W. L. CARTER.

MACHINE AND METHOD FOR WAXING PAPER.

APPLICATION FILED DEC. 13, 1913.

1,140,873.

Patented May 25, 1915.

2 SHEETS—SHEET 1.

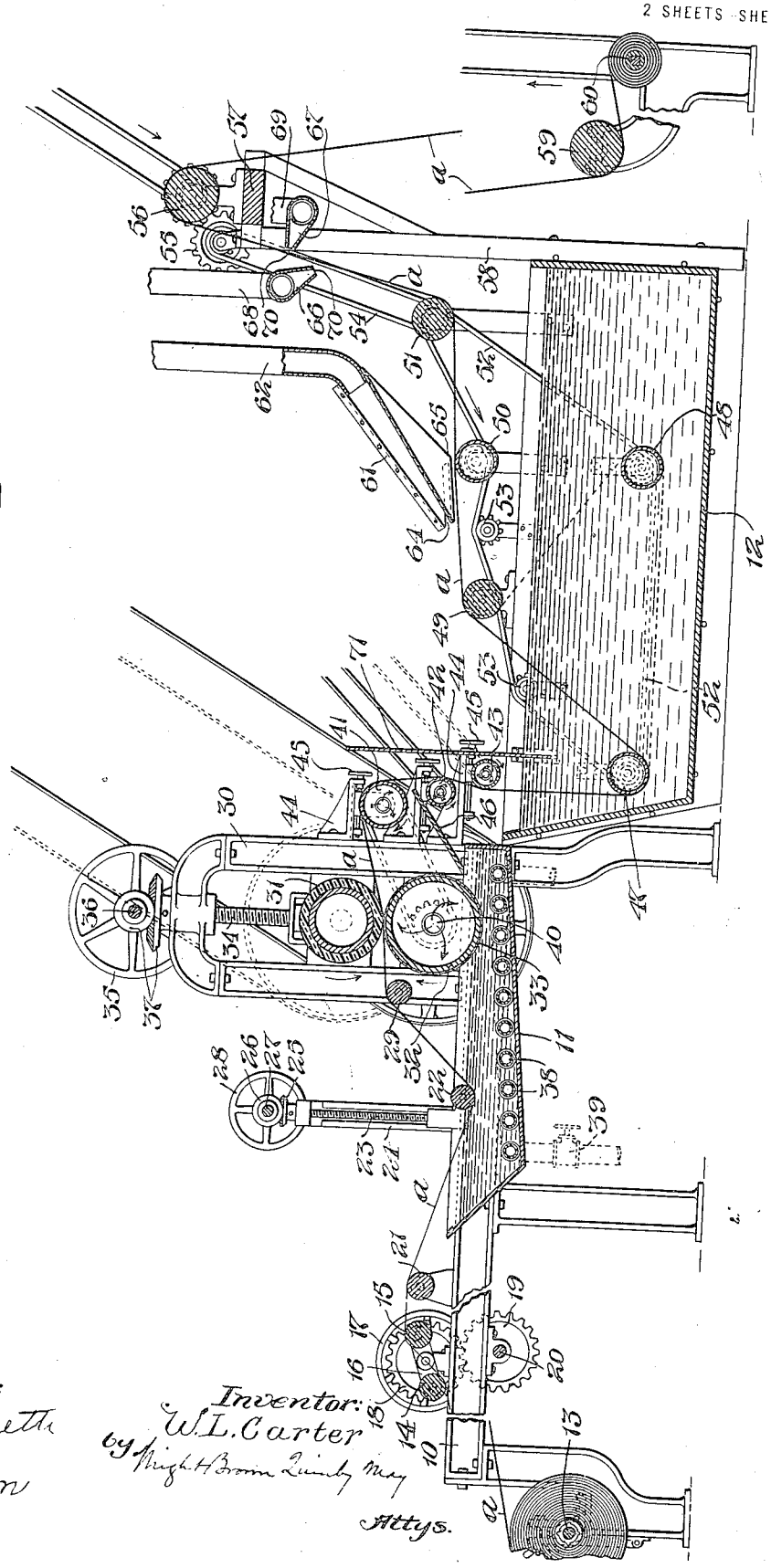


FIG. 1.

