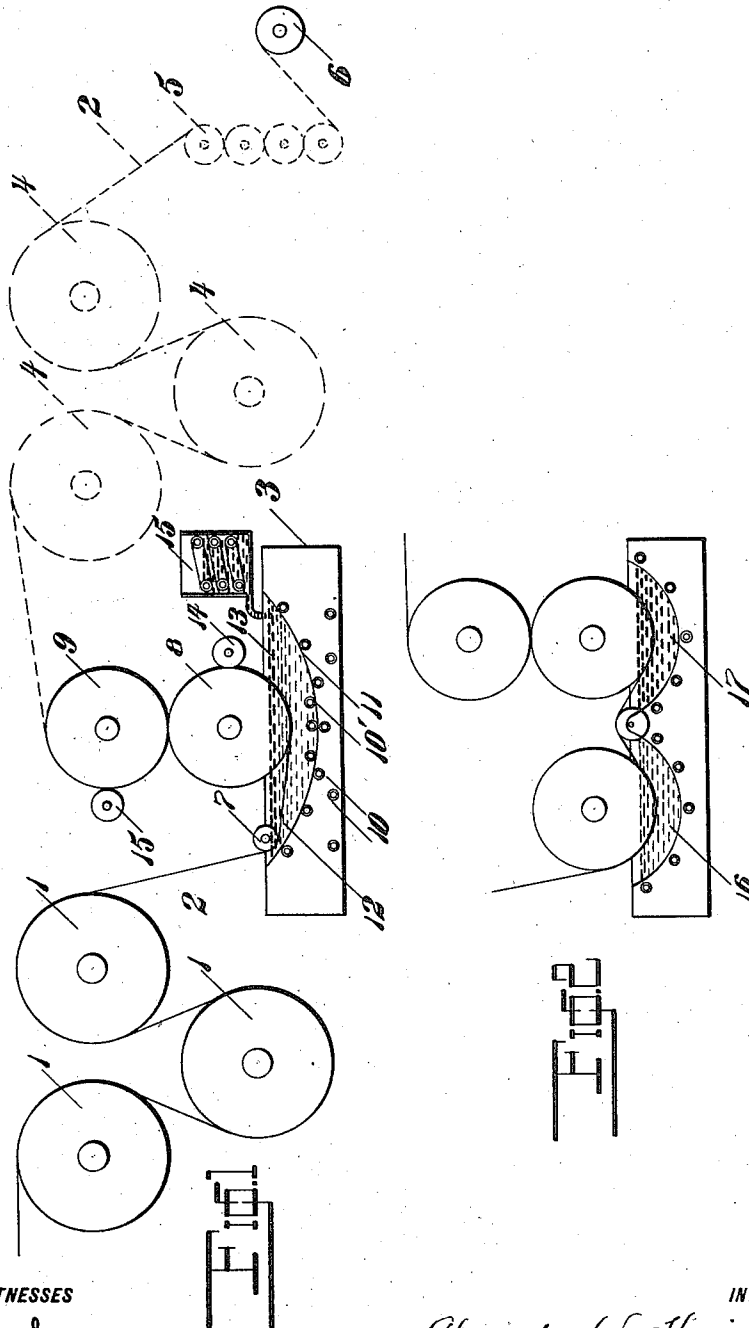


A. W. HARRINGTON.
 MAKING WAXED PAPER.
 APPLICATION FILED NOV. 28, 1905.

1,063,441.

Patented June 3, 1913.



WITNESSES
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MAKING WAXED PAPER.

1,063,441.

Specification of Letters Patent.

Patented June 3, 1913.

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To all whom it may concern:

Be it known that I, ALEXANDER W. HARRINGTON, a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, have invented new and useful Improvements in Making Waxed Paper; and in order that those skilled in the art may understand and practise my invention I give the following specification.

My invention relates to the manufacture of waxed paper and has for its object the production of waxed paper in a more expeditious manner and with greater economy of time and material, than has, so far as I am aware, been accomplished.

A further object of my invention is to produce a waxed paper which has the property of drying almost immediately after the application of the waxing composition, whereby the tedious and expensive drying or hardening operation of the wax is eliminated.

