C. CORRON.

APPARATUS FOR DYEING YARNS, FABRICS, AND THE LIKE.

APPLICATION FILED NOV. 28, 1908.

929,562.

Patented July 27, 1909.

4 SHEETS—SHEET 1.

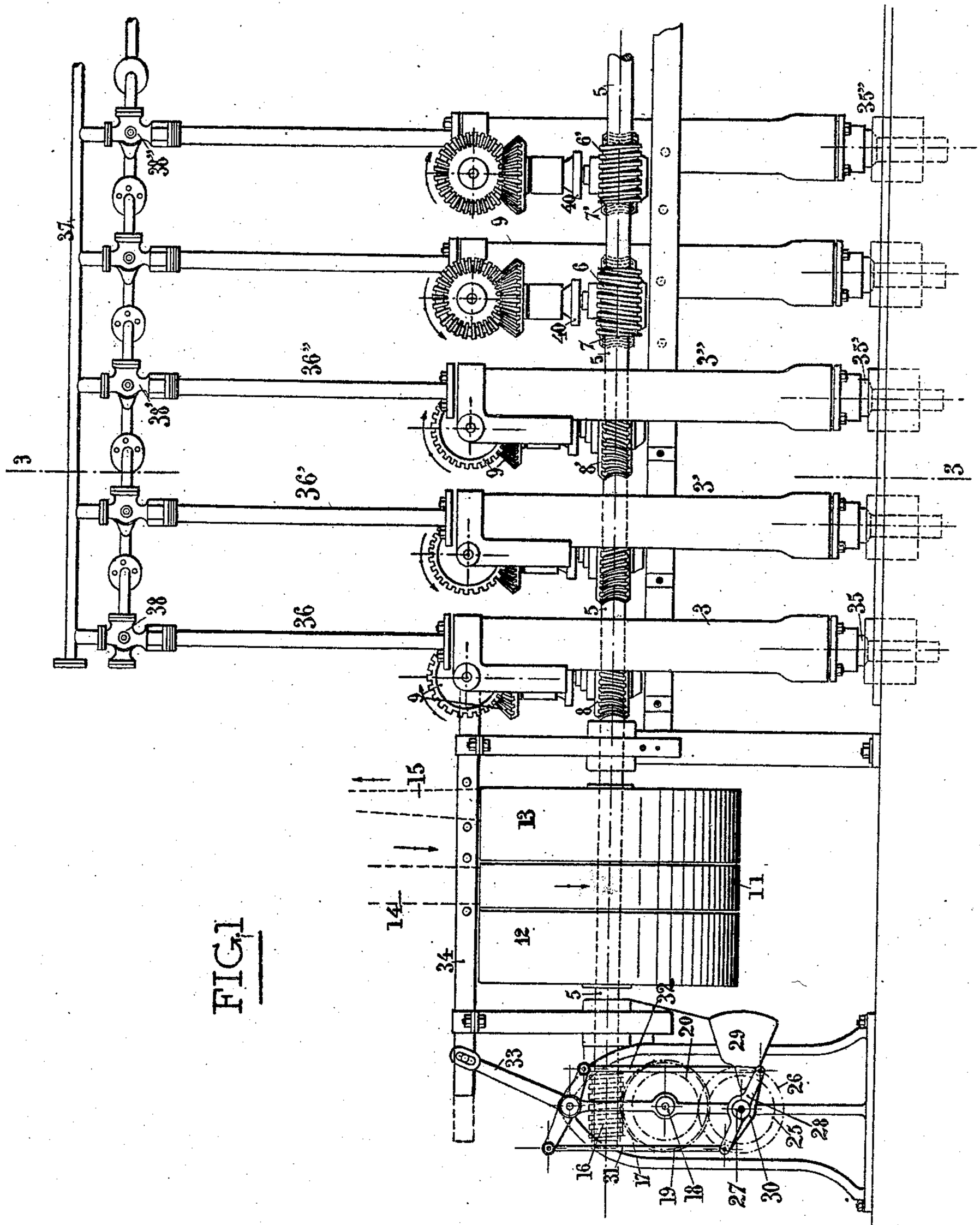

FIG. 1

Witnesses:

