March 3, 1942. R. E. HORNBECK 2,275,148

METHOD OF PREPARING PAPER STOCK FOR APPLICATION OF A MOISTURE-RESISTANT MATERIAL

Filed Nov. 2, 1938 2 Sheets-Sheet 1

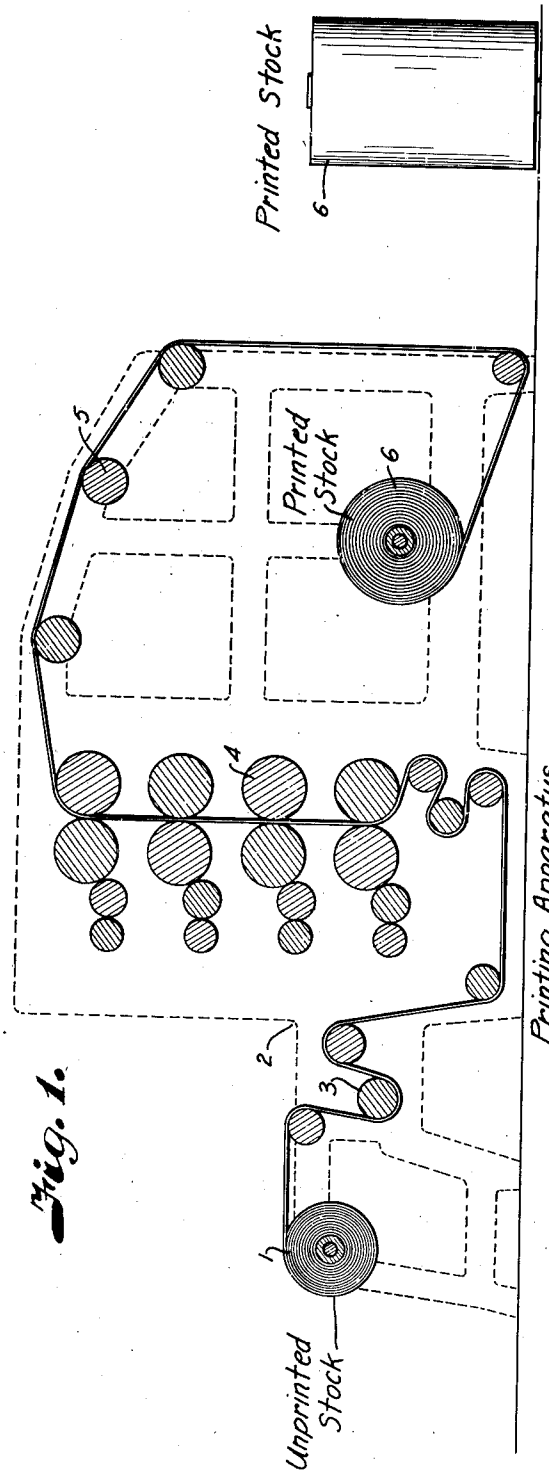


Fig. 1.