A further object of the invention is to produce waxed paper of superior quality and increased strength.

My invention enables waxed paper to be made in the ordinary process of manufacture of paper from the stock by Fourdrinier or cylinder paper making machines, without interruption in the process, the product from such machines in this case being waxed paper.

In order that my invention may be better understood, I have illustrated the same in the accompanying drawing in which—

Figure 1 represents more or less diagrammatically the drier rolls of a paper making machine, the waxing tank, the calenders and the reel. Fig. 2 represents a modification of my invention.

Referring to Fig. 1, 1 indicates the first drier rolls of a paper making machine; 2 indicates the paper web; 3 indicates the waxing tank; 4 indicates the second driers; 5 the calenders and 6 the reel. The second set of driers and the calenders are indicated in dotted lines for the reason that either or both may be omitted and the paper led from the waxing devices directly to the reel if desired.

From the above it will be seen that the waxing devices form an integral part of a paper making machine, and that my invention results in the continuous production of

waxed paper as a product of a paper making machine. This in an important feature of my invention, since it renders the waxing of paper as a separate and distinct process applied to finished, manufactured paper unnecessary, thereby saving considerable time, labor and expense.

The detailed construction of the waxing tank is as follows: The paper web 2 is led from the driers 1 under a guide roll 7 journaled near the edge of the waxing tank, and from said roll 7 to a heated roll 8 around said heated roll 8 and between the same and the second heated roll 9, around the latter to the second set of drier rolls 4, thence to the calenders 5 and finally to the roll 6. In case it is not desired to give a calendered finish to the paper, the calenders 5 may be omitted. The second set of driers would in this case in practice be unnecessary, and they may be omitted also, since the principal object of said second driers is to insure the even distribution of the waxing on the surface of the paper preparatory to passing through the calenders, it being well understood in the art that prior to passing through the calenders, the paper must be free from irregularities and unevennesses. Thus, if desired, the waxed paper may be led directly to the reel. The tank 3 is provided with hollow walls in the spaces of which pass steam or heating pipes 10 and heating pipes 10' may also be arranged in the waxing fluid receptacle 11 of the tank. The heated roll 8 dips well below the surface of the waxing composition in the tank, so that the paper web 2 is carried well down into the lower portion of the fluid. The paper is led between the rolls 8 and 9 which exert a squeezing action upon the paper to press out excess of the waxing material. Other pressing rolls 14 and 15 may be provided if necessary. A supply tank 15 is also provided for a purpose explained below.

The waxing fluid forms an important feature of the invention, and has approximately the following composition, viz: glutinous material 60 parts, glycerin or similar oily fluid 1/800 of a part, paraffin wax 115 parts, water 360 parts, or more, according to the consistency of fluid required and the character of the coating desired.

The above materials are to be mixed together and any suitable quantity of the composition may be made up with the ingredi-

ents present in substantially the proportions given. For the glutinous matter specified such materials as gum arabic, starch, or by product of rubber-making may be employed.

5 A small proportion of bees' wax may be added to the composition if desired to increase the hardness and "finish" of the surface and to increase the waterproof properties of the coating. A small proportion of
10 alcohol may be added to hasten the drying when required.

The several ingredients are mixed together with the application of heat and when the same is to be used, it is placed
15 in the waxing tank and maintained at a temperature of about 212° F. or above. In the waxing tank the waxy ingredients of the composition remain at the surface of the fluid and form a relatively thin layer on the
20 top. The glutinous material remains below as indicated in Fig. 1 of the drawing, where 13 represents the waxy constituents or materials and 12 the glutinous materials of the composition.

25 In applying the composition to the paper to be coated, the paper is led into, and passes through, the glutinous portion of the composition in the lower part of the tank, so that its pores and interfibrous spaces become
30 filled with the glutinous material. Any small portion of wax which may adhere to the web in passing into the glutinous portion of the fluid is immediately melted off on coming into the heated, lower portion of
35 the fluid. In its passage through the lower portion of the fluid, the paper takes up and absorbs and has its pores and interfibrous spaces filled with the glutinous composition. This composition gives strength, density,
40 closeness of texture and weight to the paper. On passing upward out of the fluid, the paper so filled receives a coating of wax from the waxy ingredients at the surface of the tank, and also from roll 8. On passing
45 between the heated rolls 8 and 9, the surplus wax is squeezed out and flows down over the paper on the periphery of roll 8.

