

June 27, 1939.

F. W. GERARD ET AL

2,164,174

HYDROEXTRACTOR

Filed Sept. 14, 1935

4 Sheets-Sheet 1

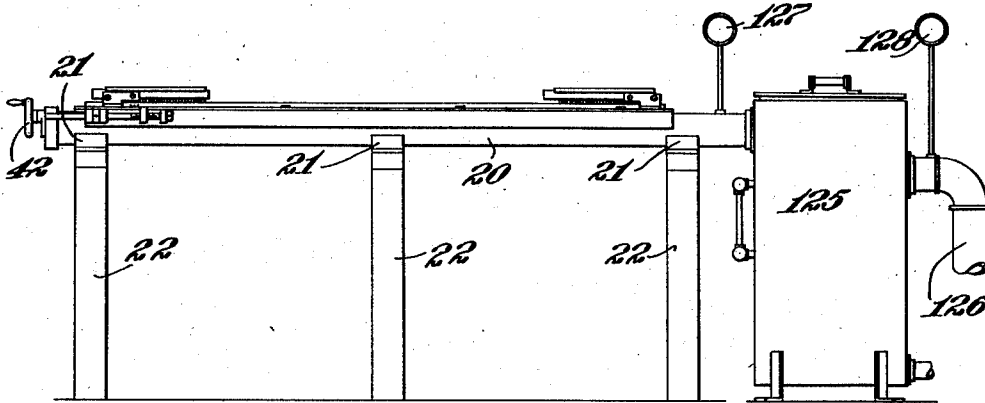


Fig. 1

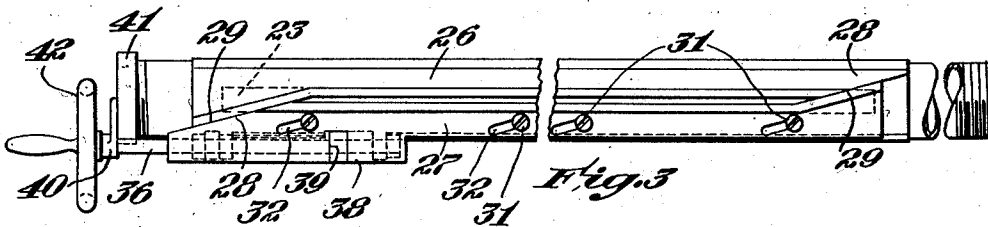


Fig. 3

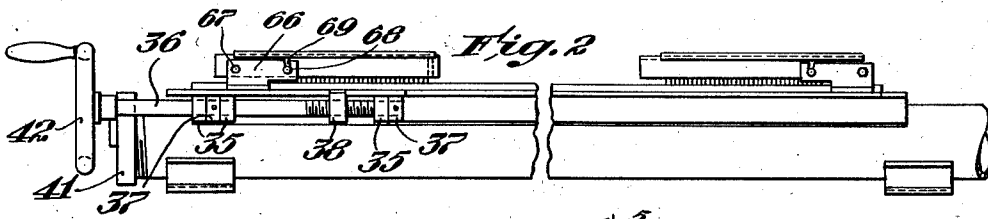


Fig. 2

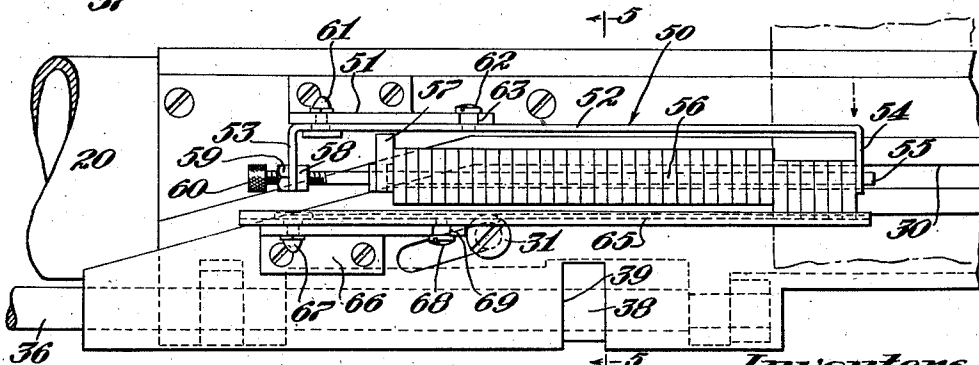


