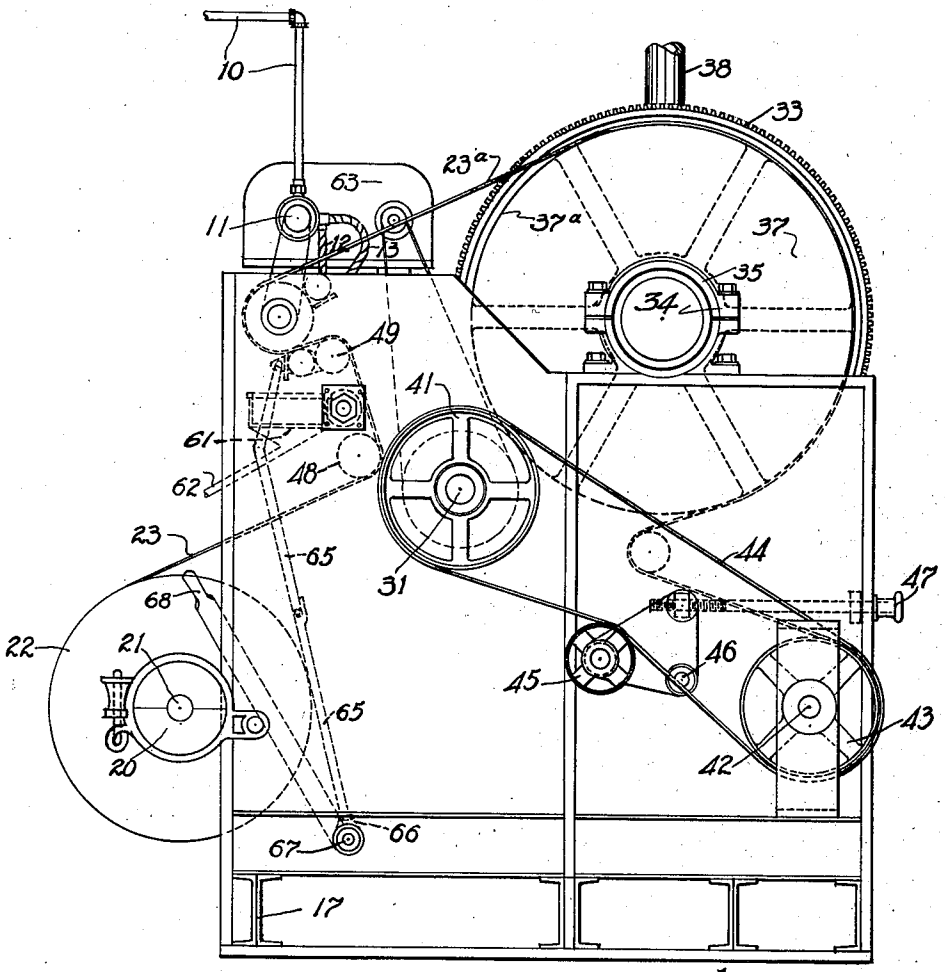
June 9, 1942. C. M. RHODES ET AL 2,285,531

APPARATUS FOR APPLYING A SURFACE COATING AS PAINT, TO PAPER, AS BREAD WRAPPING PAPER, ETC

Filed Jan. 18, 1939 3 Sheets-Sheet 1

Fig. 1.



