Oct. 15, 1935. D. GESSNER 2,017,455

MACHINE FOR MOISTENING CLOTH

Filed Feb. 15, 1932 6 Sheets-Sheet 1

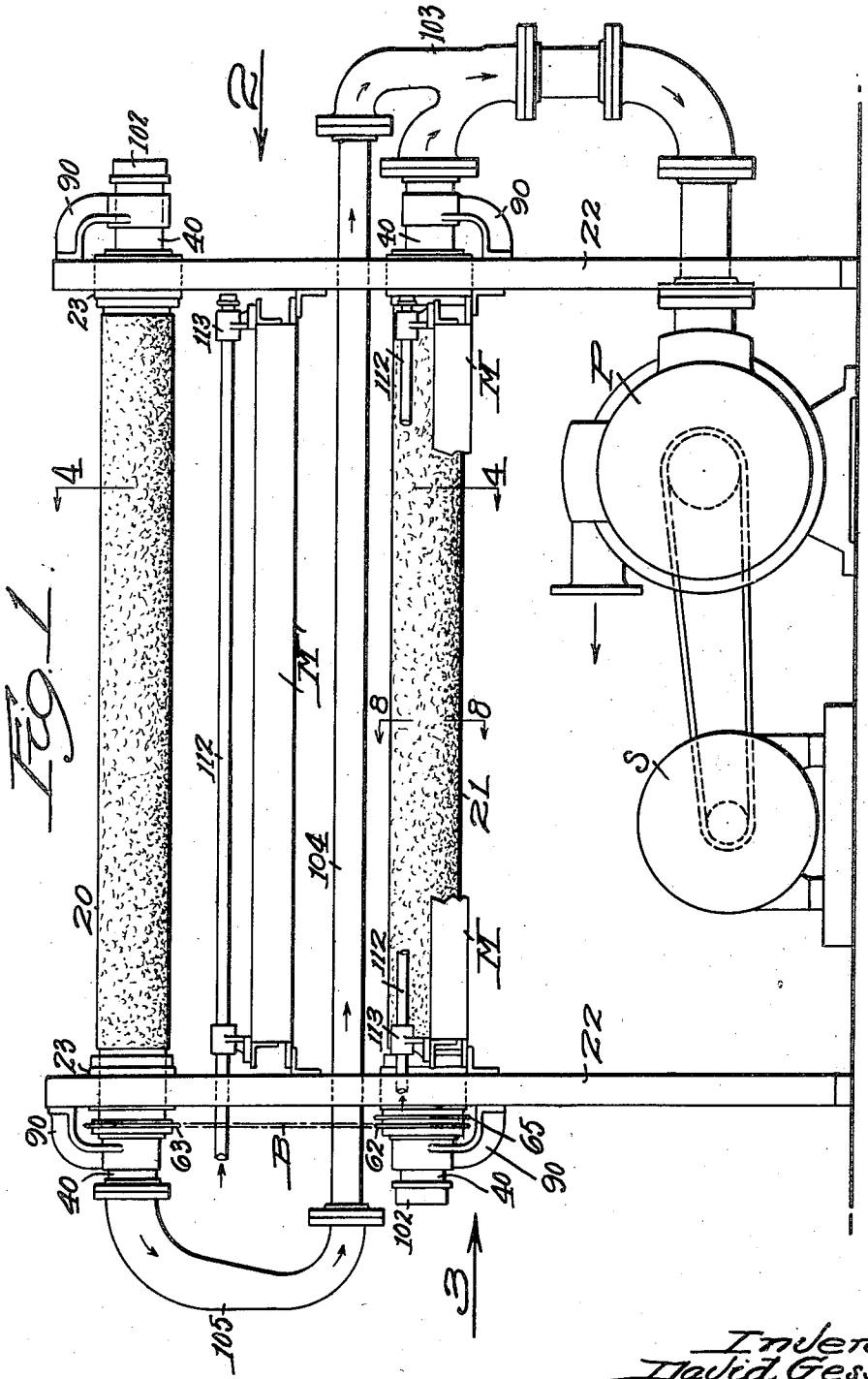

Fig. 1

