

Sept. 27, 1932.

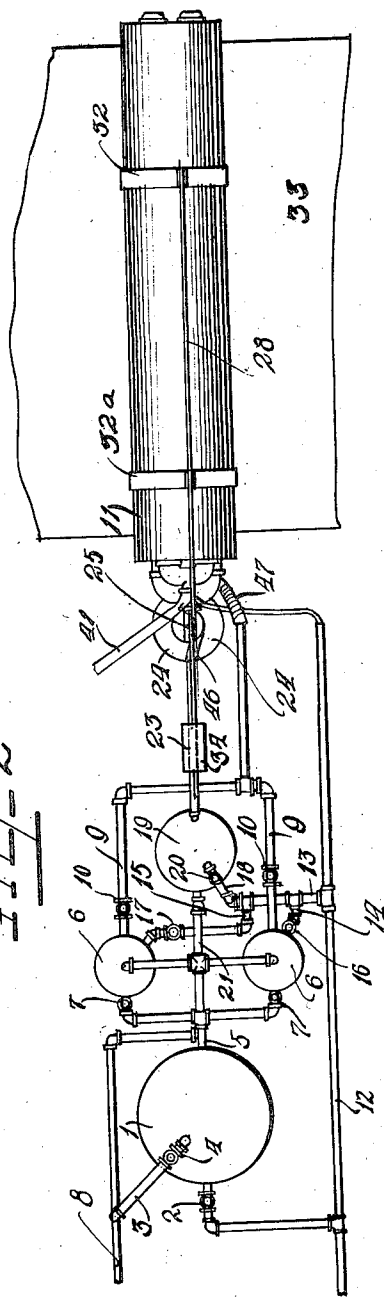
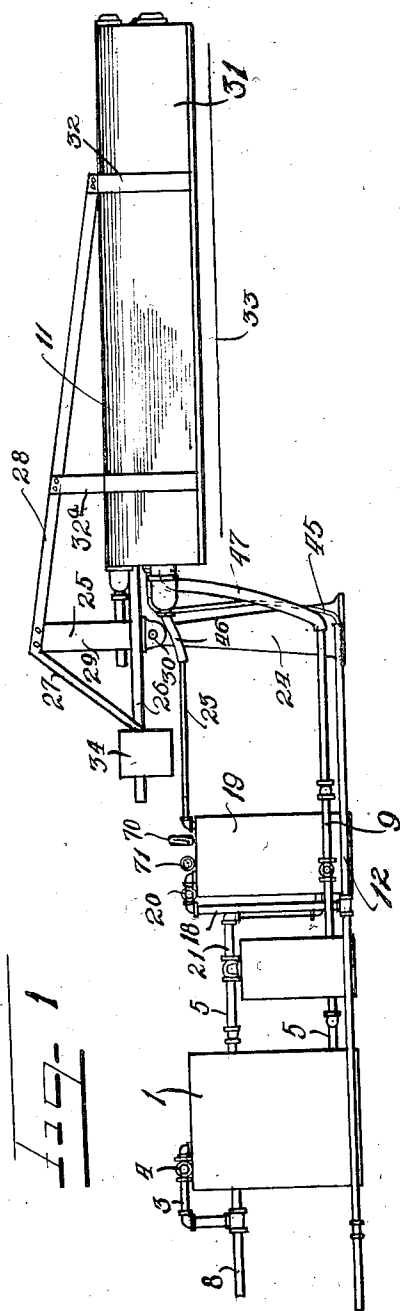
E. P. ARPIN, JR

