

July 3, 1934.

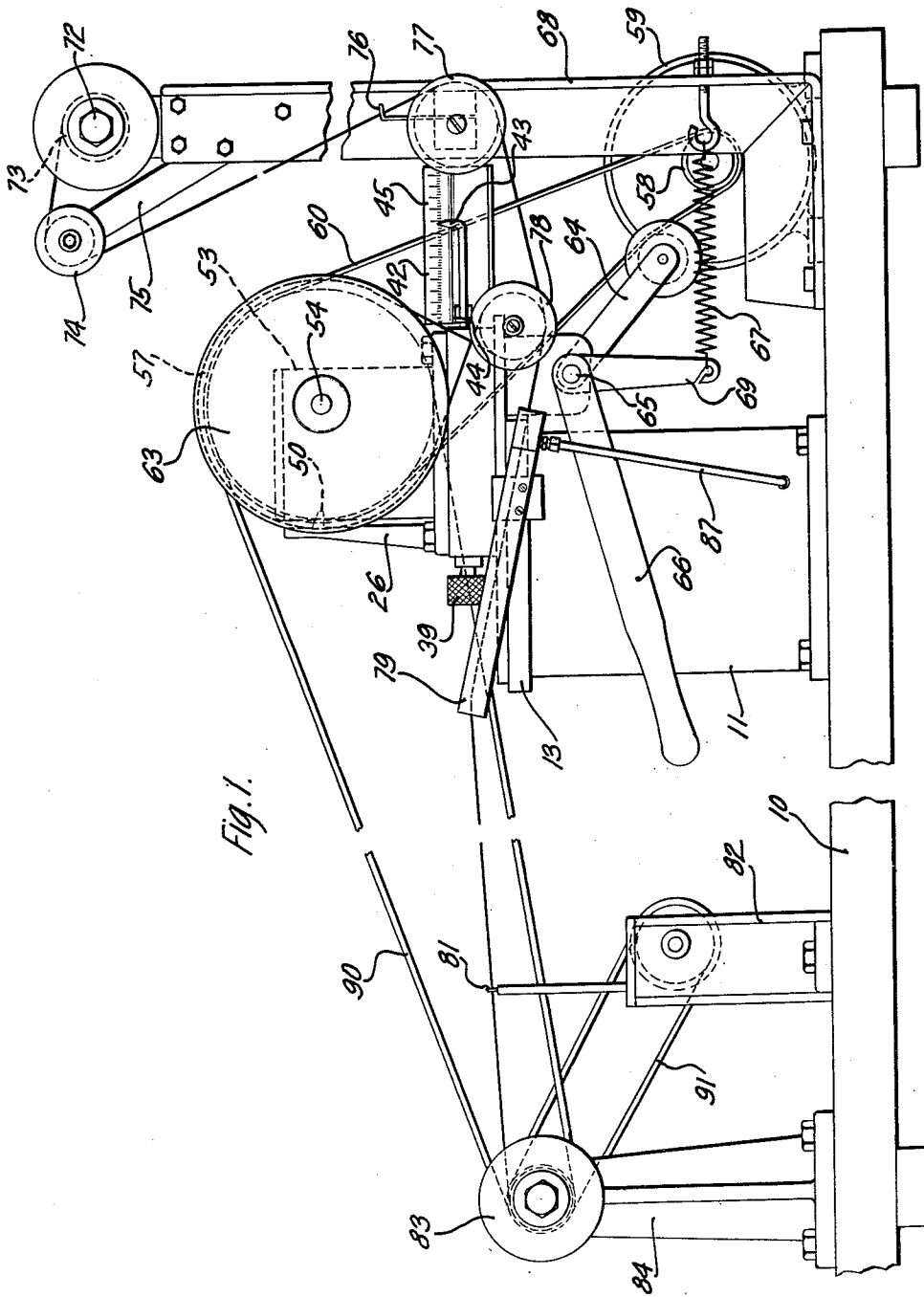
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MATERIAL PROCESSING APPARATUS

