March 10, 1925. 1,529,134

T. R. KELTER

APPARATUS FOR IMPREGNATING FABRICS

Filed May 10, 1924 2 Sheets-Sheet 1

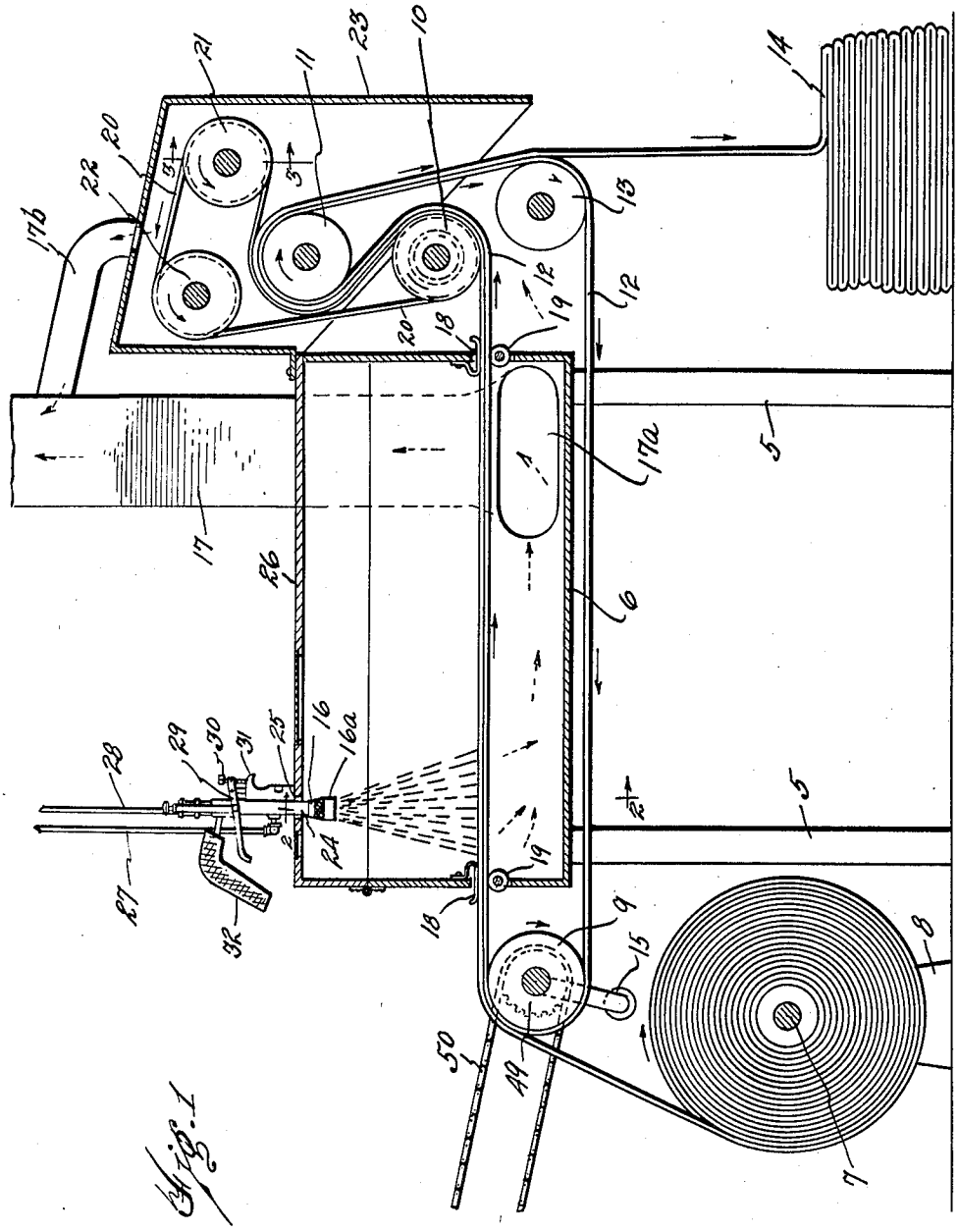


Fig. 1

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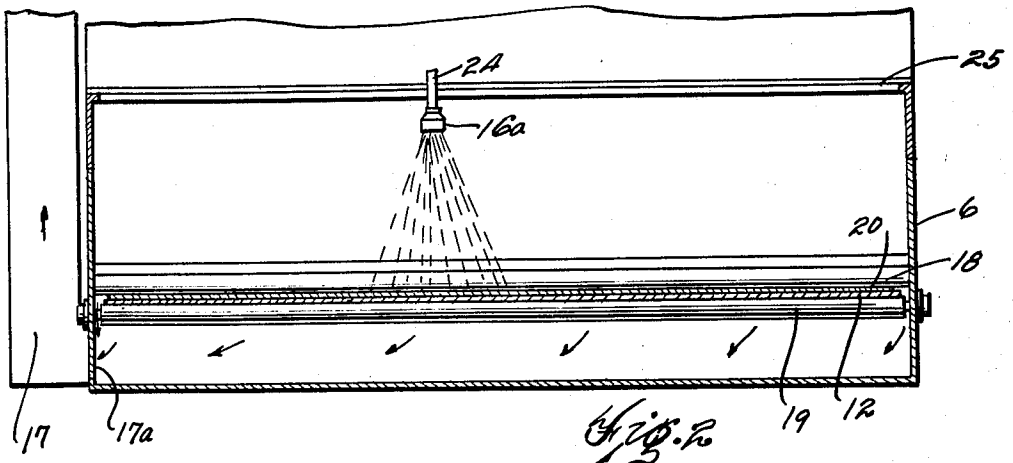


Fig. 2

