Dec. 31, 1929. J. WHITAKER ET AL 1,742,114

MACHINE FOR DYEING, SCOURING, AND WASHING WOOL AND OTHER FIBROUS MATERIALS

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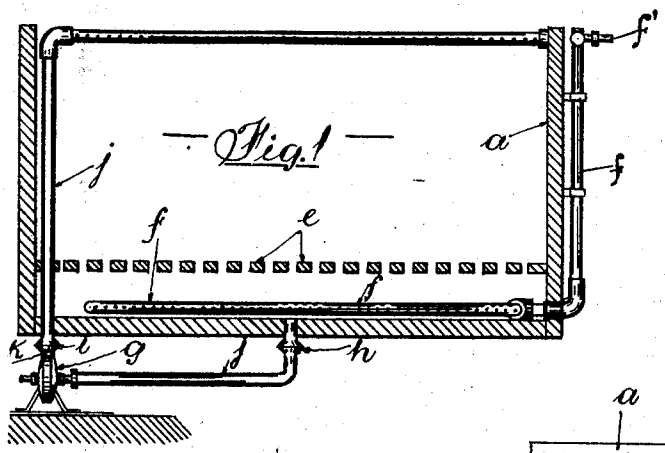
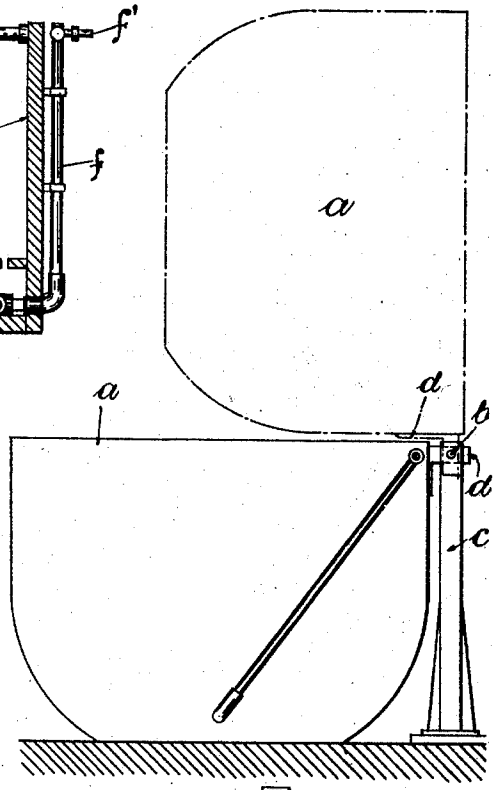
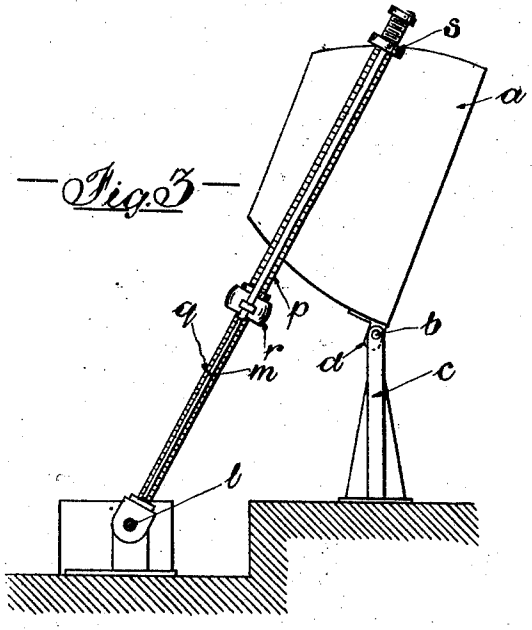


