May 28, 1940. N. MARCALUS 2,202,159

WAXING MACHINE

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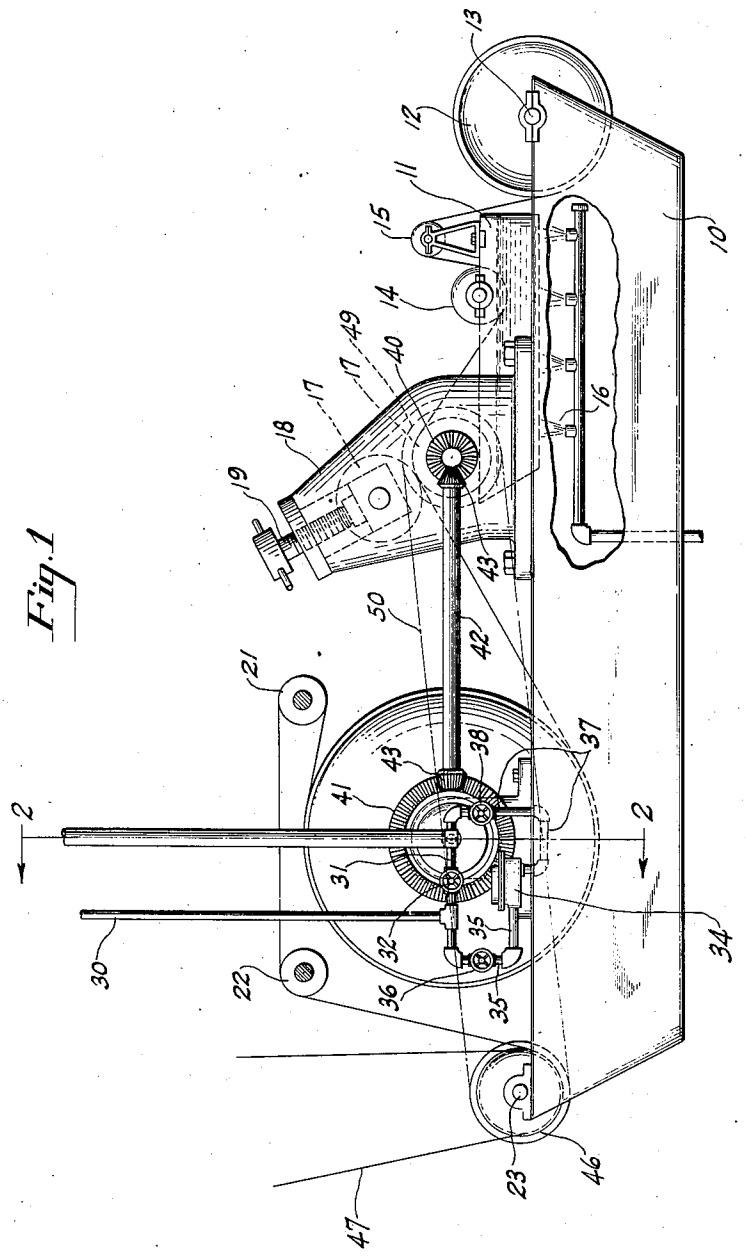


