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APPARATUS FOR TREATING WOOL OR OTHER MATERIAL

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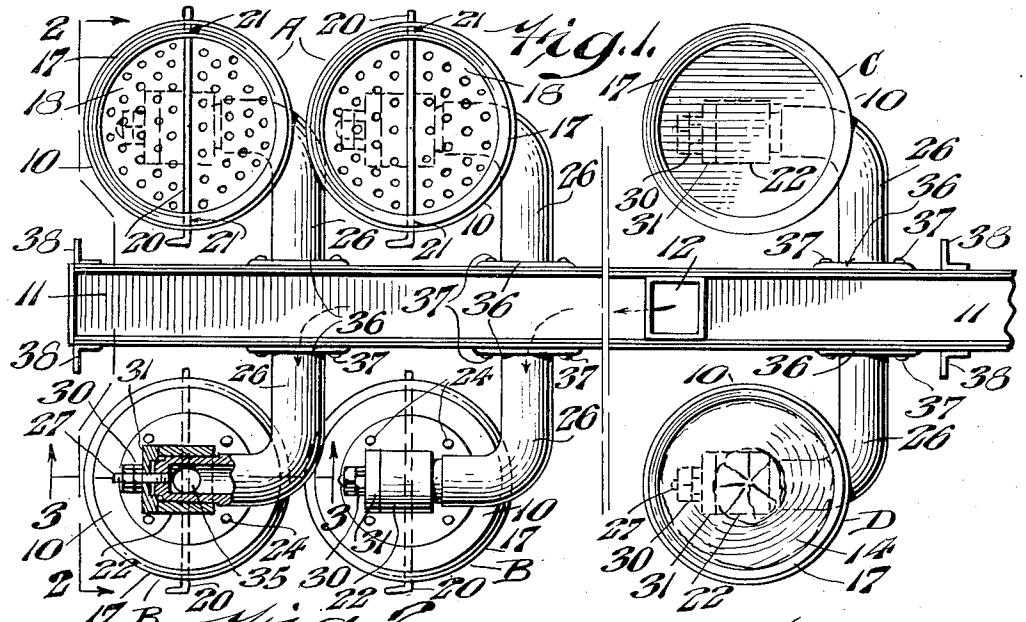


Fig. 1.

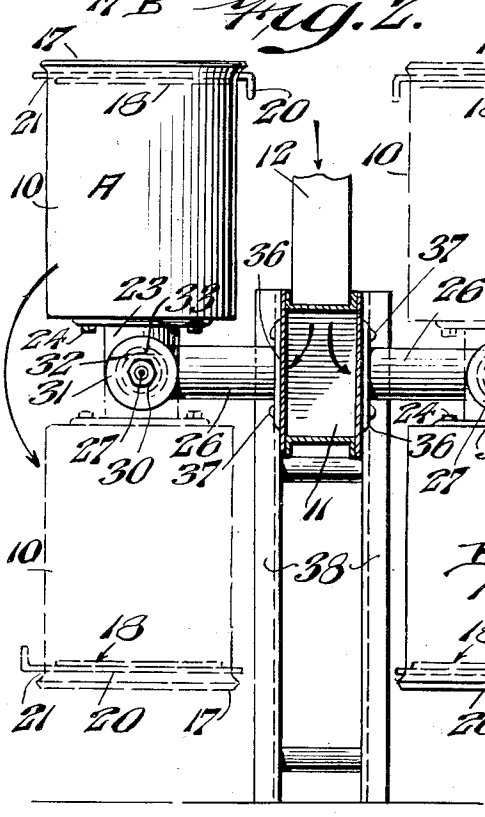


Fig. 2.

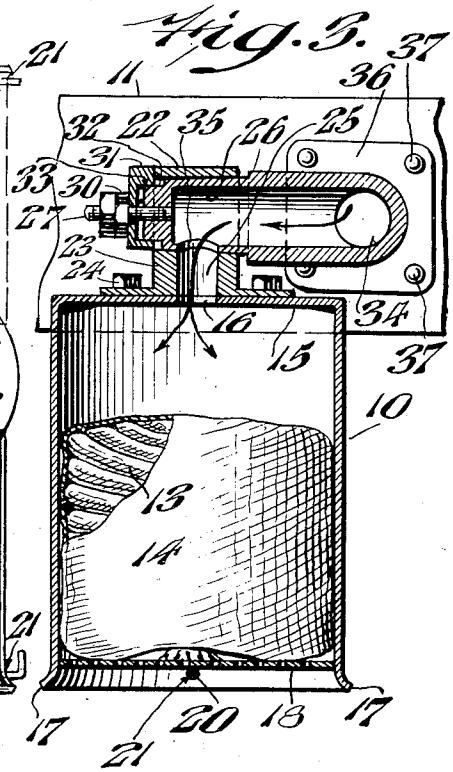


Fig. 3.