Fig. 4

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4 Sheets-Sheet 2

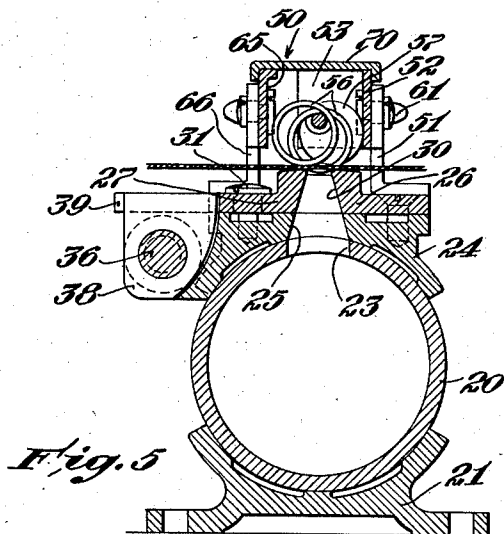


Fig. 5

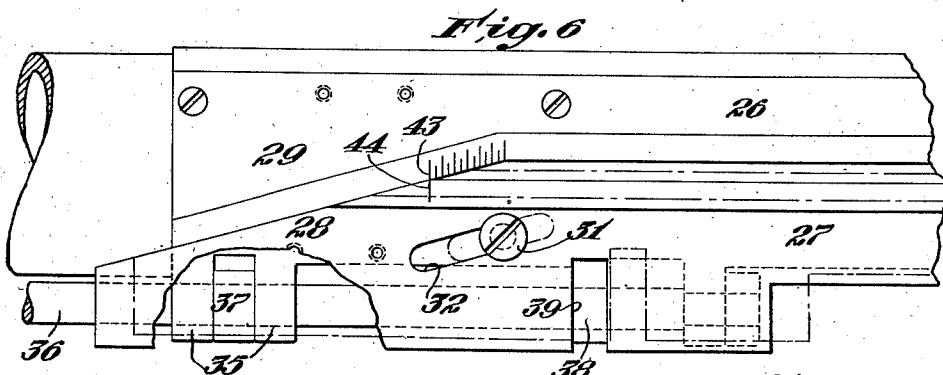


Fig. 6

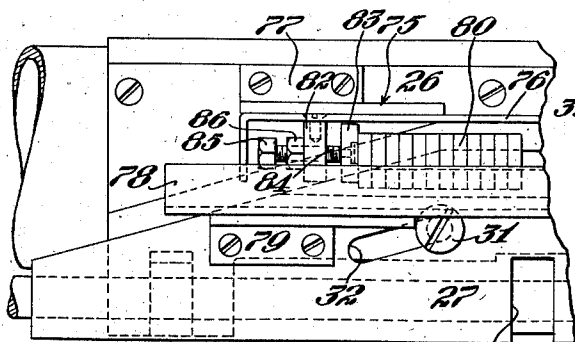


Fig. 7

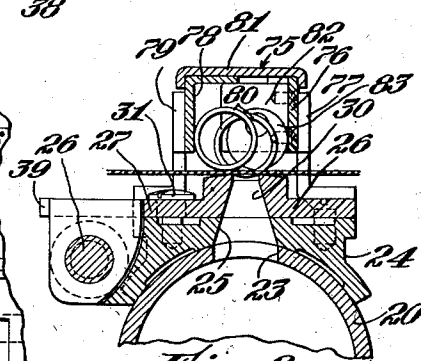


Fig. 8