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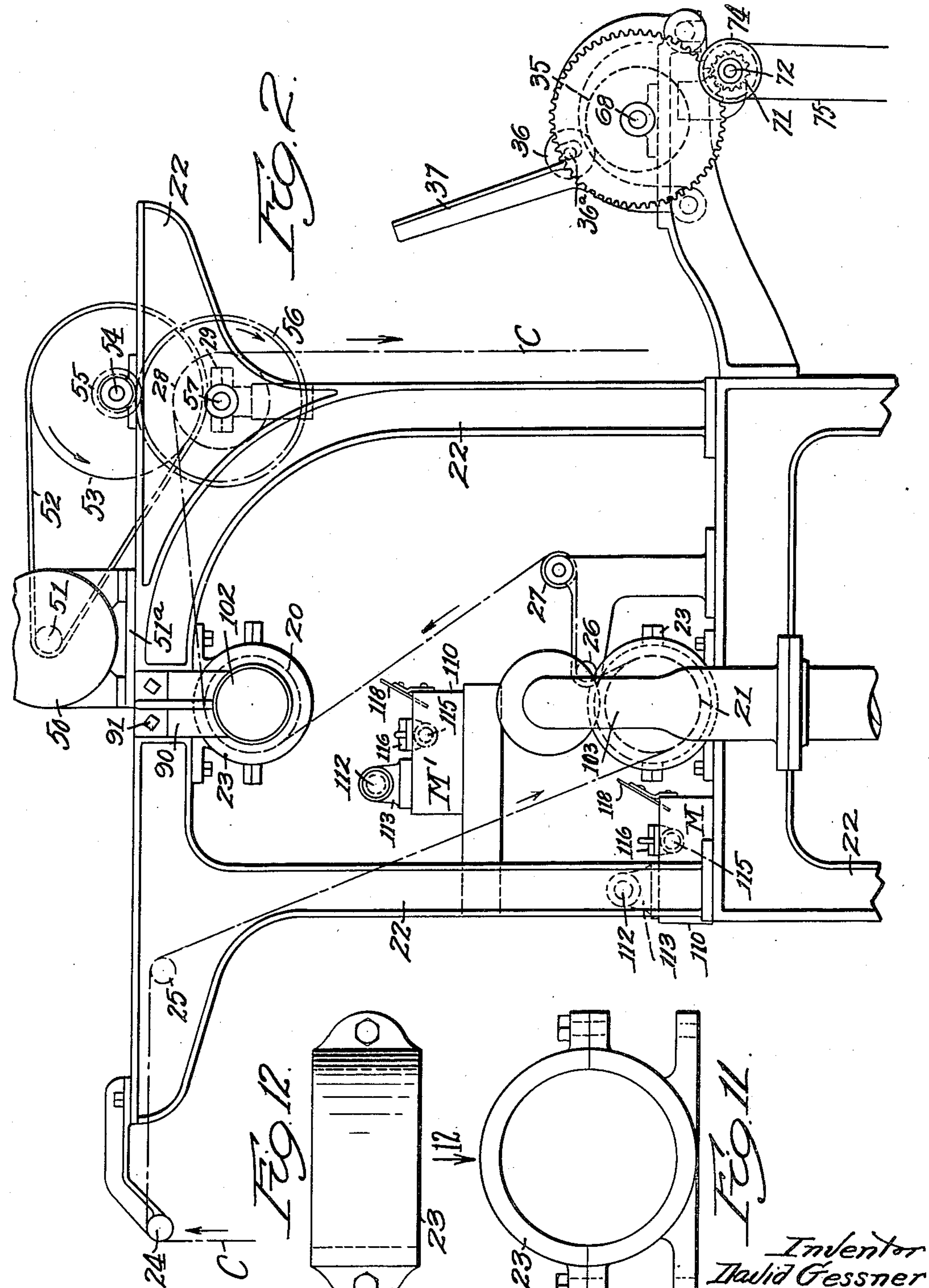

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MACHINE FOR MOISTENING CLOTH

