J. KERSHAW & J. T. COLE.

APPARATUS FOR DYEING YARN.

APPLICATION FILED OCT. 20, 1908.

934,543. Patented Sept. 21, 1909.

4 SHEETS—SHEET 1.

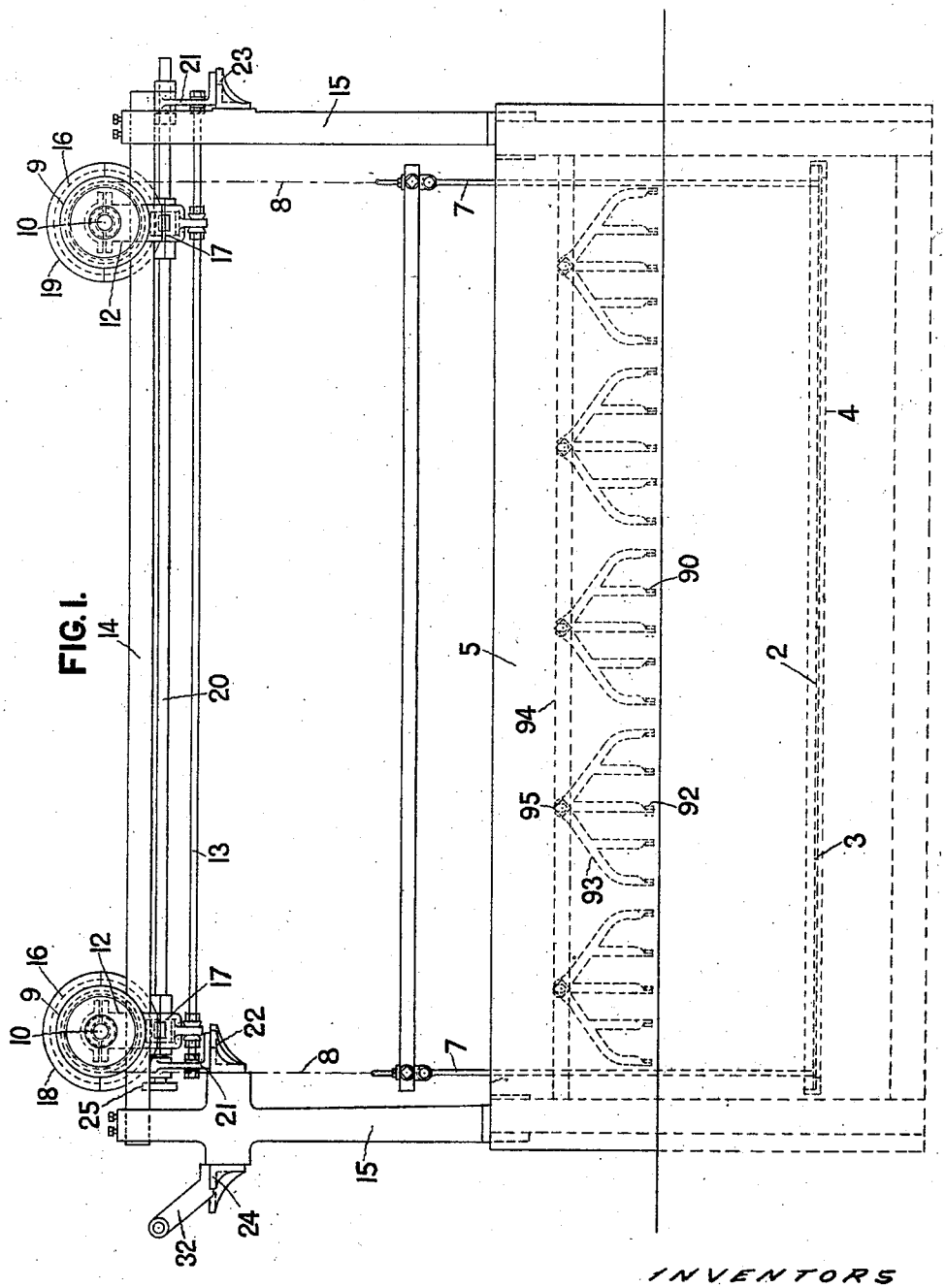

FIG. I.