1,880,065

COATING APPARATUS

Filed Sept. 16, 1926

3 Sheets-Sheet 1



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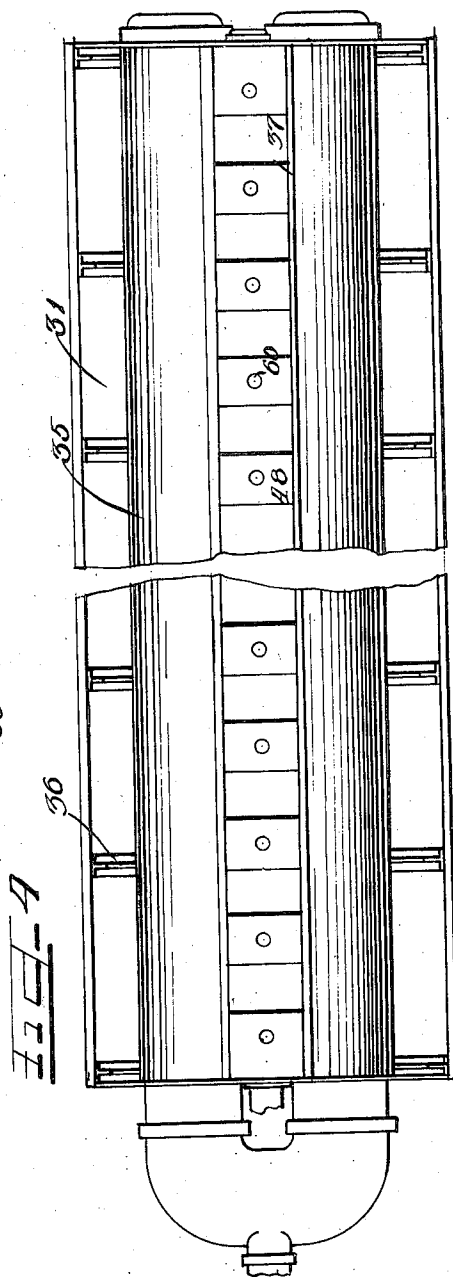
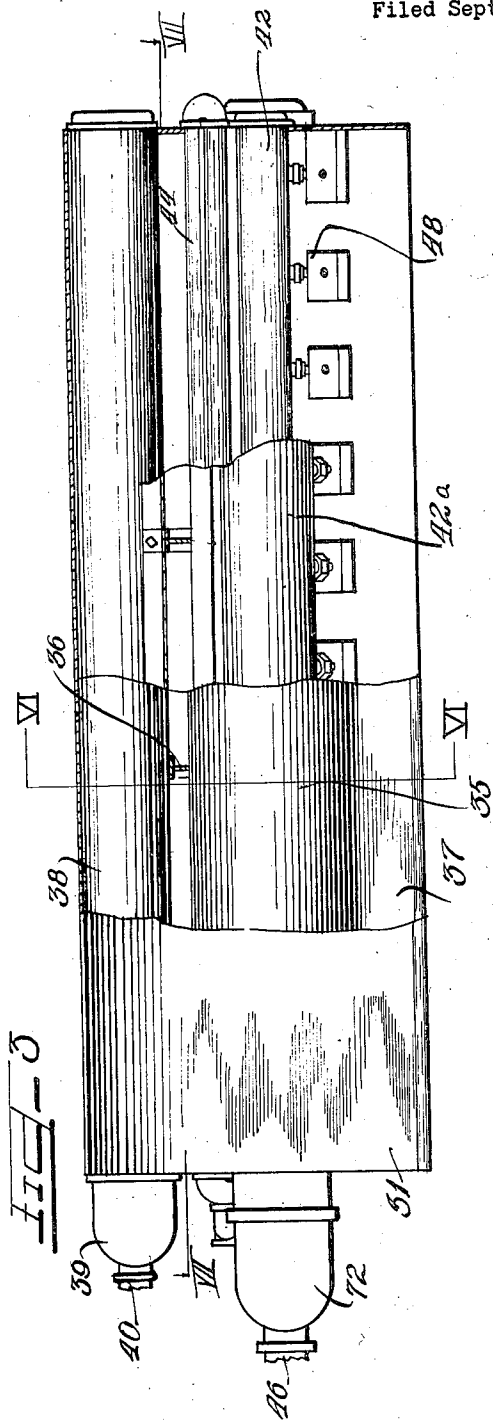
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COATING APPARATUS