Filed April 24, 1930

3 Sheets-Sheet 1



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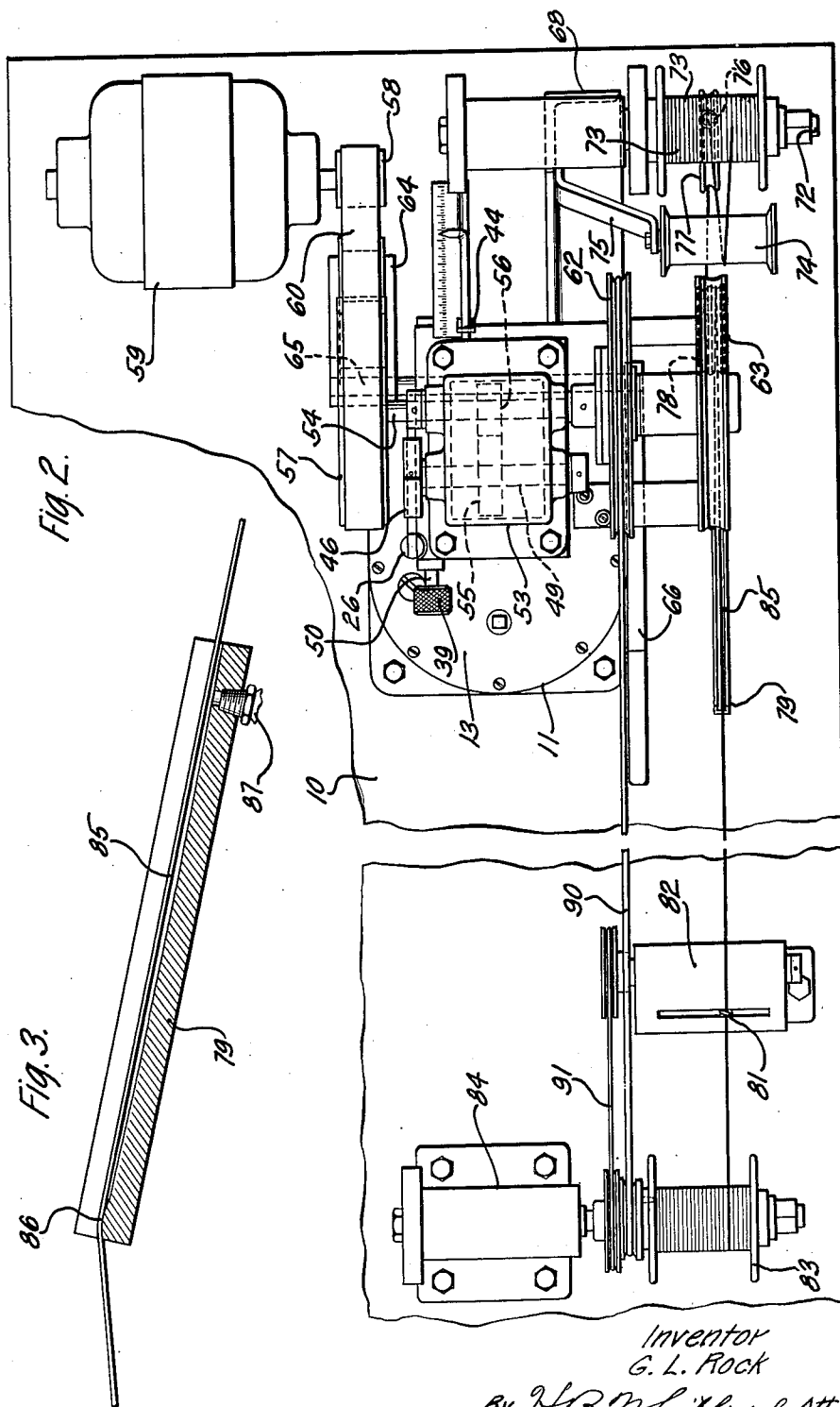
