

(No Model.)

2 Sheets—Sheet 1.

E. TURNBULL.
APPARATUS FOR DYEING.

No. 512,922.

Patented Jan. 16, 1894.

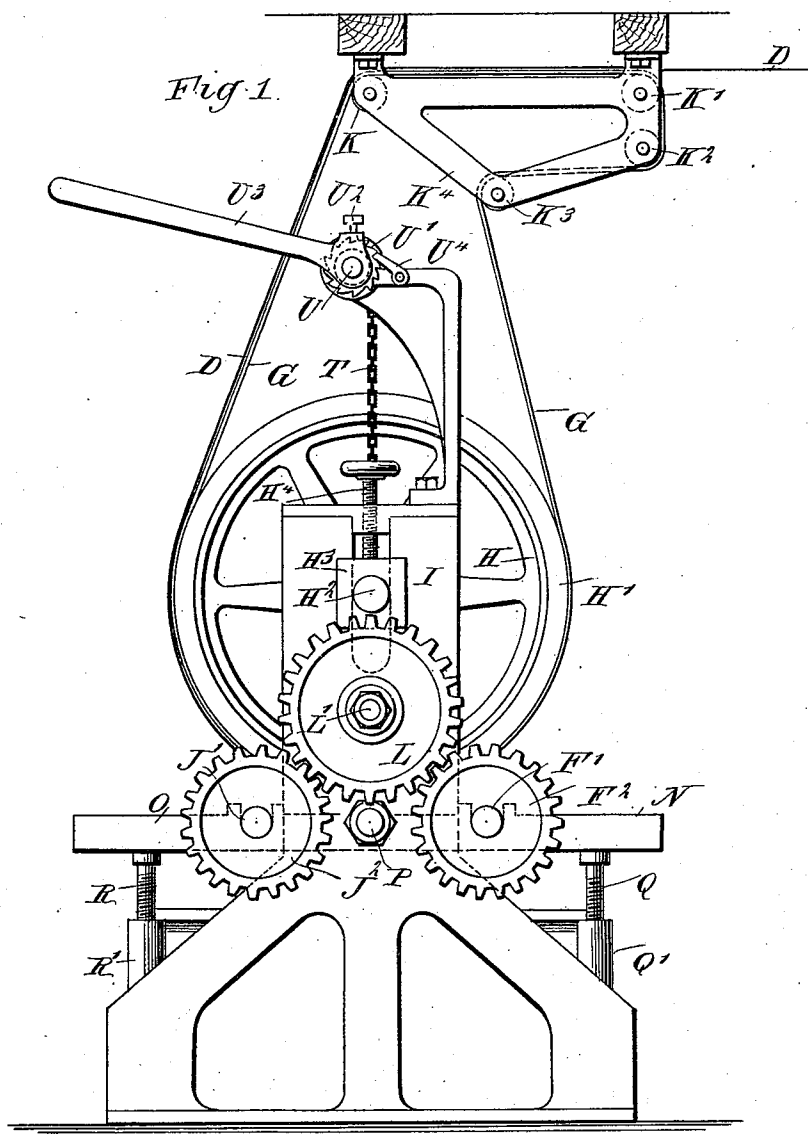
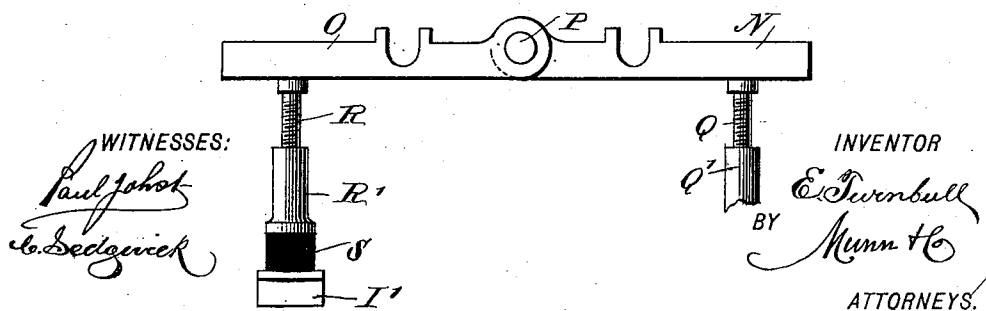


