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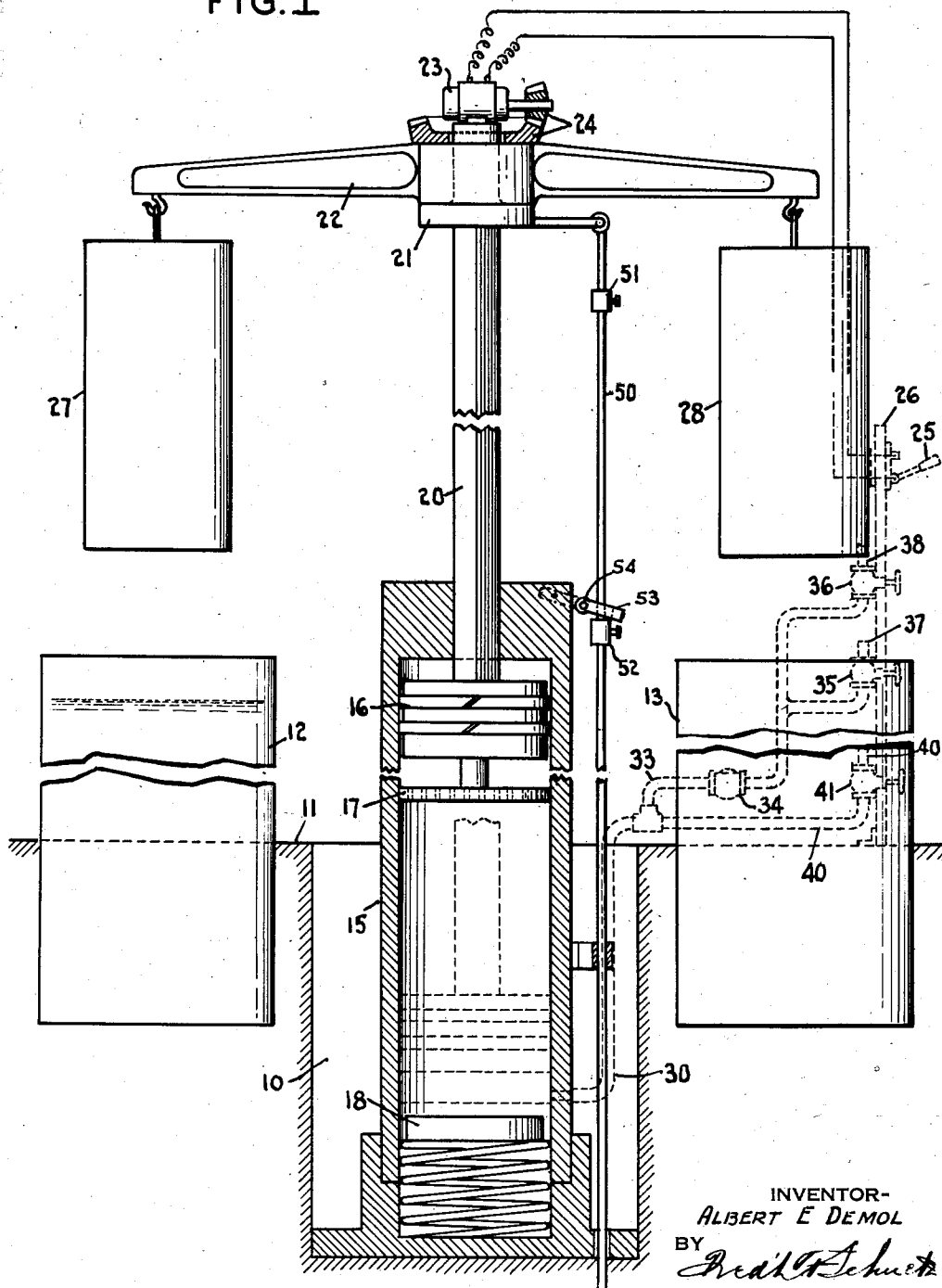
A. E. DEMOL
BOIL-OFF OR DYEING APPARATUS

