No. 629,715. Patented July 25, 1899.

J. W. CROWTHER.

HANK DYEING MACHINE.

(Application filed Dec. 23, 1898.)

(No Model.)

Fig. 1.

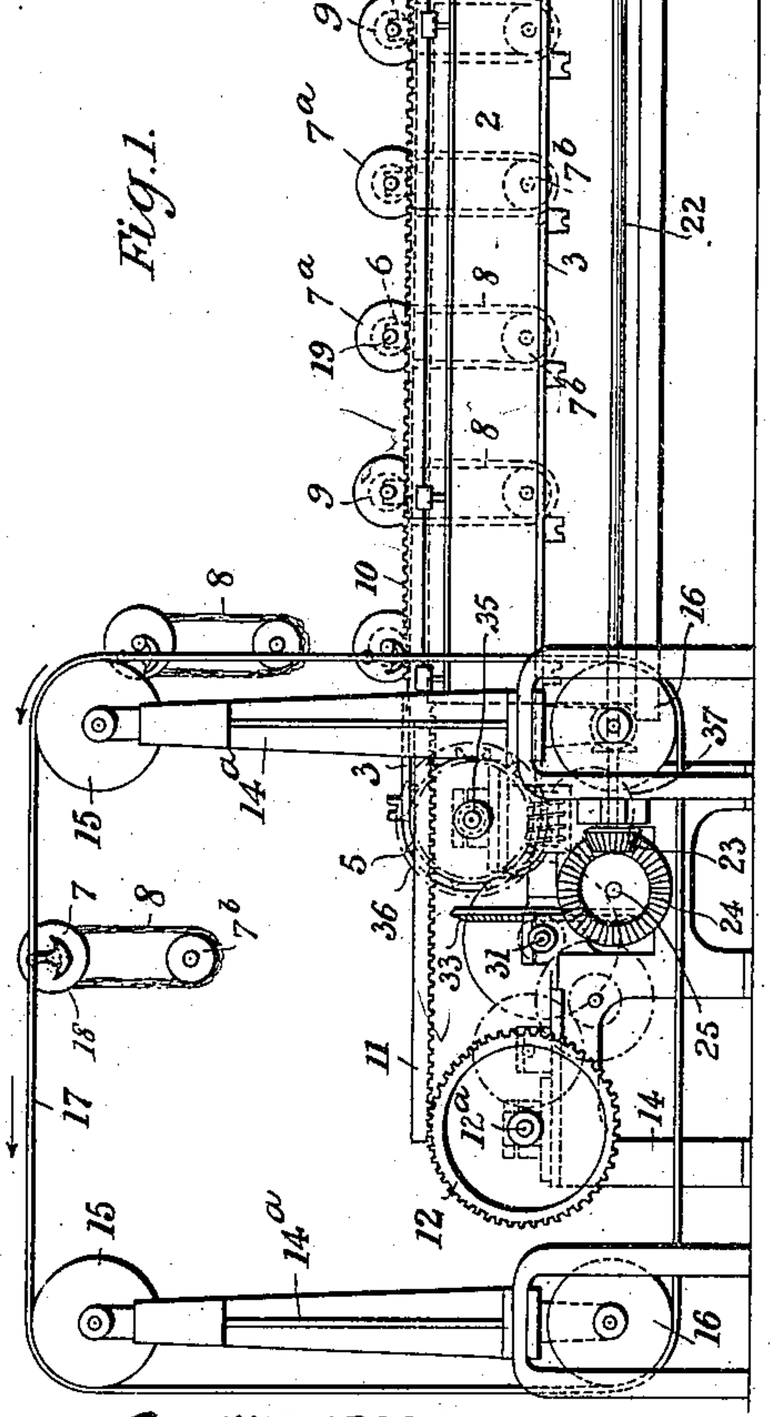


Fig. 2.