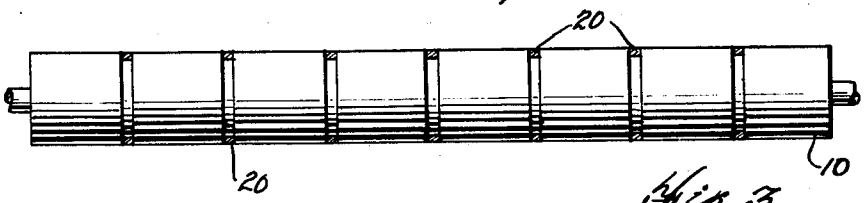


Fig. 3

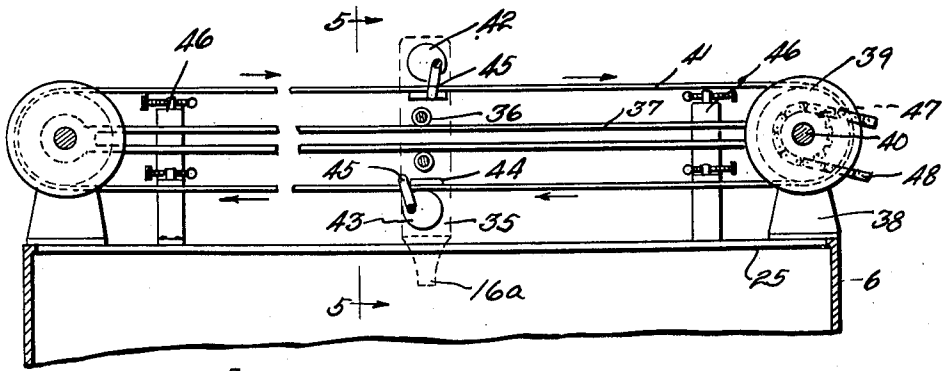


Fig. 4

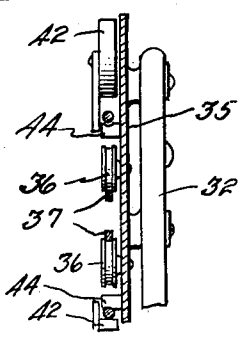


Fig. 5

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Patented Mar. 10, 1925. 1,529,134

UNITED STATES PATENT OFFICE.