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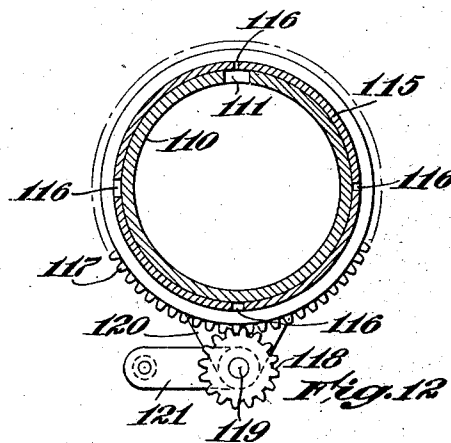
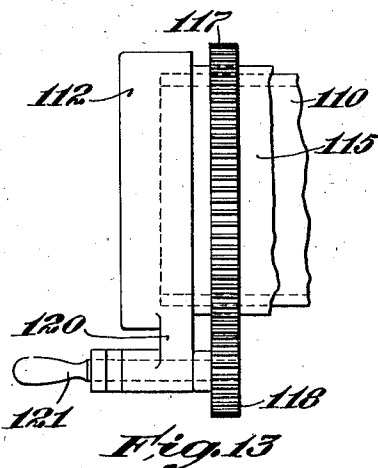
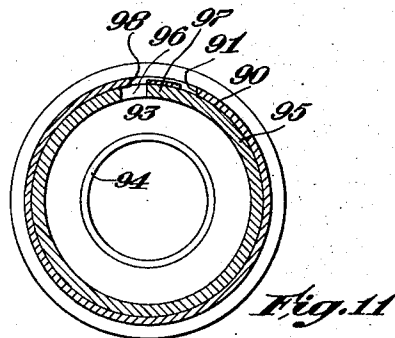
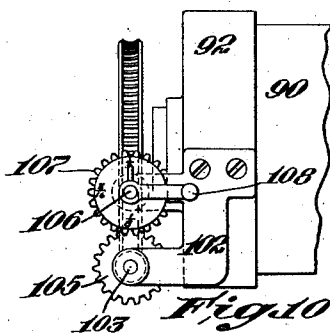
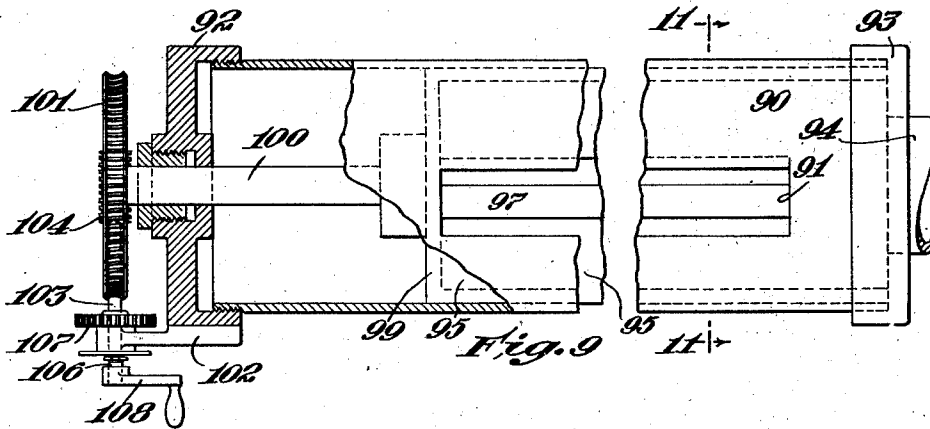
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HYDROEXTRACTOR