Witnesses:
P. W. Pezzetti
H. A. Rahn

Inventor:
W. L. Carter
by Wright Brown Quinby & May
Attys.

W. L. CARTER.

MACHINE AND METHOD FOR WAXING PAPER.

APPLICATION FILED DEC. 13, 1913.

1,140,873.

Patented May 25, 1915.

2 SHEETS—SHEET 2.

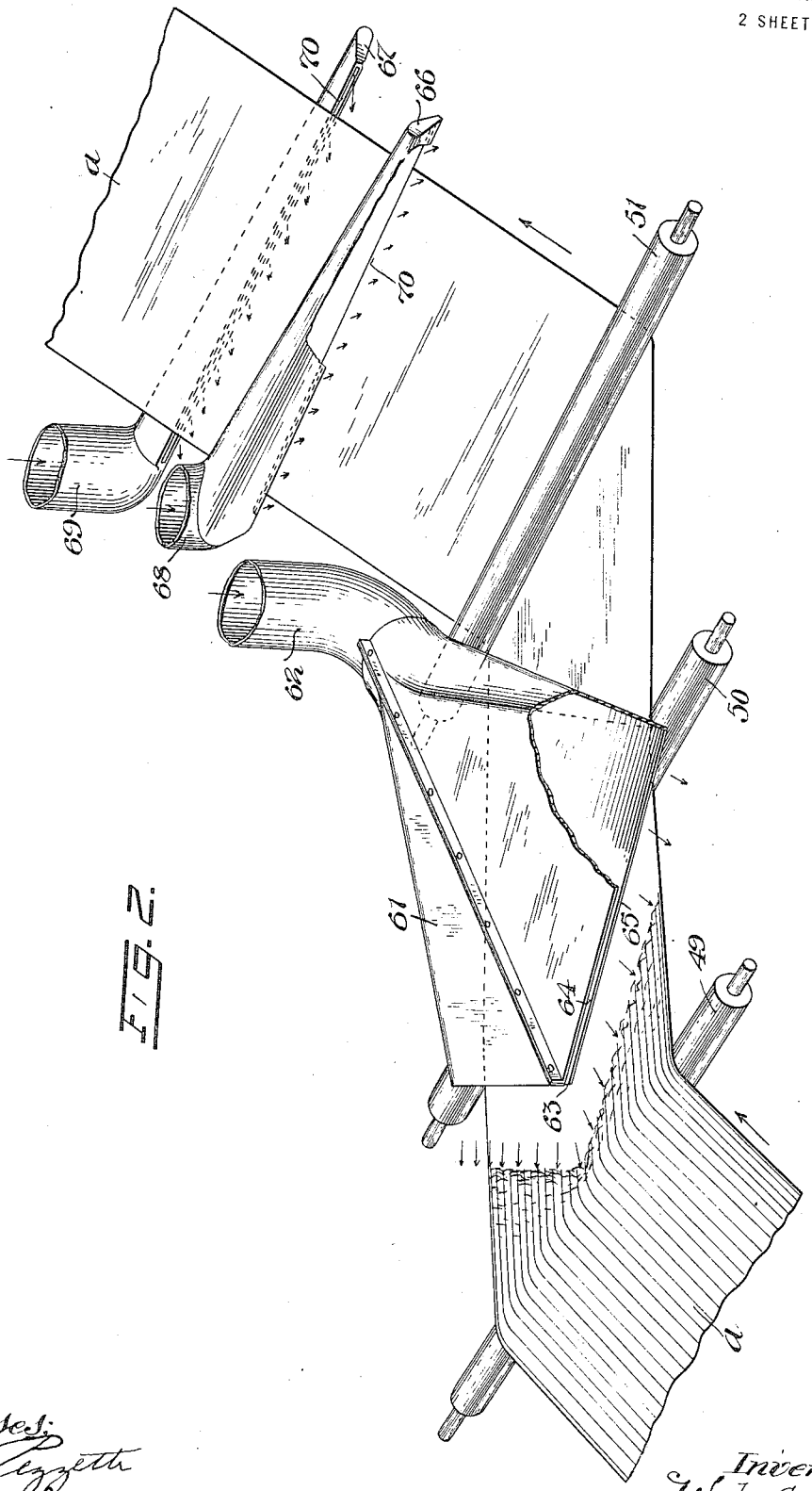


FIG. 2.