THEODORE R. KELTER, OF DETROIT, MICHIGAN.

APPARATUS FOR IMPREGNATING FABRICS.

Application filed May 10, 1924. Serial No. 712,226.

To all whom it may concern:

Be it known that I, THEODORE R. KELTER, a citizen of the United States, and resident of Detroit, in the county of Wayne and State of Michigan, have invented new and useful Improvements in Apparatus for Impregnating Fabrics, of which the following is a specification.

This invention relates to apparatus for impregating fabrics with a water proof solution or the like, and has for its primary object the provision of an apparatus for suitably spraying the solution upon the fabric while preventing the escape of the fumes therefrom into the atmosphere.

Another object of the invention is the arrangement of the spray gun for lateral movement across the fabric after the fabric is intermittently advanced, with means for regulating such lateral movement to accommodate fabrics of various width.

A further object of the invention is the provision of means for drying the impregnated fabric, spreading the solution while forcing it into the fibers of the fabric and driving off surplus solution in fumes that are drawn off through an auxiliary exhaust flue.

Other objects and advantages will be apparent from the following description, wherein reference is made to the accompanying drawings illustrating preferred embodiments of my invention and wherein similar reference numerals designate similar parts throughout the several views.

In the drawings:

Fig. 1 is a central longitudinal section through my improved apparatus.

Fig. 2 is a cross section taken substantially on the line 2—2 of Fig. 1.

Fig. 3 is a detail sectional view through one of the lifting rollers.

Fig. 4 is a detail sectional view showing in elevation the mechanism for automatically reciprocating the spray gun, and

Fig. 5 is a detail sectional view taken substantially on the line 5—5 of Fig. 4.

Referring now to the drawings, the numeral 5 designates supports for the housing 6 in which the fabric is treated with a water proof solution or the like during its passage from one end of the housing to the other. As best shown in Fig. 1, the material to be treated is unrolled from the spindle 7 mounted in trunnions 8 adjacent one end of the housing 6 and passes over a feed roller 9 and thence through the housing 6 to the feed rollers 10 and 11, preferably mounted above each other substantially as shown. A conveyor belt 12 circulating around the rollers 9, 10 and 11 as well as the return roller 13 forms a movable support for the fabric during its passage through the housing 6 and guides the fabric after it leaves the housing until it falls into folds adjacent the opposite end of the housing, substantially as shown at 14 in Fig. 1. The extent of movement of the feed roller 9 determines the extent of travel of the conveyor belt 12 and also of the fabric. In the embodiment illustrated in Figs. 1 to 3 I have shown a hand crank 15 for turning the feed roller 9 to any desired extent. Thus the hand crank 15 is turned through, say, one-half a revolution to advance the conveyor belt 12 and the fabric a distance equal to the extent of fabric surface covered by the spray gun 16. The handle is then released and the fabric remains stationary while the spray gun is moved manually from side to side of the housing 6 to treat all of the fabric surface then lying beneath the spray gun. The hand crank 15 is then turned through another half revolution to bring an untreated portion of the fabric beneath the spray gun, whereupon the lateral movement of the spray gun is repeated. Accordingly, the fabric is advanced intermittently and the spray gun laterally moved across the fabric while the fabric is stationary. The result is that each portion of the fabric is thoroughly treated with the water proofing solution and then advances further into the housing 6 where it remains while additional portions of the fabric is being treated with the water proofing solution. While the treated portion of the fabric remains in the housing any excess solution is given an opportunity to volatilize, and the fumes therefrom remain within the housing 6 without escaping to the surrounding atmosphere. Exhaust means, as the pipe 17, is arranged with an opening 17ª in one side of the housing 6 below the fabric, and a suction fan or the like is suitably mounted within the pipe 17. As best shown in Fig. 2 there is provided spaces between the sides of the fabric and the sides of the housing 6 for the fumes to escape into that portion of the housing below the belt, whence they pass into the exhaust pipe. The suction also tends to reduce the pressure within the housing 6 and enables the