Fig. 4



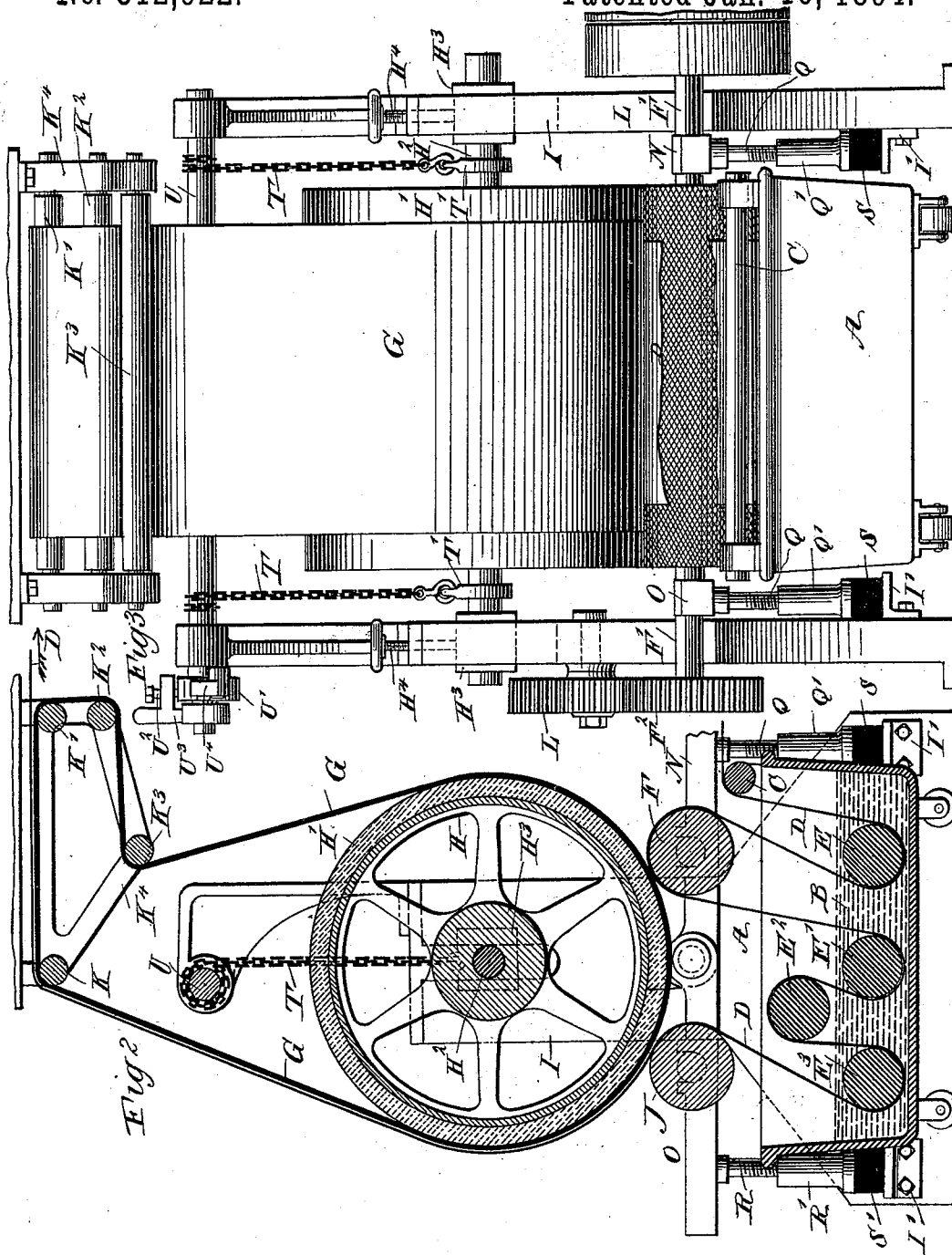
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UNITED STATES PATENT OFFICE.

EDWARD TURNBULL, OF PASSAIC, NEW JERSEY.

APPARATUS FOR DYEING.

SPECIFICATION forming part of Letters Patent No. 512,922, dated January 16, 1894.

Application filed October 2, 1893. Serial No. 487,015. (No model.)