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4 Sheets-Sheet 3



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F. W. GERARD ET AL

2,164,174

HYDROEXTRACTOR

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4 Sheets-Sheet 4

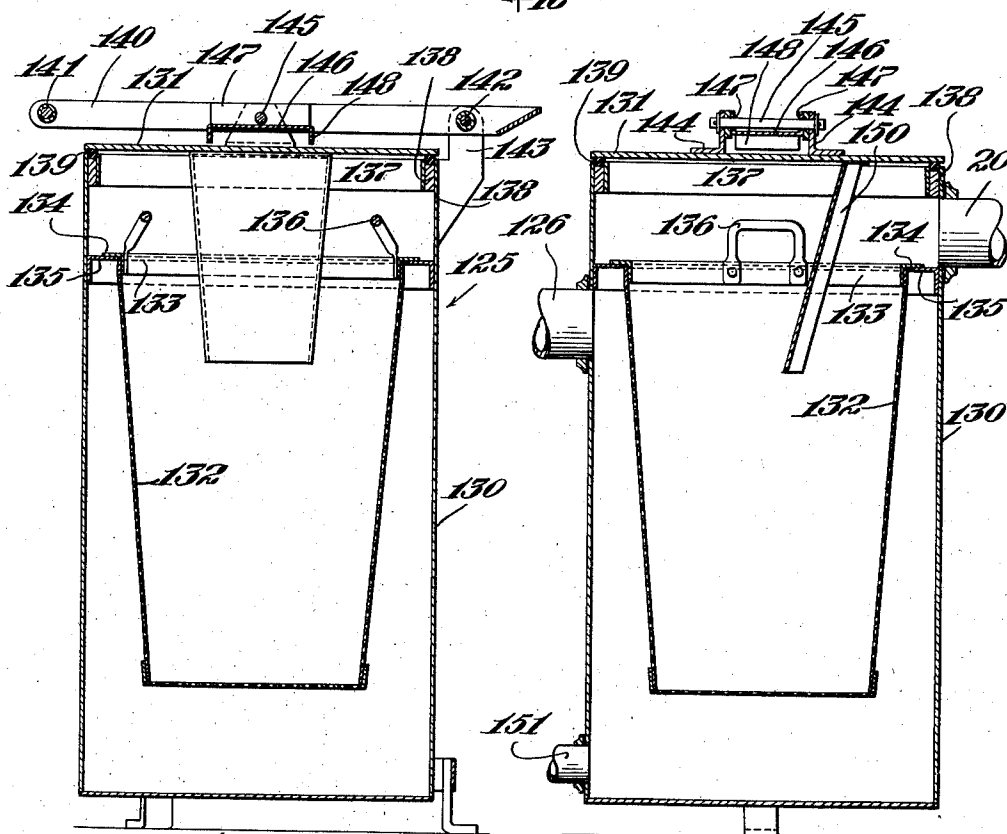
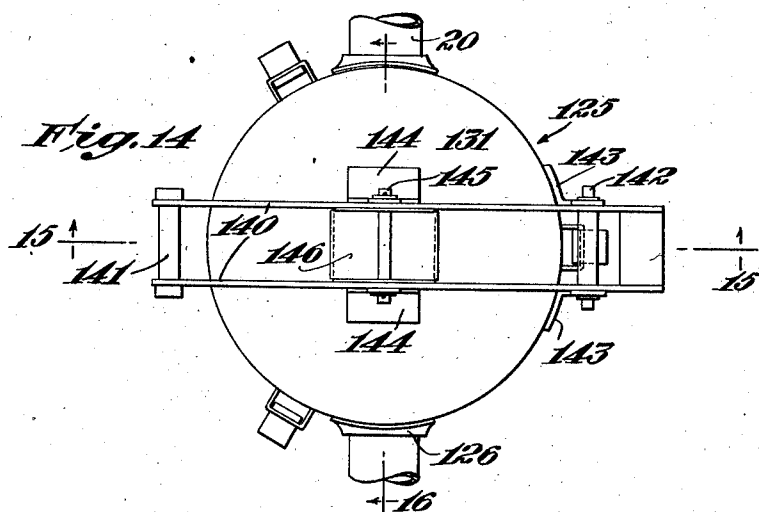


Fig. 15

Fig. 16

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UNITED STATES PATENT OFFICE

2,164,174

HYDROEXTRACTOR

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Application September 14, 1935, Serial No. 40,656

13 Claims. (Cl. 34—48)

This invention relates to an improvement in a hydroextractor and more particularly one of the type adapted to be used to extract water from wetted woolen, worsted or other textile fabric, usually of web form by the application of suction. While it has, heretofore, been customary in the textile industry to employ suction for this purpose no attempt has been made to vary the amount of suction applied despite variances in the texture and weave of the fabric and in the amount of moisture contained therein.

The primary object of the present invention is to provide a hydroextractor which embodies means for varying the amount of suction applied to the fabric whereby the optimum amount of moisture remains in the fabric after such treatment.

A further object of this invention is to provide in a hydroextractor automatically operating means for confining the application of the suction to the fabric itself regardless of any variation in width.

These and other objects will appear from a consideration of the following description and of the drawings which form a part thereof and in which

Fig. 1 is a side elevation of a hydroextractor embodying one form of this invention;

Fig. 2 is a side elevation of a portion of the hydroextractor on a larger scale;

Fig. 3 is a plan view of the portion of the hydroextractor shown in Fig. 2 the elements normally above the fabric being omitted;

Fig. 4 is a plan view on an enlarged scale of the mechanism adjacent one end of the hydroextractor, the cover thereof being removed;

Fig. 5 is a cross-sectional view taken along the line 5—5 in Fig. 4 of the complete hydroextractor;

Fig. 6 is an enlarged plan view of a portion of the elements normally below the fabric;

Figs. 7 and 8 are views similar to Figs. 4 and 5 of a portion of a hydroextractor embodying another form of this invention;

Fig. 9 is a plan view of a portion of a hydroextractor embodying still another form of this invention;

Fig. 10 is a side elevation of the adjusting mechanism thereof;

Fig. 11 is a sectional view taken along the line 11—11 in Fig. 9;

Fig. 12 is a view similar to Fig. 11 of a hydroextractor embodying a modification of the embodiment shown in Figs. 9 to 11;

Fig. 13 is a side elevation of the adjusting mechanism of such modification;

Fig. 14 is a plan view of the tank adapted to be used as a part of any of the various hydroextractors herein shown; and

Figs. 15 and 16 are sectional views thereof taken along the lines 15—15 and 16—16 in Fig. 14.

