No. 796,668. PATENTED AUG. 8, 1905.

J. MARSHALL.

DYEING APPARATUS.

APPLICATION FILED FEB. 9, 1905. 2 SHEETS—SHEET 1.

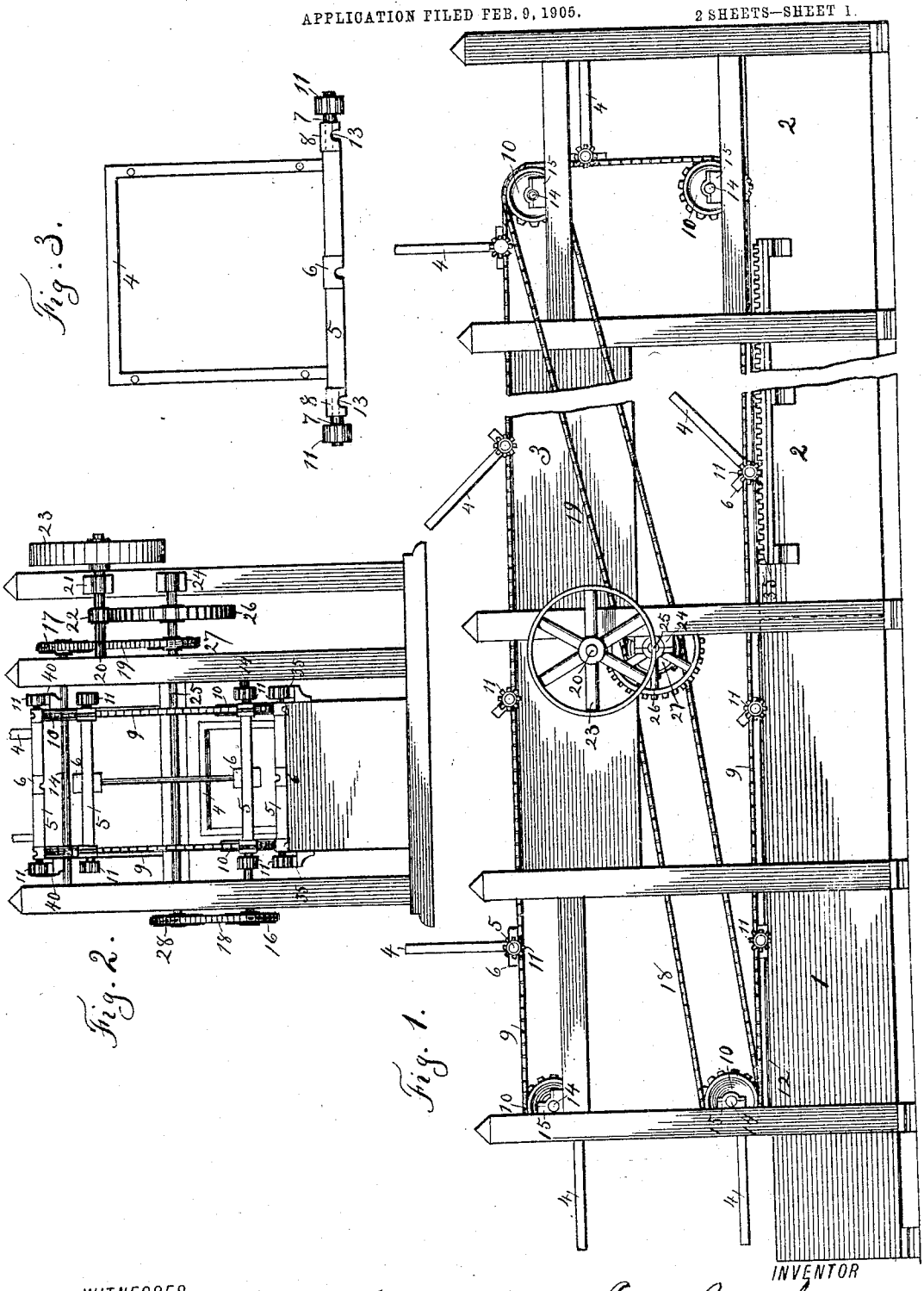


Fig. 3.

Fig. 2.

Fig. 1.

WITNESSES

Samt. H. Fairchild

Bronson Burr.