WITNESSES

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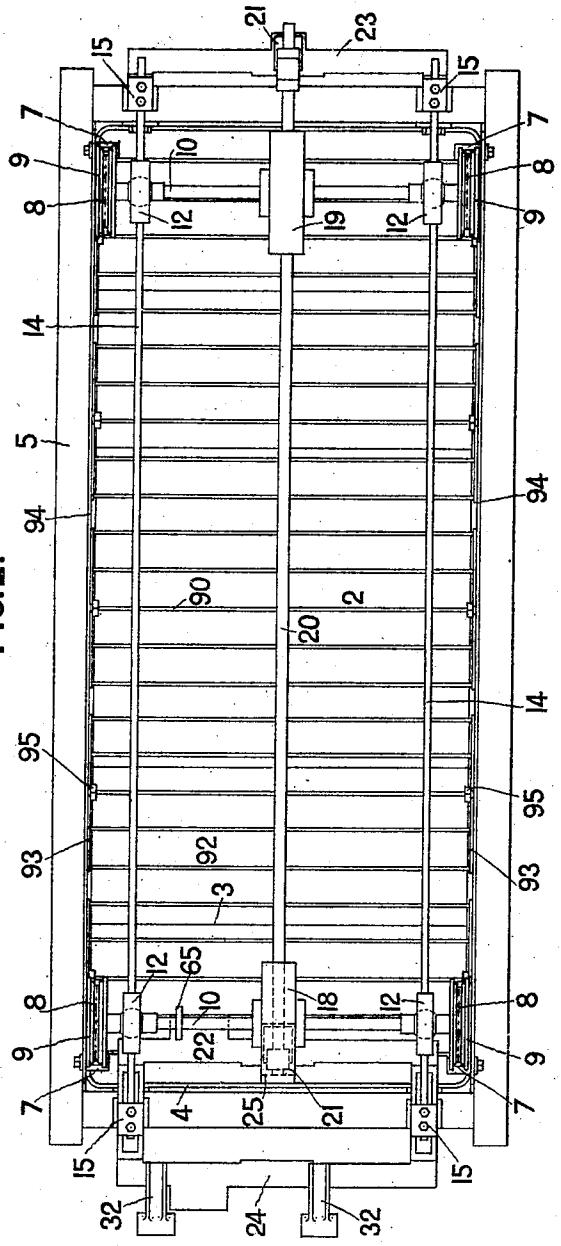

FIG. 2.

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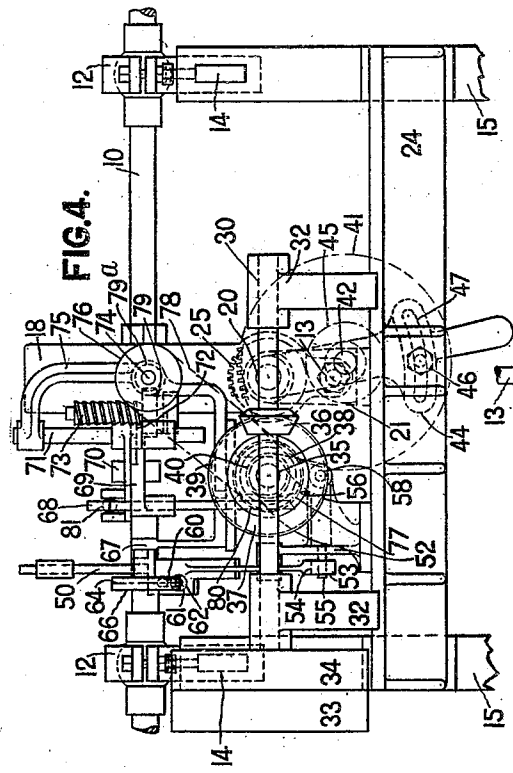

FIG. 4.