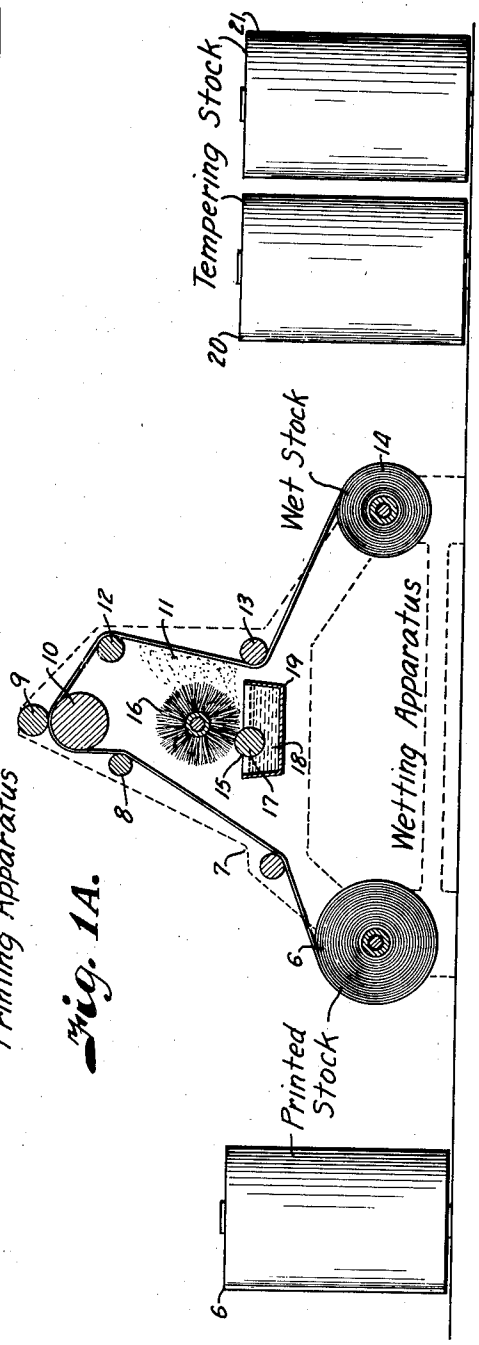


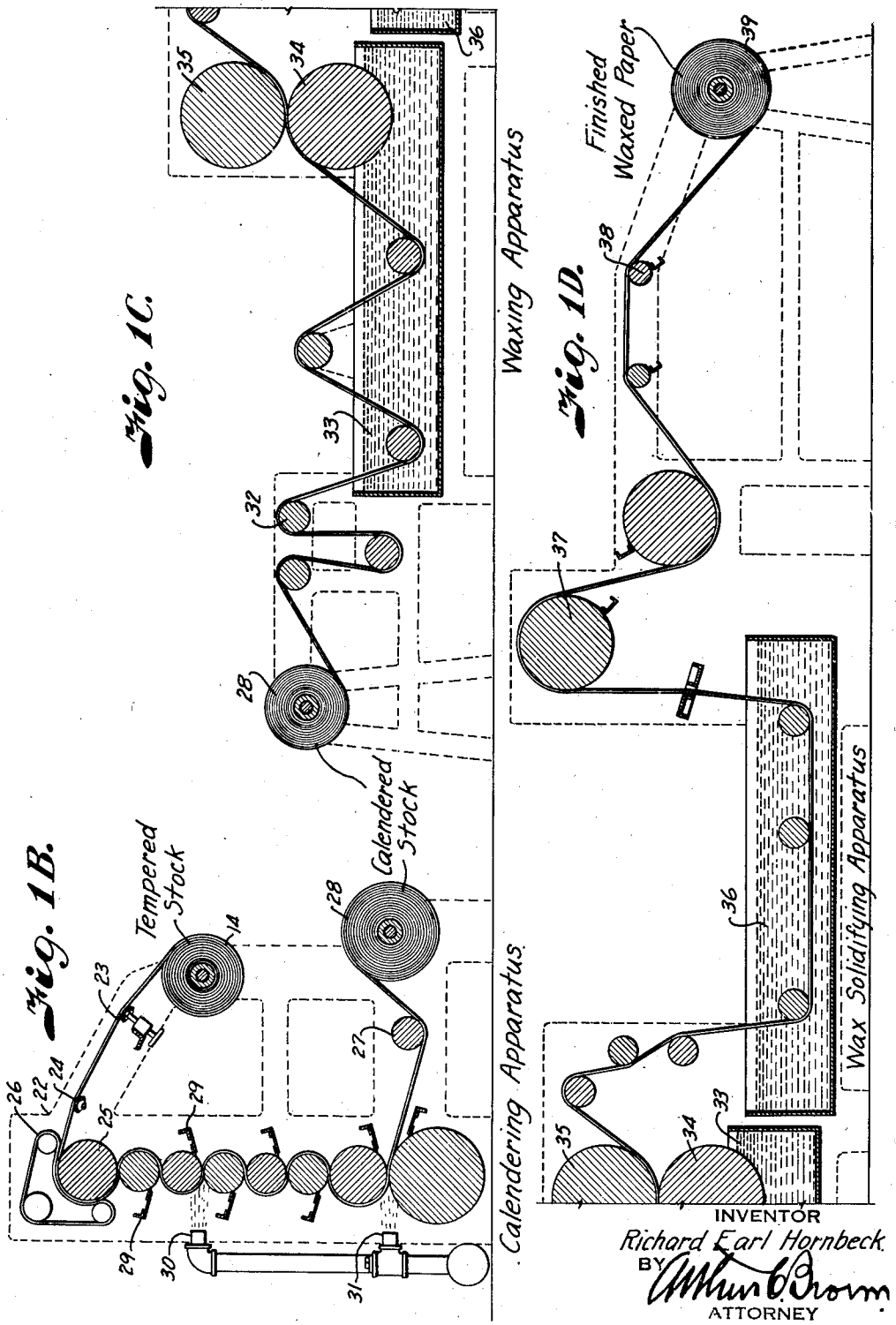
Fig. 1A.