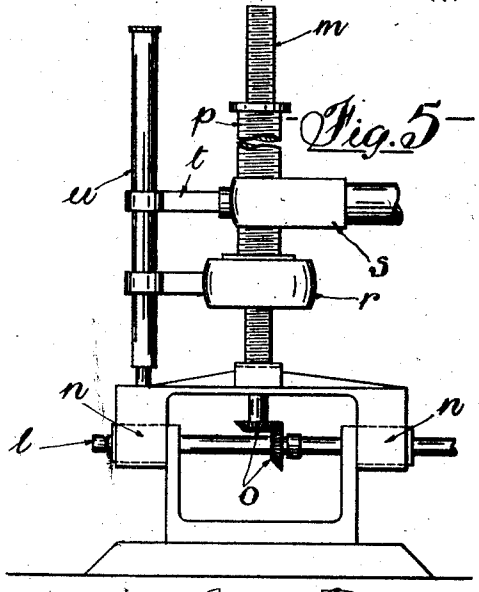
— Fig. 1 —



— Fig. 2 —



— Fig. 3 —



— Fig. 5 —

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Fig. 4

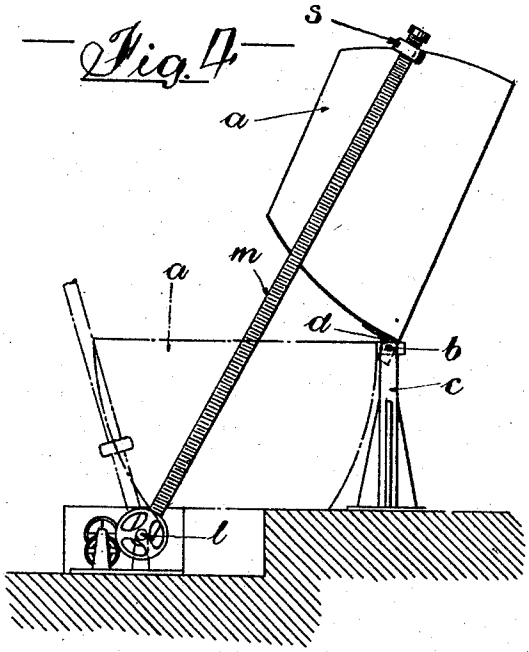
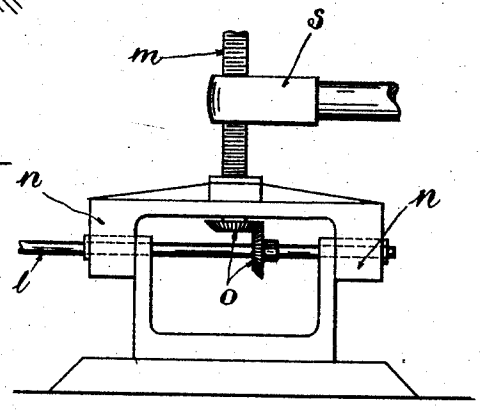


Fig. 6



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MACHINE FOR DYEING, SCOURING, AND WASHING WOOL AND OTHER FIBROUS MATERIALS

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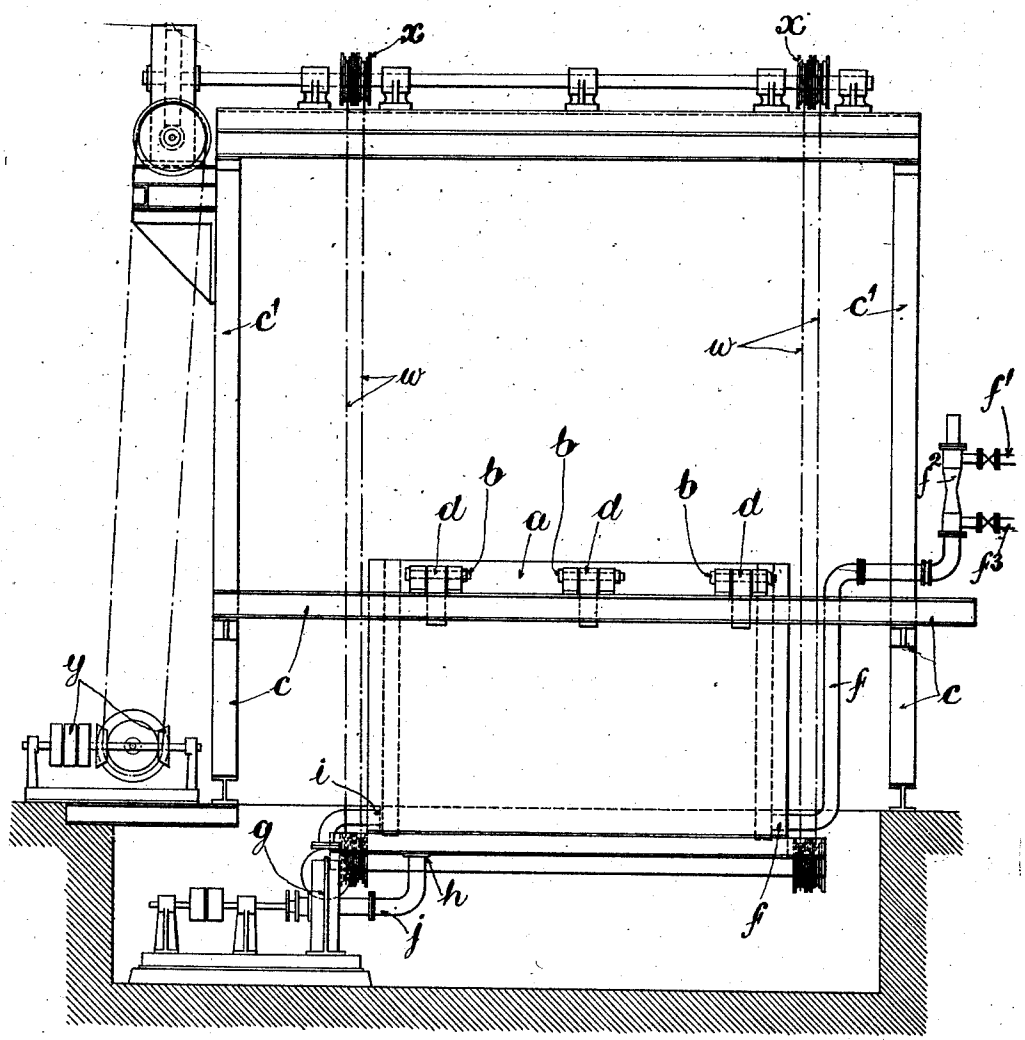
Fig. 7