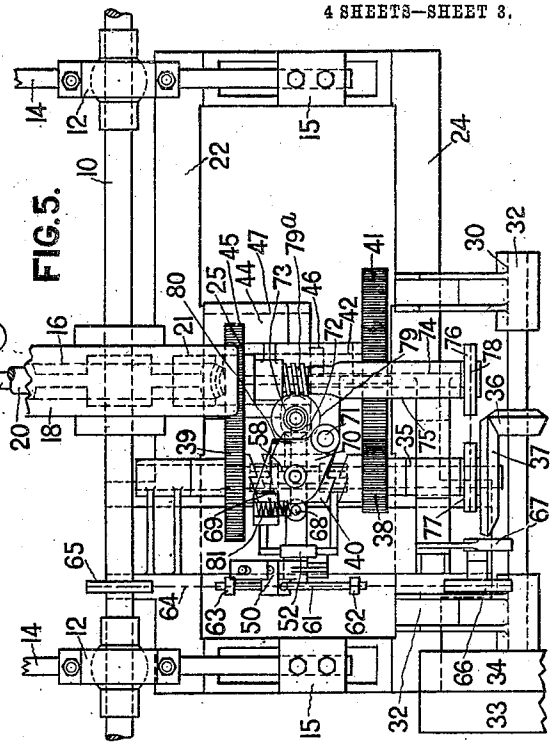

FIG. 5.

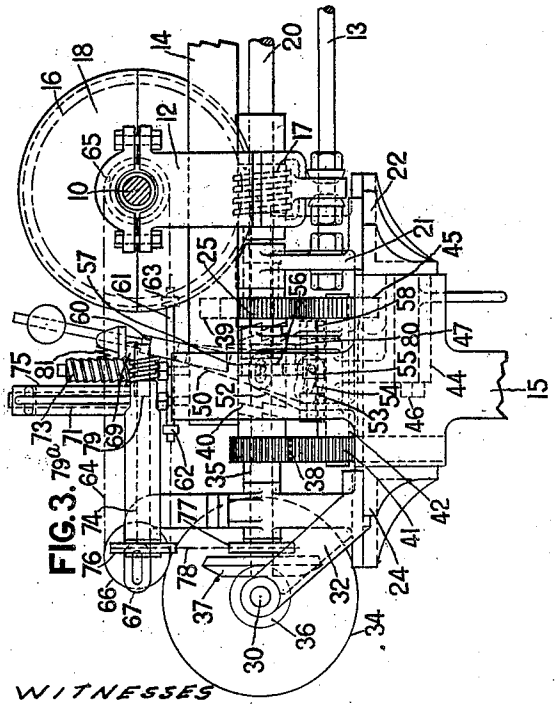

FIG. 3.

WITNESSES

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4 SHEETS—SHEET 4.

FIG.7.

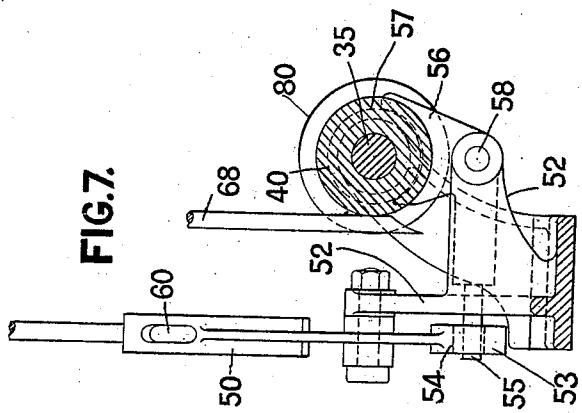
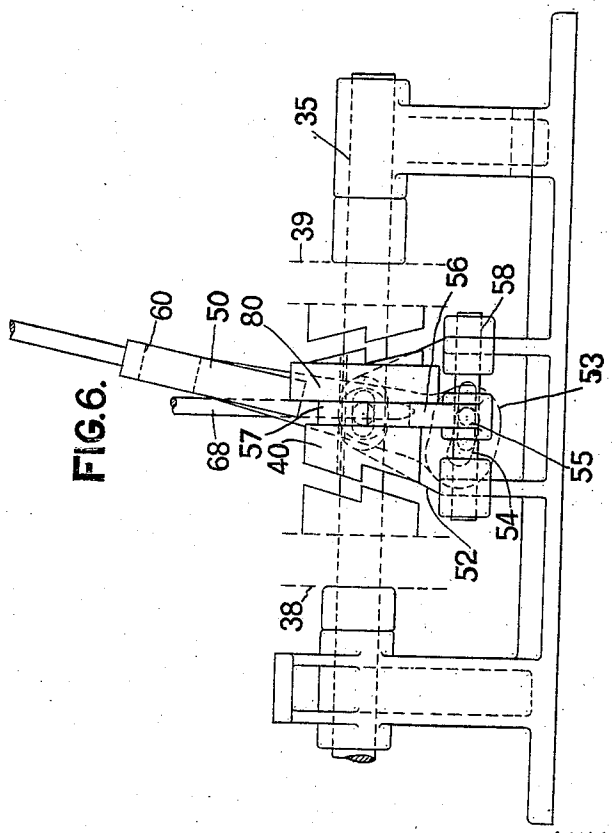


FIG.6.