INVENTOR
Richard Earl Hornbeck.
BY
William C. Brown
ATTORNEY

March 3, 1942. R. E. HORNBECK 2,275,148

METHOD OF PREPARING PAPER STOCK FOR APPLICATION OF A MOISTURE-RESISTANT MATERIAL

Filed Nov. 2, 1938 2 Sheets-Sheet 2



INVENTOR
Richard Earl Hornbeck
BY
Arthur C. Brown
ATTORNEY

Patented Mar. 3, 1942

2,275,148

UNITED STATES PATENT OFFICE

2,275,148

METHOD OF PREPARING PAPER STOCK FOR APPLICATION OF A MOISTURE-RESISTANT MATERIAL

Richard E. Hornbeck, Kansas City, Mo., assignor to Waxide Paper Company, Kansas City, Mo., a corporation of Missouri

Application November 2, 1938, Serial No. 238,374

5 Claims. (Cl. 91—67.9)

This invention relates to a method of preparing moisture-proofing paper used in wrapping various products which must be in sealed wrappers to preserve the freshness thereof, as in the instance of bread, and similar bakery products.

Paper of this character is usually prepared by printing designs on conventional paper stock and then coating the printed paper with a paraffin wax solution which is congealed thereon in quantity to give the desired moisture-proofing effect. The products, such as bread, are usually wrapped mechanically and the folds of the wrapper are sealed incidental to slight melting of the wax on the contact portions of the folds. It has been found that paper prepared in this manner is resilient and of somewhat springy character so that the folds tend to spring apart before the wax has set sufficiently to retain them in sealed condition. Often times the printing is elaborate and covers the entire area of the wrapper. The ink fills in the pores and forms an unbroken covering that prevents penetration of the wax and limits the amount that may be applied to the paper stock. Usually the coating over printed surfaces is not sufficiently thick to effect adequate seal of the folds, which adds to the aggravating effects of the springy character of the paper and makes sealing more difficult. This has been overcome in part by leaving unprinted margins where the sealing folds are to be formed, but these margins are not ordinarily desirable for the reason that they destroy the artistic character of the design, particularly at the exposed end folds of the wrapper. The ordinary waxed paper is also brittle in character so that folding presents unsightly crinkles in the wrapper. The printing appears dull and flat and free of highlights that enhance the appearance of a wrapped product. All of these ill effects are more pronounced with age of the paper stock, particularly where it is necessary to carry many sizes of paper stock on hand due to market conditions, distance of the manufacturer from the source of paper supply and other reasons.

It is, therefore, a principal object of the present invention to prepare a wax paper that is of substantially flexible character to eliminate creeping of the folds when a product is wrapped therein and to facilitate sealing qualities thereof.