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MACHINE FOR DYEING, SCOURING, AND WASHING WOOL AND OTHER FIBROUS MATERIALS

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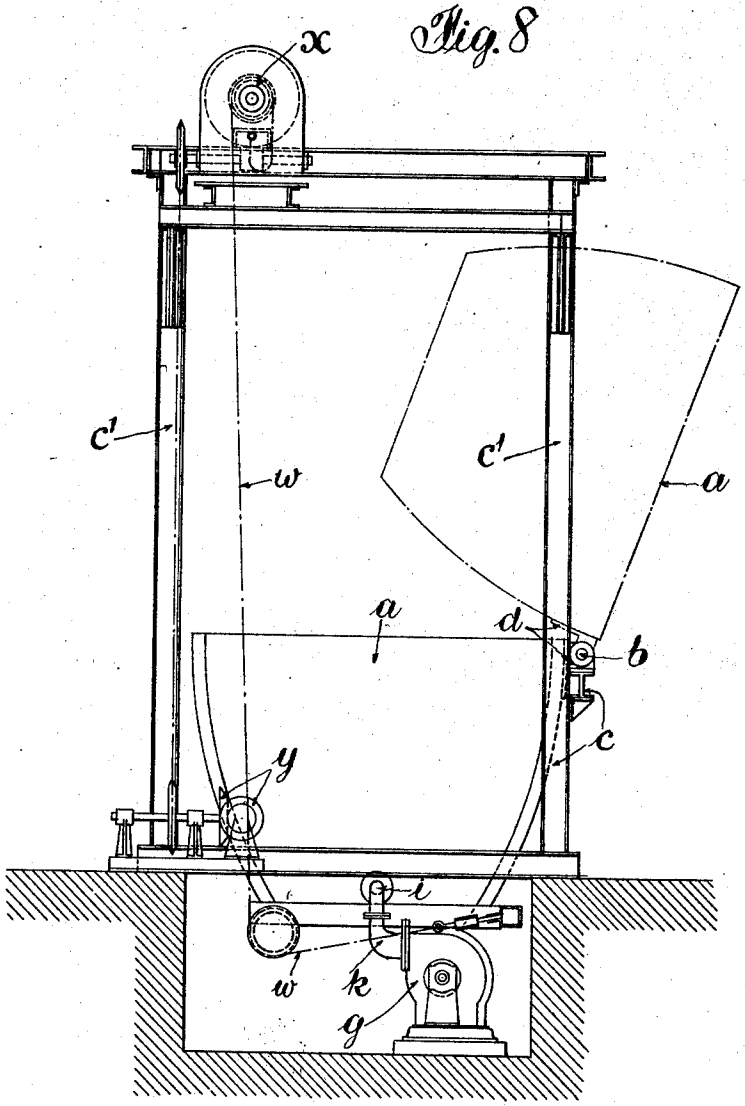
Fig. 8



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UNITED STATES PATENT OFFICE

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MACHINE FOR DYEING, SCOURING AND WASHING WOOL AND OTHER FIBROUS MATERIALS

Application filed September 16, 1926, Serial No. 135,900, and in Great Britain September 21, 1925.