The hydroextractor as shown in Fig. 1 comprises, briefly, a slotted pipe 20 over which the fabric is passed, closing units at each end of the slot in the pipe, the side edges of the fabric being passed between these units and the pipe, and a tank which receives the moisture drawn by suction from the fabric through the slot into the pipe.

The pipe 20 is closed at one end and rests upon cradles 21 supported upon upright legs 22, the cradles and legs being spaced along the length of the pipe. A slot 23 in the pipe terminates short of the ends thereof as indicated in dotted lines on Fig. 3. Mounted upon the pipe 20 is a platform 24 suitably fixed in place. An upwardly tapered slot 25 in the platform 24 registers with the slot 23 (see Fig. 5).

Carried by the platform on opposite sides of the slot 25 are a pair of jaws, the jaw 26 being fixed upon the platform and the jaw 27 being slidably movable thereover. The inner face of each jaw is inclined outwardly at one end of the jaw and inclined inwardly at the other end. When assembled on the platform 24 (see Fig. 3) the inwardly inclined portion 28 of each jaw rests against the outwardly inclined portion 29 of the other jaw. The outwardly inclined and the intermediate portions are preferably flanged in order to facilitate the passage of the fabric as will be set forth hereinafter. The intermediate faces of the jaws are parallel and are upwardly and inwardly inclined to define a slot 30 which registers with the slot 25 and when the jaws are set as shown in Fig. 5 forms a continuation thereof.

The movable jaw 27 is secured to the platform 24 by set screws 31 passed through parallel slots 32 in the jaw. The slots 32 have the same inclination as the inclined portions of the jaw faces and hence when the jaw 27 is moved toward or from the jaw 26 the intermediate portions of the jaw faces retain their parallelism. Projecting from the platform 24 are a plurality of tongues 35 having registering unthreaded openings therein to receive a shaft 36. Collars 37 pinned to the shaft prevent any longitudinal movement thereof relative to the platform 24. The inner end of the shaft is threaded to receive a nut 38 which projects through a slot 39 in the jaw 27. The nut 38 is so formed that it can not rotate with the shaft (see Fig. 5) and hence will be moved longitudinally therealong by the rotation of the shaft. The outer end of the shaft is supported by a bracket 40 carried by the cap 41 which closes one end of the pipe and is provided with a hand wheel 42 by which, when the set screws 31 are loosened, the shaft is rotated and the jaw 27 is slidably moved over the platform 24 toward or from the jaw 26 to decrease or increase the width of the slot 30. Suitable index marks 43, 44 are provided on the flanges of the jaws (see Fig. 6)

by which the width of the slot 30 is determined.

When the hydroextractor is used the fabric is passed over the slot 30 resting on the jaw flanges and since the fabrics to be treated vary in width and since, in fact, the side edges of a single length of fabric are not always uniformly even, means are provided to close the ends of the slot not covered by the fabric. One form of unit 50 for closing the ends of the slot is shown particularly in Figs. 4 and 5. Mounted upon a bracket 51 carried by the stationary jaw 26 is a U-shaped plate 52 the ends 53 and 54 of which support a rod 55. A row of floating annular disks 56 are carried by the rod over the slot 30 and normally enter and close such slot. The disks 56 are located between the end 54 of the plate 52 and a disk 57 fixed upon the rod 55. The end of the rod 55 carried by the end 53 of the plate 52 is threaded and held in position by a boss 58 on the end 53 and a nut 59. A knurled knob 60 at the outer end of the rod facilitates the rotation of the rod to adjust the position of the disk 57 and thus regulate the frictional contact between the floating disks 56. The plate 52 is pivoted at one end to the bracket 51 by a stud or rivet 61 and is normally supported parallel to and above the jaw 26 by a stud or rivet 62 which enters a slot 63 in the bracket. Parallel to the rod 55 is a flanged plate 65 carried by a bracket 66 on the movable jaw 27. The plate 65 is pivoted to the bracket by a stud or rivet 67 and positioned by a stud or rivet 68 which normally rests in a slot 69 in the bracket. The plates 52 and 65 with the elements carried thereby can, by reason of their pivotal mounting, be easily swung up out of the way to facilitate the initial laying of the fabric over the pipe jaws. A lid or cover 70 rests upon the plates 52 and 65 and completes the substantial enclosure of the disks 56.

The fabric is fed over the pipe 20 in the direction indicated by the arrows in Figs. 4 and 5, and those disks 56 which are located above that part of the slot 30 over which the fabric passes are shifted forwardly by the fabric. The plate 65 is so located that the shifting of the disks will be within suitable bounds. The remaining disks 56 continue in their normal slot closing position. It will be noted that the disks change their position without the need of any particular attention on the part of the operator and that any shift in the position of the edge of the fabric is automatically accommodated.