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3 Sheets-Sheet 2



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3 Sheets-Sheet 3

Fig. 5

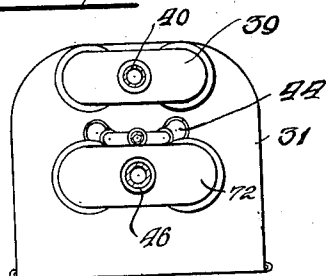


Fig. 6

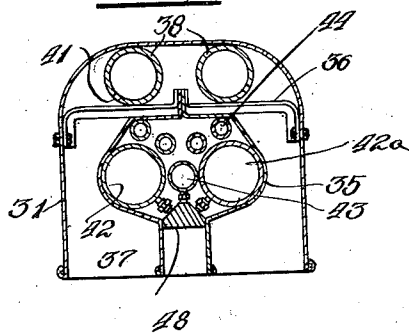


Fig. 7

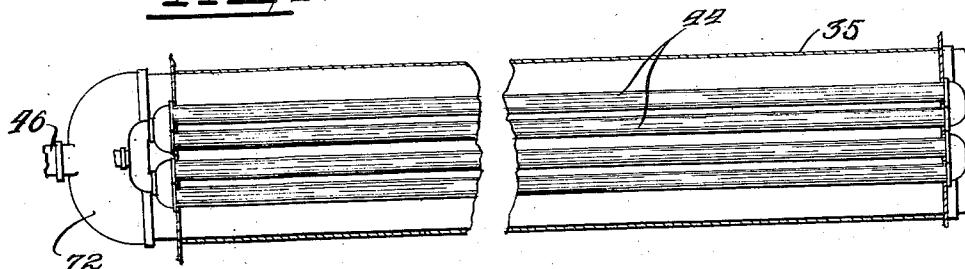
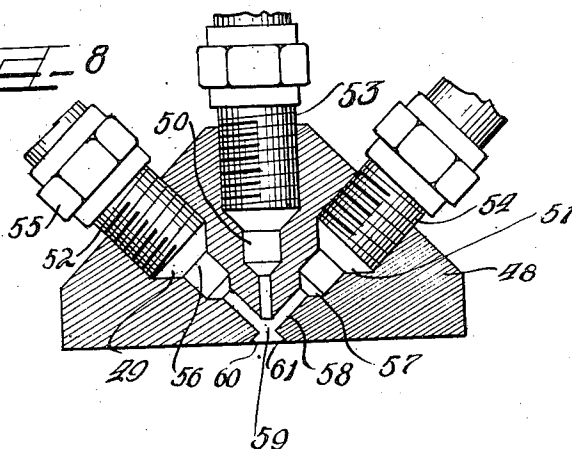


Fig. 8



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UNITED STATES PATENT OFFICE

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COATING APPARATUS

Application filed September 16, 1926. Serial No. 135,729.

This invention relates to a coating apparatus and more particularly to an apparatus for spraying, coating or waxing web material such as paper.

5 The method in general use for waxing paper comprises a separate operation from that on the paper making machine wherein the paper is caused to pass through molten wax, or paraffin, the excess paraffin being
10 squeezed out between rolls. This method is not only apt to be wasteful of paraffin, but is uneconomical of time and labor, inasmuch as it must be carried out as a separate operation from that on the paper machine.

15 It is therefore an object of this invention to provide an apparatus for spraying paraffin or other materials in liquid form on to web or sheet material, whereby a uniform coating may be obtained.

20 It is a further object of this invention to provide a coating apparatus that may be used in connection with paper machines for waxing the paper as it comes off the machine without involving a separate operation.

25 It is a further important object of this invention to provide an improved type of spraying nozzle for obtaining a uniform surface distribution and/or penetration of such materials as size, color, wax or paraffin on a
30 traveling web of paper or other material.

Other and further important objects of this invention will be apparent from the disclosures in the specification and the accompanying drawings.

35 This invention (in a preferred form) is illustrated in the drawings and hereinafter more fully described.

On the drawings:

40 Figure 1 is a side elevational view of an apparatus embodying the principles of my invention.

Figure 2 is a top plan view of the same.

45 Figure 3 is an enlarged side elevational view of the spraying device, with parts broken away to show the construction.

Figure 4 is a bottom plan view of the same.

Figure 5 is a reduced left end elevational view of Figure 3, with parts in section.

Figure 6 is a reduced sectional view taken substantially on line VI—VI of Figure 3.

Figure 7 is a broken fragmentary sectional view taken substantially on line VII—VII of Figure 3.

