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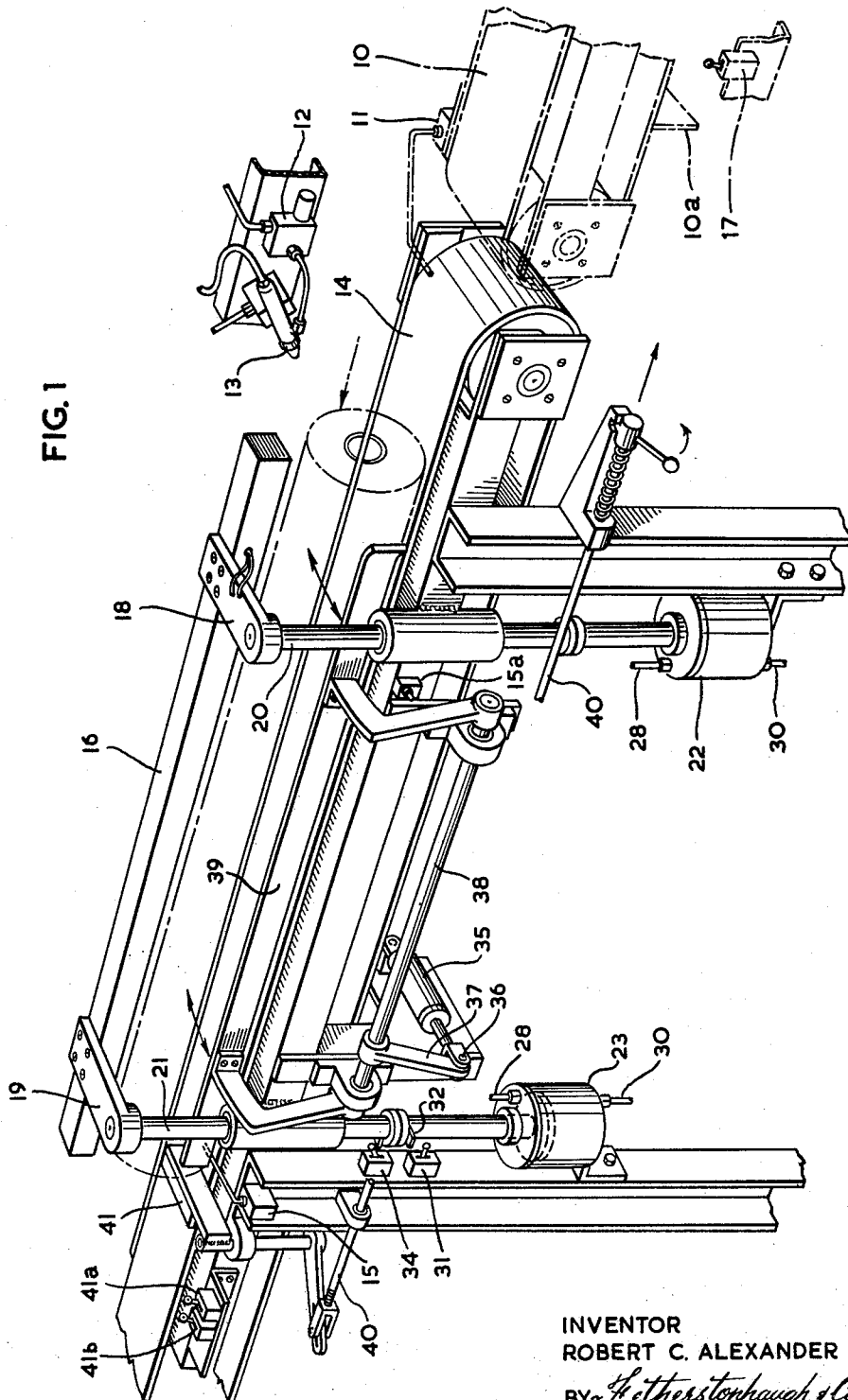
R. C. ALEXANDER
APPARATUS FOR SECURING THE FREE TERMINAL END
OF A ROLL OF ROLLED PAPER