In Figs. 7 and 8 is shown a modification of the end closing unit. The unit 75 there shown comprises a U-shaped plate 76 carried by the bracket 77 on the fixed jaw 26, an angle plate 78 carried by the bracket 79 on the movable jaw 27, a plurality of disks 80 which may or may not be annular and a cover or lid 81. The disks 80 are located between the inner end (not shown) of the plate 76 and a partition 82 fixed to the plate 76. A disk 83 carried by a set screw 84 threaded through the partition 82 determines the frictional contact between the disks. The screw 84 has a head 85 by which it is advanced or withdrawn and a lock nut 86 by which the screw is fixed in the desired position. The disks 80 act as do the disk 56 to close the slot 40 those contacted by the fabric being fed forwardly as shown in Fig. 8.

Figs. 9, 10 and 11 show another form of slotted pipe having other means for adjusting the effective width of the slot and thereby the amount of suction exerted upon the fabric passed thereover. The pipe 90 has a slot 91 therein and is closed at both ends by caps 92 and 93. A pipe 94 leads

from the cap 93 to a tank not shown and through it suction is exerted upon the fabric passed over the slot 91. Within and concentric with the pipe 90 is a tube 95 having a slot 96 therein. A lip 97 on the tube 95 projects into the slot 91 so that the effective width of the pipe slot is thus determined by the distance between the lip 97 and the wall 98 at one side of the slot 91. The tube 95 is closed at one end by a wall 99 to which a shaft 100 is secured. The shaft 100 passes through an opening at the center of the cap 92 of the pipe 90 and carries at its outer end a worm wheel 101. Supported upon the cap 92 by a bracket 102 is a stub shaft 103 provided at one end with a worm 104 which meshes with the wheel 101 and at the other end with gear 105. A second stub shaft 106 supported by the bracket 102 carries at one end a gear 107 which meshes with the gear 105 and a handle 108. By means of the handle 108 the tube 95 is turned shifting the lip 97 in the slot 91 and thereby varying the effective width of the slot of the hydroextractor.

Figs. 12 and 13 illustrate a modification of the structure shown in Figs. 9, 10 and 11. The pipe 110 has a slot 111 therein and is closed at both ends by caps, the cap 112 at one end being the only one shown in the drawings. Surrounding the pipe 110 is a tube 115 having therein a plurality of slots 116 of various widths. Mounted on one end of the tube 115 is a ring gear 117 with which a spur gear 118 meshes. The spur gear is mounted at one end of a shaft 119 supported by a bracket 120 on the cap 112. At the other end of the shaft 119 is a crank 121 by which the tube 115 is rotated to bring that slot 116 having the desired width into register with the pipe slot 111 thereby determining the effective width of the slot in the hydroextractor and regulating the amount of suction applied to the fabric.

The structures shown in Figs. 9 to 13 inclusive and described hereinabove relate solely to the means for regulating the width of the slot in the pipe. It will be understood however that a complete hydroextractor embodying either of these structures would also include units for closing the ends of the slot such as, for example, those shown in Figs. 4, 5, 7 and 8 and that the showing of such units has been omitted because unnecessary for a complete appreciation of the novel features disclosed in Figs. 9 to 13.

The various forms of hydroextractors herein shown and described include the means for creating suction through the slot in the pipe and when moistened fabric is passed over the slot moisture is drawn by the suction from the fabric and into the pipe. The moisture thus brought into the pipe is carried off in any suitable way as for instance by being collected in a tank 125. Referring to Fig. 1 suction is set up in the pipe 20 by its creation in any suitable way (not shown) in a pipe 126 connected through the tank 125 with the pipe 20. Gauges 127 and 128 on the pipes 20 and 126, respectively, indicate the amount of vacuum or negative pressure at the inlet and outlet of the tank.

The tank 125 (see Figs. 14, 15 and 16) comprises a body casing 130 and a cover or lid 131. Suspended in the casing 130 is a wire basket or other perforated wall receptacle 132. The receptacle 132 has a flanged ring 133 about its mouth and the flange 134 which projects outwardly from the receptacle rests upon a suitable seat 135 on the inner wall of the casing 130. Handles 136 facilitate the handling of the receptacle. Spaced from the wall of the casing 130 is

a ring 137, the space between the ring and the wall being filled by rubber or any suitable material 138 to form a pocket which receives an annular gasket 139.

