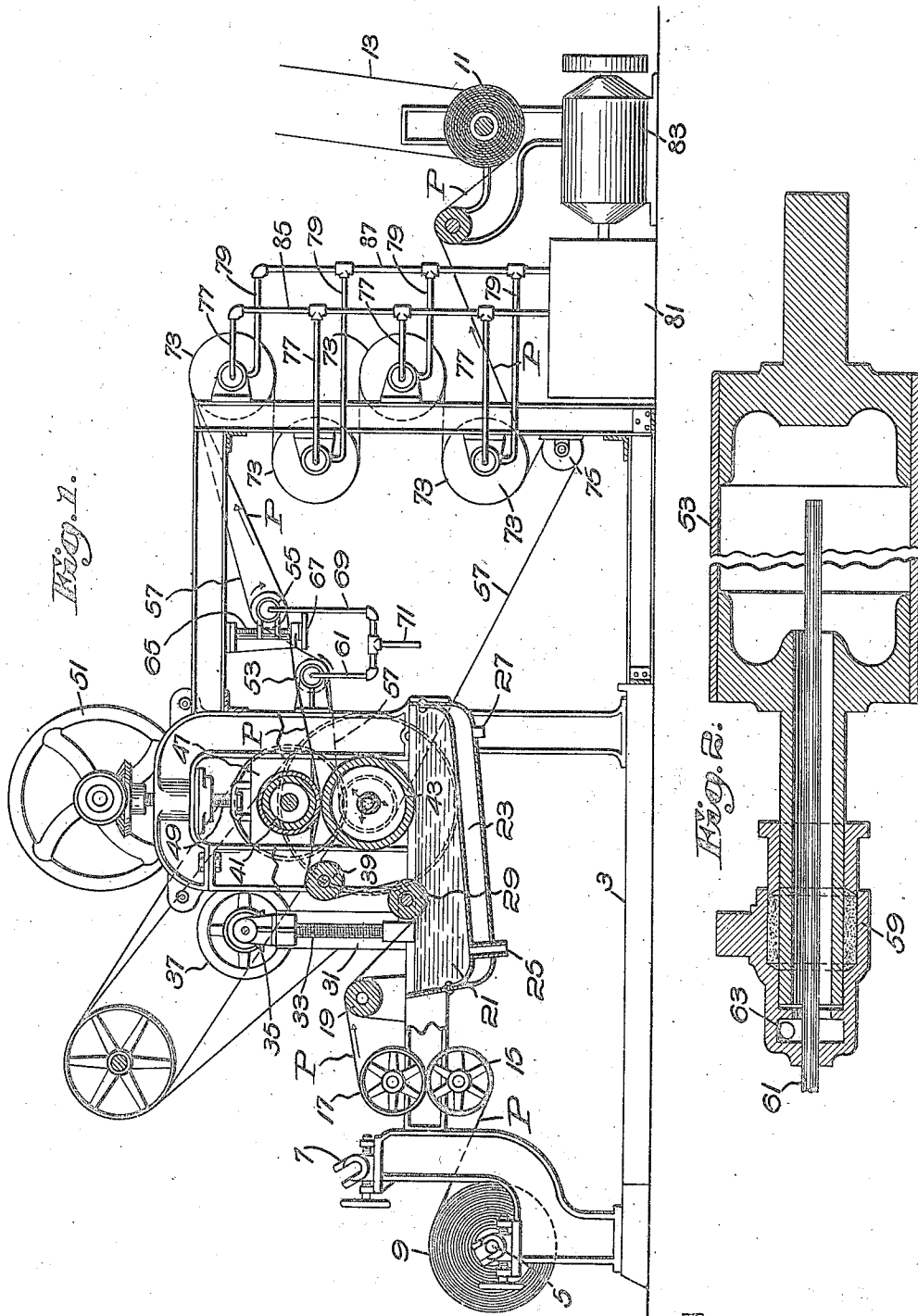


W. L. CARTER.
METHOD OF AND APPARATUS FOR WAXING PAPER.
APPLICATION FILED MAY 15, 1920.

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UNITED STATES PATENT OFFICE.

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METHOD OF AND APPARATUS FOR WAXING PAPER.

Application filed May 15, 1920. Serial No. 381,706.

To all whom it may concern:

Be it known that I, WINTHROP L. CARTER, a citizen of the United States, and a resident of Nashua, in the county of Hillsborough and State of New Hampshire, have invented an Improvement in Methods of and Apparatus for Waxing Paper, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention relates to methods of and apparatus for treating paper with paraffine or other wax, one object being to secure a smooth even finish while performing the coating operation at a relatively high rate of speed.

The invention will be best understood by reference to the following description when taken in connection with the accompanying illustration of one specific embodiment thereof, while its scope will be more particularly pointed out in the appended claims.