Filed Feb. 15, 1932 6 Sheets-Sheet 3

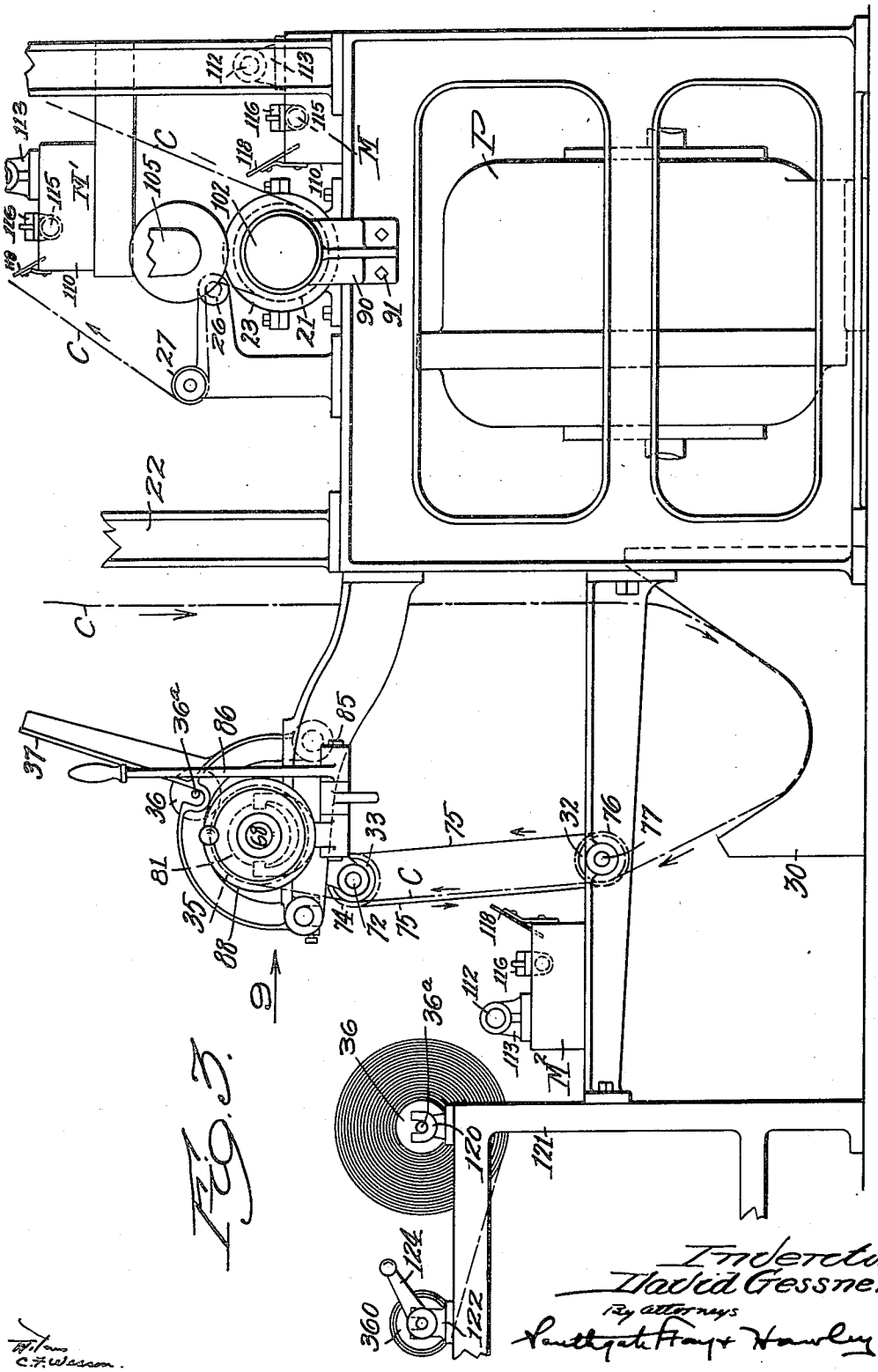

Fig. 3.

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MACHINE FOR MOISTENING CLOTH

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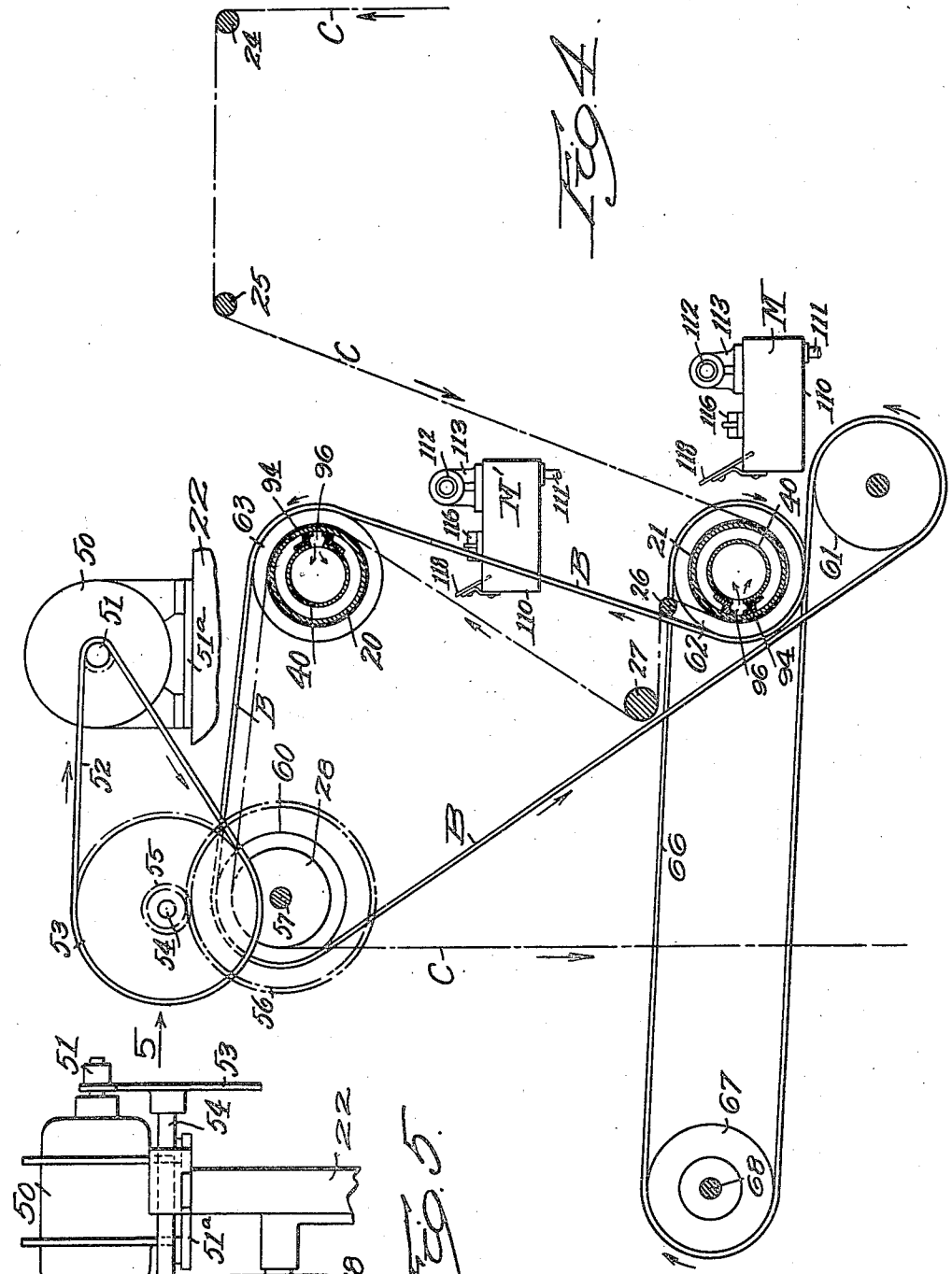

Fig. 4

Fig. 5.