Figure 8 is an enlarged detail sectional view of a spray block.

As shown on the drawings:

The reference numeral 1 indicates a tank or other suitable receptacle for storing a coating liquid, such as paraffin. In the present embodiment of the invention, the apparatus is especially adapted for use in waxing paper and will be described in connection with that process. In order to maintain the paraffin in molten state, heating means are provided for tank 1, comprising a steam coil (not shown) connected by a line 2 to a steam header 12. The tank 1 is also provided with a compressed air line 3 entering the top of the tank and controlled by means of a valve 4 for blowing out the molten paraffin. From the tank 1 the molten paraffin is blown by means of air pressure through a bottom pipe 5 into one or more pressure feed chambers 6. Valves 7 are provided for controlling the flow of paraffin into either of the chambers 6. Said chambers 6 are kept under sufficient air pressure by means of a compressed air line 8 to supply the paraffin to the spraying device at the necessary pressure. From said tanks 6 branched conduits 9 controlled by valves 10 conduct the molten paraffin under pressure to a spraying device 11. Each of the pressure chambers 6 is preferably maintained at the desired temperature by means of steam conducted from the header 12 through pipes 13, 14 and 15, said pipes 14 and 15 being provided with valves 16 and 17 respectively. The steam pipe line 13 is also connected by means of a pipe 18 to an air

preheating tank 19, the steam flow being controlled by a valve 20. Compressed air from the pipe line 5 is conducted to said preheating tank 19 through a pipe 21. Steam coils within the preheater 19 serve to preheat the air to the desired temperature, the temperature and pressure being indicated by a thermometer 70 and a gauge 71 respectively. From the tank 19 the preheated compressed air is delivered through a pipe 23 to the spraying device 11.

The spraying device 11 comprises a pedestal or support 24 at the top of which is pivotally mounted as at 30 a cantilever supporting structure 25. Said supporting structure 25 is made up of a normally horizontal beam 26, truss beams 27 and 28 and an upright member 29, said member 29 being bolted to adjacent ends of the truss beams 27 and 28. The spraying apparatus itself is housed within a hood 31 supported from the cantilever construction by means of straps 32 and 32^a. In normal position the spraying device 11 extends horizontally and transversely of the web of material to be coated indicated by the reference numeral 33. When not in use, the entire device may be swung into vertical position about the pivot point 30 and for this purpose a weight 34 is mounted on the free end of the beam 26 to serve as a counterbalance.

As shown in Figures 4 to 7 inclusive, the spraying device 11 comprises an outer hood 31 and an inner concentric hood 35 supported from said outer hood 31 by means of a plurality of straps 36 formed of angle irons. The outer hood 31 is substantially of inverted U-shape cross section, with its open side directed toward the web material 33. The inner hood or housing 35 is provided with coextensive lower edges formed by parallel spaced flanges 37. Within the space above the inner housing 35 are positioned a pair of pipes 38, supported on the angle iron straps 36 and extending the full length of the device. Said pipes 38, which are connected at one end by a U-fitting 39 to a vacuum line 40, are flanged at their other ends and provided along their length with slots 41 through which excess spraying material may be removed by suction. The inner hood 35 serves to house a pair of pipes 42 and 42^a for compressed air, a smaller pipe 43 lying between said pipes 42 and 42^a for conducting the spraying liquid and a plurality of heating coils 44. Said heating coils 44 are connected at one end by flexible hose 45 to the steam header 12. The compressed air lines 42 and 42^a are joined at one end by a U-fitting 72, to which is connected a flexible hose 46 leading from the pipe 23. The pipe 43 is connected by means of flexible hose 47 to piping 9.

At spaced intervals along the length of the pipes 43, 42 and 42^a there are mounted

spray blocks 48 which are secured in the channels formed between the flanges 37. Said spray blocks 48 each comprises a member of substantially triangular cross section provided with three convergent passages 49, 50 and 51 (Figure 8). Said passages are internally threaded to receive short connecting nipples 52, 53 and 54, each provided with a union 55 and connected to the pipes 42, 43 and 42^a respectively. Said passages 49, 50 and 51 are each similarly restricted, as at 56, and again at 57 to form capillary bores 58, intersecting as at 59 to form an enlarged orifice 60 in the lower face of each spray block.