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APPARATUS FOR TREATING WOOL OR OTHER MATERIAL

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4 Claims. (Cl. 34—30)

The present invention relates to an apparatus for treating material such as wool, cotton, silk, etc., and more particularly to the dyeing and drying of wool tops or other material in mass formation.

As an example of the application of the present invention, the following description will be directed to the treatment of wool tops, though this is not to be taken as limiting the scope of the invention to this precise material.

In the preparation of wool tops it has heretofore been necessary after the dyeing steps to return the tops to the back-washing machine to not only be subjected to an extra washing but also to be dried. In order to pass through this back-washer the sliver is unwound from the ball so that it can be fed in strand form through the rinsing bath, then through the squeegee rolls, from which it is conveyed over rotating heated rolls or on wire aprons moving through a chamber in which heated air is circulated. In some instances the ball of dyed material is subjected to the action of an extractor before unwinding it to be fed into the back-washer. This is to remove excess water. Where such extractor is used the action more or less disturbs the fibres of the wool so that the desired parallel relation thereof is disturbed, resulting in unevenness and roughness. This fibre disarrangement is of minor effect as compared to the fibre disturbance caused by unwinding the wet sliver on its way to the backwasher and it is then that the major trouble occurs. When the sliver is unwound the fibres cling to adjacent fibres and give the sliver a rough, uneven and unsightly appearance. In order to restore the sliver it is necessary to subject it to a recombing operation, thereby not only adding to the labor expense but also the loss due to colored noils.

Some of the objects of the present invention are to provide an improved apparatus for drying material, such as wool tops and the like; to provide a novel apparatus for drying material in bulk or ball formation; to provide an apparatus for drying card sliver or wool tops wherein the dyed material can be dried without change of form; to provide an apparatus for drying card sliver or wool tops wherein the fibres of the material are not disturbed and thereby eliminating back-washing and recombing operations; to provide a drying apparatus comprising a plurality of receptacles each of which is independently accessible of the others whereby one or all can be filled for drying and while the apparatus is in use any receptacle can be loaded and unloaded without discontinuing the operation of the apparatus or disturbing the other receptacles containing material being dried; to provide a drying apparatus wherein wool tops and the like can be dried in original form; to provide an apparatus for dyeing and drying wool tops or other material wherein steps of back-washing and recombing are no longer necessary; and to provide other improvements as will hereinafter appear.

In the accompanying drawing Fig. 1 represents a plan of a drying apparatus embodying one form of the present invention, certain of the receptacles being in top filling and removing position and others in drying position; Fig. 2 represents a section on line 2—2 of Fig. 1; and Fig. 3 represents a section on line 3—3 of Fig. 1.

Referring to the drawing one form of the present invention consists of a plurality of receptacles 10 mounted and arranged to be supplied with heated air under pressure from a manifold 11 common to all of the receptacles. The manifold 11 receives its supply of heated air from a duct 12 leading to a source of heated medium, such for example as a fin tube radiator (not shown) supplied with exhaust steam over which air passes from a compressor (not shown). Since the receptacle 10 and the mounting therefor are identical, the present description for sake of brevity will be confined to one, like parts in all being identified by like reference numerals.

The receptacle 10 is of such size and shape as to snugly receive a wool top 13 or other formed material which is to be dried. The bottom 15 of the receptacle 10 is provided with an opening 16 to permit the passage of air into the receptacle as will be understood. The open mouth of the receptacle 10 is substantially the same diameter as the body of the receptacle so that the top 13 can be readily placed therein or removed therefrom. To facilitate the insertion of the tops 13 into the receptacle 10 the mouth of the latter is preferably flared outwardly as shown at 17.

For the purpose of retaining the wool tops within the receptacle 10 a perforated cover plate 18 is provided and is held in place by a removable rod 20 arranged to be inserted in two diametrically opposite holes 21 appropriately located near the mouth of the receptacle 10.

For supporting the receptacle and admitting heated air to the interior thereof a fitting in the form of a sleeve 22 having a flanged base 23 is provided. This base 23 is attached to the receptacle bottom 15 by studs 24 and has a port 25 fixed in register with the opening 16. The sleeve 22 receives the closed end portion of a tubular elbow arm 26 so that the latter forms a horizontally disposed pivot about which the receptacle 10 can be rotated. Preferably that portion of the arm 26 which enters the sleeve 22 is tapered in the direction necessary to cause the sleeve 22 to fit tighter and tighter as it is urged further thereon. This adjustment is to prevent leakage around the joint and is here made by means of a threaded shank 27 anchored to and projecting from the end of the arm 26 and coaxial therewith. A nut 30

screws on the shank 27 to abut a collar 31 which seats against the end of the sleeve 22 to maintain the latter snugly on the tapered end while permitting free relative movement of the parts. Preferably the end of the arm 26 has a flat side 32 with which a like internal flat part 33 of the collar 31 coacts so that the collar 31 is held against turning movement.