3,134,706

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2 Sheets-Sheet 1

FIG. 1



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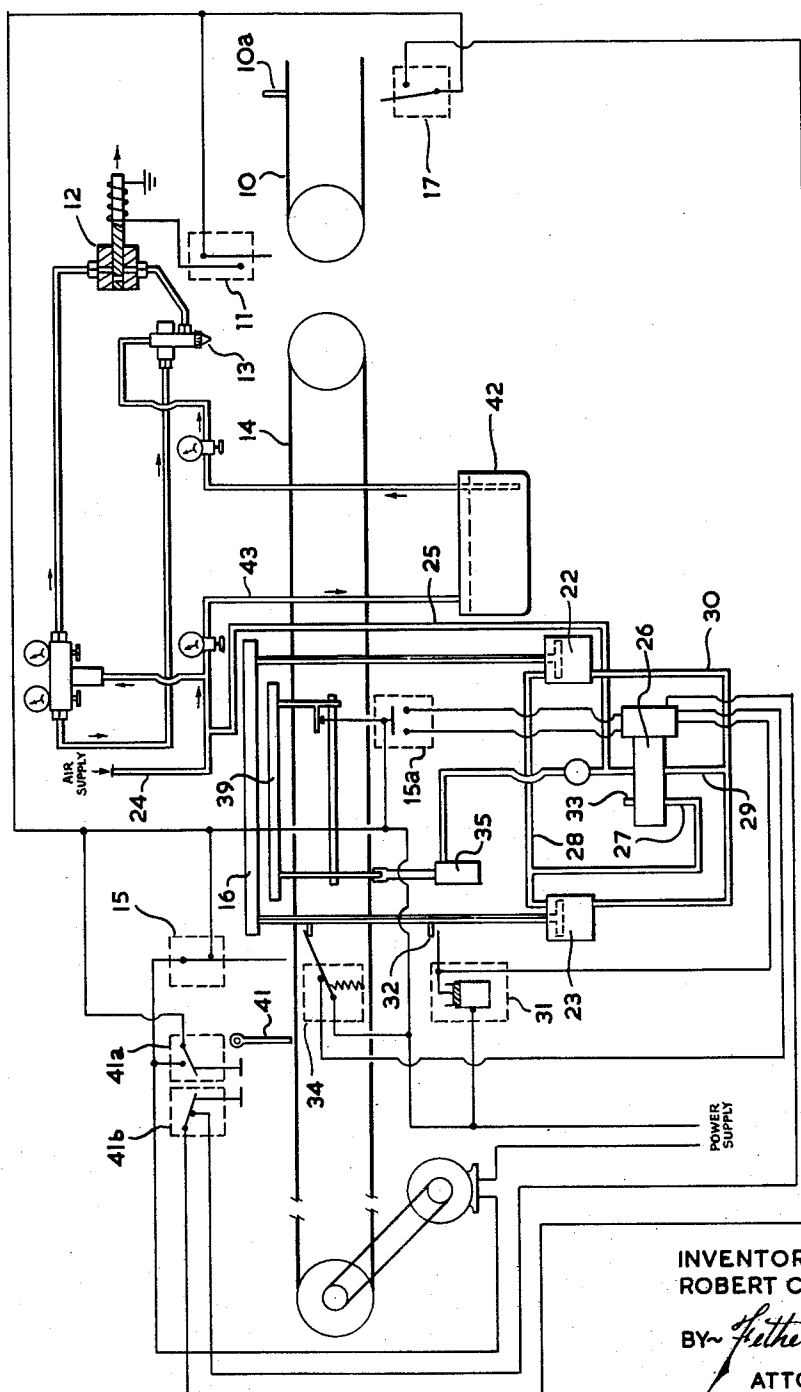


FIG. 2

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APPARATUS FOR SECURING THE FREE TERMINAL END OF A ROLL OF ROLLED PAPER

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3 Claims. (Cl. 156—357)

This invention relates to apparatus for securing the free terminal end of a roll of rolled paper. The invention is particularly applicable to rolled toilet paper and rolled paper towels.

Over a period of many years, the manufacturers of rolled paper have experienced great difficulty in securing the free end of a roll of rolled paper so that when introduced to wrapping machines, it may be neatly wrapped and without creating rejects due to faulty wrapping mainly caused by the method of securement of the final sheet of the roll. Not only do rejects result in an economic loss but faulty rolls of paper will often jamb the wrapping machine which then creates loss in production time, etc.

Up to the present time, it has been the practice to apply across the roll adjacent to the other free edge thereof, moisture or adhesive as to cause the free end sheet to adhere to the underlying surface of the roll. On the one hand, this tends to penetrate too deeply and to mat the fibres together in the underlying layers which creates an inferior roll. On the other hand, this moistening or application of adhesive requires drying time and in the travel of the roll or the log from which rolls are cut, in a conveyor, the moistened area of the paper will often tend to stick as to sometimes release the stuck end sheet or otherwise to malform the free end so that in subsequent wrapping, the displaced paper will stick out from the wrap or otherwise mar the wrapping step and make it necessary to reject imperfectly wrapped rolls. In addition, sometimes the free end of the roll adjacent to the moistened area of securement will tear off along this area where the paper is thus weakened and finally the customers are confronted with a problem in unrolling the paper which, of course, again reacts to the paper manufacturer's disadvantage.