In the drawings:—

Figure 1 is a side elevation, in partial section, showing an apparatus embodying one form of the invention and capable of carrying out one form of the method; and Fig. 2 is a sectional elevation taken through one of the polishing rolls on the line 2—2 in Fig. 1.

Referring to the drawings and to the embodiment of the invention therein selected for illustration, the machine therein shown comprises a framework 3, at one end of which there are provided adjustable bearings 5 and 7 for the shaft of a supply roll of paper 9, either one of which sets of bearings may be employed, as desired. At the opposite end of the machine there is provided the winding reel 11 driven by the driving belt 13, the paper designated as P being wound upon the reel 11 and unwound from the supply roll 9 at a relatively high rate of speed and being subjected to the intermediate steps of waxing and finishing.

On leaving the supply roll, the paper, before being subjected to the heated wax, preferably passes over a system of guiding and tensioning rolls which are herein shown as embodied in the companion guide rolls 15 and 17 journaled on the framework of the machine, and the succeeding guide roll 19. Thence the paper passes into the wax pan 21 which is supplied with paraffine in a

melted state, kept heated by means of the steam jacket 23 supplied through the inlet and outlet pipes 25 and 27 respectively, the paper being caused to pass through the melted paraffine at a depth which is determined by the adjustable guide roll 29. The latter is supported at opposite sides of the machine upon vertically adjustable guides 31, each capable of vertical adjustment through the screws 33 and a system of bevel gears 35 controlled by the hand wheel 37, so that the depth of immersion and the length of the paper immersed may be adjustably controlled.

As the paper passes through the melted paraffine it becomes saturated therewith and then passes upward over the guide roll 39 and thence between the squeeze rolls 41 and 43 which act to press out and remove the surplus melted wax. These rolls may be of any suitable construction, such as that shown in my prior Patent 1,140,873, and provided with any suitable surface or jacket covering, the lower roll being preferably hollow and provided with suitable means for admitting steam to the interior thereof for heating it, as through the inlet pipe 45. The upper roll is carried in bearings 47 vertically adjustable by means of the feed screw 49 and hand wheel 51, so that the pressure between the rolls may be varied.

The paper, having had the surplus wax removed, next passes to the polishing rolls 53 and 55 which are driven in the opposite direction to the travel of the paper (as indicated by the arrows in Fig. 1) by means of the driving belt or chain 57 driven from the lower squeeze roll shaft. The polishing rolls 53 and 55 (see Fig. 2) are preferably constructed of metal, herein of brass, and present a smooth, polished, burnishing surface, preferably heated by suitable heating means. Herein the rolls are hollow (see Fig. 2), one end of the roll shaft passing into a suitable stationary stuffing box bearing 59 and provided with the steam pipe connection 61 which passes through the stuffing box into the interior of the hollow roll. Condensation is withdrawn through a suitable pipe connection with the drip opening 63 in the end of the stuffing box.

The heated polishing rolls, pressing against the rapidly moving paper and being driven in the opposite direction to the travel

thereof, impart a smooth, even, glossy finish to the wax. To vary the pressure of the polishing rolls on the paper, one or both of the rolls may be adjustable, the roll 55 being herein shown as mounted in bearings which may be vertically adjustable by means of the screw 65 and hand wheel 67. The steam pipe connections 61 and 69 to the two rolls 53 and 55 are connected to any suitable main 71.

In order to preserve the finish imparted by the polishing rolls, the wax should be set and hardened as quickly as possible after leaving the burnishing rolls and under conditions which will create no tendency to disturb the distribution of the wax or impair the finish imparted thereto by the polishing rolls. Where the hardening is effected by passing the paper through a cold water bath, if the paper is moved at a relatively high rate of speed the motion set up in the water or the impact of the water or the removal of the surplus water which is necessary before the paper can be reeled up, or one or more of these conditions, tends to disturb the polished coating of soft wax and to produce an uneven finish or one having a more or less mottled appearance. In the illustrated form of my invention, the finished wax as it leaves the burnishing roll is set or hardened by causing the paper to travel over a smooth, hard, cooling surface which herein and preferably is in the form of a metallic roll caused to travel in the same direction with the paper and chilled or cooled by any suitable means. By this means the paper is transferred immediately from the heated burnishing roll to the smooth cooling roll or rolls and the wax set or hardened without the introduction of any disturbing conditions which would tend to impair the finish which has been imparted to the wax while hot.

To thus set or harden the wax, I have provided a series of cooling rolls 73 so arranged that they provide an ample surface of contact for the paper which travels around and with the rolls, as indicated in Fig. 2, the paper passing over the upper roll and thence down over the lower rolls, and from the lowermost roll to the winding reel 11. The rolls 73 may be driven by any suitable means but herein are driven by the belt or chain 57 which passes from the polishing roll 55 to the uppermost roll of the series, and from the lowermost roll to the lower squeeze roll shaft after passing over the idle pulley 75.