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MACHINE FOR MOISTENING CLOTH

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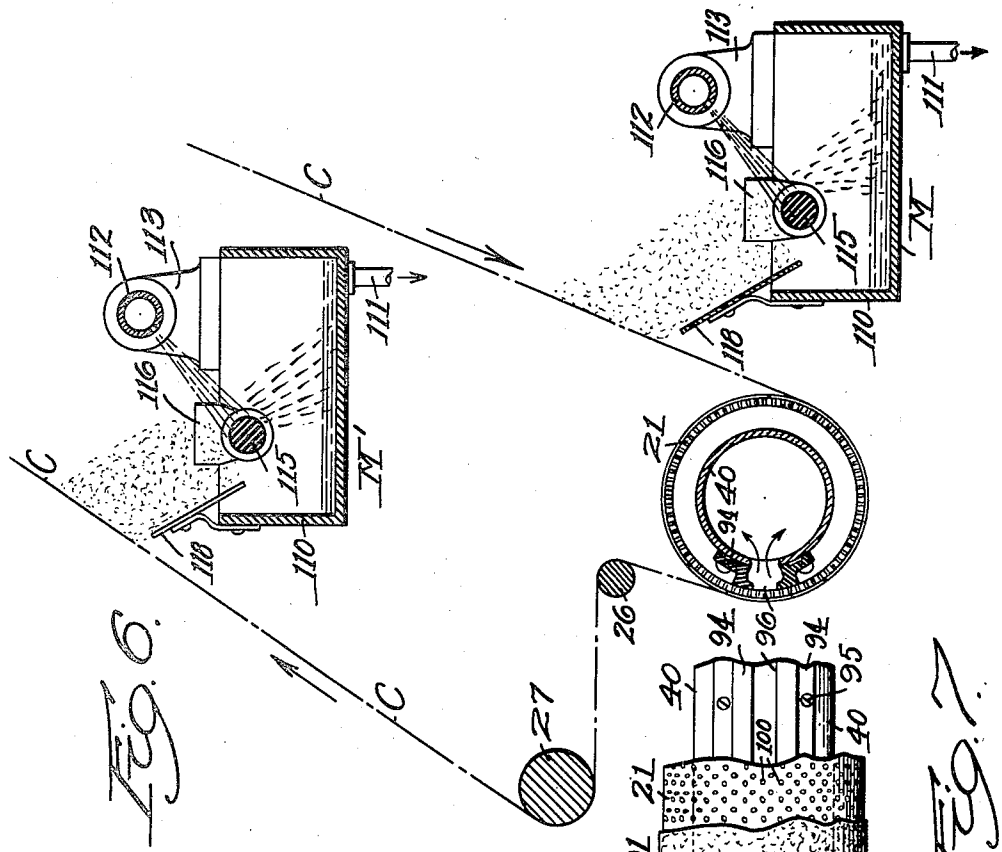

Fig. 6.

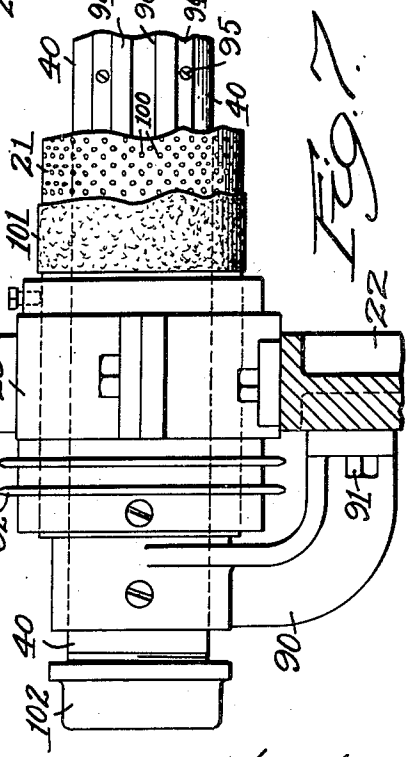

Fig. 7.

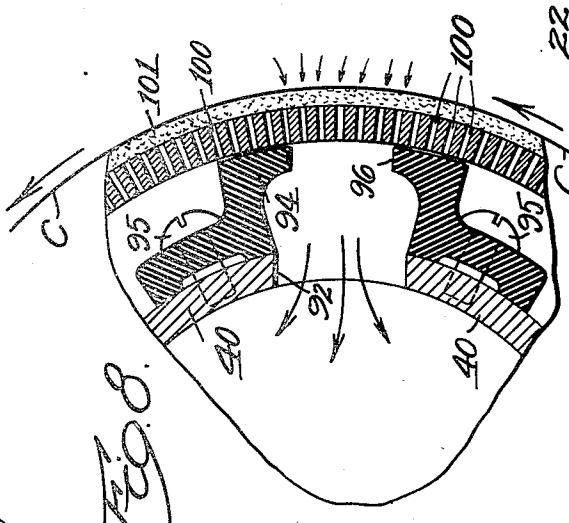

Fig. 8.

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MACHINE FOR MOISTENING CLOTH

