

### [54] PRECONDITIONER FOR PAPER STOCK

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[22] Filed: **June 25, 1973**

[21] Appl. No.: **373,080**

[52] U.S. Cl. .... **34/155, 34/152**

[51] Int. Cl. .... **F26b 13/10**

[58] Field of Search ..... **34/155, 152, 18, 153, 160, 34/23; 219/388, 216**

[56]

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[57]

### ABSTRACT

A pre-conditioning apparatus for paper stock adapted for use with electrographic printers, the apparatus having a substantially closed housing within which the paper in roll form is stored. A heated platen surface forms part of the discharge path for the paper stock, the paper stock being routed across the platen in heat exchange relationship thereto as the paper stock is dispensed from the apparatus. A fan is used to establish circulation of air through the housing, there being suitable air inlets and air baffling provided to direct the air adjacent the platen to carry away moisture given off by the paper stock.

**4 Claims, 2 Drawing Figures**

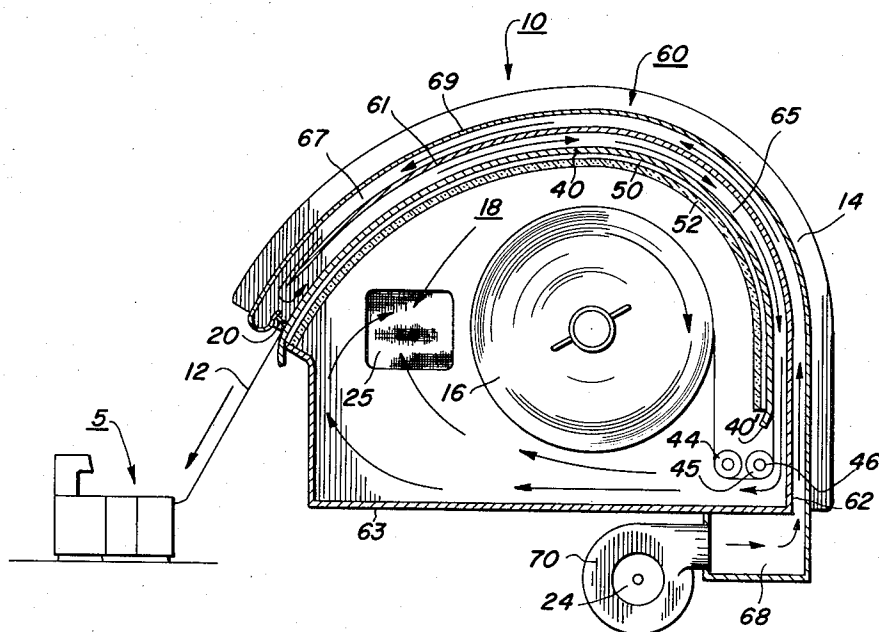


FIG. 1

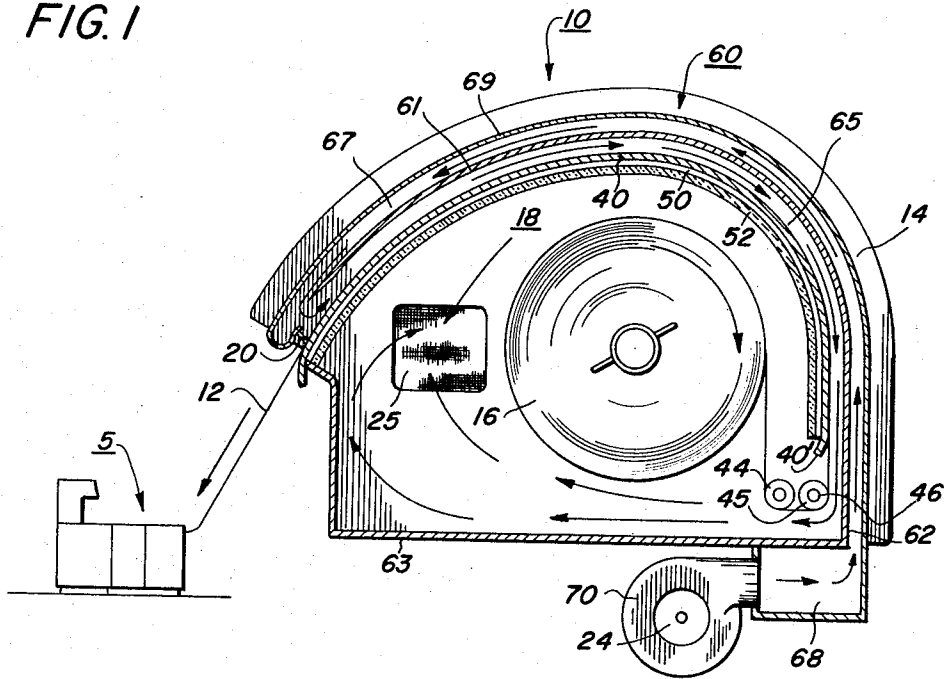
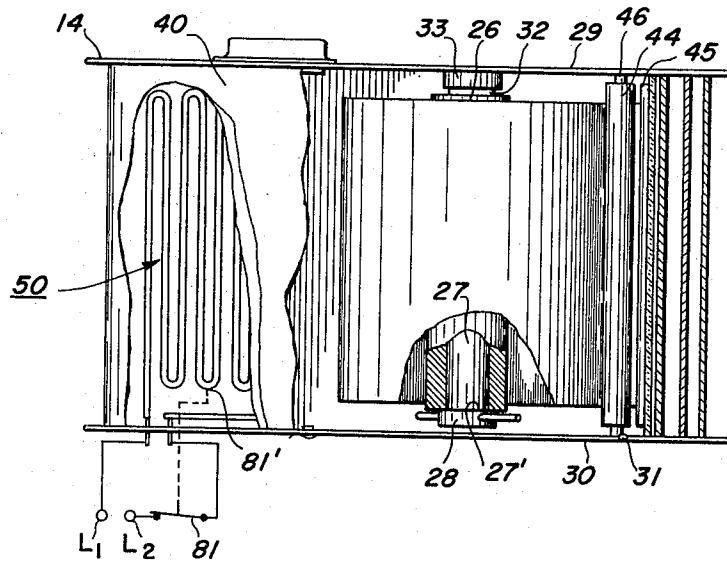


FIG. 2



**PRECONDITIONER FOR PAPER STOCK**

This invention relates to an apparatus for conditioning paper stock, and more particularly to an apparatus for drying paper stock just prior to use thereof.

In handling paper stock as, for example, that used with electrographic printers, the moisture content of the paper stock constitutes an important factor in both the ability of the printer to image thereon. Printers of this type are normally forced to use paper that has been coated or treated with a dielectric substance; this for the purpose of providing the requisite charge retention capabilities to the paper to permit its use in printers of this type. Heretofore, ordinary, that is, untreated or uncoated, paper was not generally acceptable because of the inability of plain paper to retain a charge for a duration sufficient to permit development. In this, the moisture content of plain paper tends to adversely affect the ability of this type of paper to retain a charge.

It is a principal object of the present invention to provide a new and improved paper conditioning apparatus.

It is a further object of the present invention to provide an apparatus incorporating a heated surface over which paper is brought into intimate contact just prior to discharge to dry the paper and improve the charge retention capabilities thereof.

It is a further object of the present invention to provide an improved dryer for paper incorporating a heated surface contactable with the paper together with an air stream generator for causing air to flow through the dryer in a predetermined pattern.

It is an object of the present invention to provide a drying apparatus for paper for use with electrographic type printers in which the paper supply is enclosed within the confines of the drying apparatus, with means to heat and thereby dry the paper just prior to egress of the paper from the apparatus.

This invention relates to an apparatus for supplying paper, comprising the combination of, a substantially closed housing having at least one discharge opening for the paper, a roll supply of paper in the housing, means presenting a platen surface across which the paper is adapted to pass as the paper is withdrawn from the housing through the discharge opening, and means for heating the platen surface to dry the paper as the paper is withdrawn from the housing.

Other objects and advantages will be apparent from the ensuing description and drawings in which:

FIG. 1 is a side view in section showing the paper stock conditioning apparatus of the present invention, and

FIG. 2 is a top view of the apparatus shown in FIG. 1.