5 The lid 131 is pivotally suspended at its center from a pair of parallel bars 140 connected at one end by a handle 141 and pivoted at the other end upon a rod 142 carried by brackets 143 projecting from the casing 130. The bars 140 pass between 10 a pair of angle clips 144 mounted upon the lid 131 and are secured thereto by a rod 145 passed through the clips and the bars. A plate 146 fixed to the bars 140 by upturned flanges 147 has down turned flanges 148 at each end which prevent any 15 undue swinging of the lid upon the bars. The lid rests upon the body casing and the gasket 139 seals the tank against entry of air past the lid. Projecting from the under side of the lid 131 into the receptacle 132 is a deflector 150 preferably 20 channular and slightly tapered. As shown particularly in Fig. 16 the deflector 150 is directly in front of the end of the pipe 20 and extends into the receptacle below the end of the pipe 126. The air and moisture drawn by suction from the pipe 20 thus strike the deflector 150 and any lint, dust 25 or other extraneous materials remains in the receptacle and when the gauges 127 and 128 indicate congestion the machine is stopped, the tank lid raised and receptacle removed, emptied and 30 replaced. The ends of the bars 140 beyond the rod 142 are preferably inclined so that when the lid is raised the ends rest against the wall of the casing and hold the lid at such an inclination that it has no tendency to drop closed.

35 While several embodiments of this invention have been shown and described it will be understood that we are not limited thereto and that other embodiments may be made without departing from the spirit and scope of the invention as set forth in the following claims.

We claim:

1. A hydroextractor by which moisture is removed from wetted woolen, worsted or other textile fabric, comprising a pipe having a longitudinally extending slot therein over which slot the 45 fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the pipe, and means for varying the effective width of the slot and thereby regulating the amount of moisture removed from the fabric, said means comprising a platform mounted upon the pipe and having a slot therein in register with the slot in the pipe to form a continuation thereof, a pair of jaws supported by the platform, 50 one jaw at one side of the slot and the other jaw at the other side of the slot and means for setting up a relative movement of the jaws across the slot.

2. A hydroextractor by which moisture is removed from wetted woolen, worsted or other textile fabric, comprising a pipe having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set 60 up in the pipe, and means for varying the effective width of the slot and thereby regulating the amount of moisture removed from the fabric, said means comprising a platform mounted upon the pipe and having a slot therein in register with the slot in the pipe to form a continuation thereof, a jaw fixed upon the platform at one side of the slot, a jaw carried by and slidably movable over the platform at the other side of the 70 slot and means for sliding said second jaw to-

ward or from said first jaw to vary the effective width of the slot.

3. A hydroextractor by which moisture is removed from wetted woolen, worsted or other textile fabric, comprising a pipe having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the pipe, and means for varying the effective width of the slot and thereby regulating the amount of moisture removed from the fabric, said means comprising a platform mounted upon the pipe and having a slot therein in register with the slot in the pipe to form a continuation thereof, jaws upon the platform one at either side of the slot, the inner face of each jaw having an outwardly inclined portion at one end and an inwardly inclined portion at the other end and the jaws being assembled with the outwardly inclined portion of each in contact with the inwardly inclined portion of the other, the intermediate portions being parallel and defining a slot in register with the slot in the pipe and means for setting up a relative movement of the jaws across the slot. 25

4. A hydroextractor by which moisture is removed from wetted woolen, worsted or other textile fabric, comprising a pipe having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the pipe, and means for varying the effective width of the slot and thereby regulating the amount of moisture removed from the fabric, said means comprising a platform mounted upon the pipe and having a slot therein in register with the slot in the pipe to form a continuation thereof, a pair of jaws upon the platform, one jaw being fixed at one side of the slot, the other jaw being movable over the platform at the other side of the slot, the inner face of each jaw having an outwardly inclined portion at one end and an inwardly inclined portion at the other end and the jaws being assembled with the outwardly inclined portion of each in contact with the inwardly inclined portion of the other, the intermediate portions being parallel and defining a slot in register with the slot in the pipe and means for moving the slidable jaw relative to the fixed jaw across the slot. 50

5. A hydroextractor by which moisture is removed from wetted woolen, worsted or other textile fabric, comprising a pipe having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the pipe, and means for varying the effective width of the slot and thereby regulating the amount of moisture removed from the fabric, said means comprising a platform mounted upon the pipe and having a slot therein in register with the slot in the pipe to form a continuation thereof, a pair of jaws upon the platform, one jaw being fixed at one side of the slot, the other jaw being movable over the platform at the other side of the slot, the inner face of each jaw having an outwardly inclined portion at one end and an inwardly inclined portion at the other end and the jaws being assembled with the outwardly inclined portion of each in contact with the inwardly inclined portion of the other, the intermediate portions being parallel and defining a slot in register with the slot in the pipe, parallel slots in said movable jaw having the same inclination as the inclined portions of the inner face, 75

screws passed through said slots to secure the movable jaw to the platform, said movable jaw when the screws are loosened being movable toward or from the fixed jaw across the slot.