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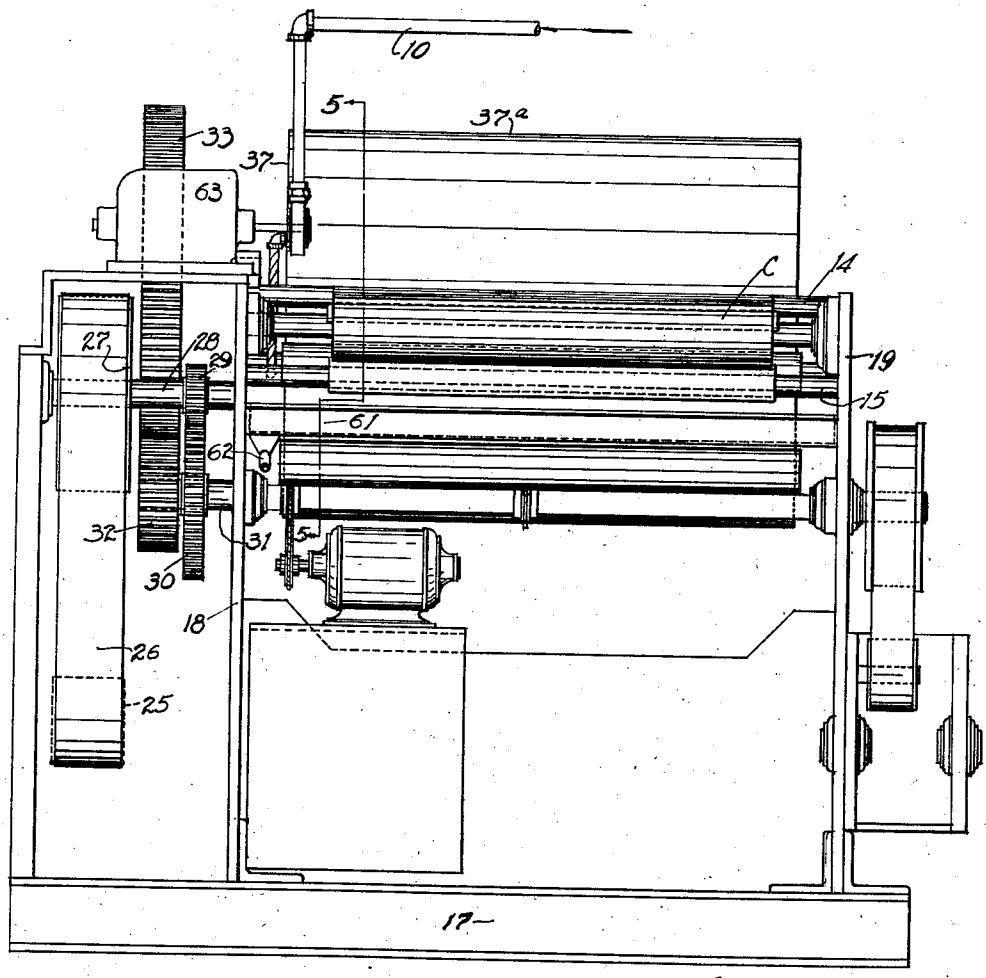
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Fig. 2.



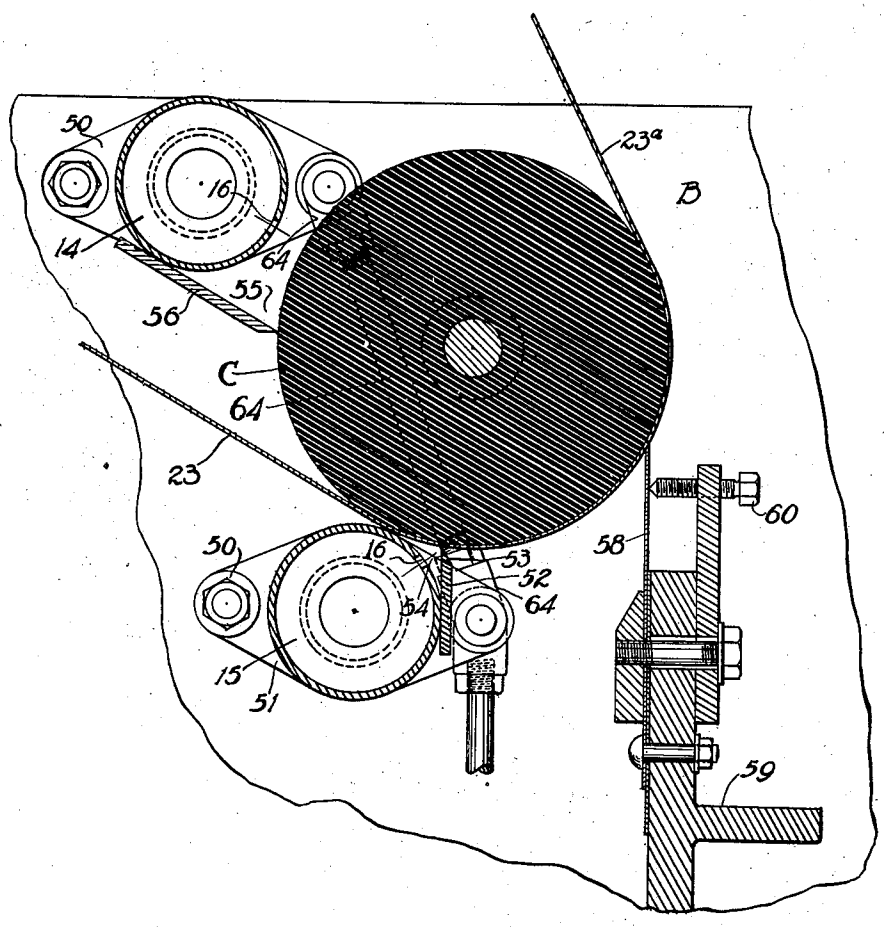
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Fig. 3.