Other important objects of the invention are to provide a moisture-proof wax paper which is glossier and of better appearance than that ordinarily produced; to provide a wax paper wherein the printing does not interfere with application of the required amount of wax necessary in effecting a seal; to produce a printed paper stock wherein the printing is of better appearance; and to provide a wax paper that is sufficiently pliable to prevent cracking of the wax coating.

In accomplishing these and other objects of the invention, as hereinafter pointed out, I have provided an improved method carried out with a novel apparatus illustrated in the accompanying drawings, wherein:

Figs. 1, 1A, 1B, 1C and 1D represent a diagrammatic section through the successive portions of the apparatus for treating base paper stock in accordance with the present invention.

Referring more in detail to the drawings:

1 designates a roll of ordinary calendered and unprinted base paper from which wax paper is prepared in accordance with the present practice, and which is mounted in a printing press 2, having a plurality of guide rollers 3 for directing the paper between sets of printing rollers 4 for printing designs on the paper stock, usually in colored inks, such as are used in printing of bread wrappers. After printing the paper passes over rollers 5 and is rewound to form a roll 6.

The printing ink when applied to the surface of the paper penetrates the pores thereof and forms a substantially smooth, unbroken covering over the surface of the paper in accordance with the design. This ink covering limits the amount of water-proofing material that may be caused to penetrate the body of the paper, and I, therefore, provide for breaking up the continuous surface of the ink so that the printed portions of the paper have substantially the same surface texture as the unprinted portions.

The rolls of paper 6, after being printed, are therefore placed in a wetting machine 7 wherein the roll is unwound and the printed paper guided over suitable rollers 8 and between driven rollers 9 and 10 across a wetting zone 11, provided intermediate lower guide rollers 12 and 13 respectively. From the lower roller 13 the paper is rewound in a roll 14.

Located adjacent the path of travel of the paper, at a point between the guide rollers 12 and 13, is a wetting mechanism 15 which distributes the wetting liquid uniformly over the unprinted side of the paper in an accurately controlled quantity to produce the desired results. The mechanism 15 includes a cylindrical brush 16 having a plurality of bristles adapted to move into wiping contact with the pickup roller 17 rotatable within a body of wetting liquid, such as water 18, that is carried in a pan 19. The brush 16 is positioned relatively to the paper and rotates at such a speed that the water picked up from the roller 17 is centrifugally discharged in a fine mist onto the unprinted side of the paper while it is passing between the rollers 12 and 13, as clearly shown in the drawing. The wetting medium is thus delivered to the surface of the paper so that there are no excessive wet spots on the paper. The wetted paper, after being wound upon the roll 14, is removed from the wetting machine and stored for a period of time to

permit thorough and uniform penetration of the wetting medium into the body of the paper, as indicated by the rolls **20** and **21**. The wetting medium increases the moisture content of the paper so that when again unrolled it is rendered extremely pliable and capable of being calendered to break down the smooth, continuous surface of the ink so that it has substantially the same texture as that of the unprinted portions of the paper. It is possible that most of the moisture is absorbed by capillarity between the fibres in the sheet and a relatively small amount is held in the form of hydration that is by actual absorption in the fibres themselves.

After the rolls of paper have stood for a period of time, for example four or five hours, the rolls **14** are delivered to a calendering machine **22** and the paper is unwound therefrom over spreaders **23** and **24** to stretch the paper so that it enters between the first of a stand of calender rolls **25** and a feed belt **26**. The paper then passes alternately over successive calender rolls and is guided by a roller **27** for rewinding into a roll **28**. The calender rolls press down and smooth out the paper to close the pores so that the moisture is retained therein and the surfaces are given a glossier, smoother and far more finished appearance. Calendering of the paper breaks the filament of ink and later permits absorption of the water-proofing solution, as later described. The tone of the ink colors is also improved so that they are brighter and of more attractive appearance. The calender rolls are kept clean by the usual doctor blades **29** and are cooled by directing air thereon through nozzles **30** and **31** as shown in Fig. 1B.