2,000,745

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2 Sheets-Sheet 1

FIG. 1



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FIG 2

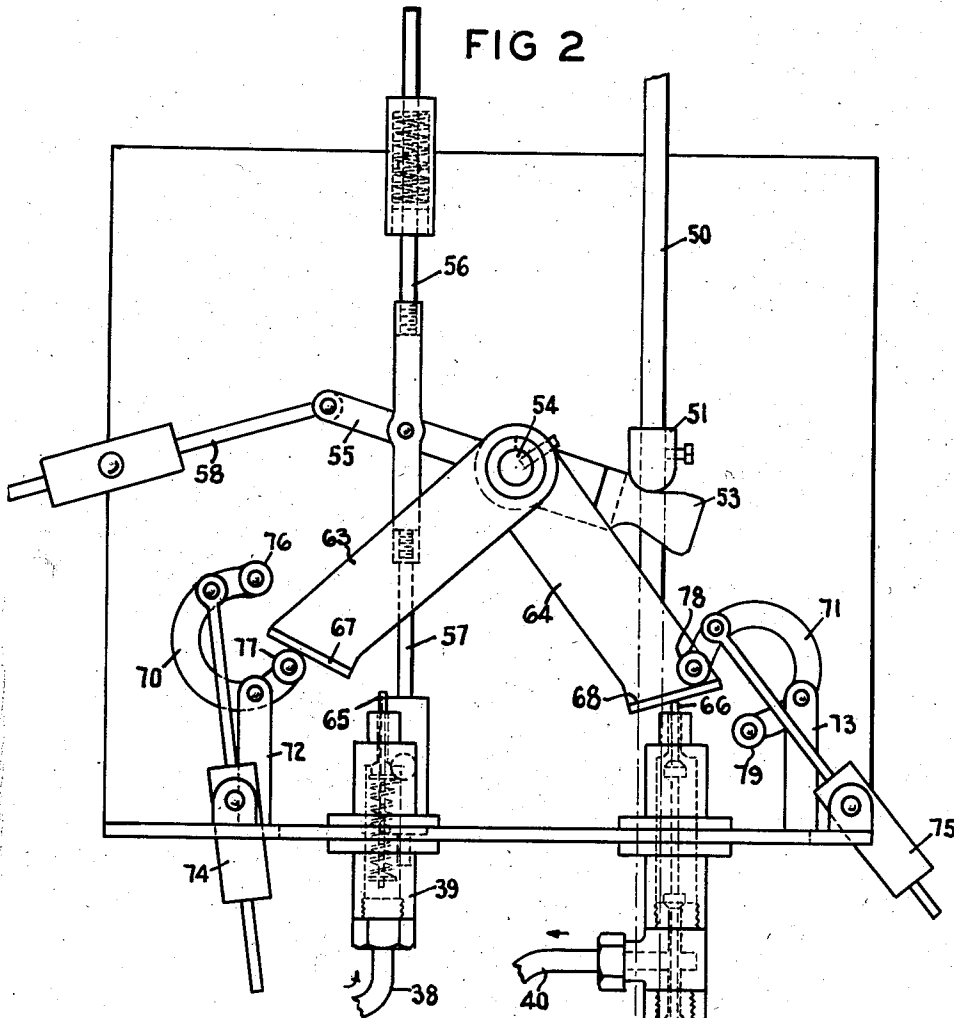
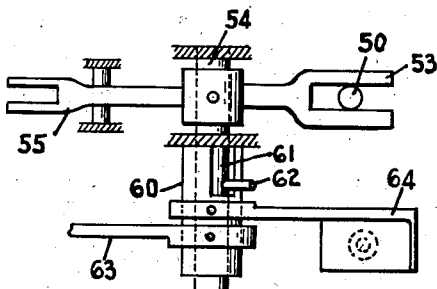


FIG. 3



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BOIL-OFF OR DYEING APPARATUS

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Application April 7, 1933, Serial No. 664,964

1 Claim. (Cl. 8—19)

The invention relates to apparatus for the treatment of natural and artificial silks and velvets, more particularly as utilized in connection with the usual boil-off operation or dyeing operation to which these materials are subjected.

It has for an object the provision of simple and effective means whereby the time required for these operations may be materially reduced, as a matter of fact to less than one-half the time now required with types of apparatus in present use.

A further object of the invention resides in the provision of apparatus of this nature wherein the use of chain blocks and other manually actuated means for positioning the reels of material, dropping the same into the vats and removing them therefrom is eliminated, and wherein all of the operations may be conducted by a single operative and with much greater expedition and convenience.

Still another object of the invention resides in the provision of apparatus whereby a pair of reels is simultaneously treated in the vats provided therefor; and, when the desired operations are completed, whereby said reels may be quickly and readily raised out of the vats and swung into position for unloading and reloading.