To all whom it may concern:

Be it known that I, EDWARD TURNBULL, of Passaic, in the county of Passaic and State of New Jersey, have invented a new and Improved Dyeing-Machine, of which the following is a full, clear, and exact description.

The invention relates to machines for dyeing fabrics in the piece, and its object is to provide a new and improved dyeing machine which is simple and durable in construction, very effective in operation, and arranged to cause the dye to penetrate the fibers and to properly and thoroughly dye the fabric without any waste of the dye.

The invention consists of certain parts and details and combinations of the same, which will be hereinafter described and pointed out in the claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the views.

Figure 1 is an end elevation of the improvement. Fig. 2 is a cross section of the same. Fig. 3 is a rear elevation of the same, with parts broken out; and Fig. 4 is a detail side elevation of the bearings for the rollers.

The improved dyeing machine is provided with a vat or tank A, mounted on wheels and containing the dye B, the said vat supporting at its rear end a transversely-extending small roller C, over which passes the piece of fabric D into the vat A, and under a roller E submerged in the dye, so that the fabric comes in contact with the dye and then passes upward upon and over a roller F, having a regular roughened surface, as indicated in Fig. 2.

On the fabric D, while passing over the roughened surface of the roller F, presses an endless rubber belt G, passing over an elastic covering H' held on the rim of a cylinder H, secured on a shaft H² mounted to revolve in suitable bearings H³, held vertically adjustable in the main frame I. The elastic covering H' is preferably formed of woollen blankets wrapped around the rim of the cylinder H to a thickness of about an inch. Thus the backing for the rubber belt G, while passing over part of the cylinder H, is elastic to

permit of pressing the fabric in firm contact with the roughened surface of the roller F without injury to the fabric. The rubber belt or blanket G presses also upon a roller J, similar in construction to the roller F, and a trifle larger in diameter, the said roller being located on the opposite side of the cylinder H, as will be readily understood by reference to Fig. 2. The fabric D, after leaving the previously mentioned roller F, passes downward again into the dye contained in the vat A, and passes under a roller E', then over a roller E², and then again under a roller E³ up to the roller J above mentioned. The rollers E, E', E² and E³ are journaled in the vat A, and the rollers E' and E³ are submerged in the dye B, while the roller E² is preferably above the same in the tank or vat A, as illustrated in Fig. 2. The fabric after being pressed a second time by the rubber belt or blanket G on the roughened surface of the roller J, passes upward with the moving blanket or belt G, the latter extending at its upper end over small rollers K, K', arranged in a horizontal plane, the fabric leaving the belt at the roller K', as plainly indicated in Fig. 2. The blanket or belt G, after leaving the roller K', extends downward under a roller K², then over a roller K³, then back to the covering H' of the cylinder H, as shown in Fig. 2. The rollers K, K', K² and K³ are preferably mounted in an overhead frame K⁴, as shown in the drawings.

The shafts F' and J' for the rollers F and J rotate in unison, and for this purpose the said shafts are provided with gear wheels F² and J² respectively in mesh with an intermediate gear wheel L mounted to rotate on a stud L', held on one of the standards of the main frame I. Either of the shafts F' or J' may be the driving shaft, and for this purpose is furnished with fast and loose pulleys or other mechanism connected with driving machinery to impart rotary motion to the said shaft F' or J', and the intermediate gear wheel L, to rotate both rollers F and J in unison.

The cylinder H rests with its weight on the rollers F and J, and when the machine is set in motion by driving either shaft F' or J', the

said cylinder H is likewise rotated, and traveling motion is given to the fabric D and belt G, by the latter two passing between the rollers F, J, and the cylinder H. If desired, the pressure of the cylinder H on the rollers F and J, and the fabric D and belt G passing between the same, can be increased by adjusting the screws H⁴ screwing in the frame I, and abutting on the top of the bearings H³, carrying the shaft H² of the cylinder H.

The shafts F' and J' of the rollers F and J respectively, are journaled in bearings secured or formed in sets of arms N and O respectively pivoted at P, to the standards of the main frame I, as will be readily understood by reference to Figs. 1 and 4. The free ends of the pivoted arms N and O rest on screws Q and R respectively, screwing in nut casings Q' and R' respectively resting with their lower ends on springs preferably in the shape of rubber blocks S and S', respectively supported on brackets I', fastened on the standards of the main frame I. By this arrangement the rollers F and J are yieldingly mounted and can, in addition, be adjusted up or down by turning the screws Q and R accordingly in their nut casings Q' and R' respectively. The rollers F and J can thus be brought in perfect alignment with the peripheral surface of the cylinder H.