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APPARATUS FOR APPLYING SURFACE COATINGS, AS PAINT, TO PAPER, AS BREAD WRAPPING PAPER, ETC.

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Application January 18, 1939, Serial No. 251,516

9 Claims. (Cl. 91—30)

The present invention relates to an apparatus for applying a surface coating as paint, to paper, as bread wrapping paper, etc. It is common practice to cover paper with a coating of white paint and then cover that surface with wax so that a glazed white surface is secured upon which may be printed desired descriptive and advertising matter.

The object of the present invention is to improve the apparatus for applying this coating so that the material is evenly and uniformly applied to the surfaces of the paper and is applied in a rapid and convenient manner. With our apparatus the coated paper may be rapidly and effectively dried so that it may be immediately wound around receiving rolls ready for use.

In carrying out the present invention suitable apparatus is employed through which the paper to be treated is passed from a source of supply to a receiving roll, and the paint applying mechanism is positioned in the path of travel of the paper from the source of supply to the receiving roll. The coating to be applied is stored and mixed in a suitable tank in connection with the apparatus with delivery means for delivering the coating material to the applying mechanism. The applying mechanism embodies a roll preferably of soft rubber over which the paper to be treated passes.

In order to apply the coating to the outer face of the paper, discharge means connected with a source of supply are positioned in contacting relationship with the paper as it passes around the roll to discharge the coating against the paper and across its surface. In connection with this discharge means, means are provided to evenly spread the coating across the outer surface of the paper and means to remove any surplus, leaving on the paper a uniform coating of proper density.

In order to apply the coating to the inner surface of the paper in the same effective manner that it is applied to the outer surface, discharge means for the coating mixture is arranged in connection with the side of the roller opposite to the side of this roller over which the paper passes, to spread upon the roller a uniform coating of the mixture so that as the roller in its rotation comes in contact with the paper the coating upon the roller will be spread upon the inner surface of the paper. Means are provided in connection with this second spreading means for evenly spreading the coating across the roller and for removing any of the desired surplus to leave a coating of required evenness and density. Special means are provided for regulating the flow of the mixture to the spreading means; for adjusting the relationship of the spreading means to the paper and the roller for carrying off the surplus mixture.

The paper after receiving the coating passes over a heating roller to thoroughly dry the coated paper and condition it for delivery to the receiving roller. Special means are provided for interiorly heating and controlling the heating of the roller.

The above and other features of the process and apparatus are fully set forth in the following specifications and shown in the accompanying drawings in which:

Figure 1 is a right side elevation of the coating apparatus,

Figure 2 is a front elevation, and,

Figure 3 is a detailed constructional drawing of the coater.

Coating material from a suitable supply flows through the inlet pipe 10 into a suitable mechanical flow regulator 11 supported near the left top of the framework B in which framework the operating mechanism is supported. The coating contents passing through the flow regulator 11 into flexible feeder pipes 12 and 13 respectively supplying the spreader feeding tubes 14 and 15. These spreader feeders 14 and 15 are each provided with a line of perforations 16.

The coating material in the operation of the apparatus passes through the perforations of the feeder tube 14 to the outer surface of the soft rubber spreader roller C and passes through the perforations of the feeder tube 15 to the outer surface of the paper as it passes around said roller. The operation of the feeder tubes and cooperating feeders are hereinafter more particularly set forth.

The machine framework B rests upon a base 17. The two vertical sides 18 and 19 of the framework form a support for the spreader roller C and other parts of the mechanism as shown in the drawings. The frame sides 18 and 19 support the frictional paper roll support 20 upon whose shaft 21 is positioned a roll of paper 22. The paper passes from this roll through the machine as shown particularly in Figure 5.

The operative apparatus supported through the framework B is powered by a motor not shown in the drawings over whose driver pulley 25 passes a transmission belt 26 to a pulley 27 upon the shaft 28. The shaft 28 carries a pinion 29 which meshes with a gear 30 upon the shaft 31. The shaft 31 further carries a gear 32 which

meshes with a drum gear 33 carried by the hollow drum support shaft 34 which shaft 34 is journaled in bearings 35 and made fast to the top of side frame members 18 and 19.