Fig. 1

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Fig. 2

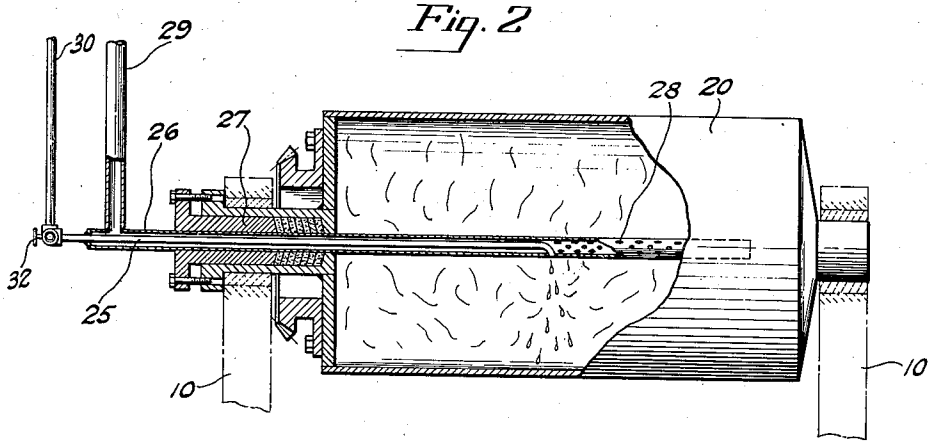


Fig. 3

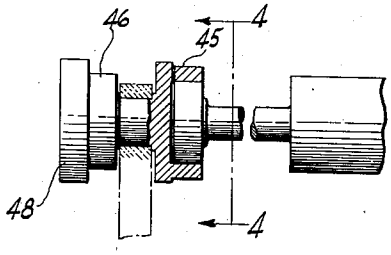


Fig. 4

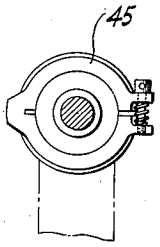
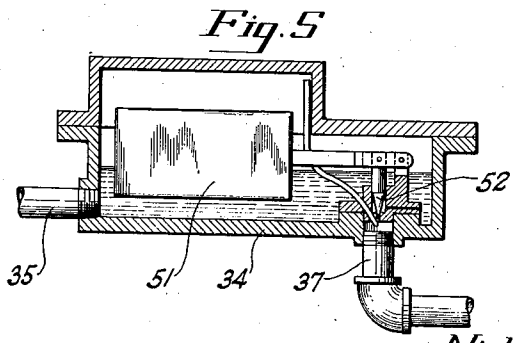


Fig. 5



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WAXING MACHINE

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Application March 17, 1937, Serial No. 131,419

1 Claim. (Cl. 91—55)

This invention relates to waxing machines and more particularly to a machine adapted to apply a thin coating of hot melted wax to a continuous supply of paper or other fabric and to immediately cool the waxed material to harden and dry the wax in crystalline form.

An object of the present invention is to provide a machine containing a tank of wax maintained at a temperature sufficient to liquefy the wax and through which a strip of paper or other fabric may be passed at a high rate of speed.

Another object of the invention is to provide a chilled drum into which a refrigerant is directly admitted and over which the strip of material being waxed may be passed, the drum being maintained at such low temperature that the wax picked up by the strip in the tank may be quickly reduced in temperature to be hardened and crystallized.

Another object of the invention is to provide squeezing rolls for the strip of material being waxed after passing through the tank and before the strip passes over the cooling drum to limit the amount of wax deposited on the strip and to return excess wax to the tank.

One feature of the invention which is of importance is that the entire waxing and cooling operation may take place in a single self-contained machine and the strip usually paper immediately rolled upon a suitable mandrel for subsequent cutting into retail widths and lengths.

Another feature of importance is that the strip may be advanced through the machine by drivingly rotating the cooling drum and/or one of the squeezing rolls over which the strip passes.

With the above and other objects in view, my invention includes the features of construction and operation set forth in the following specification and illustrated in the accompanying drawings.

In the accompanying drawings annexed hereto and forming a part of this specification, I have shown my invention applied to a waxing machine for a large roll of paper, but it is to be understood that the invention can be otherwise embodied, and that the drawings are not to be construed as defining or limiting the scope of the invention, the claim appended to this specification being relied upon for that purpose.

In the drawings:

Fig. 1 is a complete side elevation of one embodiment of my invention selected for illustration.

Fig. 2 is a transverse sectional view taken upon the plane of line 2—2 of Fig. 1 and showing the cooling drum partly in section.