Referring to the drawing, there is shown the paper supply conditioning apparatus, designated generally by the numeral 10, of the present invention. As will appear, conditioning apparatus 10 serves to precondition material, i.e., paper 12, in the form of a web as the paper is dispensed for use, as for example, to an electrographic printer 5 of the type shown and described in U.S. Pat. No. 3,673,603 to John L. Brock. It is understood that the paper user, i.e., electrographic printer 5, includes suitable apparatus (not shown) for drawing the paper 12 thereto.

Supply apparatus 10 includes a suitable housing 14 arranged to accommodate therewithin a supply roll 16 of paper 12 together with a drying mechanism 18, the latter serving to condition, that is dry, the paper 12 as

it is dispensed from housing 14. Housing 14, which is preferably formed of a suitable non-heat conducting material, is substantially closed, except for paper discharge opening 20 at one side thereof and, as will appear more fully herein, suitable air inlet and air discharge openings 24, 25, respectively.

Supply roll 16 is supported within housing 14 by means of a rotatable reel shaft assembly 26. Shaft assembly 26 includes a main shaft 27 which is suitably supported on one side 29 of housing 14 and projects towards the opposite side 30 of housing 14. Shaft 27 is provided with a threaded end 27' on which lock nut 28 is provided to retain roll 16 on shaft 27. Side 30 of housing 14 is preferably hinged at 31 to provide access to the interior of housing 14 as when loading or unloading supply roll 16 or servicing the conditioning apparatus 10.

To tension the paper 12 during unwinding and prevent overspeeding or overrunning of the roll 16, a suitable drag break or tensioning device may be provided to restrain free rotation of the reel shaft 27. In the arrangement shown, a suitable friction washer 32 is interposed between shaft 27 and hub 33 on housing side 29, friction washer 32 serving to provide a drag or restraint on the free rotation of shaft 27 and the supply roll 16 carried thereon. To assure rotation of supply roll 16 in unison with the shaft 27, the outer dimension of shaft 27 and the inner dimension of paper supply roll hub 35 are chosen to provide frictional engagement therebetween.

To provide the desired pre-conditioning of paper 12, an elongated, generally rectangular platen surface 40, which is preferably curved, is disposed between sides 29, 30 of housing 14. Platen 40 extends from a point adjacent the supply roll 16 to a point just short of paper discharge opening 20. As will appear, the surface of platen 40 serves as a guide across which the paper 12 unwinds in its travel toward discharge opening 20.

To guide paper 12 from roll 16 onto the surface of platen 40, a pair of guide rollers 44, 45 are provided between supply roll 16 and the leading end 40' of platen 40. Guide rollers 44, 45 are disposed between sides 29, 30 of housing 14, rollers 44, 45 being supported on rods 46 extending between and held by sides 29, 30 of the housing 14. Suitable bearing means (not shown) are provided to journal rollers 44, 45 for rotation on shafts 46.

Platen 40, which is preferably fabricated from stainless steel, has a suitable heating element, i.e., resistance type heater 50, in intimate heat exchange relationship with the underside thereof. A suitable cover 52 which is preferably comprised of a suitable insulating material such as asbestos is provided to insulate the underside portion of platen 40 from the ambient to reduce heat loss.

A baffle 60 is provided within housing 14 to route the air drawn through air inlet 24 in a predetermined path through housing 14, across platen 40, and out to discharge opening 25, baffle 60 serving in cooperation with platen 40 to provide a channel-like area 65 above the platen 40 through which paper 12 passes. In the arrangement shown, baffle 60 includes a curved segment 61 opposite to and spaced from platen 40 and cooperable therewith to form the air space 65, and a lower base part 62 cooperable with the adjoining sides 29, 30, base 63 of housing 14, and outer wall 69 to form a fan chamber 68. The inlet to fan chamber 68 comprises air

inlet opening 24. The space 67 between the baffle segment 61 and the upper wall 69 of housing 14 routes air from fan chamber 68 to the space 65. A suitable fan 70 is disposed in chamber 68, the discharge side of fan 70 communicating with the air discharge opening 25 via passages 67, 65 as described.