ready volatilization of the fumes and excess solution. To aid in maintaining this reduction in pressure within the housing 6 suitable closure members 18 are provided adjacent the inlet and outlet slots for the passage of the belt 12 of the fabric (note Figs. 1 and 2). These closure members preferably are formed of resilient metal shaped substantially as shown and secured at their upper edges to the end walls of the housing. The lower extremities are curved upwardly so that tearing of the fabric is obviated. Directly below the closure members 18 are preferably provided supporting rollers 19 for the belt 12.

As the fabric emerges from the housing 6 it passes around the roller 10 which is preferably heated electrically to dry the impregnated fabric while spreading the solution to thoroughly saturate each fiber, and then drive off all surplus solution.

The belt 12 which has supported the fabric as it passed through the housing remains in contact with what had been the lower surface of the fabric and supports that surface while it turns upwardly and around the higher roller 11. At the same time a series of narrow belts 20 (see Fig. 3) fitted into the surface of the roller 10 engage what had heretofore been the upper surface of the fabric during its passage to the higher roller 11, the narrow belts 20 passing around the roller 11 onto the rollers 21 and 22 to complete their orbits. With this construction the fabric is securely held between the belt 12 and the series of narrow belts 20 as it is raised from the lower roller 10 to the upper roller 11 and during its passage around the roller 11, after which it falls by gravity away from the series of narrow belts 20 onto the floor adjacent the rear extremity of the housing 6. The fabric is thus held in contact with the heated roller 10 as long as practicable, and then passes through the heated air space directly above the roller 10 enroute to the roller 11. A hood 23 is placed over the rollers 10, 11, 21 and 22 to inclose the fumes arising from the fabric as it passes over the heated roller 10, and an auxiliary exhaust pipe 17^b opens into the hood 23 to permit the withdrawal of such fumes through the same exhaust pipe 17. Since the fumes from the water proofing solution are lighter than air the open bottom of the hood 23 does not permit the escape of the fumes into the atmosphere adjacent the impregnating apparatus.

The spray gun 16 preferably comprises a nozzle 16^a arranged within the housing 6, being carried at the lower extremity of the pipe 24 extending through the slot 25 in the hinged cover 26 of the housing. The pipe 24 is suitably connected with the pipe 27 leading from a compressed air tank and the pipe 28 leading from a container for the water proofing solution, the relative amounts of solution and air admitted to the nozzle 16^a being adjusted to obtain the desired mixture. A suitable valve 29 is arranged to automatically shut off the air and solution from the nozzle 16^a whenever released by the operator, and an adjusting screw 30 set in the valve lever and adapted to contact an abutment member 31 regulates the opening of the valve whenever the valve lever is pulled upwardly by the operator. Thus, while the fabric is being advanced through the turning of the hand crank 15 the valve 29 shuts off the mixture of air and solution from the nozzle 16^a, and then when it is desired to treat the fabric just advanced into position beneath the nozzle, the operator grasps the handle 32 of the spray gun and lifts the lever 29 until the adjusting screw 30 engages the abutment member 31. The spray gun is now moved laterally across the housing 6, and if desired returned to its original position, whereupon the operator releases his hold on the valve lever 29, and the flow to the nozzle is automatically stopped. The fabric is then again advanced, and the operation repeated as often as desired. For convenience the handle 32 of the spray gun is made somewhat like the usual revolver grip and the adjacent end of the valve lever 29 is curved to resemble the usual trigger of revolvers. By virtue of this arrangement the operator may readily open the valve by pulling upon the curved portion of the lever 29 and holding it raised while moving the spray gun from side to side across the housing 6.