INVENTOR

James Marshall

BY

ATTORNEY

Chas. E. Jackett

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

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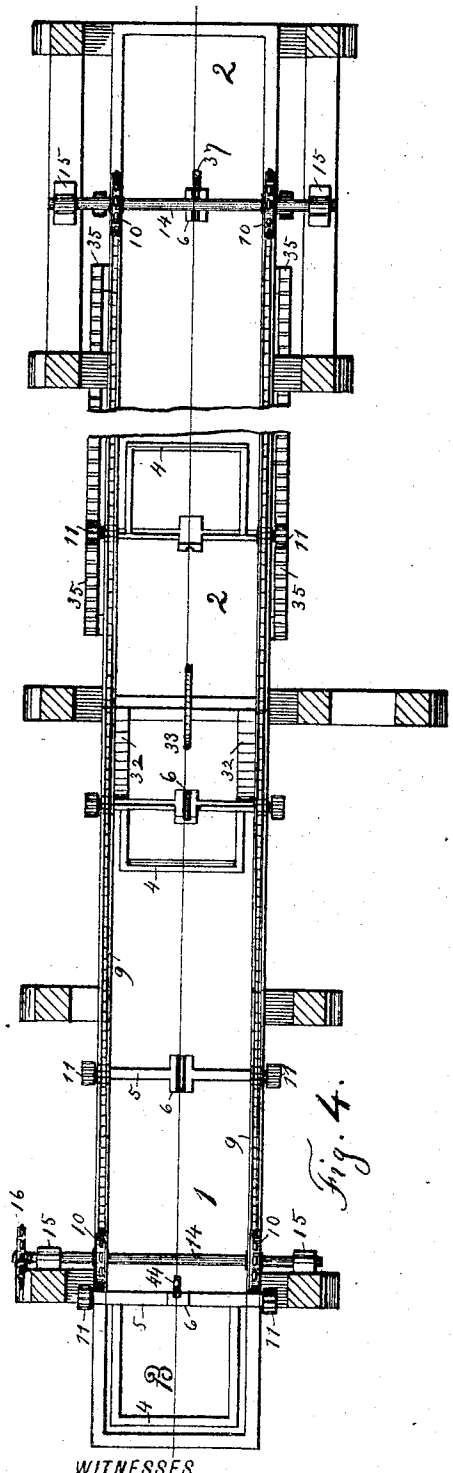


Fig. 4.