On passage of the sheet through the calender stock some of the moisture is evaporated but a substantial portion of the moisture held by the capillaries is transformed and retained through hydration of the fibres. The treated sheet is thus rendered smoothly dense, and has a greatly improved appearance after coating.

After being super-calendered the rolls **28** are then delivered to a coating machine, indicated in Fig. 1C, wherein the paper is guided over rollers **32** and through a bath of coating solution **33**, such as melted paraffin. After passing through the coating solution, the paper is guided between rollers **34** and **35** which squeeze off excessive material and drain it back into the body of coating solution. From the rollers **34** and **35** the paper is guided through a chilled water bath **36** where the coating solution is solidified and hardened, as in conventional wax coating of paper. The waxed paper then passes over smoothing rollers **37** and guide rollers **38** for rewinding in a storage roll **39**. The paper, when wound on the roll **39**, is then removed and is ready to be cut into small rolls for shipping to the user.

When the paper is treated in accordance with the above described process, the wax coating penetrates substantially uniformly into the paper regardless of the printing, so that there is sufficient wax covering the printing to effect seal thereof when the paper is used in wrapping various articles. For example, in the wrapping of bread, the rolls of paper **39** are used in a standard wrapping machine wherein wrappers are cut and loaves of bread are successively wrapped and the ends of the wrapper folded. Heat is applied to the folds of the wrapper to cause slight melting of the wax on the contacting portions of the fold, which, when congealed, provides a substantially hermetically sealed wrapper. The wrapper, being very pliable, retains its folds until the wax has congealed. The printing colors are also clearly improved, the colors being substantially brighter and having highlights, which enhance the appearance of the wrapped article. The flexibility of the paper also prevents checking and marking of the wax and when the paper is used as wrappers they form fresh and attractive packages.

What I claim and desire to secure by Letters Patent is:

1. The method of preparing a paper base stock for application of a moisture resistant coating including, printing the paper base stock, wetting the printed paper base stock with water, forming the wetted paper base stock into a roll to prevent evaporation of said water and effect penetration of the water into the paper base stock, storing the roll paper base stock for a time to complete said penetration, and calendering said printed base stock to render said paper base stock including the printed portions thereof absorbent to said moisture resistant coating.

2. The method of preparing a paper base stock for application of a coating material including, printing a calendered paper base stock, wetting the calendered paper base stock after printing with water, forming the wetted paper base stock into a roll to prevent evaporation of the water and effect penetration of the water into the base stock, and supercalendering the base stock to render the base stock and printing absorbent to said coating material.

3. The method of preparing a paper base stock for application of a moisture resistant coating material including, printing a calendered paper base stock, wetting one surface of the calendered paper base stock after printing with water, rolling up the wetted stock to bring the wetted surface into contact with the unwetted surface, allowing the roll to stand for a sufficient time for the water to thoroughly penetrate the base stock, and supercalendering the base stock to smooth the surfaces thereof and render said printed portions absorbent to the water resistant material.

4. The method of preparing a paper base stock for application of a moisture resistant material including, printing the paper base stock, treating the base stock with water, rolling up the printed base stock for preventing evaporation of the water and effecting penetration of the water into the stock for rendering the stock sufficiently pliable for calendering, unrolling the base stock after the water has sufficiently penetrated the body of the stock, and calendering the base stock to reduce the surfaces of said printing so that the inked portions of the printing are rendered absorbent to a moisture resistant coating.

5. The method of preparing a paper base stock for application of a moisture resistant material including, printing a relatively dry calendered paper base stock, wetting the base stock with water to increase the moisture content thereof, forming the base stock into a roll for effecting uniform penetration of added moisture to render the base stock sufficiently pliable for calendering, and breaking the surface of the ink by calendering the base stock so that the inked portions are rendered absorbent to the moisture resistant material.

RICHARD E. HORNBECK.