Apart from these difficulties, it has been found in some cases that the moistened area of securement, due to the weakening of the paper in this area while still moist, causes the paper to scuff as it proceeds on a conveyor with the result that it becomes unsightly as well as difficult to start to unroll when required and produces an imperfect product.

The present invention provides apparatus designed to avoid all these difficulties so as to present a perfectly secured roll at the wrapping machine and to present to the customer a perfect product which is easily started in unrolling.

The invention generally embodies apparatus which includes means for intermittently feeding rolls of paper to a sealing station, means for spraying said roll with a fine atomized spray of fluid in a narrow path in a direction along the longitudinal axis of the roll as it moves to said station whereby to penetrate the uppermost layer and a minimum number of layers therebelow, a heated platen, means for moving said platen into momentary engagement with said moistened area of said roll as to dry it instantly, and successively acting means for discharging said roll from said station when said platen is removed therefrom, each discharged roll having its terminal layer lightly adhered to its underlying layer. The apparatus is preferably combined with a paper rewinding machine and may form part of such machine, and is designed automatically to feed rolled logs of paper as they are discharged from the forming mandrel.

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The invention will be clearly understood by reference to the following detailed specification taken in conjunction with the accompanying drawings wherein,

FIG. 1 is a perspective illustration of preferred apparatus of the present invention as to illustrate the general manner of its construction and its function; and

FIG. 2 is a schematic diagram illustrating the electrical circuits, the air circuit and the liquid circuit which may conveniently be employed in the apparatus.

The apparatus basically employs a rolled paper log feeding conveyor 10 associated with the rewinding apparatus which winds the log and subject to switch control on the rewinding apparatus, a log is discharged intermittently from the forming mandrel onto the conveyor 10 which correspondingly is set in motion as the log is delivered thereto. Conveyor 10 carries the stripper cleat 10a which is caused to engage the end of the log and accordingly the log is carried axially forward on the conveyor 10. The leading end of the log, in the first instance, trips switch 11 which initiates the spray, which operates through suitable circuit incorporating the solenoid valve 12, opens the nozzle 13 to produce a finely atomized spray directed to impinge the log along its longitudinal axis as it passes from conveyor 10 to conveyor 14.

Conveyor 14 is a constantly operating conveyor whose operation is stopped momentarily to position the log at a drying station. In this instance, as the log moves to the position shown in FIG. 1 on conveyor 14, it trips switch 15 which through circuitry causes conveyor 14 to stop and thus position the log at this station below the heated platen 16. This platen may include a plurality of embossing dies on its lower surface for embossing the log at spaced apart intervals along its length or merely constitute a flat platen surface for engaging the log throughout its length but in either case, an instantaneous drying of the lightly moistened area is effected as to achieve the securement of the terminal or tail sheet of the log to the underlying layer.

As the conveyor 10 discharges the log onto the conveyor 14, cleat 10a now moving in the opposite direction, as shown, trips switch 17 which then initiates a circuit controlling movement of the platen 16 to cause it to move down into engagement with the moistened area of the log, and which action will be described hereinafter.

The platen 16, as shown, is conveniently carried on a pair of arms 18 and 19, in turn carried on the ends of the piston rods 20 and 21 which are suitably guided and moved vertically upwardly and downwardly by pistons carried in the double-acting cylinders 22 and 23 suitably carried on the frame as shown. These cylinders are actuated through an air circuit (FIG. 2) supplied with air from an air supply line 24 and which feeds to the line 25 through to a four-way valve 26. On the one hand, line 27 leads from this valve to the branch cylinder connecting line 28 on one side of the pistons while by line 29 it connects with the branch cylinder connecting line 30 disposed between the opposite ends of pistons 22 and 23.