The drum supporting shaft 34 is provided at one bearing end with a steam tight shaft cap 36 through which live steam is fed into the supported drum 37 through a steam main 38. As the live steam enters the drum 37 it heats the peripheral surface 37A. The live steam entering said drum 37 causes a pressure upon any condensed liquid steam in the bottom of the drum and expels the same through a suitable syphon to the waste.

Upon the shaft 31 is made fast a rewind pulley 41 which imparts power to rewind the shaft 42 through the belt 44 connecting the pulley 41 with the pulley 43 upon the shaft 42. The belt 44 is held taut by suitable slack take-up mechanism 45 having pivoted support 46. 47 indicates suitable control mechanism for the slack take-up. Such control mechanism adjustably connects the slack take-up with the framework as shown in Figure 1.

In operation of this mechanism the paper strip 23 is fed in upwardly over idler roller 48 and thence upwardly and over idler roller 49 and thence through the coating mechanism passing over the spreader feeder pipe 15. The spreader feeder pipe 15 is pivotally secured at pin 50 to the framework by a link 51 which permits the raising and lowering of entire length of pipe for paper feeding in threading paper into the coating machine.

Supported on the under side of the feeder tube 15 is a blade 52 extended toward the roller 44 and having its edge 53 in substantial contact with the roller for the purpose of leveling and smoothing the mixture discharged from the feeder tube and insure a predetermined thickness of coating upon the paper. The blade 52 in connection with the feeder pipe forms a trough for receiving the mixture and holding it in contact with the paper.

The feeder tube 14 as shown in Figure 2 corresponds in construction and arrangement to the feeder tube 15 and its associated parts.

The blade 56 forms a trough in connection with the feeder tube 14 and functions to hold supply of the mixture discharged from the feeder tube against the roller 49 on the opposite side of the roller over which the paper is passing.

The outer ends of the links 51 for the feeder tubes 14 and 15 are pivotally connected by a link 64, the link 64 being in turn connected with an eccentric link 65 connected at its lower end to an eccentric 66 upon the rotatable shaft 67 operatable by the lever 68. Thus by the actuation of the lever 68, the feeder tubes may be turned on their pivot supports away from the roll to facilitate the threading of the paper.

In operation the coating mixture is spread upon the outside surface of the paper through the feeder tube 15 and associated parts and at the same time the coating material is fed against the opposite face of the roll itself from the feeder tube 14 and spread upon the roller so that the roller in its rotation will deposit the coating upon the inner face of the paper. The paper is thus effectively and evenly coated upon both sides.

Supported to contact with the outer face of the paper after it has passed the feeder tube 15 and associated spreader blade is a pressure blade 58 supported by a cross frame 59 sustained by the side frame members 18 and 19. Pressure of the blade upon the coated paper is regulated for different film thickness by adjusting the tension of the blade through the tension screw 60.

Any surplus coating material will fall from the troughs 54 and 55 into a cross pan trough 61 permitting the same to flow back into the mixing compartment A through the pipe 62.

The coated paper 23A travels upwardly from the roller 29 onto and over periphery 37A of the power rotated and steam heated traveling drum 37, the heat of the drum removing the moisture from the coating. The coated paper then travels over a polishing roll 64 to the rewind shaft 42.

A particular advantage of the present invention lies in the small length of time that the main body of coating material is held in contact with the paper thus preventing the paper becoming saturated and damaged by the coating material. As will be evident by referring to Figure 7 the combination, particularly of the feeder tube 15 and blade 52 forms a comparatively narrow trough for holding the coating discharge from the feeder tube so that the paper is quickly carried beyond the coating material in the trough. It is common in coating papers to carry the paper through a saturated bath of coating material leaving the paper subjected to the material for some length of time, bringing about sogginess and other damage of the paper. This damage is prevented in the present invention by the very short length of time the paper is exposed to the coating material in the coating of the paper, and in applicants' the paper is left consequently uninjured and unsaturated by the coating.

