to the stems 64 and the roller 53 shifted towards or away from the roller 52.

The delivery unit 3 also has a frame including the side members or uprights 70 and 71 between which extend rollers 72, 73 and 74 with which the strip of material is engaged before being formed into a roll 75 about a shaft 76. The roller 73 is an idler roller but the rollers 72 and 74 are to be positively driven and their axles carry interengaging gears 77 78. The gear meshes with a cooperation gear 79 upon the counter shaft 80 which is rotatably supported by the upright 71 and a support 81 and carries a sprocket wheel 82 about which is disposed the sprocket chain 28. An idler sprocket 83 located between the sprocket 54 and the sprocket 82 serves as a tightener to retain the sprocket chain in operative engagement with the sprockets. The shaft 76 has one end coupled to a shaft 84 as shown at 85 and by referring to Figures 1 and 2 it will be seen that the shaft 84 is rotatably mounted in bearings at the upper end of a support 86 and carries a pulley 87 about which is engaged a belt 88. This belt 88 is also engaged about the pulley 89 fixed upon the shaft 80 and a belt tightener 90 carried by the support 86 and engaged the upper flight of the belt 88 serves to retain the belt under tension.

During operation of the apparatus water is liable to accumulate upon the rollers 57, 58 and 74 and in order to remove this water there has been provided scrapers 91, 92, and 93. These scrapers are of a duplicate construction and each has a trough 94 having heads 95 at its ends from which extend arms 96. The arms are pivotally mounted as shown at 97 to the respective side members of the units 2 and 3 and are engaged by springs 98 serving to draw the scrapers toward the rollers and yieldably hold the blades 99 of the scrapers in close contacting engagement with the same. Each blade has its ends engaged in seats 100 formed in the heads 95 and projects outwardly through a side opening formed in its trough. Water scraped from the rollers by the blades flows across the blades into the troughs and escapes through drain pipes 101 and by referring to Figure 3 it will be seen that the drain pipes of the scrapers 91 and 92 are connected by a coupling 102 to a pipe 103 extending into the tank 39. Therefore, water in the tank will be replenished. The drain pipe for the scraper 93 may also extend to the tank.

I have therefore provided an apparatus by means of which coating may be applied to a strip of material, the coating then properly set by passing the coated material through a water bath and the strip of material then thoroughly dried and formed in a roll at the delivery end of the apparatus.

From the foregoing description of the construction of my improved apparatus, the operation thereof and the method of applying the same to use will be readily understood. It will be seen that I have provided a simple, inexpensive and efficient means for carrying out the objects of the invention.

While I have particularly described the elements best adapted to perform the functions set forth, it is obvious that various changes in form, proportion and in the minor details of construction may be resorted to without departing from the spirit or sacrificing any of the principles of the invention.

Having thus described the invention what is claimed is:

An apparatus for coating a strip of material comprising means for applying a coating substance to the strip, means for applying water to the coated strip to set the coating, means for wiping water from the coated strip, a series of rollers for engagement by the strip after being wiped and guiding the strip to a point of delivery, and scrapers engaging certain of said rollers for removing water deposited thereon by said strip, each scraper consisting of a trough extending longitudinally of a roller, heads closing ends of the trough and having arms extending transversely of the trough and pivotally mounted near their ends to mount the trough for swinging movement towards and away from the roller, the trough being open along its side facing the roller and the heads hav-

ing their inner faces formed with grooves, a blade extending longitudinally in said trough with its ends seated in said grooves, said blade having a side edge portion projecting outwardly through the open side of said trough and sharpened to form a scraping edge, springs engaged with said arms to yieldably resist movement of the trough away from the roller and retain the scraping edge of the blade in close contact with the roller, and a drain leading from said trough.

In testimony whereof, I affix my signature.

WILLIAM J. EISNER.