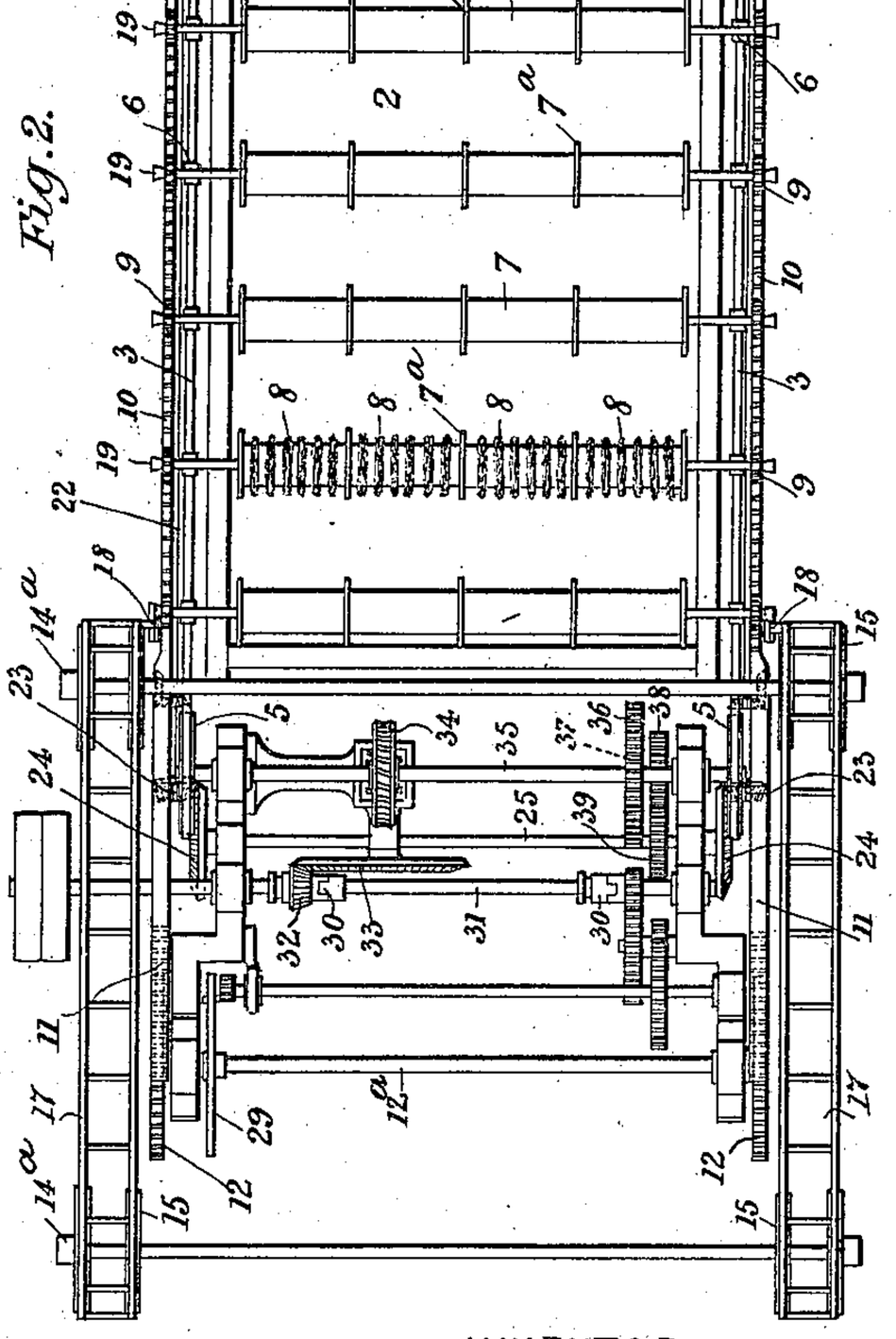


Fig. 3.