In Figs. 4 and 5 I have illustrated a mechanical means for performing the operations of intermittently advancing the fabric and reciprocating the spray gun while the fabric is stationary.

The spray gun 16 is mounted on a traveler plate 35 with its nozzle extending into the housing 6 through the slot 25. The traveler plate 35 carries grooved rollers 36 for engagement with the upper and lower tracks 37 supported upon suitable standards 38 extending upwardly from the top of the housing 6. A pair of pulleys 39 are mounted on stub shafts 40 journaled in the standards 38 and an endless belt 41 passes over these pulleys, preferably in the direction of the arrows in Fig. 4. Suitable clamps 42 and 43 are provided on the traveler plate 35 to engage the belt 41 alternately, whereby the belt will pull the traveler plate 35 and the spray gun attached thereto across the housing 6 alternately in opposite directions. As herein shown the clamps 42 and 43 comprise eccentric discs pivoted on the traveler plate and so arranged that when the wider portions of the discs are moved toward vertical position the belt 41 is urged into clamping relation with the grooved jaw

members 44, and when the wider portion of the discs are moved away from vertical position the belt is freed from engagement with the clamping jaws. Suitable levers 45 are carried by each of the eccentric discs for engagement with suitable abutment members 46 arranged adjacent the opposite sides of the housing, substantially as shown in Fig. 4. Preferably one at least of the abutment members 46 is slidably mounted for adjustment toward and away from the other abutment member, whereby the travel of the spray gun may be varied to accommodate different widths of fabrics. The abutments 46 are each provided with two contact screws in position to engage the levers 45 of the cam discs. One of the contact screws is spaced slightly in advance of the other so that the lever 45 of the disc then operating to clamp the traveler plate 35 to the belt will be first engaged to release its clamping jaw from the belt before the other contact screw of that abutment engages the lever 45 of the other cam disc to trip it into position to throw the belt into contact with its clamping jaw. Thus, in Fig. 4 the upper cam disc 42 clamps the belt and pulls the traveler plate from left to right. Accordingly, the upper contact screw of the right hand abutment 46 is set in advance of the lower contact screw of this abutment, whereby the lever 45 of the upper cam disc is first swung to release the belt from its clamping jaw and later the lever 45 of the lower cam disc is tripped to bring the belt into engagement with its clamping jaw, whereupon the lower cam disc and clamp pulls the traveler plate and its attached spray gun toward the left. The left hand abutment member 46 has its contact screws exactly reversed, the lower contact screw being set in advance of the upper contact screw to first release the clamping jaw of the lower clamp and later to trip the upper cam disc and secure the belt upon the upper clamp to again reciprocate the traveler plate and spray gun toward the right.

One of the pulleys 39 is preferably connected with a pinion 47, and a chain 48 connects this pinion with suitable actuating mechanism, as an electric motor.

A pinion 49 may be placed on the shaft of the feed roller 9 and a chain 50 meshed therewith to advance the fabric intermittently as and when desired, the chain being actuated through suitable mechanism whenever the fabric is to be advanced.

While it will be apparent that the illustrated embodiments of my invention herein disclosed are well calculated to adequately fulfill the objects and advantages primarily stated, it is to be understood that the invention is susceptible to variation, modification and change within the spirit and scope of the subjoined claims.

Having described my invention, I claim—

1. In an apparatus for impregnating fabrics, a housing of slightly greater width than the fabric and having a slot in its upper wall, means for advancing the fabric intermittently through the housing, a spray gun having its nozzle extended into the housing through said slot, and means for moving the spray gun from side to side across the fabric.

2. In an apparatus for impregnating fabrics, a housing of slightly greater width than the fabric and having a slot in its upper wall, a traveling belt passing through the housing from end to end and adapted to support the fabric within the housing, means for advancing the belt and housing intermittently, a spray gun having its nozzle extended into the housing through said slot, and means for reciprocating the spray gun while the fabric is stationary.