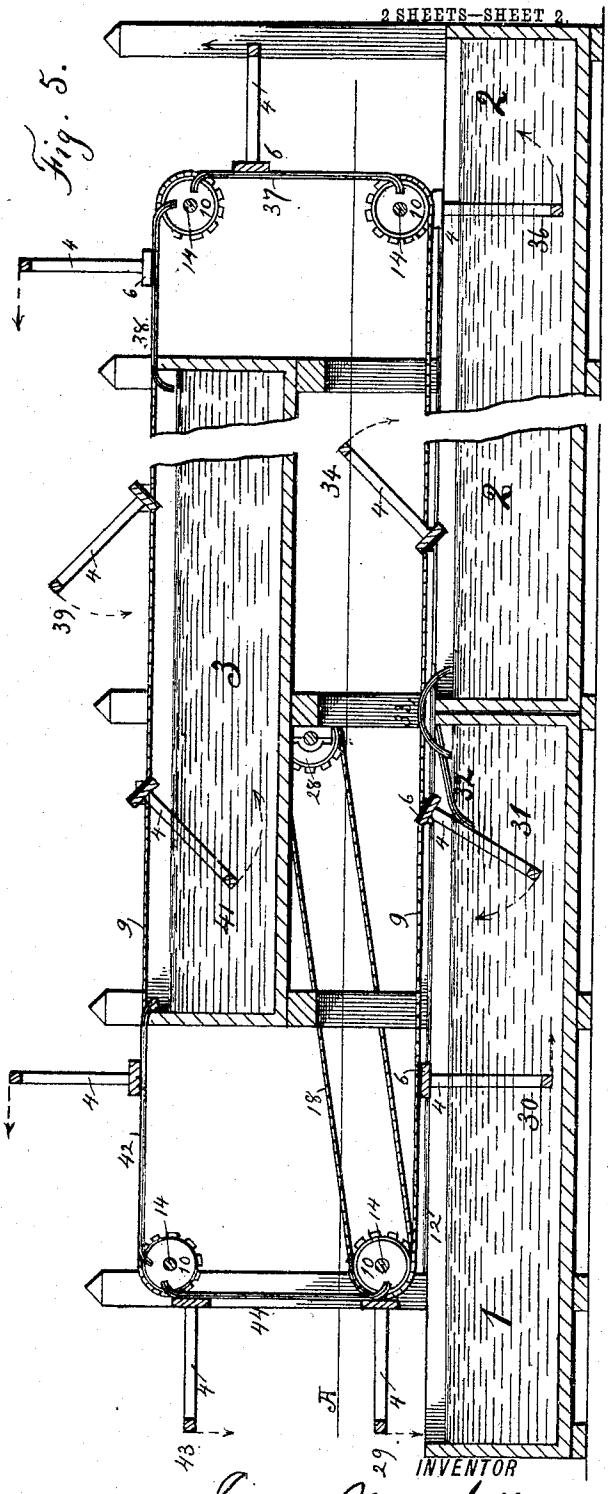


Fig. 5.

WITNESSES

Saml. H. Fairchild

Bronson S. Burr.

James Marshall

BY

ATTORNEY

Chas. E. Sackett

ANDREW. B. GRAHAM CO., PHOTO-LITHOGRAPHERS, WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JAMES MARSHALL, OF FALL RIVER, MASSACHUSETTS.

DYEING APPARATUS.

No. 796,668 Specification of Letters Patent. Patented Aug. 8, 1905.

Application filed February 9, 1905. Serial No. 244,971.

To all whom it may concern:

Be it known that I, JAMES MARSHALL, a citizen of the United States, residing at Fall River, in the county of Bristol and State of Massachusetts, have invented a new and useful Improvement in Dyeing and Clearing Apparatus, of which the following is a specification.

My invention relates to improvements in dyeing and clearing vats in which articles to be treated are immersed in a succession of liquid solutions designed to set the color or to wash or clear the fabrics from any extraneous matter.

The object of my invention is not only to perform the operation mechanically and automatically in a more thorough and uniform manner than can be done by the present separate processes, but to make the whole process automatically continuous, so that each article is treated exactly alike as to length of immersion and manipulation in the several solutions. I attain these objects by the mechanism illustrated in the accompanying drawings, in which—

Figure 1 is a parted outside elevation of the apparatus; Fig. 2, a front view; Fig. 3, an enlarged view of one of the movable frames; Fig. 4, a parted horizontal section on line A of Fig. 5, which shows a vertical section through line B of Fig. 4.

In all the figures like numerals relate to like parts.

1 is a vat for holding a liquid solution; 2, a vat having similar side and end sections abutting against vat 1 and holding a liquid solution adapted for successive application to the articles treated. This vat is shown parted, as it is desirable in most instances to have it much longer than could be illustrated here. 3 is a vat arranged above the other two, having substantially the same width, of suitable depth, and also shown parted for the above reasons. This vat holds hot or cold water or any solution desirable for washing or clearing the fabrics from any extraneous matter. These vats are arranged in upper and lower divisions supported by a substantial frame, as shown.

4 is a movable frame, a number of which are used in connection with the apparatus. It consists (see Fig. 3) of a frame of any suitable shape, one side of which is formed into an axle 5, having a fast central bearing 6 and outside journals 7, supporting loose boxes 8. These boxes are attached in a uniform manner by means of screws or bolts to a link belt, 9, which moves continuously along the top edges of the sides of the vats and around the four sprocket-wheels 10 at each end of the vats. These parts are duplicated on each side of the vats, so that the movement of the frames is uniform through the liquor. The journals of the frame-axles are extended beyond the sides of the vats and terminate in gear-wheels 11, made fast to them. The side edges of the two lower vats have a raised track 12 of any desirable shape secured to them, and the bottoms of the loose boxes are grooved, as at 13 in Fig. 3, to conform to this shape and slide upon it. The sprocket-wheels 10 near each end of the vats are attached to through-shafts 14, journaled in boxes 15, attached to the frame of the machine and having at one outboard end fast sprocket-wheels 16 17, which drive them. (See Fig. 2.) These wheels are connected by link belts 18 19 to a central driving mechanism consisting of a shaft 20, journaled in boxes 21, attached to the frame and carrying between the boxes a spur-gear 22. On the outboard end of this shaft is a fast pulley 23, which is belted to any convenient power for driving the apparatus. Below this shaft, journaled in boxes 24, is a through-shaft 25, carrying a large gear 26, meshing into the spur-gear, and a sprocket-wheel 27, driving the link belt 19 on one side of the machine. At the other end of the shaft is a similar sprocket-wheel 28, driving the link belt 18 on the other side of the machine. Thus the driving-chains give to all the sprocket-wheels, shafts, and boxes attached to the chains carrying the movable frames a positive uniform slow movement through the various solutions.