Witnesses:
C. F. Pezzetti
H. A. Rahn

Inventor:
W. L. Carter
by Wright Brown Quinby & May
Atty's.

UNITED STATES PATENT OFFICE.

WINTHROP L. CARTER, OF NASHUA, NEW HAMPSHIRE.

MACHINE AND METHOD FOR WAXING PAPER.

1,140,873. Specification of Letters Patent. Patented May 25, 1915.

Application filed December 18, 1913. Serial No. 807,439.

To all whom it may concern:

Be it known that I, WINTHROP L. CARTER, a citizen of the United States, and resident of Nashua, in the county of Hillsboro and State of New Hampshire, have invented certain new and useful Improvements in Machines and Methods for Waxing Paper, of which the following is a specification.

This invention relates to machines and methods for coating paper with wax, the particular kind of coating material I employ usually being paraffin, and the invention has particular reference to machines of this character which will enable either a thick or a thin coating to be applied with highly finished surfaces.

In carrying out my invention I provide means for running the web of paper first through a bath of melted paraffin wax, then ironing or smoothing the coating, then running the paper through a cold water bath to harden the coating, removing the water by a blast of cool air, and then drying and reeling up the web of paper.

The invention consists in the improvements which I shall now proceed to describe and claim.

Of the accompanying drawings: Figure 1 is a longitudinal sectional representation of a machine embodying my improvements; Fig. 2 is a perspective view of the air delivering nozzles and the rolls in contact with which the paper web runs after leaving the water bath.

Referring first to Fig. 1, a suitable frame 10 is provided, said frame supporting a paraffin tray 11 and a water tank 12. At one end of the frame are bearings for a shaft or spindle 13 for the supply roll of paper *a*. From the supply roll the paper is led under a roll 14 and over a roll 15, the object of said rolls being to smooth out the paper and hold the web under proper tension. The rolls 14, 15, are carried by a frame 16 mounted to be adjusted on trunnions by a hand wheel 17. At one end the frame is connected to a toothed segment 18 meshing with a toothed segment 19 at one end of a shaft 20. It is to be understood that at the other end of the shaft 20 is another segment 19 meshing with a segment connected to the other end of the adjustable frame 16, in order that when the hand wheel 17 is rotated it will rock both ends of the frame 16 so that the rolls 14, 15, may be properly adjusted in parallelism. From the roll 15 the paper leads over a guide roll 21 and then under an adjustable guide roll 22, which is held at the proper point below the level of the melted paraffin in the tank 11 by means of a screw 23 mounted in a post 24 at each side of the machine. The upper end of each screw carries a bevel gear 25 meshing with a bevel gear 26 on a shaft 27 having a hand wheel 28 by means of which the guide roll 22 may be adjusted vertically to vary the length of the paper that is immersed in the melted paraffin. It will be readily understood that by adjusting the roll 22 to a lower position than indicated in Fig. 1, the length of paper that is immersed, when the surface of the paraffin is at a given level, will be increased. From the roll 22 the web of paper *a* leads over a guide roll 29 mounted in a frame bracket 30, which latter is provided with bearings for upper and lower rolls 31, 32 respectively. Preferably the lower roll 32 has a covering 33 such as a blanket jacket. The bearings of the upper roll 31 are adjusted by means of a screw at each end, one of which is shown at 34 in Fig. 1. The space between the rolls 31, 32, may be varied by means of a hand wheel 35 carried by a shaft 36 having bevel gearing 37 with the screws 34. Suitable pipes 38 in the bottom of the paraffin tank 11, supplied by steam under the control of the valve 39, provide for keeping the paraffin in melted condition. The roll 33 is hollow and is provided with suitable means for heating it, as by a steam inlet indicated at 40. From the nip of the rolls 31, 32, the web of paper passes over hollow heated smoothing or ironing rolls 41, 42, 43, which are carried by brackets 44, the bearings of the rolls being laterally adjustable as by means of screw shafts having hand wheels 45. These rolls are preferably heated as by providing for the admission of steam to them or through them, in a manner similar to the provision for heating the roll 32. Preferably the roll 41 is of steel and the rolls 42, 43, are of brass, the latter metal being found to produce a better ironing effect upon the coating. As indicated by the arrows in Fig. 1, the direction of rotation of the ironing rolls 42, 43, is such that the peripheries of said rolls move in a direction