As can be seen by reference to the exemplary arrows 71 in the drawing, fan 70 draws air into the housing 14 through the inlet or inlets 24, the air passing through the space 67 above baffle 60, then through the space 65 above the portion of paper 12 then in contact with platen 40, and from there through the space adjacent supply roll 16 to discharge opening 25 and the atmosphere. It will be understood that the air, when passing through space 67 above baffle 60, will, through contact with the warm surface of baffle 60, be preheated to some extent.

Where desired, some or all of the air within housing 14 may be recirculated as by the use of one or more thermostatically controlled air dampners. Further, to obtain maximum pre-conditioning of the paper on supply roll 16, air discharge openings may be provided at opposite sides of supply roll 16. Alternately, openings 25 may be provided around the circumference thereof.

A suitable source of electrical energy L1, L2 is provided to energize the resistance heater 50. A suitable control switch, preferably a thermostatic switch 81 designed to open and close in response to temperature conditions of the platen 40 is provided. For this purpose, the sensing element 81' of switch 81 is disposed in intimate heat exchange relationship with heater 50. By this construction, heater 50 is controlled in response to temperature conditions of platen 40 to maintain platen 40 within a predetermined operating temperature range.

In operation, heater 50 is energized to heat the surface of platen 40 and the portion of paper 12 thereon. As the paper is drawn from supply roll 16, succeeding portions of paper 12 move across the surface of platen 40 and are heated thereby. The heating action of platen 40 serves, in cooperation with the movement of air through housing 14, to dry, i.e., dehumidify, the paper without overheating or damaging the paper as by burning or charring. This facilitates subsequent use of the paper, particularly in electrographic printers, and avoids the previous need to pre-condition the paper by chemical treatments, coatings, and the like prior to use in printers of this type.

While the invention has been described with reference to the structure disclosed, it is not confined to the details set forth, but is intended to cover such modifications or changes as may come within the scope of the following claims.

What is claimed is:

1. In an apparatus for supplying paper, the combina-

tion of:

a substantially closed housing having at least a discharge opening for said paper;

a supply of said paper in said housing;

means presenting a platen surface across which said paper is adapted to move as the paper is withdrawn from said housing through said discharge opening; means for heating said platen surface to dry said paper as the paper is withdrawn from said housing; means to circulate air through said housing, said air circulating means including at least one air inlet opening, and fan means adapted when energized to circulate said air; and

baffle means for routing said circulating air first into juxtaposition with said platen surface whereby to prevent overheating of said paper while assuring uniform heating thereof and then into juxtaposition with said paper supply whereby to precondition said paper supply preparatory to movement of said paper across said platen, said baffle means include a baffling member disposed opposite to and spaced from said platen surface, said baffling member cooperating with said housing to form a first air passage paralleling the direction of movement of said paper and communicating with said fan means through which air from said fan means circulates; said baffling member cooper with said platen surface to form a second air passage between said first air passage and said platen surface, said second air passage paralleling the direction of movement of said paper, said second air passage receiving air from said first passage and circulating said air into juxtaposition with said platen in reverse flow with respect to the movement of said paper, said paper moving through said second passage and across said platen surface as the paper is withdrawn from said housing and means to discharge said air from said housing.

2. The apparatus according to claim 1 including means to tension said paper across said platen surface whereby to enhance heat transfer between said platen surface and said paper as the paper moves thereacross.

3. The apparatus according to claim 2 in which said heating means is disposed in intimate heat exchange relationship with said platen surface, and insulating means in operative juxtaposition with said heating means to enhance efficiency of said heating means.

4. The apparatus according to claim 2 in which said paper supply comprises a paper supply roll, and means supporting said paper supply roll for rotation within said housing, said tension means including braking means to restrain rotation of said supply roll during unwinding of said paper.

\* \* \* \* \*

UNITED STATES PATENT OFFICE  
CERTIFICATE OF CORRECTION

Patent No. 3,867,767 Dated February 25, 1975

Inventor(s) John S. Wright

It is certified that error appears in the above-identified patent and that said Letters Patent are hereby corrected as shown below:

Claim 1, column 4, line 27, change "cooper" to  
-- cooperate --.

Signed and sealed this 15th day of July 1975.

(SEAL)  
Attest:

RUTH C. MASON  
Attesting Officer

C. MARSHALL DANN  
Commissioner of Patents  
and Trademarks