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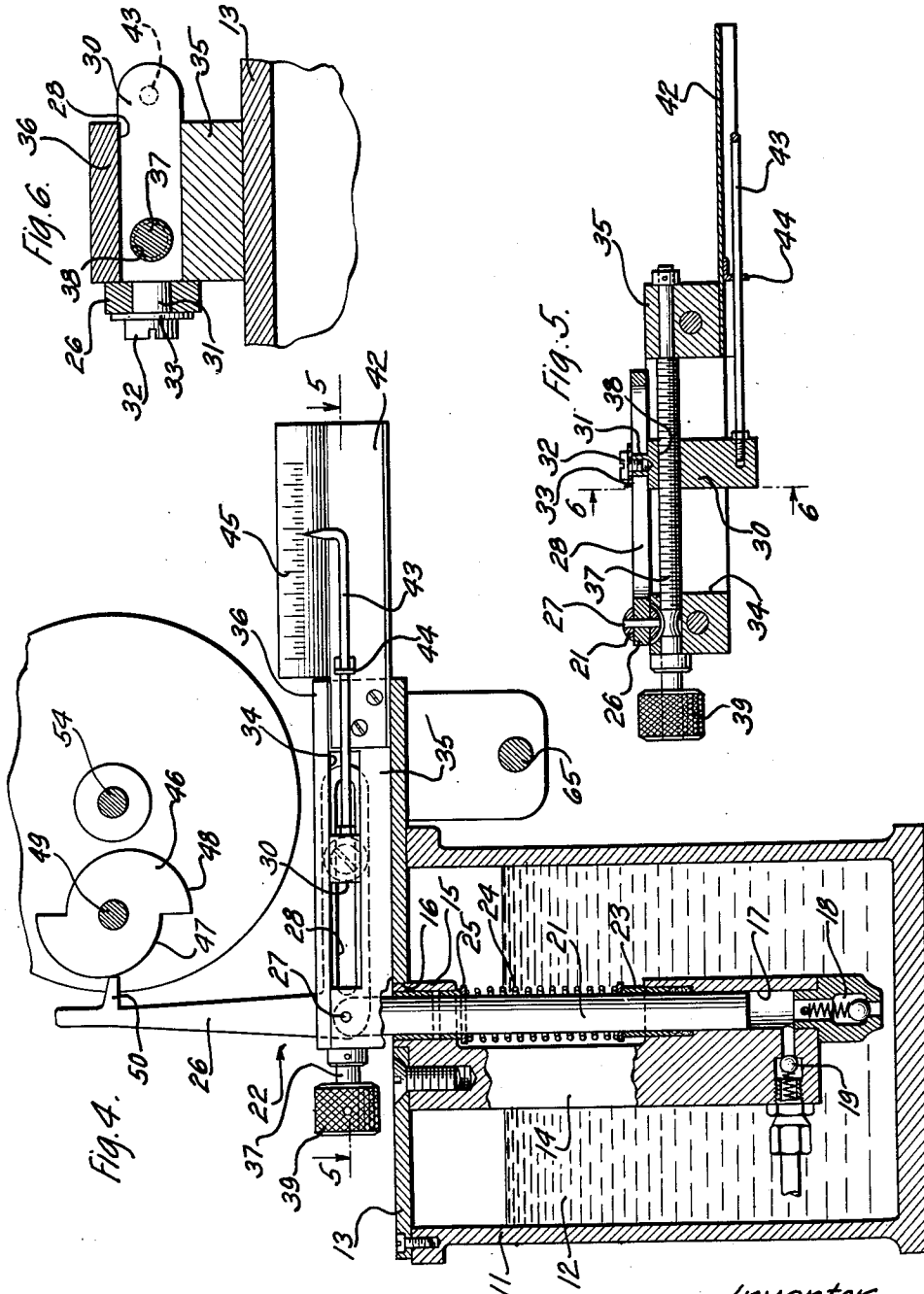
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UNITED STATES PATENT OFFICE