The four-way valve 26 is a solenoid operated valve. Its circuit, as mentioned, is initiated by the switch 17 to operate the pistons and cylinders 22 and 23 downwardly whereby to cause the platen to engage the log stationed thereunder. As this action takes place, the time delay switch 31 (FIG. 1) is actuated by a tripper 32 on piston rod 21 and which maintains the platen in engagement with the log for the required length of time but which may be a substantially instantaneous contact and removal depending upon the character of the metal of the platen and the degree of heat which is applied thereto. Regardless of which, switch 31 causes reversal of the cylinder action at the appropriate instant and operates the solenoid of valve 26 to reverse its position, thereby to feed air to the under side of the pistons to return the platen

to raised position. In this connection, the four-way valve includes the usual exhaust outlet 33.

As the piston rods move upwardly to disengage the platen 16 from the log, switch 34, which in the present illustration conveniently takes the form of a toggle switch which operates only in one direction, is tripped and which through the circuit as shown actuates a solenoid valve on air cylinder 35, the piston rod of which, as shown in FIG. 1, is pivotally connected as at 36 with the lever arm 37 carried by rotary shaft 38 which actuates arms carrying the kicker bar 39. In consequence, the kicker bar is swung forward to engage the roll and kick it off the conveyor 14. This, therefore, completes the cycle of operation and as the log discharges from the conveyor 14, switch 15a is released causing conveyor 14 to commence to operate again and the apparatus will continue to operate cycle after cycle required.

In the case where a malformed log may be presented to the conveyor 14, the operator noting this merely has to operate the lever for rod 40 as to swing gate 41 from its transverse position across the path of conveyor 14 so that the log will continue on the conveyor past the platen to a reject receiver. In this connection, as the gate 41 is swung from said path, it engages switches 41a and 41b which function so that conveyor 14 continues to operate and the first mentioned switch cuts out the circuit controlled by switch 17 and the second cuts out the circuit supplying the solenoid valve for air cylinder 35 so that the platen 16 remains in its normal upright position and the kicker bar 39 will not function to kick the log thereby permitting the malformed log to be ejected along the path of the conveyor.

The atomizer 13 is, of course, connected in a suitable circuit which may be the water pressure circuit supplied to the plant and which may be conveniently controlled by a suitable regulator in the line. Alternatively, particularly when using a plain-faced platen for achieving the adherence of the terminal or tail sheet of the log to the body, it is proposed to employ in the line a solution having some adhesive qualities. This may be achieved by incorporating a tank 42 which contains the solution and which is placed under pressure by way of the air line 43. The liquid circuit may include suitable regulators as to pressure and atomization so that it will be clear that when valve 12 is initiated by the operation of conveyor 10 as previously described, the required atomized solution will be delivered along the path required on a log as it travels to position shown in FIG. 1.

What I claim as my invention is:

1. Apparatus for securing the free terminal end of a roll of rolled paper comprising a pair of axially aligned conveyors, means for driving said conveyors, the first of said conveyors being a roll feeding conveyor and adapted

intermittently to receive a roll of paper, the second conveyor being a receiving and delivering conveyor for receiving rolls from the first conveyor and delivering them to a station, means actuated by movement of a roll carried on said receiving and delivering conveyor for stopping said roll receiving and delivering conveyor as to position the roll received thereby at said station, an atomizing device including a nozzle mounted above said conveyors having its nozzle substantially aligned with the longitudinal axis of each roll moved by said conveyors and located in spaced relation to said conveyors in a position approximating the adjacent ends thereof, means actuated by movement of a roll of paper passing from said first conveyor to said second conveyor for operating said nozzle whereby momentarily to spray said roll from end to end in a narrow path along its longitudinal axis, a movable platen located at said station and aligned with the moistened area of a roll stopped at said station, means controlled by said first conveyor for moving said platen to engage the moistened area of a roll stopped at said station whereby to dry it, means for reversing said platen from engagement with said roll, and means acting in response to reverse movement of said platen for ejecting said roll from said second conveyor as said platen is removed therefrom.

2. Apparatus for securing the free terminal end of a roll of paper comprising means for intermittently feeding rolls of paper to a sealing station along a path longitudinally aligned with the axis of said rolls, a sealing station comprising receiving and conveying means adapted for intermittent stop and go operation and a vertically movable heated platen with means for vertically reciprocating said platen, spray means adapted to automatically apply a narrow strip of finely atomized fluid along the uppermost surface of said roll while said roll is being fed to the receiving and conveying means of said station, means for stopping said conveying means to position said roll under said platen at said station, means for actuating said platen into momentary pressure engagement with the fluid treated surface of said stopped roll, means for removing said platen from pressure engagement with said roll, and means for thereafter transversely discharging said roll from said sealing station.

3. The apparatus of claim 2 in which the heated platen includes a plurality of spaced embossing dies on its lower surface.

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