In order to establish communication between the passage 34 of the elbow fitting and the port 25 an outlet 35 is provided in the bottom of the arm 26 and in the plane of movement of the port 25 whereby heated air is admitted to the receptacle when in an inverted position and is cut off when the receptacle is in a reversed or filling position. The elbow 26 is provided with a usual flange 36 for connecting it to the manifold by means of bolts or studs 37. While the manifold 11 may be of any suitable form it is here shown of rectangular section and mounted upon support legs 38 of angle iron or other construction.

In the operation of the apparatus of the present invention the tops are respectively in the usual ball form in which they come from the finishing room ready to be submerged in a bath of dye liquor for the proper length of time to insure complete impregnation of the wool by the dye and uniform coloring. When the dyeing is complete the wet tops are carried to the drying apparatus and each placed in one of the receptacles of the apparatus above described. This operation consists in swinging the receptacle 10 from its inverted position to an upright one as indicated at "A" on Figs. 1 and 2 whereupon the rod 20 is taken out so that the perforated cover plate 18 can be removed. The top is then lowered into the receptacle, the cover 18 replaced, the pin returned to its fastening position, and the receptacle then swung downward to its inverted position as shown at "B" Fig. 2. When in its upright position the port 25 is out of register with the outlet 28 and consequently the compressed heated air is cut off from the receptacle. As soon, however, as the receptacle is brought to its lowered position the aforesaid port and outlet come into register and heated air immediately enters from the manifold 11 and elbow 26. Since the heated air is under pressure the action is to force the excess dye liquor out of the top and through the perforated cover 18 where it falls upon the floor, where it is soon dried by the air escaping from the receptacle. The continued exposure of the wound sliver or top to the heated air causes all of the remaining moisture to be quickly evaporated and the top is thoroughly dried. Since both the dyeing and drying operations have taken place without any winding or rewinding of the sliver, the top remains in perfect condition and no damaged or displaced fibers are present.

The removal of the dried top from the receptacle is readily accomplished since the pressure of the incoming air can be used to assist the operator in withdrawing the top, this being done by raising the receptacle about two-thirds of the way to its upright position, at which place the ports are still slightly in register and enough air can enter the receptacle to serve as an auxiliary ejecting means.

In Figs. 1 and 2, the receptacles shown at "A" are in upright position, while the opposite two are in inverted postion ready for drying. Receptacle "C" is in an upright position but with the perforated cover removed. Receptacle "D" is in an upright position with the top in place ready for the cover to be replaced.

In some instances the material in its bulk or mass formation can be placed in a bag as shown at 14 and wherein it is subjected to the dyeing and drying steps heretofore described. This bag, however, is not essential for the efficient carrying out of the invention as the top or other article can be handled, dyed and dried entirely satisfactory without such a bag.

Where in the foregoing the term "wool tops" is used it is to be understood as of generic scope because the invention is of relatively wide application.

While only a single form is shown in which this invention may be embodied, it is to be understood that the invention is not limited to any specific cnstruction, but might be applied to various forms without departing from the spirit of the invention or the scope of the appended claims.

Having thus described my invention, I claim:—

1. In a drying apparatus, a receptacle for receiving material having an opening in the bottom thereof, a conduit for supplying a drying medium, said conduit having a discharge outlet, a pivotal support attached to the bottom of said receptacle, means associated with said support for bringing said opening into register with said outlet when said receptacle is inverted and for moving said opening out of register when said receptacle is upright, and a perforated cover for said receptacle.

2. In a drying apparatus, a receptacle for receiving material, said receptacle having an opening in the bottom thereof, a conduit for supplying a drying medium, said conduit having a discharge outlet, a sleeve attached to said receptacle bottom having a port in register with said opening, means for mounting said sleeve on said conduit for rotary movement and with said port in the plane of said outlet, whereby in upright position of said receptacle said outlet and port are out of register and in inverted position of said receptacle said outlet and port are in register, and a perforated cover for said receptacle.

3. In a drying apparatus, a receptacle for receiving material, said receptacle having an opening in the bottom thereof, a conduit for supplying a drying medium, said conduit having a tapered end provided with a discharge outlet, a sleeve attached to said receptacle bottom and arranged to receive said tapered end as a pivoted support, said sleeve having a port in register with said opening, means to hold and adjust said sleeve on said end, the arrangement being such that in upright position of said receptacle said port and outlet are out of register and in inverted position of said receptacle said port and outlet are in register, and a perforated cover for said receptacle.

4. In a drying apparatus the combination of a conduit for supplying a drying medium, a receptacle for receiving material, a top for said receptacle having a drain outlet, means for removably securing said top in place, a bottom for said receptacle having an opening, means for pivotally mounting said bottom on said conduit, and a closure controlled by said mounting means for opening and closing communication between said opening and said conduit.

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