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MATERIAL PROCESSING APPARATUS

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5 Claims. (Cl. 91-46)

This invention relates to a material processing apparatus, and more particularly to an apparatus for plasticizing cellulose acetate silk.

5 An object of the invention is to provide an apparatus which is simple, efficient, and reliable for processing material.

In accordance with the general features of the invention, the invention comprises an inclined trough having a concave groove through which the strands of material pass, and means for supplying a predetermined quantity of a plasticizing medium to the trough at a certain rate. The plasticizing medium or oil is supplied at a predetermined rate by operating a pump in timed relation to the capstan which draws the silk from a supply spool at a substantially constant rate.

15 Other objects of the invention will be clearly comprehended from the following description, taken in connection with the accompanying drawings, in which

20 Fig. 1 is a side elevational view of the apparatus;

Fig. 2 is a top plan view of the apparatus;

25 Fig. 3 is a longitudinal sectional view of the trough;

Fig. 4 is a vertical sectional view of the pumping mechanism, portions thereof being shown in elevation;

30 Fig. 5 is a longitudinal sectional view of the adjusting mechanism taken substantially along the line 5-5 of Fig. 4, and

Fig. 6 is a sectional view taken substantially along the line 6-6 of Fig. 5.

35 Referring now to the drawings wherein like numerals designate similar parts throughout the figures, numeral 10 designates a support upon which is mounted a housing 11 arranged to contain the medium 12 which in the present instance is a suitable plasticizing material such as oil. A cover 13 is disposed upon the open end of the housing 11, and vertically disposed in the housing 11 is a pump casing 14 (Fig. 4) secured to the cover 13 and provided with a bearing portion 15 which extends through an aperture 16 in the cover. In alignment with the bearing portion 15 in the pump casing 14 is a cylindrical member 17 which has a spring pressed ball inlet valve 18 disposed in the lower end thereof and a spring pressed ball outlet valve 19 communicating with the side thereof.

50 A vertically extending piston 21 has its lower end movably disposed in the cylindrical member 17 and its upper end operatively connected to an actuating mechanism indicated generally at 22.

55 A packing unit 23 is disposed concentric with the

piston 21 and is receivable in the casing 14 adjacent the cylindrical portion 17. The piston 21 is normally held upwardly by a spring 24 which is disposed concentric therewith and has one end disposed in abutting relation with the packing unit 23 while the other end is disposed in engagement with a pin 25 carried by the piston.

The actuating mechanism 22 consists of an L-shaped cam actuated lever 26 which is pivotally secured at 27 to the piston 21 and provided with a longitudinally extending aperture 28 in one of the arm portions thereof. An adjustable pivot block 30 has a reduced pivot portion 31 extending through the aperture 28 and provided with a screw 32 and a washer 33 for the purpose of holding the lever 26 in operative relation with the pivot block 30. The pivot block 30 is movably disposed in an elongated rectangular aperture 34 of a frame 35 which has a top member 36 and is rigidly mounted upon the cover 13. An adjusting screw 37 extends longitudinally through the frame 35 and the aperture 34 and is rotatable therein. The threaded portion of the screw 37 extends through a threaded aperture 38 in the pivot block 30 for the purpose of moving the pivot block relative to the frame 35 when the adjusting screw 37 is rotated. A hand-wheel 39 is disposed upon the forward end of the adjusting screw 37 so that the adjusting screw may be manually rotated. A means is provided for indicating the amount of oil or medium forced out of the cylindrical portion 17 and through the outlet valve 19. This means consists of an indicating plate 42 rigidly mounted upon the frame 35 and extending rearwardly therefrom. A pointer 43 has one end secured to the pivot block 30 (Fig. 5) and extends through a supporting bracket 44, while the other end extends upwardly and is disposed adjacent indications 45 upon the indicating plate 42.

A double cam 46 having cam surfaces 47 and 48 is fixedly mounted upon a shaft 49 and is disposed in operative engagement with a cam engaging finger 50 of the lever 26. The shaft 49 is journaled in a casing 53 and is operatively connected to a drive shaft 54 by gears 55 and 56 (Fig. 2), respectively. The drive shaft 54 is also journaled in the casing 53 with its ends extending therethrough, one end being provided with a pulley 57 which is operatively connected to a pulley 58 of a motor 59 by a belt 60, while the other end has mounted thereupon a pulley 62 and a capstan 63 at spaced positions. The belt 60 is sufficiently loose upon the pulley 58 so that the motor 59 may be energized without actuating

the mechanism. A belt tightening member 64 (Fig. 1) is fixed to one end of a shaft 65 and is arranged to be moved by a hand lever 66 is mounted upon the other end of the shaft 65. A tension spring 67 has one end fixed to an upright 68 and the other end fixed to an arm 69 which is carried by the shaft 65 for the purpose of holding the belt tightening member 64 in operative engagement with the belt 60.