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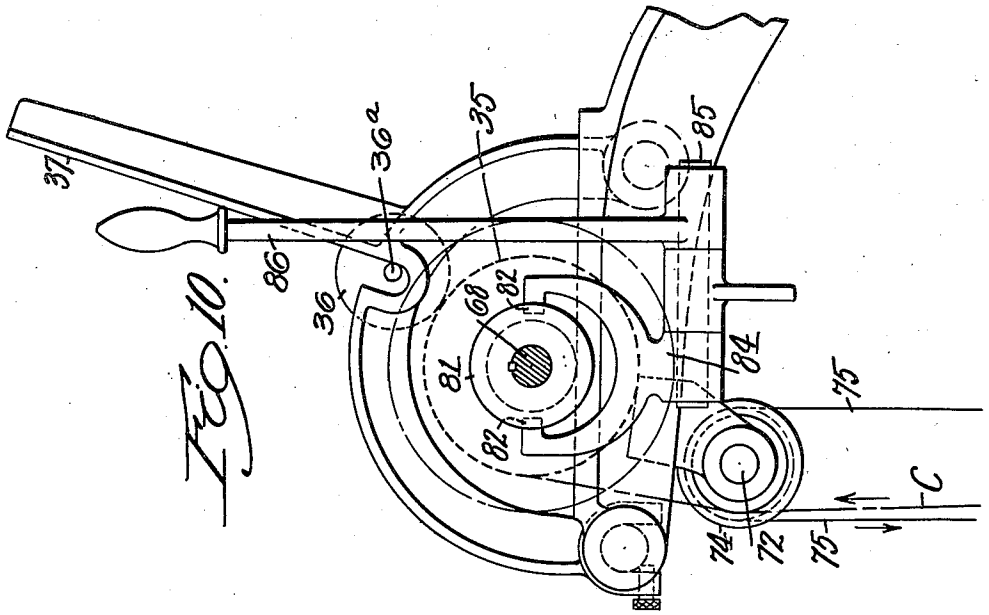

Fig. 10.

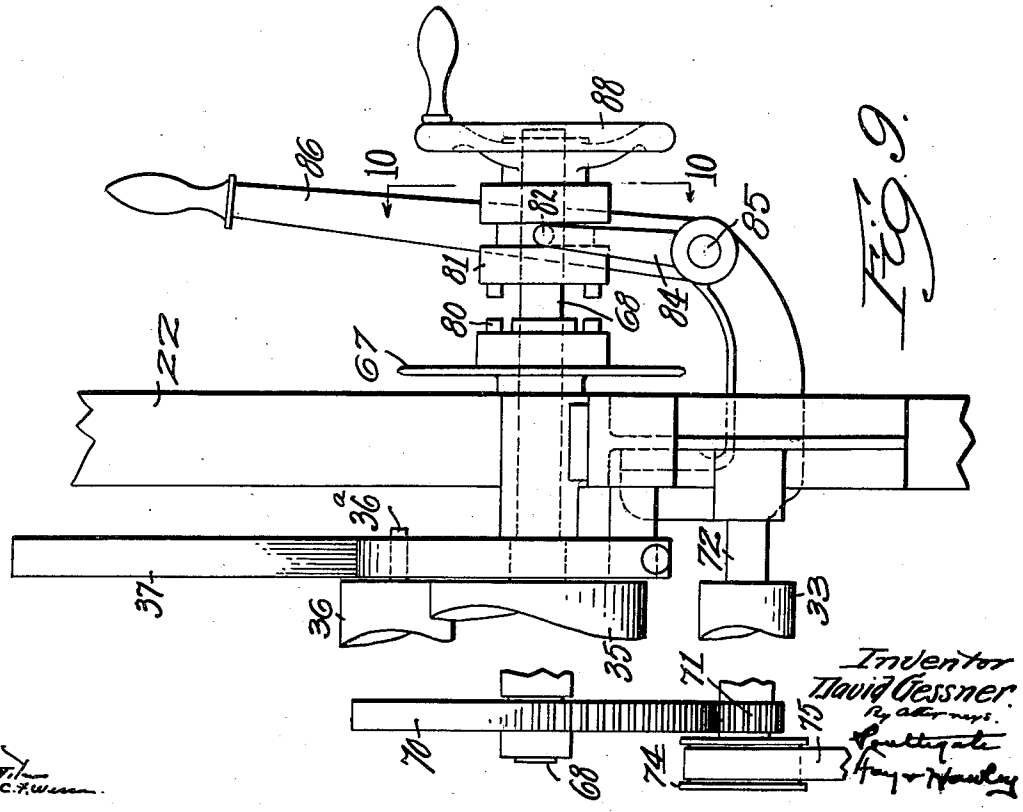

Fig. 9.

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UNITED STATES PATENT OFFICE

2,017,455

MACHINE FOR MOISTENING CLOTH

David Gessner, Worcester, Mass.

Application February 15, 1932, Serial No. 593,062

7 Claims. (Cl. 26—46)

This invention relates to a machine for moistening cloth preparatory to shrinking it for use by a tailor. In order to produce uniform shrinkage it is necessary that the cloth be thoroughly and uniformly moistened throughout its length and breadth, and particularly throughout its thickness. A machine for this general purpose is shown in my prior Patent #1,737,790, issued December 3, 1929.

It is the general object of my present invention to improve the machine shown in my prior patent and to produce a moistening machine which will be reliable and satisfactory in use, and which will be more economical in the consumption of power.

To the accomplishment of this purpose, an improved feature of my invention relates to the provision of a suction member mounted in fixed position within a rotating perforated cylinder, said suction member being open only at that angular segment at which the cloth engages the perforated cylinder and overlies the perforations therein. Air leakage is thus greatly reduced with a substantial saving in power and with a corresponding saving in cost of operation.

A further feature of the invention relates to a construction by which moisture may be supplied successively to the opposite sides of a piece of cloth, together with means for drawing the moisture into the body of the cloth from each side thereof.

I also provide a construction by which the suction member may be more easily adjusted to operative position, and will be more positively retained in such position during continued operation of the machine. I also provide means for re-moistening and re-winding the cloth when considered desirable, and I provide improved air connections by which the operation of the suction air pump is much facilitated.

My invention further relates to arrangements and combinations of parts which will be hereinafter described and more particularly pointed out in the appended claims.