When it is desired to dye a piece of fabric with a different dye, then the vat A is run out from under the rollers F and J, and another like vat with the desired dye stuff therein is placed in position under the rollers. Now, in order to run the fabric between the rollers F, J and belt G, the cylinder H must be raised, and for this purpose I provide lifting chains or ropes T, T', formed at their lower ends with rings T' loosely engaging the shaft H² at opposite ends of the cylinder H, as will be readily understood by reference to Fig. 3. The upper ends of the chains T wind on a shaft or drum U, journaled in the upper end of the frame I. The shaft U carries a ratchet wheel U', adapted to be engaged by a pawl or pin U² held on a lever U³ fulcrumed loosely on the shaft U. A dog U⁴, pivoted on the frame I, also engages the said ratchet wheel to prevent a return movement of the ratchet wheel and cylinder H, after the latter is raised. Now, in order to do this, the operator first screws the screws H⁴ up and then moves the device U³ downward so that the pawl U² turns the ratchet wheel U' and shaft U, to wind up the chains T. The dog U⁴ then holds the ratchet wheel in place for the operator to move the lever U³ upward for a new grip with the pawl U² on the ratchet wheel U'. The above described operation is then repeated until the cylinder H is sufficiently raised to permit a convenient insertion of the new fabric to be dyed between the rollers F, J, and the belt G and cylinder H. The latter is then lowered by throwing the dog U⁴ out of mesh with the ratchet wheel U'. Now it will be seen that

when the machine is in operation, the fabric first receives the dye stuff, and is then pressed by the elastic covering of the cylinder H upon the roughened peripheral surface of the roller F, after which the fabric is again passed through the dye and over the other roller J, to be again pressed in contact with the peripheral surface of the said roller J by the elastic covering of the cylinder H. Any surplus dye stuff will run down the upwardly-moving fabric and pass back into the vat. The fabric after leaving the roller J, passes up with the rubber belt or blanket G, to finally pass over the same in a horizontal plane between the rollers K and K', as above described.

This machine will cause the dye to penetrate the fibers of the fabric so as to perfectly dye the same throughout and without any waste of the dyeing material. The rubber belt or blanket G serves principally to prevent the dye stuff from passing upon the elastic covering of the cylinder H.

By this machine I am enabled to save considerable labor and time over the ordinary method of dyeing as heretofore employed, and I am enabled to dye any desired color on all kinds of piece fabrics.

I have found by experience that the goods dyed with this machine do not need to undergo a scouring and finishing process. The dye in the vats does not require heating, and no extracting process is necessary, as no surplus dye or moisture is left in the fabric after it leaves the machine.

It is to be understood that considerable pressure is exerted by the cylinder H while the fabric is undergoing the dyeing process.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A dyeing machine, provided with a roller having a roughened peripheral surface over which passes the fabric after having passed through the dye in the vat, a revoluble cylinder having an elastic covering and arranged over the said roller, to press a fabric firmly upon the roughened surface of the said roller to distribute the dye and press the latter into the fibers, and a rubber belt or blanket passing over the said elastic covering, between the latter and the said roller, substantially as shown and described.

2. A dyeing machine, comprising a revoluble cylinder having an elastic peripheral covering, a rubber belt or blanket passing around the said cylinder, two rollers having roughened peripheral surfaces and over which passes the fabric to be pressed on by the said cylinder, a dye vat containing the dye, and rollers journaled in the said vat and over which passes the fabric to take up dye and to pass over the said rollers, substantially as shown and described.

3. A dyeing machine, comprising a revoluble cylinder having an elastic peripheral covering, a rubber belt or blanket passing

around the said cylinder, two rollers having
roughened peripheral surfaces and over which
passes the fabric to be pressed on by the said
cylinder, a dye vat containing the dye, roll-
5 ers journaled in the said vat and over which
passes the fabric to take up dye and to pass
over the said rollers, and guide rollers for the

said belt or blanket, substantially as shown
and described.

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Witnesses:

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