Roll 9 is preferably maintained at a somewhat higher temperature than roll 8, and in
50 addition to acting as a squeezing roll, it acts as a distributing roll, thus heating and distributing the wax on the paper.

By reason of the paper being first led into and through the heated glutinous composition its pores and interstices become filled
55 with the hot glutinous composition. In this condition the paper immediately passes, without cooling, to the waxing composition with which it becomes superficially coated. Both the glutinous composition filling the
60 pores and interstices of the paper and the waxing composition immediately applied thereto being heated, and both being applied in practically one coating operation, there
65 results a union between the waxing compo-

sition and the glutinous composition whereby the glutinous composition merges into the waxy film or coating at the surface of the paper. The waxy coating is therefore much less liable to crack, separate or flake
70 off than where a wax coating is applied to paper as a separate operation. Furthermore the amount of wax required to form a coating is considerably reduced, which not only effects an economy in the amount required
75 to coat a given surface of paper but also reduces the cost of production in that the setting of the wax is much more rapid than where a thicker coat of wax is required. A further advantage results in that the
80 waxy coating is more integral and flexible than the ordinary waxed paper.

From the roll 9, the coated paper may pass, as shown, to the driers 4, and from
85 thence to the calenders 5, if a finished surface be required. Driers 4 being heated, these further assist in the spreading of the wax and the production of a uniform surface. From the calenders, the paper passes
90 directly to the reel. It will thus be seen that according to my invention, the process of making waxed paper may be continuous from the pulp to the finished coated paper.

A tank 15 may be provided to contain the waxy ingredients of the composition and
95 supply the same to the waxing tank to replenish what is used up. This tank may be heated to keep the contents thereof fluid and at approximately the temperature of the fluid in the coating tank.

In Fig. 2, I have shown a modification of the invention in which the coating tank is shown
100 as having two divisions. In the first division 16 of which is placed the glutinous ingredients of the composition and in the second
105 division 17 of which is placed the waxy ingredients. The paper passes first into the portion 16 of the tank where its pores become filled with the glutinous portion of the composition, and thence passes into the
110 division 17 of the tank in which it is coated with the waxy ingredients. It will be understood that the tank in this case is heated and kept at the proper temperature in a manner similar to the one shown in Fig. 1.
115

As a result of my invention, the coated paper dries almost immediately after coating and no tedious and cumbrous processes
120 and appliances are required for drying or setting the waxed coating and the paper may be led directly to the reel if desired. My invention not only results in an improvement in the process of making waxed paper, but an improved waxed paper of increased strength, and closeness of texture as
125 well as increased weight.

Having thus described my invention, what I claim and desire to protect by Letters Patent is:

1. The process of treating paper which 130

consists in first immersing the paper in a heated glutinous fluid composition to fill the pores and interstices of the paper therewith and bind the fibers together more firmly,

5 then as the paper is withdrawn from said heated fluid composition while the same is still hot applying to the paper so treated a waxy composition, whereby the heat of the glutinous composition assists in the distribution and spreading of the waxy composition, and the latter becomes united with the glutinous composition in the pores of the paper.

10 2. The process of treating paper which consists in floating a waxy composition upon the heated glutinous composition, leading the paper to be treated into the heated glutinous composition to fill the pores and interstices of the paper therewith, and withdrawing said paper from said glutinous composition through the superimposed waxy

composition, whereby the latter becomes united with the glutinous composition filling the pores of the paper and forms a superficial coating on the paper.

3. The process of making waxed paper 25 in a continuous operation which consists in first leading the paper into and through a heated liquid composition comprising a glutinous material and glycerin to fill the pores and interstices thereof immediately 30 thereafter leading the paper so treated through the waxing composition whereby the heat of the glutinous material assists in spreading the waxing composition upon the surface of the paper.

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Witnesses:

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