opposite to the direction of travel of the paper web *a*. As is clearly indicated in Fig. 1, adjustment of the rolls 41, 42 and 43, particularly the latter two, relatively to each other, the ironing or smoothing pressure upon the opposite surfaces of the web of paper may be varied according to the amount of deflection that is imparted to the web, this amount of deflection being also varied as required according to the tension on the entire web. To provide for the return to the tank 11 of the wax that may escape or be removed from the web before reaching the rolls 42, 43, I provide an inclined drip shelf 46. From the roll 43 the web passes under a roll 47 mounted in suitable bearings in the water tank 12, any suitable means being provided for keeping the water in said tank at the proper level. Preferably I provide a second submerged roll 48. Rolls 49, 50 and 51 are mounted in suitable bearings above the tank 12. The shafts of all of the rolls 47 to 51 inclusive are provided with sprocket wheels with which an endless sprocket chain 52 meshes, idle sprockets 53 being mounted where necessary to direct the chain 52 in the proper path of travel to insure rotation of all of the rolls 47 to 51 inclusive preferably at the same surface speed of rotation. All these rolls are driven by means of a chain 54 connecting the shaft of roll 51 with an upper shaft having a gear 55 meshing with a gear upon roll 56, the shaft of which is driven by any suitable means such as a belt. The roll 56 is mounted upon a bracket 57 supported by an upright 58.

The rolls 31, 32, and the rolls 41, 42 and 43 are driven in the direction indicated by the arrows in Fig. 1, either by any suitable gearing or by belting. In Fig. 1 the web of paper *a* is shown as passing under the roll 47, then over the rolls 49 and 50, then under the roll 51 and over the roll 56 and under a suitably supported guide roll 59 to the winding reel 60, which is rotated by any suitable means such as a belt. If it be desired to continue the immersion of the paper in the water for a greater length of time during this travel, the web instead of passing directly from roll 47 to roll 49 may be led around the roll 48 so that the web is immersed in the form of a loop, as indicated by dotted lines in Fig. 1. To obtain the best results it is essential that the water shall be removed from the paper as quickly as possible after it leaves the water bath, and this is done by blowing the water from the middle of the web toward and off from its edges. To effect this result I provide an air nozzle 61 (see Figs. 1 and 2) which is supplied with cold or cool air through a trunk 62 leading from a blower not shown. The delivery edge of the nozzle 61 is tapering, having its apex 63 just above the mid-width of the paper web, the delivery slot 64 being continuous. By comparing Figs. 1 and 2 it will be seen that the lower edge 65 of the nozzle is in a substantially horizontal plane, although the nozzle as a whole inclines downwardly and has a tapering formation where the slot 64 delivers the air. Preferably the roll 50 is somewhat higher than the roll 49 so that the stretch of paper that receives the blast of air from the nozzle 61 is inclined. It is important, of course, that the direction of the blast shall be rearwardly relatively to the direction of travel of the paper in order to obtain the effect illustrated in Fig. 2. The result of the structure and mounting of the nozzle 61 as shown and described is that the blast of air is delivered so as to have a spreading or plow-like action upon the globules of water that are adhering to the web of paper, to force them rearwardly and laterally and off from the edges. In other words, the water is parted at the middle of the web and forced aside so as to be blown toward and off from the edges of the web. Usually there is a greater amount of water adhering to the upper surface of the web than to the lower surface. Such as adheres to the under surface is largely shaken off and drops back into the tank 12, this action being partially due to the speed of travel of the paper causing it to vibrate to some extent, and also due to the pulsating effect of the blast of air, the blower employed being preferably of a type which causes the air to pulsate. From the roll 50 the web of paper, freed from all but a slight dampness, passes under the roll 50 and then upwardly over the roll 56. While so passing it is subjected to the action of drying blasts of air directed against its opposite surfaces by means of nozzles 66, 67, connected by trunks 68, 69, with either the same blower as that which supplies air to the nozzle 61 or with another blower. Of course in practice the air employed is rendered as dry as possible before discharge through the slits 70 of the nozzles. To prevent the water blown from the web by the nozzle 61 from being driven against the still heated coating as the paper is passing toward and into the water bath, I provide a deflector such as indicated at 71 in Fig. 1.