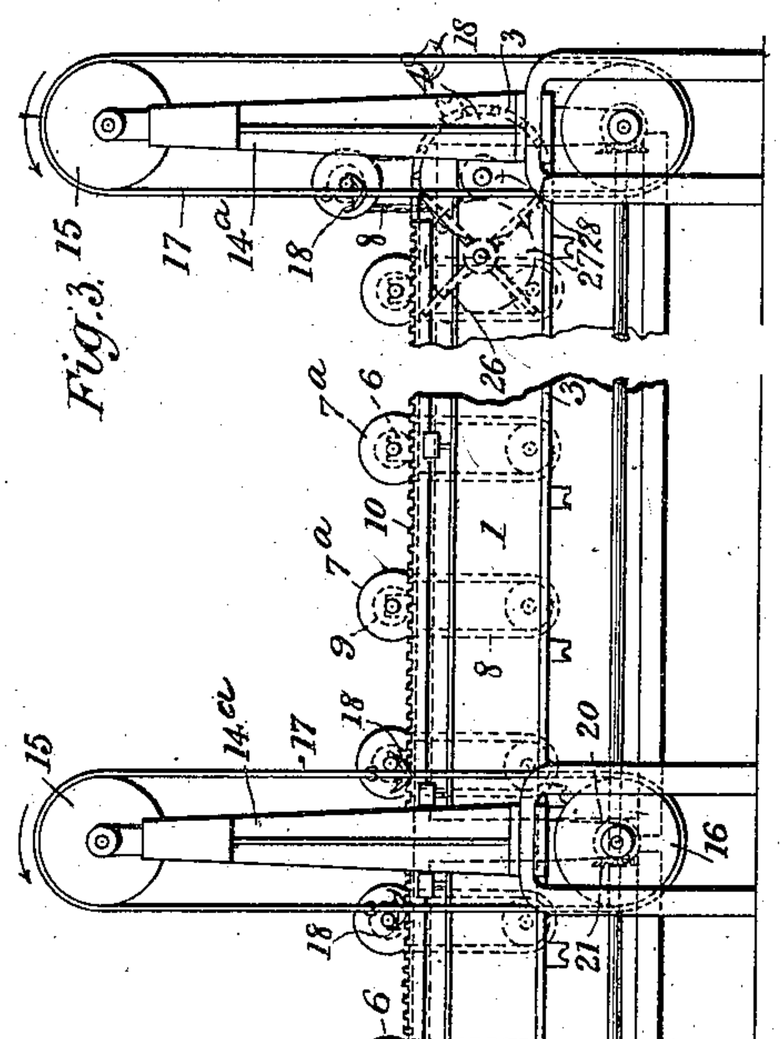
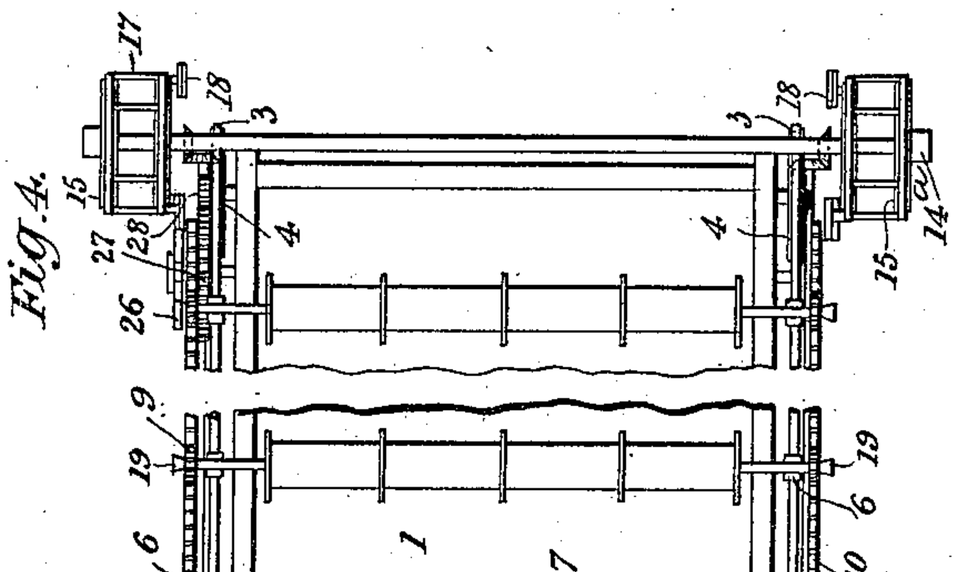


Fig. 4.