In carrying out the invention, provision is made for suspending a pair of reels, loaded with the goods to be boiled-off or dyed, from the ends of a cross-head or the like. The latter is fixed against oscillation in a vertical plane, but is mounted for rotation in a horizontal plane, upon a vertically reciprocable spindle or piston rod and whereby the said reels may not only be periodically and simultaneously reciprocated in both of the pair of vats containing the desired liquid, but when these operations are completed and when the reels have been withdrawn from their respective vats, they may be swung about the vertical axis of the rod to a position for unloading or removal from the cross-head.

When a new set of reels is to be treated, they are first suspended from the opposite ends of this cross-head, which is then again swung about into position to align the reels with the respective vats and into which they are then lowered for reciprocation. This operation of reciprocating the reels while immersed in their vats is arranged to be accomplished automatically in the provision of an air-driven piston for reciprocating the said rod carrying the cross-head. To this end, air is introduced behind the piston, through a suitable valve, and an exhaust connection is also made thereto through a further

valve. The air-admission as well as the exhaust is arranged, not only for manual control, but also for automatic operation from the movement of the piston rod, as through a tappet-rod movable therewith and bearing tappets for engagement with a suitable spring toggle means acting on suitable valves in accordance with the engagement of said means by the tappets. Provision is also made in the exhaust connection for constricting the passageway thereof to retard the outflow of the air so that the piston will not descend too rapidly.

The nature of the invention, however, will best be understood when described in connection with the accompanying drawings, in which:

Fig. 1 is a front elevation, partly in vertical section, showing an installation of the novel apparatus in association with a pair of vats.

Fig. 2 is a more or less diagrammatic view illustrating the action of the valve-operating mechanism; and Fig. 3 is a fragmentary plan of a portion thereof.

Referring to the drawings, 10 designates a suitable pit or well into which a portion of the apparatus may be sunk to reduce the height of the same above the surface or grade 11. Upon either side of this pit are also sunk two tanks or vats 12 and 13, respectively, only a portion, however, of the same being below grade.

Within the pit is mounted a cylinder 15 having the piston 16 mounted for reciprocation therein, there being attached to the bottom of the piston a perforated metal bumper 17 adapted for engagement with suitable cushioning means 18 at the bottom of the cylinder when the piston descends to the lowermost point of its travel. A piston rod 20 projects through the upper end of the cylinder 15 being squared therein, as shown, to prevent rotation thereof relatively to the cylinder 15; and the said rod carries at its outer end, through the flange or shoulder 21 thereon, a cross-head 22 rotatable upon said shoulder about the longitudinal axis of said piston rod or spindle. The said spindle carries also at its extreme outer end and beyond the cross-head 22 an electric motor 23 which is geared, by means of the meshing gears 24, with the said cross-head 22. By energizing the motor, as by closing the starting switch 25 on panel 26, it will be appreciated that the cross-head may be rotated about spindle 20; and reels 27 and 28 suspended from its opposite ends may thus conveniently be brought into alignment with the vats 12 and 13 into which they are to be immersed as hereinafter set

forth. Furthermore, when the treatment of the reels containing the goods is completed, the motor may again be operated to swing the cross-head into a position such that the reels carried thereby shall be substantially at right angles to their position when being treated in the vats—the position shown in Fig. 1.

To effect the reciprocation of the piston, provision is made for introducing behind the same air or other gas under the required pressure, and also for exhausting the same therefrom. To this end, a connection 30 may be had from a suitable source of air under pressure, as, for example, the tank 31, Fig. 2, supplied from a motor-driven compressor 32 and through suitable valves and piping hereinafter more fully set forth. From the connection 30, an exhaust connection 33 is taken with a reducing valve 34 included to suitably restrict the outflow when the piston is lowered under gravity action so as to obviate an excessive rate of descent.

Suitable controls, both manual and automatic, are provided for the control of air from the said supply and exhaust connections. Thus, the latter connection 33 is provided with two manually controlled valves 35 and 36, the valve 35 having an outlet 37 directly to the atmosphere, while the outlet 38 from valve 36 connects with an automatically controlled valve 39, Fig. 2, adapted for exhausting gas from behind the piston 16. Beyond the exhaust connection to pipe connection 30, a supply connection 40 is had and in the same is included a manually controlled valve 41 for the supply of air under pressure to the cylinder and behind the piston, said valve 41 being included in series with an automatically controlled valve 42, Fig. 2, in the line from the supply tank 31. These various valves are preferably located on the panel 23; and by manipulating the same as hereinafter set forth, various controls of the piston and attached cross-head will be had for the loading, lowering and raising and unloading of the reels.