A particularly important feature of the invention lies in the application of the spreader and evener blade 58. The adjustable spring blade 58 in cooperation with the soft surfaced roller brings about a very effective spreading and evening of the coating upon the paper and the removal of any surplus coating left upon the paper in the operation of the means for depositing the coating. By the adjustability of the tension of the spring blade 58 the different thicknesses of coating are compensated for. While the illustrated means for depositing the coating material upon the paper particularly cooperates with the spreader blade 58, other means for depositing the coating material upon the paper may be used effectively in connection with the spreading and evening blade 58. The resilient pressure brought about by this spring blade and the soft surface of the roller or the yielding characteristic of either of them, bring about particularly effective spreading and evening of the coating upon the outer surface of the paper. As to the coating upon the inner face of the paper that coating being deposited, as shown, against the surface of the roller and then transferred from the paper to the roller the coating will become spread and evened by the pressure of the soft surfaced roller itself against the paper. 63 indicates a variable speed control of a suitable type. This control 63 may act to meter the flow of coating to the feeder tubes 14 and 15.

We claim:

1. Means for applying a coating to the opposite sides of a sheet of paper comprising a roller, means for carrying the sheet over the roller, coating material discharge tubes pivotally supported adjacent the outer surface of said paper and adjacent to the face of the roller opposite the sheet and means connecting said discharge tubes and manually actuatable to turn said spreader tubes away from said roller and paper for the purpose set forth.

2. Means for applying a coating to the oppo-

site sides of a sheet of paper comprising a soft surfaced roller, means for carrying the sheet over said roller, means for discharging a supply of coating material against the outer surface of paper passing over said roller and means for discharging a supply of coating material against the face of the roller opposite to the paper whereby the roller in its rotation will carry said coating material against the inner surface of the paper.

3. Means for applying a coating to the opposite sides of a sheet of paper, comprising a roller, means for carrying the sheet over said roller, means for discharging a supply of coating material against the outer surface of the paper passing over said roller, means associated with said discharge means for holding a supply of said coating material against the paper, means for discharging a supply of coating material against the face of the roller opposite to the paper whereby the roller in its rotation will carry said coating material against the inner surface of the roller and means associated with said discharge means for holding a supply of the coating material against said roller.

4. In combination with a soft surfaced roller, means for conveying paper over said roller, means for applying a coating to the exterior surface of paper passing over said roller, comprising a feeder discharge tube formed with openings directed toward the paper, means for supplying coating material to said feeder tube, means for applying a coating to the face of the roller opposite the paper passing over the roller consisting of a feeder tube provided with discharge openings directed toward the roller and means for supplying coating mixture to said second mentioned feeder tube.

5. In combination with a soft surfaced roller, means for conveying paper over said roller, means for applying a coating to the exterior surface of the paper passing over said roller comprising a feeder discharge tube formed with discharge openings directed toward the paper, means for supplying coating material to said feeder tube, means for applying a coating to the face of the roller opposite the paper passing over the roller consisting of a feeder tube provided with discharge openings directed toward the roller, means for supplying coating material to said second mentioned feeder tube and a spreader blade arranged in connection with each of said tubes below the discharge openings and extending in contacting relationship with the paper passing over said roll and with the side of the roller opposite said conveyed paper for the purpose set forth.

6. Means for applying a coating to a sheet of paper comprising a roller, means for carrying a sheet over said roller, a feeder discharge tube arranged substantially parallel to said roller and beneath the said roller and formed with discharge openings directed toward the paper passing over said roller, and a rigid blade arranged in connection with the discharge tube adjacent the discharge openings, said blade extending upwardly from said tube into contact relationship with the paper passing over said roller, and said blade forming with said tube, a material holding trough for the purpose set forth.

7. Means for applying coating to a sheet of paper comprising a roller, means for carrying said sheet over said roller, a feeder discharge tube substantially parallel to and adjacent the said roller and having discharge openings directed toward said roller, means mounting said tube for movement toward and away from said roller, a material holding trough associated with said tube adjacent to the discharge openings, and a rigid spreader blade forming a part of said trough and movable together with said tube for the purpose set forth.

8. Means for applying coating to a sheet of paper comprising a roller, means for carrying said sheet over said roller, a coating material discharge tube pivotally supported substantially parallel to said roller and extending closely adjacent the outer surface of the sheet of paper passing over said roller, and a spreader blade extending from said tube substantially to said paper and forming a trough holding a supply of coating in contact with said paper, said tube having discharge openings leading to said trough, said trough being substantially closed by the sheet of paper.

9. The combination of 8, and means for additionally regulating the spreading of the coating upon said paper, consisting of a resilient blade, means for holding the resilient blade in contact with the paper at a distance spaced forwardly from said material trough, and means regulating the pressure of said blade against the paper.

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