A preferred form of the invention is shown in the drawings, in which

Fig. 1 is a front elevation of my improved moistening machine;

Figs. 2 and 3 are end views looking in the direction of the arrows 2 and 3 in Fig. 1;

Fig. 4 is an enlarged sectional side elevation, taken along the line 4—4 in Fig. 1;

Fig. 5 is a detail rear elevation, looking in the direction of the arrow 5 in Fig. 4;

Fig. 6 is a partial sectional side elevation on an enlarged scale and illustrating the operation of the moistening device;

Fig. 7 is an enlarged front elevation of a portion of one of the perforated rolls and parts associated therewith;

Fig. 8 is an enlarged detail sectional view of one of the perforated rolls, taken along the line 8—8 in Fig. 1;

Fig. 9 is a front elevation of a clutch mechanism controlling the winding roll drive, looking in the direction of the arrow 9 in Fig. 3;

Fig. 10 is a sectional side elevation, taken along the line 10—10 in Fig. 9;

Fig. 11 is a side elevation of one of the cylinder bearings, and

Fig. 12 is a plan view thereof, looking in the direction of the arrow 12 in Fig. 11.

Referring to Figs. 1 and 2, my improved machine comprises upper and lower perforated cylinders 20 and 21 rotatably mounted in suitable bearings 23 (Figs. 11 and 12) in frame members 22. The cloth C (Fig. 2) is drawn into the machine over guide rolls 24 and 25 from any usual cloth roll or container. The cloth passes from the guide roll 25 to the lower perforated cylinder 21 and thence around guide rolls 26 and 27 to the upper perforated cylinder 20.

The cloth passes from the cylinder 20 to a large driven feed roll 28 mounted in bearings 29 in the upper part of the frame 22, and then drops to a trough or cradle 30 (Fig. 3). It is next drawn upward past spreader rolls 32 and 33 and partially over a winding drum 35.

The end of the cloth is wrapped around a cloth roll shaft or roller 36 which rests loosely on the upper surface of the drum 35. As the roll of cloth increases in size, the gudgeons 36a of the shaft 36 are engaged by upwardly extending fixed guide arms 37.

During its travel through the machine, the cloth C is drawn past moistening devices M and M' which apply a finely divided spray successively to opposite sides of the cloth.

Each perforated cylinder 20 and 21 is supplied with a suction member 40, mounted in fixed position in the frame 22 and extending into and from end to end of the perforated cylinder. An air pump P (Fig. 1) is constantly driven by a suitable motor S and withdraws air from the suction members 40 through suitable pipe connections to be described.

It will appear from this brief description that my improved moistening machine comprises means for passing a piece of cloth successively around upper and lower perforated cylinders 20

and 21, for applying a fine spray successively to the opposite sides of the cloth as the cloth approaches the cylinders 20 and 21, for exhausting the air from the members 40, thus drawing the moisture into the body of the fabric, and finally for re-winding the moistened cloth into a compact roll.

Having thus briefly described the general construction and operation of my improved machine, I will now describe the details of construction thereof.

The driving mechanism

I will first describe the mechanism by which the several parts of my improved machine are driven in suitable predetermined speed relations. A motor 50 (Figs. 4 and 5) is mounted on a bracket 51a secured to the upper part of the frame 22. The armature shaft of the motor 50 is connected by a pinion 51 and chain or belt 52 to a sprocket 53 on an intermediate shaft 54 rotatable in fixed bearings. The shaft 54 is provided with a pinion 55 engaging a gear 56 on the shaft 57 which supports the driven feed roll 28.

The shaft 57 also carries a pulley or sprocket 60 (Fig. 4) over which runs a belt or chain B. This chain B passes around a guide sprocket 61 in the lower part of the machine and thence partially around a sprocket 62 on the lower perforated cylinder 21. The chain B then passes around a similar sprocket 63 on the upper cylinder 20, from which it returns to the driving sprocket 60. I thus drive the upper and lower perforated cylinders 20 and 21 in a definite and predetermined speed relation to the feed roll 28.

The lower cylinder 21 is provided with a second sprocket 65 (Fig. 1) which is connected by a second chain 66 (Fig. 4) to a sprocket 67 loose on the shaft 68 on which the winding drum 35 is mounted. The shaft 68 is provided with a gear 70 (Fig. 9) engaging a pinion 71 on the shaft 72 which supports the upper spreader roll 33. The shaft 72 is connected by a pulley 74 and belt 75 to a pulley 76 on the shaft 77 which supports the lower spreader roll 32.

It will be noted that the spreader rolls 32 and 33 rotate in opposition to the travel of the cloth C toward the winding drum 35. The spreader rolls thus act to smooth the cloth and to remove folds and wrinkles therefrom as the cloth approaches the winding drum.

The sprocket 67 (Fig. 9) is loosely rotatable on the shaft 68 but is provided with clutch teeth 80 engageable by corresponding clutch teeth on a clutch collar 81, keyed to the shaft 68 but slidable axially thereon. These parts preferably form a one-way clutch only for a reason to be explained. The collar 81 is grooved to receive studs 82 in the ends of a yoke 84 fixed to a short cross shaft 85 which is provided with a control handle 86.

By means of this handle 86 the winding drum 35 and spreader rolls 32 and 33 may be started and stopped independently of the perforated cylinders 20 and 21. A hand wheel 88 (Fig. 9) is also provided by means of which the winding drum 35 and spreader rolls 32 and 33 may be manually rotated, as in starting up the machine.