The frames, as shown in Figs. 1 and 5, at the front of the machine are held in a horizontal position as they pass in order that they may be supplied with the materials to be treated and those finished removed. This is most easily accomplished by having a matched frame with suitable catches on which the materials have already been arranged and which is quickly substituted for a finished frame as it slowly passes down the front of the machine.

The operation of the machine is as follows: The link belts being started, the frame 4 at the starting position 29 (see Fig. 5) moves in the direction of the dotted line and entering the vat passes through the liquid, as shown

at position 30, until it reaches position 31, where it encounters inside flanges 32, arranged at each side of the vat, which push the frame up until its central axle-bearing 6 encounters the central arched track 33, which causes the frame to rise from vat 1 and descend into vat 2, where the outside axle-gears 11 encounter an outside rack 35, (see Figs. 1 and 2,) and the frame 4 begins to revolve through the liquid as it moves along, as shown in position 34 of Fig. 5, thus stirring the materials well through the solution, and this is kept up for any desirable length of vat. The gear-racks end in time to leave the frame 4 in a quiescent state as it passes under the sprocket-wheel at position 36. Having passed around it, its center bearing slides upon the upright track 37, which steadies the frame until it passes around the upper sprocket wheel, where its center bearing slides upon track 38, which supports the frame over the edge of vat 3, where it descends into the liquid, as shown at position 39. At the same time the outside gear-wheels encounter outside tracks 40, (see Fig. 2,) which cause the frame to revolve through the vat until it reaches its end at position 41. Here its center bearing encounters track 42, which supports it over the sprocket-wheel to position 43, where it passes down upright track 44 to the starting-point. These operations may be lengthened or repeated, as is desirable.

Various mechanical modifications for the lifting or revolving devices or the manipulation or form of the frames carrying the materials may be adopted without departing from the spirit of the invention.

The apparatus is suitable for a variety of uses, such as the clearing of hats after stiffening and other similar operations.

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

1. In a dyeing and clearing apparatus the combination of a frame supporting vats adapted to hold liquids, said vats being arranged in upper and lower divisions, a series of frames having a forward movement through the liquids contained in the vats of the lower division, mechanism for transferring said frames from vat to vat, mechanism for lifting the frames from the vats of the lower division to the vats of the upper division, said mechanism giving said frames a return movement through the liquid contained in said upper vats to the place of beginning, substantially as described and shown.

2. In a dyeing or clearing apparatus, the combination of two or more vats arranged contiguous to each other adapted to hold liquids, a series of frames joined to link belts at regular intervals adapted to move along the edges of said vats, said frames having outside journals to which gear-wheels are made fast, said gear-wheels meshing into racks made fast to the sides of said vats, whereby the frames are revolved at suitable intervals and positions within said vats, substantially as described and shown.

3. In a dyeing or clearing apparatus, the combination of two or more vats arranged contiguous to each other adapted to hold liquids and supported by a common frame, a series of movable frames having axles at one side, and loose boxes journaled on said axles adapted to move along the edges of said vats, continuous link belts made fast to said boxes at suitable intervals, sprocket-wheels actuated by a driving power giving movement to said belts, gears made fast to the extremities of said frame-axles arranged outside said vats, racks made fast to the side of said vats engaging said gears at suitable intervals, and a central bearing on said frame-axles, arranged to slide upon a central track, and support said frames, when not supported by the sides of the vats, substantially as described and shown.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

JAMES MARSHALL.

Witnesses:
SAML. H. FAIRCHILD,
BRONSON S. BURR.