The operation of the automatic valves 39 and 42 in order to effect the automatic operation of periodic reciprocation of the reels, is accomplished from the reciprocation of piston rod 20. To this end, there is carried by the rod, or rather its flange 21, a tappet-rod 50 having adjustably secured thereon a pair of tappets 51 and 52 which are separated from each other a distance corresponding to the length of the reciprocation desired, it being understood that rod 50 will partake of the reciprocation of the piston rod 20. These tappets are adapted to engage alternately with the forked end 53 of a lever secured to a rotatably mounted shaft 54.

The other end 55 of the lever is pivoted to spring toggle means embodying the oppositely acting spring-urged arms 56 and 57 and the spring-urged arm 58. This provides for a spring-toggle control whereby, when the arm 55 is rocked past a horizontal position, it will be snapped into a location at one side or the other of the horizontal through the action of spring-urged arm 58, all of which is well understood and forms no particular part of the present invention.

The shaft 54, however, has mounted thereover a sleeve 60 provided with a longitudinal slot 61 into which extends a radially projecting pin 62 secured to the shaft; and fixedly secured to the said sleeve are oppositely extending valve operating arms 63 and 64, respectively. These

arms are adapted in one or the other of their positions, corresponding to the position of lever arm 55, to engage with or remain out of engagement with respective valve stems 65 and 66, respectively, of the valves 39 and 42, through corresponding laterally projecting fingers 67 and 68 of the said arms. Thus, in one or the other of the set positions, the valve 39 will be opened for exhausting connection 38 directly to the atmosphere or be shut off; and, similarly, the valve 42 will be opened to admit air under pressure behind the piston, or the supply of air be cut off.

It will be understood that in the provision of slot 61 and pin 62, a lost-motion action is involved so that the arms 63 and 64 will not immediately follow the movement of arm 55 and thus prevent premature action of a valve, which should occur only as the snap action takes place.

Furthermore, provision is made to insure a holding-in of a valve during the period that a particular cycle is taking place under its control.

To this end, an oscillating element 70 is provided for the arm 63, or rather its finger 67, and an oscillating element 71 for the arm 64, or rather its finger 68. These oscillating elements are pivoted upon respective posts 72 and 73 and are under the influence of a spring toggle mechanism represented at 74 and 75, respectively. In addition, each element is provided at its ends with rollers 76, 77 and 78, 79, which are adapted to embrace the respective fingers 67 and 68, one or the other of a pair of rollers being in engagement with a finger, in the particular position to which it has been set, and serving thus to block undesired movement of the corresponding arm.

When the period of automatic reciprocation has been completed through the automatic operation hereinbefore described, and it is desired to unload the reel from the cross-head, the valve 41 may be manually operated to shut off the supply of air and the exhaust valve 35 may be similarly opened to permit direct exhausting of the air from behind the piston. This will cause the cross-head to descend and with it the tappet 52 controlling the exhaust. This tappet is then loosened and lowered to such an extent that in the subsequent elevation of the cross-head no automatic exhausting will result through action of the tappet. Both exhaust valves 35 and 36 may then be shut off and the valve 41 again opened to admit air for elevating the cross-head sufficiently to swing the reels 27 and 28 clear of the tanks 12 and 13, whereupon, by closing switch 25, the motor 23 may be operated for turning the cross-head substantially at right-angles to its previous position for unloading of the reels and the loading on of a new set. The cross-head is then returned to its position wherein the ends thereof are in alignment with the tanks, and lowered by closing of the valve 41 and opening of exhaust valve 35. The tappet 52 is then again set for the desired position, after which the air-supply valve 41 is opened, the exhaust valves 35 closed and the exhaust valve 36 opened, which sets the apparatus for the automatic reciprocating cycle.

I claim:

In apparatus of the character described: a rotatably mounted cross-head, reels adapted to be suspended from opposite ends thereof, a pair of liquid-containing tanks with which the opposite ends of the cross-head may be vertically aligned to receive the reels suspended from the

said ends, a cylinder, a piston reciprocable therein, a piston rod extending through the cylinder to afford a vertical support for the said cross-head and secured against rotation relatively to the cylinder, means to admit fluid under pressure to said piston, means to exhaust fluid therefrom, and an electric motor carried by the piston rod at its outer end and geared to the cross-head for rotating the same about the vertical axis of said piston rod to position the reels with respect to the said tanks.

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