The operation of the apparatus is substantially as follows:

Steam is admitted to the coils in the paraffin tank 1 by means of valve 2 and the paraffin heated until at the desired temperature. Valve 4 is then opened to blow the molten paraffin over into the feed tanks 6, which are now kept under a predetermined pressure. Either of the valves 10 is next opened to allow the molten paraffin to flow under pressure through the flexible hose 47 into the pipe 43. At the same time preheated compressed air from tank 19 is run into pipes 42 and 42^a under a slightly higher pressure. The liquid paraffin will be forced out through the nipples 53 into the passages 50 and will meet at the convergence points 59 the angular streams of compressed air flowing through the passages 49 and 51. The high velocity of the converging fluid due to the restriction of the passages as at 57 to substantially capillary bore causes a very fine atomization of the molten paraffin, which issues from the orifices 60 as a fine mist. It should be noticed that the orifices 60 are each flared beyond the convergence point 59, as at 61, so that the spray assumes a flattened shape in the transverse direction of the traveling band 33 of web material. It is obvious that the distance of the orifice 60 from the web material 33 should be so arranged that adjacent sprays overlap slightly and thus cover the entire surface of the material to be coated.

When used in connection with the waxing of paper, the coating device is adapted to be positioned at some convenient point on the paper machine, preferably after the calendar stack and before a series of chilled rolls placed in front of the reel. It might also be placed between the reel stand and the rewinder, or, for the application of size, color and the like, in front of the driers. Because of the even distribution and penetration of the paraffin on and between the fibres, the coating operation may be regulated so as to obtain either a surface coating or a treatment to any desired depth. The regulation may be easily obtained by adjusting the pressure and temperature of the air and the

relative amount of paraffin fed into the spraying device proper. In the event that complete penetration of wax is desired, an additional spray attachment may be placed below the sheet in inverted position.

5 While the apparatus has been described in connection with the treatment of paper, it should be understood that the device is equally applicable to coating fabrics or spraying lacquer, paint and the like on traveling sheet or band material.

10 I am aware that many changes may be made, and numerous details of construction may be varied through a wide range without departing from the principles of this invention, and I therefore do not purpose limiting the patent granted hereon, otherwise than necessitated by the prior art.

I claim as my invention:

20 1. A device for coating a traveling web of paper with paraffin and the like, comprising a housing positioned above and transversely of the web of paper and having a longitudinal bottom opening the full width of said paper web, an inner casing supported in said housing and spaced therefrom, a plurality of spray blocks within said inner casing, each having a spray orifice and separate conduits for conducting air and a coating liquid to said orifices positioned within said inner casing.

2. A device for coating a traveling web of paper with paraffin and the like, comprising a housing positioned above and transversely of the web of paper and having a longitudinal bottom opening the full width of said paper web, an inner casing supported in said housing and spaced therefrom, a plurality of spray blocks within said inner casing, each having a spray orifice, separate conduits for conducting air and a coating liquid to said orifices positioned within said inner casing, and means for supplying air and coating liquid under pressure to said conduits.

3. A device for spraying paper and like web material, comprising a hood positioned above and transversely of a web of paper, an inner casing supported in said hood, a conduit within said casing for conducting a spraying liquid, separate conduits for compressed air lying adjacent said liquid conduit and branched spray nozzles connected to said conduits for mixing the air with the spraying liquid.

4. A device for coating paper with paraffin and the like, comprising a hood extending transversely of a traveling web of paper, an inner casing supported in said hood, piping housed within said casing for conducting a coating fluid, air and a heating medium, respectively, and spray nozzles positioned at frequent intervals for connection with said coating fluid and air piping.

5. A device for coating paper with par-

affin and the like, comprising a suction hood positioned above and transversely of a traveling web of paper, an inner casing supported in said hood, spray blocks mounted upon the lower side of said casing and piping within said casing connected to said spray blocks for supplying thereto a coating fluid and air under pressure.

In testimony whereof I have hereunto subscribed my name.

EDMUND P. ARPIN, JR.

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