This invention relates to that type of machine used for dyeing, scouring and washing wool, rags, jute, hemp and other fibrous materials wherein the materials to be treated are placed in a movable vessel, hinged or pivoted at its upper edge, so as to permit of the vessel being tilted for a side-tip discharge under the control of gearing. Hitherto, said machines or apparatus have comprised an inner movable hinged vessel and an external vessel or vat as in our prior British specifications Nos. 101,060; 108,809; 142,602 and 178,940, the inner vessel or cage being hinged to the side of the outer vessel or vat to permit of the cage being swung upwardly clear of the vat. The present invention has for its chief object to simplify and cheapen the construction of such dyeing machines or apparatus whereby they may be used either for single or two bath dyeing.

According to the present invention one of the vessels is dispensed with and the remaining vessel adapted to be hinged or pivoted along its upper edge in a frame or bracket and serve as the dyeing vessel. In an embodiment of the invention the hinged or pivoted vat or vessel is lined with or constructed of any appropriate material and has a perforated false bottom affording between it and the bottom proper, a space or chamber for circulating the steam liquor or its equivalent through the machine. The hinging or pivoting of the vessel is effected in any appropriate manner either by mounting the vessel on hinges or pivots at suitable points at one of its upper edges to the adjacent frame or structure and means are provided such as screw, chain, rope or other similar gearing for either tilting the machine automatically or otherwise by appropriate mechanism, for emptying or discharging the contents, as and when required.

Also the connections to the circulating space at the bottom of the vessel will be such as to allow of the necessary tilting or turning movement being given to the vessel with or without disconnecting the connections as is found advantageous.

In order that the invention may be clearly understood and readily carried into effect, the same will now be more fully described with reference to the accompanying drawings in which:—

Figure 1 is a longitudinal or front sectional view of a dyeing machine according to the invention, the mechanism for tipping the vat not being shown.

Figure 2 is an end view showing the dyeing vat in two positions, the full line position indicating the normal position of the vat and the dotted line position that which it assumes when tilted for emptying or discharging purposes, the mechanism for tipping the vat and the pump and pipe connections not being shown.

Figures 3 and 4 show alternative methods of tilting the vat, by double and single screw lifting gear respectively.

Figure 5 is a front view of the gearing shown in Figure 3, Figure 6 is a similar view in part of the single screw lifting gear employed in Figure 4.

Figures 7 and 8 illustrate in front and side elevation, respectively, a slightly modified form of the invention.

Referring now to the drawings in which it will be noted in Figure 1 that the mechanism for tipping the vat is not shown, and in Figure 2 the mechanism for tipping the vat and the pump and pipe connections are not shown in order to better illustrate the other structure, *a* indicates the vat which is of any size or shape according to requirements and lined with any appropriate material to withstand the dyeing liquor. As shown the vat *a* is mounted to be swung or tilted in an upward direction about the pivots or fulcrums *b* in the form of a rod or shaft in or on the brackets *c* of which there are two, one at either side of the machine. Or, if desired,

the fulcrums may take the form of short stub axles or trunnions engaging lugs or brackets *d* on the vat *a*, as shown in Figure 7.

Steam for heating purposes is uniformly delivered beneath and through the false bottom *e* (see Fig. 1), by way of a main perforated steam pipe *f* extending along the base of the vat and heated air may be uniformly delivered, for agitation of the material as and when required, by way of the pipe *f* in conjunction with a branch pipe *f'*. The pipe *f* may also be fitted with small branch inlet pipe f^3 (Fig. 7), whereby the dye may be introduced into the machine along with the steam supply, a more uniform distribution of the dye being thereby obtained.

Particular attention is called to the fact that the single delivery pipe *f* carries steam for heating purposes, air for the agitation of the material, and also the dye. The air is introduced into the pipe *f* by means of a branch pipe *f'*, and the dye is introduced into pipe *f* by means of the branch pipe f^3.