WITNESSES
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UNITED STATES PATENT OFFICE.

JOE KERSHAW AND JOHN THOMAS COLE, OF MENSTON, ENGLAND.

APPARATUS FOR DYEING YARN.

934,543. Specification of Letters Patent. **Patented Sept. 21, 1909.**

Application filed October 20, 1908. Serial No. 458,697.

To all whom it may concern:

Be it known that we, JOE KERSHAW and JOHN THOMAS COLE, subjects of the King of Great Britain, residing at Malvern Villa and Rose Mount, Menston, Yorkshire, England, respectively, have invented new and useful Improvements in Apparatus for Dyeing Yarn and the Like, of which the following is a specification.

This invention relates to improvements in machines or apparatus for dyeing, mordanting or similarly treating with liquids wool, slubbing, yarn and other fibrous material, and the object of the invention is to impart a clean and even dye to the material by repeatedly compressing or squeezing it when in a saturated condition and allowing it to open out after each compression to its normal state or proportion by its own expansibility thus allowing it to absorb dye or the like liquid to its normal capacity when in an open state which superfluous liquid is again expelled by each compression thus evenly impregnating each fiber of the material being treated.

To fully describe our invention reference is made to the accompanying sheets of drawings, forming a part of this specification, in which similar reference numerals indicate corresponding parts in each of the views.

Figure 1 represents a side elevation of an ordinary slubbing vat fitted with our improvements but shown without the driving mechanism. Fig. 2 is a plan view of the same. Fig. 3 represents a side elevation on a larger scale of the driving mechanism, Fig. 4 an end view and Fig. 5 a plan view of the same. Figs. 6 and 7 are two views at right angles to each other of the clutch mechanism and associated parts as shown in Figs. 3 and 4 respectively on a larger scale.

A false bottom 2 of perforated metal or other reticulated material and preferably made in sections 3 is carried on the frame 4 fitting the bath or vat 5 which frame is supported, preferably, at each corner by vertical rods 7 and connected at the tops of such rods by chains 8 to the chain wheels 9 secured to the cross shafts 10. These cross shafts are carried by the bearing blocks 12 secured to the longitudinal bars 14 attached to the end pillars 15. The cross shafts 10 carrying the chain wheels 9 are rotated by right and left handed worm wheels 16 and worms 17, the worms being secured on the longitudinal shaft 20 supported at each end by the brackets 21 secured to the cross stays 22 and 23. The worm wheels 16 and worms 17 are inclosed in casings 18 and 19 which are secured in position on the longitudinal tie rod 13. The driving mechanism which is carried on the cross stays 24 and 22 operates the longitudinal shaft 20 by the end spur wheel 25.

The false bottom 2 is raised and allowed to fall by the driving shaft 30 journaled in bearings in the brackets or supports 32 secured to the cross stay 24. The shaft 30 has fast and loose pulleys 33 and 34 and drives the short shaft 35 by means of the bevel wheels 36 and 37. On the short shaft 35 is loosely mounted two spur wheels 38 and 39 between which the clutch 40 slides on a feather key. When the clutch engages the wheel 38 it locks it to its shaft 35 and the wheel drives a larger wheel 41 secured to the short shaft 42 journaled in the bracket 44, the wheel 41 drives the wheel 45 secured to the other end of the shaft 42 which wheel engages the end spur wheel 25 and thereby gives a slow rising motion to the false bottom 2. When the clutch engages the wheel 39 it locks such wheel to its shaft 35 which wheel engages the end spur wheel 25 thus allowing a rapid fall of the bottom. The spur wheels 41 and 45 are change wheels and the bracket 44 is hung from the shaft 20 in order that the change wheels may be changed to alter the relative speeds of the upward and downward motion of the false bottom, and the said bracket is locked in position by the bolt 46 passing through a slot 47 in the bracket and secured to the cross stay 22. The clutch is thrown into gear with either of the wheels 38 and 39 by the weighted falling lever 50 pivoted to the bracket 52 and the lower end 53 of such lever being provided with a slot 54 through which the pin 55 passes, the pin being secured to a forked or curved piece 56 fitting a recess 57 in the clutch 40 and the piece 56 is capable of sliding on the short shaft 58 secured in bearings in the bracket 52. Through a slot 60 in the upper arm of the weighted lever a rod 61 passes which rod is provided with adjustable collars 62 and 63 one on either side of the lever and which come into contact with the weighted lever 50 to throw it over from one

side to the other. To the ends of the rod 61 a chain 64 is fastened and such chain passes over a sprocket wheel 65 on the cross shaft 10 and a guide sprocket wheel 66 on a bracket 67.