Suction members and connections

The suction members 40 are in the form of heavy tubes or cylinders, preferably of brass or other non-corrosive material, supported in brackets 90 (Fig. 7) secured to the machine frame 22 by clamping bolts 91. The members 40 extend freely through the perforated cylinders 20 and 21 and are each provided with an elongated slot or opening 92 (Fig. 8) and with a mouth-piece 94 secured to the suction member by clamping screws 95 and also provided with an elongated but somewhat narrower longitudinal slot or opening 96. The outer surface of each mouth-piece 94 is accurately shaped to a convex surface corresponding to the inner concave surface of the perforated cylinder 20 or 21 with which its suction member is associated.

The bearing brackets 90 may be adjusted on the frame 22 to bring the mouth-piece and cylinder into close engagement and may be firmly clamped to preserve the adjustment.

Referring to Fig. 4, it will be seen that the suction members 40 are so mounted that the openings 96 in the mouth-pieces 94 are substantially on the horizontal diameters of the suction members and that they are directed toward the angular segment in which the cloth C is in close contact with the perforated cylinders 20 and 21. There is a sufficient portion of each suction member 40 below the level of its opening 96 so that any water collecting therein will drain off and not stain or spot the cloth. The inwardly enlarged air-passage of the mouth-piece 94, shown in section in Fig. 8, is found to be of much importance in effecting uniform air exhaustion.

The details of construction of one of the perforated cylinders 20 and 21 are clearly shown in Figs. 7 and 8. The cylinder itself is preferably formed from a piece of brass or bronze tubing of substantial thickness, accuately machined to correctly cylindrical inner and outer surfaces. A very large number of small holes 100 are drilled through the brass cylinder, and the outer surface of the cylinder is preferably covered with a layer 101 of relatively thick and porous felt.

One end of each suction member 40 is closed by a cap 102 and the opposite end is connected to the air pump P. The connections between the suction members and the pump are clearly shown at Fig. 1.

The pump is connected through suitable pipe fittings to a special Y connection 103, one branch of which is connected directly to one end of the lower suction member 40 and the other branch of which is connected through a pipe 104 and U-shaped connection 105 to the upper suction member 40. The Y connection 103 and U-shaped connection 105 are specially designed to produce an even and uniform suction through the longitudinal slots or openings 96 of the two suction members 40.

The moistening devices M and M' are also of special construction and are shown in detail in Fig. 6. Each moistening device consists of a box or receptacle 110 having a drainage pipe 111 and supporting a spray pipe 112 in brackets 113. Water is ejected under pressure through slots or perforations in the pipes 112, and the jets of water are directed against a cylindrical rod 115, mounted in brackets 116 on the box or receptacle 110.

A deflector or guide-plate 118 is secured to one side of the box 110 and directs the spray and fine mist against the adjacent side of the cloth C. With this construction, it will be noted that the jets of water escaping from the pipe 112 do not directly engage the cloth but that the cloth is moistened by the spray or mist occasioned by the impact of the jets of water on the cylindrical rods 115.

On such engagement, a portion of the water

rises in the form of mist or spray and is taken up by the adjacent surface of the cloth, and the remainder of the water is collected in the box 110 and is carried away by the drainage pipe 111.

It will be evident from Fig. 6 that the device M moistens the cloth on one side surface, while the device M' moistens the cloth on the opposite side surface. It will also be evident by reference to Fig. 4 that the cloth in each instance is moistened on that surface which will be at the outside as the cloth passes over the perforated cylinder which is associated with each moistening device.

The air suction in the member 40 is so regulated that the moisture will be drawn into the cloth as it passes over the mouth-piece 94 but will not be extracted from the cloth. Consequently the moisture taken up from the devices M and M' is uniformly distributed throughout the length and breadth of the cloth and also throughout the thickness thereof, and the entire fabric is thus uniformly and effectively moistened.

It will be also noted that the perforated cylinders 20 and 21 and the feed roll 28 are all positively driven, so that no excessive tension or drag on the cloth occurs during its passage through the machine.

The use of the guide rolls 26 and 27 (Fig. 2) permits the cylinders 40 to be mounted in the same vertical plane, with corresponding simplification of the suction connections and economy of floor space.

In starting up the machine, the operator allows a sufficient quantity of moistened cloth to accumulate in the trough or cradle 30 and he then draws the end of the cloth upward past the spreader rolls 32 and 33 and over the winding drum 35 and winds the extreme end of the piece of cloth around the cloth roll shaft 36. This threading of the cloth is accomplished while the rolls 32 and 33 and drum 35 are at rest. He then operates the handle 86 to throw in the clutch mechanism shown in Fig. 9, and the cloth is thereafter wound upon the shaft 36 by engagement of the cloth roll with the upper surface of the winding drum 35.

Preferably the clutch members 80 (Fig. 9) on the sprocket 67 drive only in the forward direction, so that it is possible for the operator to rotate the roll 35 more rapidly than the sprocket 67 at any time if he finds that too much cloth has accumulated in the trough or cradle 30.

Re-winding mechanism

Regardless of the care with which the cloth is smoothed and stretched by the spreader rolls 32 and 33 and is wound by the winding drum 35, it is found that the inner portion of the roll of moistened cloth wound in this way will become badly wrinkled if left for any considerable length of time. This is not serious where it is the practice to transfer the cloth immediately to a dryer, but with certain fabrics and under certain conditions it is found desirable to leave the moistened cloth in the roller for a longer or shorter period before putting it through the drying machine. More perfect shrinkage of certain kinds of cloth is apparently obtained by allowing the cloth a rest period after dampening and before drying. This procedure is commonly termed "sweating" and is considered beneficial under certain conditions.