3. In an apparatus for impregnating fabrics, a housing of slightly greater width than the fabric and having a slot in its upper wall, a traveling belt passing through the housing from end to end and adapted to support the fabric within the housing, means for advancing the belt and housing intermittently, flexible plates arranged to seal the housing adjacent the entrance and exit of said belt and fabric, a spray gun having its nozzle extended into the housing through said slot, and means for reciprocating the spray gun while the fabric is stationary.

4. In an apparatus for impregnating fabrics, a housing of slightly greater width than the fabric and having a slot in its upper wall, a belt passing through the housing from end to end and of slightly less width than the housing, said belt being adapted to support the fabric within the housing, a spray gun mounted above the fabric with its nozzle extending through said slot in the housing, said spray gun being mounted for reciprocating movement across the fabric, and an exhaust pipe, the mouth of which opens into the housing below the fabric.

5. In an apparatus for impregnating fabrics, a housing of slightly greater width than the fabric and having a slot in its upper wall, a belt passing through the housing from end to end and of slightly less width than the housing, said belt being adapted to support the fabric within the housing, flexible plates arranged to seal the housing adjacent the entrance and exit of said belt and fabric, a spray gun mounted above the fabric with its nozzle extending through said slot in the housing, said spray gun being mounted for reciprocating movement across the fabric, and an exhaust pipe, the mouth of which opens into the housing below the fabric.

6. In an apparatus for impregnating fab-

rics, the combination of a housing having a slot in its upper wall adjacent its forward end, a belt arranged to pass through the lower portion of the housing and mounted over rollers journaled adjacent the ends of the housing, said belt supporting the fabric as it passes through the housing, a spray gun having its nozzle extending into the housing through said slot and reciprocable from side to side across the housing, one of said rollers being heated to dry the impregnated fabric and drive off surplus moisture, and means for exhausting such surplus moisture from the vicinity of said roller.

7. In an apparatus for impregnating fabrics, the combination of a housing having a slot in its upper wall adjacent its forward end, a belt arranged to pass through the lower portion of the housing and mounted over rollers journaled adjacent the ends of the housing, said belt supporting the fabric as it passes through the housing, a spray gun having its nozzle extending into the housing through said slot and reciprocable from side to side across the housing, an exhaust pipe opening into the housing adjacent its rear end wall, one of said rollers being heated to dry the impregnated fabric and drive off surplus moisture, and an auxiliary exhaust pipe arranged to withdraw such surplus moisture from the vicinity of the heated roller.

8. In an apparatus for impregnating fabrics, the combination of a housing having a slot in its upper wall adjacent its forward end, a belt arranged to pass through the lower portion of the housing and mounted over rollers journaled adjacent the ends of the housing, said belt supporting the fabric as it passes through the housing, a spray gun having its nozzle extending into the housing through said slot and reciprocable from side to side across the housing, an exhaust pipe opening into the housing adjacent its rear end wall, one of said rollers being heated to dry the impregnated fabric and drive off surplus moisture, a hood covering the heated roller, and an auxiliary exhaust pipe opening into the hood above the heated roller.

9. In an apparatus for impregnating fabrics, the combination of a housing having its end walls slotted adjacent their lower extremities, a feed belt passing through said slots and winding over a series of rollers journaled outside of the housing, said belt being adapted to support the fabric during its passage through the housing, flexible plates secured to the end walls of the housing and adapted to seal said slots, a spray gun having its nozzle extended within the upper portion of the housing and mounted for reciprocation across the housing, a series of lifting belts arranged exteriorly of the housing and adapted to elevate the impregnated fabric as it emerges from the housing, an exhaust pipe opening into the housing to draw off fumes and excess solution from the interior of the housing, and an auxiliary exhaust pipe arranged to draw off fumes from the vicinity of said lifting belts.

In witness whereof I hereunto set my hand.

THEODORE R. KELTER.

Witnesses:
REX FRYE,
ETHEL JEDLISK.