The cooling rolls 73 may be cooled also by any suitable means but herein are hollow and of a general construction similar to that shown in Fig. 2 for the burnishing rolls. To chill the rolls, cooling water or other fluid is introduced through a fixed

stuffing box at the end of each roll by means of the supply pipe 77 and withdrawn through the outlet pipes 79. While liquid from any suitable source may be utilized, herein the same is provided by a small refrigerating plant, indicated diagrammatically at 81, driven by the electric motor 83 and connected to the feed pipes by the supply main 85 and the return pipe 87.

The cooling rolls may be constructed of any suitable material but preferably of metal with a finished or polished surface and also preferably of brass or copper-plated to minimize surface condensation.

By the use of the apparatus herein shown, the paper may be given a high rate of travel without impairing the finish thereof and after passing over the smooth surface of the cooling rolls, which are preferably driven at the same rate of speed as the rate of travel of the paper, is delivered to the winding reel 11 in a dry, hardened and completely finished condition. The unsupported or unguided travel of the paper is relatively short, permitting maintenance of a high speed of travel without any vibratory movement of the paper; and, when the latter is first installed and lined up in the machine at the commencement of a run, there is very small initial waste as compared with the wastage of paper which results from lining up when a water bath is employed.

While I have herein shown and described for purposes of illustration one specific form of the invention, it is to be understood that the same is not limited to the specific details or relative form or arrangement of parts herein shown but that extensive deviations may be made without departing from the spirit thereof.

Claims:

1. The method of waxing paper which consists in passing the same through heated wax, squeezing the surplus wax therefrom, polishing the surface while still hot, and then immediately chilling the wax to harden the same by contact with a chilled surface moving in the same direction as the paper to avoid disturbing the polish.

2. A machine for making waxed paper having a receptacle for heated wax, means for guiding the paper through the wax, means for removing the surplus wax, one or more heated polishing rolls over which the paper is passed together with means for driving the same and one or more cooling rolls for chilling the paper without disturbing the polished surface.

3. In a machine for making waxed paper the combination with means for applying heated wax to the paper, a burnishing roll for burnishing the same while hot, means to drive the same, of one or more cooling rolls to which the paper is immediately thereafter

delivered and means for driving said rolls in the same direction as the travel of the paper.

4. In a machine for making waxed paper the combination with paper guiding and feeding means of means for applying heated wax thereto, a heated burnishing roll in contact with which the paper is guided, means for driving said burnishing roll in a direction opposite to the travel of the paper and a cooling member having a smooth cooling surface over which the paper is carried from the burnishing roll.

5. In a machine for making waxed paper the combination with paper guiding and feeding means of means for applying heated wax thereto, a heated burnishing roll in contact with which the paper is guided, means for driving said burnishing roll in a direction opposite to the travel of the paper and a cooling member having a smooth cooling surface over which the paper is carried from the burnishing roll, said cooling member comprising a hollow metallic roll with means for introducing a cooling liquid to the interior thereof.

6. In a machine for making waxed paper the combination with paper guiding and feeding means of means for applying heated wax thereto, a heated burnishing roll in contact with which the paper is guided, means for driving said burnishing roll in a direction opposite to the travel of the paper and a cooling member having a smooth cooling surface over which the paper is carried from the burnishing roll, said cooling member comprising a hollow metallic roll with means for introducing a cooling liquid to the

interior thereof and means for driving said roll in the same direction as the travel of the paper and at substantially the same speed therewith.

7. In a machine for waxing paper, the combination with a receptacle for heated wax, squeeze rolls, a plurality of heated burnishing rolls, a plurality of chilled rolls, and means for guiding the paper to pass the same first in contact with heated wax in said receptacle, next between the squeeze rolls, next in contact on one side with one burnishing roll and then on the opposite side in contact with another burnishing roll, next in contact on one side with a cooling roll and then on the opposite side in contact with another cooling roll, said burnishing rolls being driven in a direction opposite to the travel of the paper and the cooling rolls traveling in the same direction as the paper and at substantially the same speed.

8. In a machine for waxing paper, the combination with a receptacle for the heated wax, squeeze rolls, a heated burnishing member, a cooling member, and means for guiding the paper to pass first in contact with the heated wax in said receptacle, next between the squeeze rolls, then in contact with said heated burnishing member, next in contact with said cooling member, said heated burnishing member being moved in a direction opposite to the travel of the paper and said cooling member traveling in the same direction therewith.

In testimony whereof, I have signed my name to this specification.

WINTHROP L. CARTER.