A supporting shaft 72 is mounted upon the upper end of the upright or frame 68 for rotatably receiving a supply spool 73 of the material to be treated, which consists of a plurality of strands of cellulose acetate silk. A takeoff guide spool 74 is disposed in close proximity to the supporting shaft 72 and is supported by an arm 75 or any suitable means. The strands of material to be treated are passed over the spool 74 through an eyelet guide 76 and into engagement with a single grooved pulley 77 which is rotatably mounted upon the upright 68. The strands of material are then disposed in one groove of a double grooved idler pulley 78, passed around the capstan 63 and disposed in the other groove of the idler pulley 78. The strands are then passed through a trough 79, through an eyelet 81 of a distributor 82 and onto a takeup reel 83 which is rotatably carried by a supporting bracket 84 mounted upon the support 10. The trough 79 has a concave groove 85 therein of such a contour that the strands will be held free of the walls thereof by the forward guiding portion 86. A supply pipe 87 provides communication between the groove 85 of the trough 79 and the pump 14 due to its communication with the outlet valve 19.

In operating the apparatus, the motor 59 is energized by any suitable means (not shown), and the lever 66 is moved downwardly at a sufficiently slow rate so as to gradually tighten the belt 60 upon the pulley 58 and effect an operative connection between the pulley 58 and the pulley 57. This gradual tightening of the belt 60 avoids the breaking of the strands. When the pulley 57 is rotated, the drive shaft 54 together with the capstan 63 and the pulley 62 are rotated. The takeup reel 83 is rotated by means of a belt connection 90 with the pulley 62 and the distributor 82 is actuated due to its operative connection with the takeup reel mechanism by means of a belt connection 91. Therefore, the rotation of the capstan 63 draws the strands from the supply spool 73 over the spool 74 and around the pulleys 77 and 78. The strands are then drawn by the rotation of the takeup reel 83 through the concave groove 85 in the trough 79 where the plasticizing medium is supplied to the strands.

The supplying of the plasticizing medium to the strands is effected by the actuation of the pump 14 (Fig. 4). The cam 46 is rotated continuously during the rotation of the drive shaft 54 due to the operative connection therewith through the gears 55 and 56, and during this continuous rotation the cam surfaces 48 are alternately moved into engagement with the cam engaging finger 50 of the lever 26. Therefore, during this operative connection of the lever 26 with the cam 46, the lever will be moved about its pivot 31, thus moving the piston 21 downwardly against the tension of the spring 24 so as to force the medium, which has been drawn into the cylinder 17, past the ball valve 18 and into the supply pipe 87. When the lever 26 is released by the cam 46, that is, when the cutaway portions of the cam are moved into registration with the finger 50, the piston 21 is moved upwardly instantaneously by the spring 24, thus drawing a new supply of medium from the housing 11, past the inlet valve 18, and into the cylindrical portion 17. The piston 21 will be moved again downwardly, due to the actuation of the lever 26 by its operative engagement with the cam 46, so as to force the additional supply of medium from the cylinder 17 into the pipe 87. This relatively slow downward movement of the piston 21 forces a medium at a predetermined rate of speed into the groove 85 of the trough 79. The instantaneous return of the piston 21 to its upward position for the purpose of drawing a new supply of medium into the cylinder 17, makes it possible for the pumping mechanism to force almost a continuous supply of medium into the trough. By so doing, a sufficient quantity of medium is supplied to the strands so that they may be drawn through the trough rapidly and receive the desired quantity of medium. The trough 79 extends upwardly so that the medium, which enters the groove 85 adjacent the lower end of the trough, may be drawn upwardly toward the guiding portion 86 during the rapid movement of the strands through the recess.