Figs. 3 and 4 are side and front views respectively of a friction driving connection in the rotating means for the take-up roll or mandrel, and

Fig. 5 is a sectional view of one form of float valve in the connections for supplying refrigerant to the cooling drum.

In the above mentioned drawings, I have shown but one embodiment of the invention which is now deemed preferable, but it is to be understood that changes and modifications may be made within the scope of the appended claim without departing from the spirit of the invention.

Briefly and in its broadest aspect, my invention may include the following principal parts; first, a frame or base on which the operative parts of the machine may be mounted; second, a tank for the melted wax, there being heating means preferably below the tank by means of which the wax is maintained completely liquefied; third, squeeze rolls through which the strip of material being waxed passes after going through the tank of liquefied heated wax, the rolls being resiliently adjustable toward and from each other; fourth, a drum into which may be admitted a refrigerant such as liquid ammonia, these means preferably admitting a regulated small amount of refrigerant continuously; fifth, means to withdraw the refrigerant after it has been expanded to substantially atmospheric pressure; sixth, rotating means for one of the squeeze rolls and also preferably for the cooling drum so that the roll and drum may have the same surface speed; seventh, means to support a roll of paper or other material to be waxed, and eighth, means to support and frictionally rotate a roll or mandrel on which the waxed paper may be wound.

Referring more in detail to the figures, I provide a base or frame 10 on which the operative parts of the machine may be mounted. Secured in position on this frame 10 is a tank 11 completely open at its top and of sufficient width to accommodate a strip of paper or other material passing through this tank. Preferably the material to be waxed is furnished to the machine from a large roll 12 which may be mounted for rotation upon suitable supports or bearings 13 at one end of the machine.

In order to pass the material below the surface of the melted wax in tank 11 a freely rotatable roller 14 suitably mounted on frame 10 is provided, the periphery of which dips partially below and within the tank 11. Between the roll 14 and the roll of material 12 there may be mounted a guiding roll 15 over which the strip of material passes before dipping within the wax.

Within the tank 11 is a large amount of wax maintained at a suitable temperature, approximately 133° F. to completely liquefy it, so that it will adhere firmly to the material being coated. For that purpose gas burners 16 or other heating means may be provided preferably directly below the tank. The wax employed may be a high grade colorless and odorless paraffin wax which

at normal room temperature solidifies to a clear white and firm crystallized mass.

After passing through the tank 11 the strip of material being waxed passes between a pair of squeeze rolls 17—17 by means of which excess wax is removed and allowed to drip back into tank 11. The wax retained by the strip is forced closely into contact therewith so that it will firmly adhere thereto. As shown in Figure 1 of the drawings, the rolls 17 are mounted in suitable housings 18 for rotation one above the other. In order to obtain the necessary pressure between rolls 17 the upper roll may have its bearings adjustable toward and from the lower roll as by means of screws 19, one of which is shown in Figure 1.

From the squeeze rolls 17—17 the strip passes substantially around the outside cylindrical surface of a large drum 20 and from the drum 20 guide rolls 21 and 22 suitably supported and freely rotatably lead the strip to a suitable mandrel or roll 23 upon which the strip may be directly wound. During its passage around the drum the melted wax is completely coated and solidified.

The drum 20 as more clearly shown in Figure 2 is hollow and mounted for rotation upon suitable bearings. Through one of the end supporting journals pass two concentric pipes 25 and 26 one within the other. To permit rotation of the drum 20 a suitable stuffing box 27 is provided within the journal providing a substantially gas tight joint. Through the inner pipe 25 a refrigerant such as ammonia or sulphur dioxide at a low pressure may be admitted to the interior of the drum 20. As shown in Figure 2 pipe 25 terminates centrally of the drum and at that point extends to the outside of pipe 26. The gas from pipe 25 may therefore expand freely into the drum 20 thus maintaining the drum at an extremely low temperature, approximately 0° to 15° F. By controlling the amount of refrigerant admitted through pipe 25 the temperature may be varied to whatever degree necessary to solidify and crystallize the amount of wax carried by the paper or other material.