In order that the false bottom may dwell at the bottom of its downward motion we provide a vertical rod 68 adjustably secured to the end of a horizontal lever plate 69 carried by and pivoted to the bracket 70 which bracket is secured to the rod 71 sliding vertically in bearings, the rod is prevented from turning in the bearings by a feathered key. The other end 72 of the lever 69 is so shaped as to be capable of fitting the groove of the buttress thread 73 which is kept constantly rotating by the worm wheel 79 secured to the bottom of such thread and a worm 79^a on the end of a short shaft 74 supported in the bracket 75 the other end of such shaft 74 being driven by its sprocket wheel 76 from the sprocket wheel 77 on the clutch shaft 35 by the chain 78. The lever plate 69 and vertical rod 68 adjustably secured thereto rise when the end 72 engages the rotating buttress thread 73 through a collar 80 on the clutch 40 coming into contact with the rod 68 when the clutch is thrown out of gear with the wheel 39 and is passing toward the wheel 38. The collar 80 is made wide enough in order that when the clutch engages the wheel 38 the end of the vertical rod 68, when lifted out of the way of such collar, rests on the periphery of the collar. When the collar 80 comes into contact with the vertical rod adjustably attached to one end of the lever plate 69 it forces the other end 72 of such plate into gear with the rotating buttress thread 73 against the tension of the spring 81 and thereby raises the rod 68 until the collar can pass beneath such rod when the clutch is thrown into gear with the wheel 38 and the rod rests on the periphery of the collar. When the clutch is thrown into gear with the wheel 39 the rod falls off the periphery of the collar 80 into its normal position down at the side of the clutch until it is again operated upon by the collar.

To prevent shock when the bracket 70 and connecting parts fall and also to facilitate raising the bracket and connecting parts we connect them to a counterweight attached to one end of a chain passing over a pulley fixed to any convenient stationary part of the apparatus, the other end of the chain is secured to either the bracket 70 or the top of the vertical rod 71 thus the parts are counterbalanced in proportion to the heaviness of the weight employed.

The material to be treated is placed evenly in the vat on the false bottom 2 and is packed more or less up to the grid or lattice top 90 preferably made in two or more sections 92 and provided with hinged pieces or ends 93 secured to the flanges 94 at the sides of the vat by thumb screws or nuts 95.

In operation the material being treated in the vat of the apparatus is repeatedly squeezed or compressed between the false bottom 2 and the grid or lattice 90, thus expelling the superfluous dye liquor, and the action of the mechanism allowing the false bottom to drop to the bottom of the vat, thus removing the pressure from the material which naturally opens out, similar to the action of a sponge, until it again absorbs the dye liquor to its maximum capacity when it is again squeezed by the automatically rising false bottom. It will be evident that the dye liquor being repeatedly absorbed by and expelled from the material such material will become thoroughly permeated, thus causing all the composing fibers to be evenly dyed or treated. The rapidly falling bottom tends to keep the liquor in an agitated condition.

We claim:—

1. In machinery or apparatus for dyeing and similarly treating wool, yarn and the like, a vat, a relatively fixed grid a false bottom below said grid, means for repeatedly elevating and means of allowing a rapid fall of the false bottom, said means permitting said false bottom time to dwell sufficiently at the bottom of the vat to permit the material being treated time to expand and open out after each compression, as for the purpose specified.

2. In dyeing and similar machines, the containing vat 5, the perforated false bottom 2, chain wheels 9, means for giving said wheels a slow rising motion and a quick falling motion with a dwell at the end of such motion, chains supporting the bottom 2 from the wheels 9, and the grid or lattice top 90, as herein shown and described and for the purpose specified.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOE KERSHAW.
JOHN THOMAS COLE.

Witnesses:
SAMUEL A. DRACUP,
CECIL A. S. BAXTER.