The quantity of the medium forced into the groove 85 may be varied by varying the position of the pivot block 30 relative to the piston 21, which may be accomplished by rotating the adjusting screw 37 in a clockwise direction (Figs. 4 and 5), thus moving the pivot block 30 toward the piston 21 and reducing the stroke of the piston 21. By rotating the adjusting screw 37 in a counterclockwise direction, the pivot block 30 will be moved away from the piston, thus lengthening the stroke of the piston when actuated. During this movement of the pivot block a similar movement will be imparted to the pointer 43 relative to the indicating plate 42, thus indicating the quantity of medium forced into a trough at each stroke of the piston.

As the strands of material are drawn through the concave groove 85 in the trough, they only engage with the guiding portion 86 and are held sufficiently close to the walls of the groove to receive the plasticizing medium. The purpose of the guiding portion 86 holding the strands away from the walls of the recess, throughout almost the entire length of the trough, is to relieve the strands of considerable excess tension, thus eliminating the possibility of breakage due to the whipping of the individual strands and allow the strands to be free throughout their cross-sectional contour to receive and absorb a desired quantity of plasticizing medium. The strands, after leaving the trough, are distributed upon the takeup reel 83 by the actuation of the distributor 82. After the strands have been removed from the supply spool 73, treated, by passing through the medium in the trough 85 and wound on the takeup reel 83, the apparatus may be operatively disconnected from the power means or motor 59 by moving the lever 66 upwardly and loosening the belt 60. The takeup reel with the treated material may be removed and an empty takeup reel disposed in its place. A new spool of material to be treated may then be disposed upon the supporting shaft 72 in place of the empty spool, and the material may be wound on the spool 74, the pulleys 77 and 78 around the capstan 63, the second groove in the pulley 78 through the recess in the trough 79, the eyelet in the distributor arm, and secured to the new takeup reel 83. Operative connection may again be had between the motor and the apparatus by moving the lever 66 downwardly so as to gradually tighten the belt 60.

The operative connection of the material or strands moving mechanism with the medium supplying mechanism maintains a constant predetermined ratio between the amount of material passed through the trough and the amount of treating medium supplied to the trough. This ratio may be varied by adjusting the pivot block 30 relative to the actuating lever 261.

Although the invention has been herein illustrated and described as an apparatus for plasticizing cellulose acetate silk it should be understood that the apparatus may be used for processing other materials without departing from the spirit and scope of the invention.

What is claimed:

1. In a material processing apparatus, an inclined trough, means for passing material to be treated longitudinally through the trough, and means for forcing treating medium into the trough through the bottom thereof at a point directly beneath the material and in accordance with the rate of movement of the material being treated.

2. In a material processing apparatus, an inclined trough, means for passing material to be treated upwardly through the trough, and means for forcing a treating fluid into the lower end of the trough and against the material so that a quantity of the fluid will be carried upwardly in the trough during the advancement of the material therethrough.

3. In a material processing apparatus, an inclined trough, means for passing material to be

treated upwardly through the trough, means disposed in the upper end of the trough for spacing the material from the walls of the trough during its advancement through the trough, and means for forcing a treating fluid into the lower end of the trough at a point directly beneath the material so that a quantity of the fluid will pass upwardly in the trough during the advancement of the material therethrough.

4. In a material processing apparatus, an inclined trough, means for passing material to be treated upwardly through the trough, means for forcing a treating fluid into the lower end of the trough beneath the material so that a quantity of the material will pass upwardly in the trough during the advancement of the material therethrough, and means disposed in the trough for limiting the upward movement of the treating fluid in the trough and for spacing the material from the walls of the trough so that it may be surrounded by the treating fluid.

5. In a material processing apparatus, means for advancing absorbent material, a treating medium receiving member disposed adjacent the path of advancement of the material, and means for forcing treating medium into one end of the receiving member and against the material at a rate in accordance with the rate of advancement of the material so that the treating medium will be absorbed entirely by the material during the advancement of the material through the receiving member.

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