The machine is rapid and continuous in its operation, and has all necessary parts so adjustable as to provide for any desired thickness or heaviness of coating applied to the paper, the web passing into the water bath in a highly finished condition, which condition is rendered permanent by the immediate action of the cold water upon the coating, the water being then so quickly removed from the surface that it can have no spotting effect upon the coating. If the

water is not removed quickly by such means as the nozzle 61, as above described, the paper is liable to have a mottled appearance.

Having described my invention, I claim:

1. A machine for making waxed paper, comprising a receptacle for heated wax, a water receptacle, means for guiding the paper through said receptacles, and means for subjecting the paper to the spreading action of a fan-like blast of air to remove water from the paper after it leaves the water receptacle.

2. A machine for making waxed paper, comprising a receptacle for heated wax, a water receptacle, means for guiding the paper through said receptacles, and means for subjecting the paper, after it leaves the water receptacle, to a spreading blast of air directed to the middle of the paper and backwardly relatively to the direction of travel of the paper.

3. A machine for making waxed paper, comprising a receptacle for heated wax, a water receptacle, means for guiding the paper through said receptacles, and means for simultaneously subjecting the paper, after it leaves the water receptacle, to agitation and a globule-removing blast of air in a direction opposite to the travel of the paper.

4. A machine for making waxed paper, comprising a receptacle for heated wax, a water receptacle, means for guiding the paper through said receptacles, means for subjecting the paper, after it leaves the water receptacle, to a blast of air to remove particles of water from the paper, and means for finally subjecting the paper to the action of blasts of air to dry the coating in a direction opposite to the travel of the paper.

5. A machine for making waxed paper, comprising a receptacle for heated wax, a water receptacle, means for guiding the paper through said receptacles, means for subjecting the paper to the action of a blast of air in a direction opposite to the travel of the paper, and a barrier for preventing water blown off from the paper from being driven against the paper on its way from one receptacle to the other.

6. A machine for making waxed paper, comprising a receptacle for heated wax, a water receptacle, means for guiding the paper through said receptacles, means interposed between said receptacles for ironing the coated paper as it passes from one to the other, and means for subjecting the paper, after it leaves the water receptacle, to the action of a blast of air in a direction opposite to the travel of the paper.

7. A machine for making waxed paper, comprising a receptacle for heated wax, a water receptacle, means for guiding the paper through said receptacles, rolls interposed between said receptacles, means for heating said rolls, and means for rotating said rolls to cause their surfaces to travel in a direction opposite to the direction of travel of the paper.

8. A machine for making waxed paper, comprising a receptacle for heated wax, a water receptacle, means for guiding the paper through said receptacles, and means for varying the length of the stretch of paper immersed in each of said receptacles, and means for blowing the water from the paper after it leaves the water receptacle.

9. A machine for making waxed paper, comprising a receptacle for heated wax, a water receptacle, means for guiding the paper through said receptacles, and means for blowing the water from the paper, said means comprising a nozzle having a wide delivery portion, said delivery portion being angular with the apex of its angle at the center, connections being provided whereby the nozzle may be supplied with air under pressure.

10. A machine for making waxed paper, comprising a receptacle for heated wax, a water receptacle, means for guiding the paper through said receptacles, means for blowing the water from the paper, said means comprising a nozzle having a wide delivery portion, said delivery portion being angular with the apex of its angle at the center, connections being provided whereby the nozzle may be supplied with air under pressure, and air delivery nozzles on opposite sides of the path of the paper after it passes the first mentioned nozzle.

11. The method of making waxed paper consisting in causing the paper to travel in the direction of its length, first through a bath of heated wax and then through a water bath, and subjecting the paper, after it leaves the water bath, to the action of a blast of air in a direction opposite the direction of movement of the paper.

In testimony whereof I have affixed my signature, in presence of two witnesses.

WINTHROP L. CARTER.

Witnesses:

R. J. Hola,

Guy Kelly.