Circulation of the liquor within the vat is controlled by means of a pump *g*, automatic sealing joints being provided at *h*, *i*, permitting the uptake pipes *j*, *k*, respectively, to be instantly and automatically disconnected or connected as the vat *a* is raised or lowered.

As shown in Figure 1, the pipe *j*, communicate with the vat, respectively, below the false bottom *e* and above the same, so that when the pump *g* is operating, the liquid in the vat will be continuously circulated through such false bottom and the material in the vat. The joints *h*, *i*, permit the vat to be bodily moved, as described relative to the pump *g*.

As shown, the vat *a* is preferably formed with curved sides to facilitate the side tipping discharge movement. To effect this side tipping a power-driven shaft *l*, see Figures 3 to 6, is mounted horizontally and longitudinally behind the vat *a* at or about the floor level, with screw shaft *m* carried by trunnion bearings *n* associated with said shaft *l*. The other extremities of said screw shafts are pivotally connected one on each side of the vat *a* at a point below the horizontal center line of the vat to permit, when the screw shafts *m* are rotated, of the vat being raised or lowered, see Figure 4. The connecting gear *o* between the screw shafts and the power shaft is of the bevel planet type, whilst each shaft being carried by the trunnion bearings *n* permits of the necessary angular movement of the vat *a*. An ordinary multiplying gear for the drive on to the power shaft, and a direct reversing gear may be provided both preferably controlled from a single driving belt.

In Figures 3 and 5, the primary solid screw shafts *m* are reduced in length and fitted with a secondary hollow externally threaded screw shaft *p* slidable thereon, the hollow screw by engaging in a longitudinal keyway *q* in the solid screw shaft *m*. The latter is in threaded engagement with a non-rotating nut *r* which rotatably supports the hollow screw shaft *p* and the hollow screw shaft *p* is in threaded engagement with the non-rotating swivel attached to vat *a* nut *s*. The nut *r* is prevented from rotating by any convenient means, as for example by a side extension *t* thereon engaging slidably on a guide rod *u*. As the solid screw shaft *m* is rotated its non-rotating nut *r* is raised or lowered and thereby raises or lowers the hollow screw-shaft *p* and its connections to the vat *a*. At the same time the rotation of the solid screw shaft *m* is transmitted by the pin and keyway device to the screw shaft *p* which operating through the stationary nut *s* further raises or lowers the vat *a*. As shown in Figure 4, however, lifting single screws *m* are employed although the double screw arrangement avoids of having screws of undue length.

While preferring the above described methods for raising and lowering the vat from one position to another it will be understood that any other appropriate means may be utilized. Also the pipe connections will in all cases be such as to permit of swinging or tilting movements of the vat, as and when required.

Alternatively the lifting gear may in some cases comprise chains *w*, disposed at each end of the machine and passing over runners *x*, supported by end frames *c'* and a reversing mechanism *y* may also be provided.

In the claims:

1. In a machine for dyeing, scouring and washing wool and other fibrous materials, a vertical supporting bracket, a single vessel having a perforated false bottom hinged at one end thereto, and means for tilting the vessel to a position beyond the vertical line of the said bracket.

2. In a machine for dyeing, scouring and washing wool and other fibrous materials, a vertical supporting bracket, a single vessel having a perforated false bottom hinged at one end thereto, a screw shaft having one end pivotally connected to the vessel, and the other end connected to a power shaft to tilt the vessel to a position beyond the vertical line of the said bracket.

3. In a machine for dyeing, scouring and washing wool and other fibrous materials, a vertical supporting bracket, a single vessel having a perforated false bottom hinged at one end thereto, a screw shaft having one end pivotally connected below the horizontal center line of the vessel, and a bevel planet gear connecting the other end of said shaft to a power shaft to tilt the vessel to a position beyond the vertical line of the said bracket.

4. In a machine for dyeing, scouring and washing wool and other fibrous materials, a single vessel having a false perforated bottom, a pipe for supplying steam or air hav-

ing a perforated section within the vessel beneath the false bottom therein, and means for circulating liquid through the perforations in the false bottom comprising a pump arranged exteriorly of the vessel and inlet and discharge pipes connecting the pump, respectively, with the vessel below the false bottom and above the same, the connections between said pump and vessel including automatic sealing joints permitting the vessel to be bodily moved, at will, relative to the pump.

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