In order to permit this rest period or sweating operation, without causing the objectionable folds and wrinkles above described, I have provided the re-winding mechanism shown in Fig. 3. This mechanism consists simply of bearing brackets 120 mounted on a fixed stand or support 121 and spaced to receive the gudgeons 36a of the cloth roll shaft 36. The end of the cloth is then wrapped around a second cloth roll shaft 360 supported in a second pair of bearing brackets 122. A handle 124 is affixed to the shaft 360, by which it may be manually rotated.

The cloth may thus be re-wound manually under very light and even tension, as the weight of each shaft 36 and 360 and the cloth thereon is supported by the brackets 120 and 122 instead of engagement of the periphery of the cloth roll with the winding drum 35 previously described.

It is found that the cloth re-wound manually as above described is not subject to the objectionable folds and wrinkles occurring when the original roll is left standing for any considerable length of time. By providing my improved re-winding mechanism as a part of the moistening machine, the operator is enabled to perform the rewinding operation without loss of time, as he can easily re-wind one piece of cloth while the next piece of cloth is being moistened and wound up by the winding drum 35.

I have also indicated in Fig. 3 an additional moistening device M^2 by which an additional spray or mist may be supplied to the cloth as it passes upward to the winding roll. This additional moistening device may be used or not as conditions indicate.

A particularly important advantage of my present machine over the machine shown in my prior patent lies in the fact that each suction member is open only along a single and relatively narrow slot which is always covered by the cloth C, so that practically no air enters either suction member 40 except as it is drawn through the cloth and through the perforations of the cylinder 20 or 21 and through the heavy felt covering thereon. Consequently substantially all of the air exhausted by the pump P is usefully employed in drawing moisture into the cloth C.

The carefully finished adjacent surfaces of the mouth pieces 94 and the perforated cylinders 20 and 21 permit these parts to be easily adjusted into very close contact so that very little air leakage occurs. Consequently my improved machine is able to operate with a smaller pump and with substantially less power than a machine of the type shown in my prior patent.

I also obtain improved results by spraying both faces of the cloth, instead of one face only, as in my prior machine.

Having thus described my invention and the advantages thereof, I do not wish to be limited to the details herein disclosed, otherwise than as set forth in the claims, but what I claim is:—

1. In a cloth moistening machine, a rotatably mounted perforated cylinder, and a suction member mounted in fixed supports and extending through said perforated cylinder, said suction member having a central air passage and having an air-inlet covered by a mouth-piece having a longitudinally slotted convex outer surface closely engaging the concave inner surface of said perforated cylinder, and said mouth-piece having an inwardly enlarged air passage of greater width throughout, than the width of said slot connecting the longitudinal slot of said mouth-piece with the air-inlet and central air passage of said suction member.

2. A cloth moistening machine comprising a rotatable perforated cylinder, means to cause a piece of cloth to engage the outer surface of said

cylinder and to move in contact therewith for a portion of a revolution of said cylinder, means to spray the outer surface of said cloth, and a suction member formed as a tubular air-conductor extending lengthwise of said cylinder and mounted in fixed position within said cylinder, said air-conductor having an air-inlet and having a slotted mouth-piece clamped to said air-conductor and covering said air-inlet, the outer convex surface of said mouth-piece being positioned closely adjacent the internal cylindrical surface of said cylinder and the slot in said mouth-piece being directed toward the angular segment in which the cloth is in engagement with the cylinder, said suction member being effective to draw the moisture into the fabric and to leave the moisture uniformly distributed therein.

3. In a winding machine, successive devices for moistening the opposite faces of a piece of cloth, successive suction cylinders for drawing the moisture into the cloth and leaving the moisture therein, a trough in which said moistened cloth is loosely deposited, and means to withdraw the cloth from said trough and to wind said cloth into a roll, said latter means comprising a winding drum, a driving member therefor, an over-running clutch between said member and said drum, means to entirely disengage said clutch, and means to turn said drum by hand.

4. In a winding machine, successive devices for moistening the opposite faces of a piece of cloth, successive suction cylinders for drawing the moisture into the cloth and leaving the moisture therein, means to rotate said cylinders, a trough in which said moistened cloth is loosely deposited, means including spreader rolls and a winding drum effective to withdraw the cloth from said trough and to wind said cloth into a roll, and devices for starting and stopping said winding means while the suction cylinders are continuously rotated.

5. The method of moistening cloth which comprises applying moisture to one side of the cloth, drawing the moisture into said cloth and leaving it therein, thereafter applying additional moisture to the other side of the cloth, drawing the additional moisture into the cloth and leaving it therein, winding the cloth into a roll supported on a winding drum and rotated thereby, and thereafter manually re-winding the cloth under light tension into a second roll, in order that the cloth may be stored in the roll for a substantial period without producing folds or wrinkles therein.

6. The method of moistening cloth which comprises applying moisture to one side of the cloth, drawing the moisture into said cloth and leaving it therein, thereafter applying additional moisture to the other side of the cloth, drawing the additional moisture into the cloth and leaving it therein, winding the cloth into a roll supported on a winding drum and rotated thereby, and thereafter re-winding the cloth under light and substantially even tension into a second roll supported on roll shaft bearings, in order that the cloth may be stored in the roll for a substantial period without producing folds or wrinkles therein.

7. In a cloth moistening machine, a rotatably mounted perforated cylinder, a tubular suction member mounted in fixed supports and extending through said perforated cylinder, said suction member having an elongated air-inlet, and a mouth-piece detachably mounted on said member over said air-inlet and having a slotted portion closely adjacent the internal surface of said perforated cylinder, the slot in said mouth-piece being substantially narrower than the air-inlet in said suction member.

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