6. A hydroextractor by which moisture is removed from wetted woolen, worsted or other textile fabric, comprising a pipe having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the pipe, and means for automatically sealing the ends of the slot, each of such means comprising a plate pivotally supported at one end upon the pipe and a plurality of disks carried thereby, said disks being independently movable and normally sealing the ends of the slot and being swung by contact of the fabric out of such sealing position and said plate being pivotally movable with the disks away from the pipe to facilitate the placing of the fabric over the slot.

7. A hydroextractor by which moisture is removed from wetted woolen, worsted or other textile fabric, comprising a pipe having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the pipe, and means for automatically sealing the ends of the slot, each of such means comprising a plate pivotally supported at one end upon the pipe, a plurality of annular disks carried thereby, said disks being independently movable and normally sealing the ends of the slot and being swung laterally by contact of the fabric out of such sealing position and said plate being pivotally movable with the disks away from the pipe to facilitate the placing of the fabric over the slot and a shaft carried by the plate and passed through the disks to attach the disks to the plate and limit their lateral movement relative thereto.

8. A hydroextractor by which moisture is removed from wetted woolen, worsted or other textile fabric, comprising a pipe having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the pipe, and a tank through which the suction is set up in the pipe, and in which the moisture withdrawn from the fabric is collected, one end of the pipe terminating in the tank, a receptacle in the tank and a deflector in the tank in front of the end of the pipe, the moisture striking against the deflector and being deflected thereby into the receptacle.

9. A hydroextractor by which moisture is removed from wetted, woolen, worsted or other textile fabric, comprising a pipe having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the pipe, and a tank through which the suction is set up in the pipe, and in which the moisture withdrawn from the fabric is collected, one end of the pipe terminating in the tank, a receptacle in the tank and a deflector in the tank in front of the end of the pipe, the moisture striking against the deflector and being deflected thereby into the receptacle, said receptacle having perforate walls whereby the moisture escapes while lint or other extraneous matter carried by the moisture into the tank is retained.

10. A hydroextractor by which moisture is removed from wetted woolen, worsted or other textile fabrics, comprising a chamber having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the chamber, and means for automatically sealing the ends of the slot, each of such means comprising a plurality of disks and an enclosure therefor including plates parallel to each other and to the slot and spaced apart a distance greater than the diameter of the disks, said disk normally resting upon and closing a portion of said slot and being movable laterally transversely of the slot by contact with the fabric, whereby the suction through the fabric is uniform along the effective length of the slot.

11. A hydroextractor by which moisture is removed from wetted woolen worsted or other textile fabric, comprising a pipe having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the pipe, and means for automatically sealing the ends of the slot, each of such means comprising a plurality of disks which normally seal one end of the slot, and an enclosure for said disks including a plate by which the disks are carried, a second plate parallel to the first plate and spaced therefrom a distance greater than the diameter of the disks, the plates being parallel to the slot and on opposite sides thereof, and a lid carried by said plates and coacting therewith to complete the enclosure, said disks being freely movable transversely of the slot and being moved by contact of the fabric out of the slot-sealing position.

12. A vacuum extractor comprising a vacuum tube having a longitudinal slot therein, means for varying the effective width of the slot comprising means mounted in fixed position on the tube on each side of the slot and forming a continuation thereof, said means having on one side a surface bearing on the outer surface of the tube and having on its opposite side a substantially horizontal bearing surface, a cloth engaging bar supported on said bearing surface at each side of the slot, and mechanism for moving one of said bars toward and away from the other of said bars to vary the effective width of said slot.

13. A hydroextractor by which moisture is removed from wetted woolen, worsted or other textile fabrics, comprising a chamber having a longitudinally extending slot therein over which slot the fabric being treated is passed and through which moisture is drawn from the fabric by suction set up in the chamber, a support at one end of the slot extending parallel to and above the same, and a plurality of disks pivotally associated with said support and positioned to normally bear upon the slot edges, each of said disks being independently movable substantially horizontally with respect to said support and out of opposed alignment with the slot upon contact of the fabric with a disk so that the suction through the fabric will be uniform along the effective length of the slot.

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