WITNESSES.

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JOSEPH WILBY CROWTHER, OF KIRKHEATON, ENGLAND.

HANK-DYEING MACHINE.

SPECIFICATION forming part of Letters Patent No. 629,715, dated July 25, 1899.

Application filed December 23, 1898. Serial No. 700,135. (No model.)

To all whom it may concern:

Be it known that I, JOSEPH WILBY CROWTHER, a subject of Her Majesty the Queen of Great Britain, residing at Gawthorp Green, Kirkheaton, in the county of York, England, have invented a certain new and useful Improvement in Hank-Dyeing and Like Machines, of which the following is a specification.

My invention relates to an improvement in hank-dyeing and like machines, such as scouring-machines; and it consists of improved apparatus constructed to provide for the supply of hanks to the vats, to effect the automatic transfer of such hanks from vat to vat throughout the series of vats, to reverse the individual motion of the hanks in the vats, and to deposit such hanks when dyed or treated upon a delivery creeper or carrier.

In the accompanying drawings is illustrated a machine constructed according to my invention.

Figure 1 is an elevation of a portion of my machine; Fig. 2, a plan; Fig. 3, an elevation of the entering end of a machine to show a modification, and Fig. 4 a plan of Fig. 3.

According to my invention I employ one or more dye or liquor vats. As shown in Figs. 1 and 2, two only are used, and these are indicated by the numerals 1 2; but any number may be employed. Extending the length of all the vats are endless chains 3 3, one being on each side. These travel adjacent to the upper edge of the vats and are carried by sprocket-wheels 4 4 and 5 5 at either end. The wheels 4 4 at the entering end are not shown in Figs. 1 and 2, but may be seen in Figs. 3 and 4, which show the entering end of the machine with a modification. On the chains are a series of bearing-blocks 6 for the purpose of supporting the spindles of rollers 7, on which are placed the hanks 8 to be treated. In place of rollers plain rods may be employed; but in either case it is desirable to divide the rollers or rods into lengths, as by flanges 7^a, so as to separate the hanks somewhat and keep the mass of them from crowding together, whereby they are in a more open state when in the liquor. The hanks are kept distended by loose bottom rollers 7^b, hung in the bights of same. The rollers (or rods) 7, with their hanks, are thus supported by the chains 3. The spindle of each roller has also near each end a pinion 9, which engages with a rack 10. At the delivery end each of the racks 10 is attached to a second rack 11, inverted as regards the first one, so as to engage with gear-wheels 12 12 on a shaft 12^a, supported in a suitable framework 14.

Between the tanks 1 2 and between every tank and next where more than two are employed is an elevating device for transferring the hanks from one tank to the next. These consist of frames or uprights 14^a 14^a, each carrying in suitable bearings double pulleys 15 16 at the top and bottom, respectively, over which pass wide chains 17, adapted to travel on both of the pulleys. The chains carry on the inside a number of pivotally-hung hooks 18, adapted to engage with the ends 19 of the spindles of the rollers 7. These ends are preferably expanded or flared outwardly, as shown in Fig. 2, to assist them in remaining on the hooks 18 when lifted by same.

The pulleys 15 and 16 are doubled and the elevator-chain made wide enough to travel over both in order to take the strain of the hooks 18 when loaded, such hooks being on one side of same, as shown. The hooks may be of any suitable shape and are preferably so formed that the ends of the rollers 7 are in line with the chain 17.