To withdraw the refrigerant from the drum 20 perforations 28 are provided throughout the length of pipe 26 within the drum. Outside the stuffing box 27 pipe 26 is joined to a pipe 29 leading to the outside atmosphere. The pressure within the drum 20 is substantially atmospheric as pipe 29 is always open and is directly connected to perforated exhaust pipe 26.

The admission pipe 25 may be connected to a suitable supply of refrigerant, preferably a liquefied gas under extremely high pressure, by means of a supply pipe 30. A short pipe 31 connecting supply pipe 30 with admission pipe 25 permits the refrigerant to be directly admitted to the drum. A manually operated valve 32 may be provided within this pipe 31 to control admission of refrigerant to the drum as needed.

Preferably however and as shown in Figure 1, I provide admitting means for slowly and continuously supplying refrigerant to the drum. For that purpose I provide a float valve 34 in a conduit 35 connected to supply pipe 30 and including a manual valve 36. This float valve 35 by a conduit 37 preferably including a manual valve 38 permits gas to enter admission pipe 25. Any preferred form of float valve 34 may be employed maintaining a suitable level of refrigerant under pressure and admitting this gas to the drum 20 as it is evaporated and exhausted through pipe 26. By partially opening valves 36 and 38 while the valve 32 is closed, the gas may be admitted slowly and continuously to the drum 20 as required. By these means the temperature at the periphery of the drum 20 may be maintained at the desired low temperature.

To traverse the strip being waxed through tank 11 and over drum 20 so that the strip may be maintained under suitable tension and continuously in motion but without breaking, the lower squeeze roll 17 and the drum 20 are positively driven in any suitable manner so that their surfaces may have the same linear speed. One end each of the lower squeeze roll 17 and the drum 20 may be provided with bevel gears 40 and 41 respectively, the number of teeth in these gears having the same ratio as their circumferences. These gears 40 and 41 may be connected by means of a shaft 42 having pinions 43 at its opposite ends of equal number of teeth. By driving either the drum 20 or the roll 17 the other will be driven at the proper speed.

The take up roll or mandrel 23 must be rotated at variable speeds as the diameter of the waxed roll increases. To accommodate its rotation to the diameter of the finished coated material, there may be interposed a friction clutch 45. A main driving pulley 46 may be provided on this friction clutch 45 so that a belt 17 may be employed to drive the entire machine. A pulley 48 rotating with pulley 47 may drive a pulley 49 on the shaft carrying the lower squeeze roll 17. For this purpose a belt 50 connects these pulleys 48 and 49.

The float valve 34 referred to above may preferably be of the type shown in Figure 5 in which the float 51 opens and closes a small needle valve 52 which opens and closes communication between the float chamber of valve 34 and the pipe 37 admitting the refrigerant at low pressure directly to the drum 20. Refrigerant may be supplied from pipe 30 to pipe 35 and thence to the float chamber within the valve 34.

The above described refrigerant supplying means is adapted for connection directly to a steel tube or bottle of commercial ammonia or other refrigerant in highly compressed and liquefied form. With the drum 20 maintained sufficiently cold and the liquid wax maintained at a suitable level within tank 11 a complete roll of paper or other material may be coated with wax and taken from the machine in completely finished form upon a roll with the wax cooled, hardened and crystallized ready for cutting into commercial retail quantities.

I claim:

A wax coating machine comprising in combination, a base, a tank thereon containing a supply of heated and melted wax, a drum rotatably mounted on said base, means to slowly supply a vaporizing refrigerant from a source under pressure and in liquid form to the interior thereof, means to continuously remove said refrigerant from said drum after evaporation, and means to pass material to be coated through said tank and around said chilled drum, whereby said waxed material is rapidly chilled.

NICHOLAS MARCALUS.