The spindle which carries the pulleys 16 carries a bevel-gear 20, which engages with a similar gear 21 on a shaft 22, running along the length of the machine, which shaft is driven from a bevel-gear 23 from a gear 24 on shaft 25. At the entering end of the machine in the arrangement shown in Figs. 3 and 4 there may be placed a similar elevator to that previously described, and in this case the rollers or rods 7, previously supplied with hanks and loose rollers 7^b, are placed by hand on the hooks 18. The chain 3 in this case is not driven positively, but the elevator-chains 17 are driven as above described. As the chains 17 travel around the hook on that side will strike against a four-armed or star wheel 26 and move same part of a revolution. On the axis of this wheel is a spur-wheel 27, which engages with a pinion 28 on the shaft of the sprocket-wheel 4, so that the latter is given a partial turn, operating the chain 3 intermittently and bringing the next bearing-block 6

of same into line, so that the next roller on the chain 17 will be dropped therein. The chains 3 are thus intermittently moved throughout their travel over the vats. An elevator arrangement may also be used at the delivery end, as shown in Figs. 1 and 2; but in this case the chain 17 travels over the pulleys of two sets of uprights 14ª, and the rollers with the treated hanks are removed by hand on the hooks bearing them, bringing them within reach.

The hanks as they pass through the vats are subjected to a rotating motion and a reversal of same by means of the pinions 9 and racks 10 11, the wheel 12 of which latter is given a to-and-fro reversing motion at intervals by any suitable means, such as a mangle-wheel (indicated at 29 and carried on shaft 12ª) and the clutches 30 30 on the main shaft 31, in the usual manner. The mechanism for driving, however, may be varied. As the means of driving the chains 3 I may employ the bevel-gear 32 on the main shaft, which engages with bevel-gear 33 and drives, through a worm and worm-wheel 34, a shaft 35, on which the sprocket-wheels 5 5 are carried.

For driving the shaft 22 I employ, as stated, the bevel-gears 23 24 on shaft 25, which is driven in turn by a train of gears 36, 37, 38, and 39.

The arrangement of star-wheel 26 and gearing connecting with sprocket-wheel 4 may be employed at the delivery end also to cause the chains of the tank and those of the elevating devices to move in unison.

In operation the hanks and rollers are placed on the first elevating device, where that is employed, or directly on the bearings of the chain 3 of the elevator and thence travel through the first tank. They are then taken by the elevating device at the end of the first tank, removed from the first tank, placed on the chain again, carried through the second tank, (having a reversing motion given to them while in both tanks,) taken by the delivery device out of the last tank, carried over the driving mechanism, and collected from said delivery device by hand. By the reversal of the motion of the hanks in the liquor of the tanks a more complete impregnation of same is effected.

What I claim is—

1. In a hank-dyeing and like machine, and in combination, a tank, endless chains on each side of the same, rods for supporting the hanks, bearing-blocks carried by said chains for supporting the rods and means for intermittently driving said chains, pinions on said rods, rack-bars engaging said pinions, and means for reciprocating said rack-bars, substantially as described.

2. In a hank-dyeing and like machine, and in combination, a tank, endless chains on each side of same, rods for supporting the hanks, bearing-blocks carried by the chains for supporting the rods, an endless carrier for placing said rods or hanks on the bearings of the chain at the entering end of the machine, and a wheel having arms arranged to be struck by the said carrier for imparting an intermittent movement to the said chains through their carrying-shaft, substantially as described.

3. In a hank-dyeing and like machine, and in combination, a tank, endless chains on each side of same, rods for supporting the hanks, bearing-blocks carried by the chains for supporting the rods, pinions on said rods, rack-bars engaging said pinions, means for reciprocating said rack-bars and an elevating device and hooks carried by the said elevating device to engage the rods, and means for driving the chains and elevating device, substantially as described.

4. In a hank-dyeing and like machine, the combination with a tank, hank-rollers, an endless chain forming a means for carrying the hank-rollers and hanks, pinions upon said rollers, reciprocating rack-bars arranged to engage said rollers when carried by said chain; of an elevating device comprising an upright at one end of the tank, pulleys carried by same, a chain adapted to travel over said pulleys, hooks carried by the chain for carrying the hank-rollers, means for driving one of said pulleys, a star-wheel adapted to engage the hooks, means for supporting said wheel, and gearing driven by said wheel and engaging the driving means of the endless chain of the tank, whereby the chain of the elevating device and the chain of the tank, move in unison, substantially as described.

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses.

JOSEPH WILBY CROWTHER.

Witnesses:

J. B. HOWARD,

WALTER BRIERLEY.