Jean Germain

Guillaume Pioche

Inventor:

Cesar Corron

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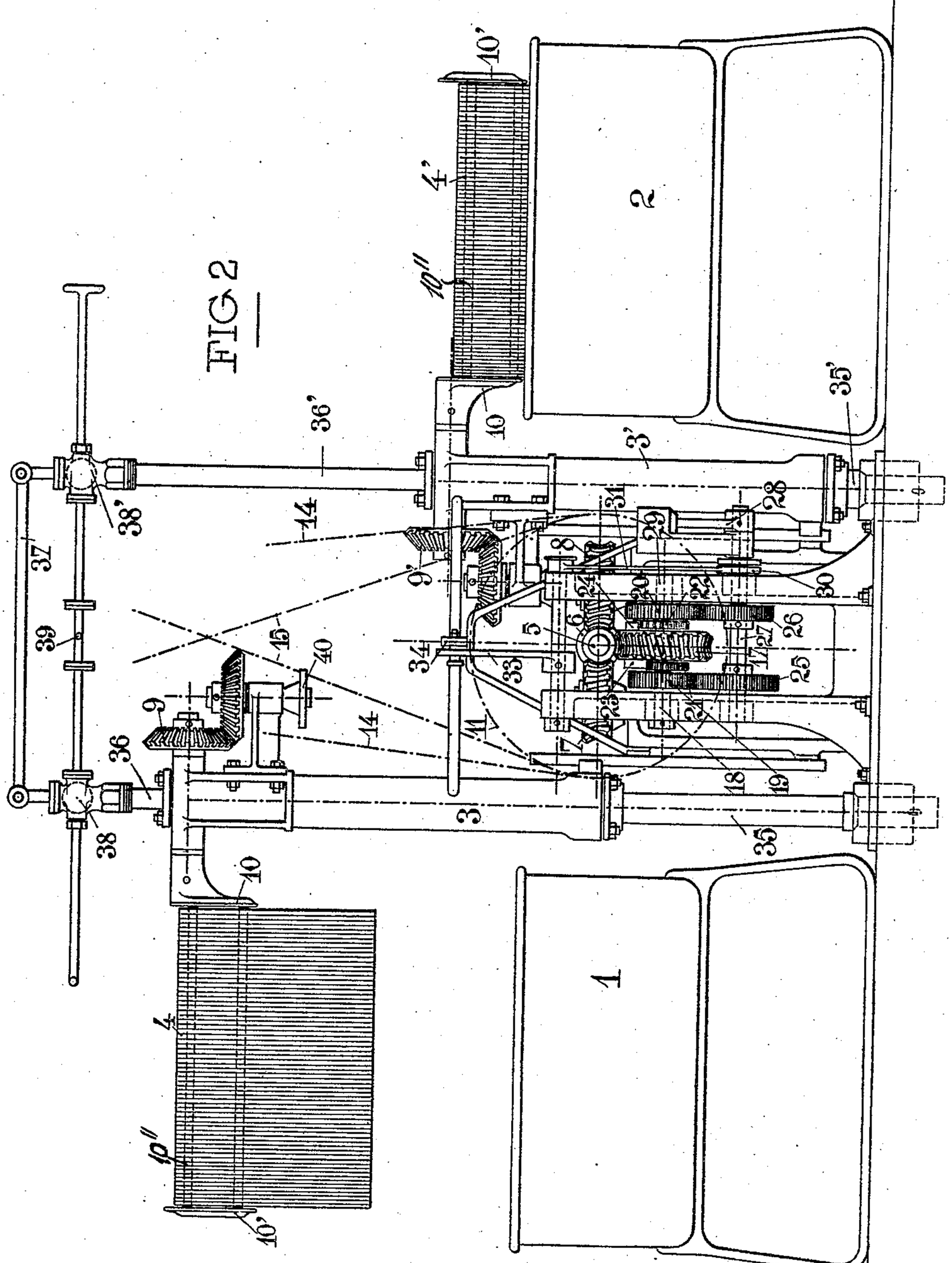
4 SHEETS—SHEET 2.

FIG 2



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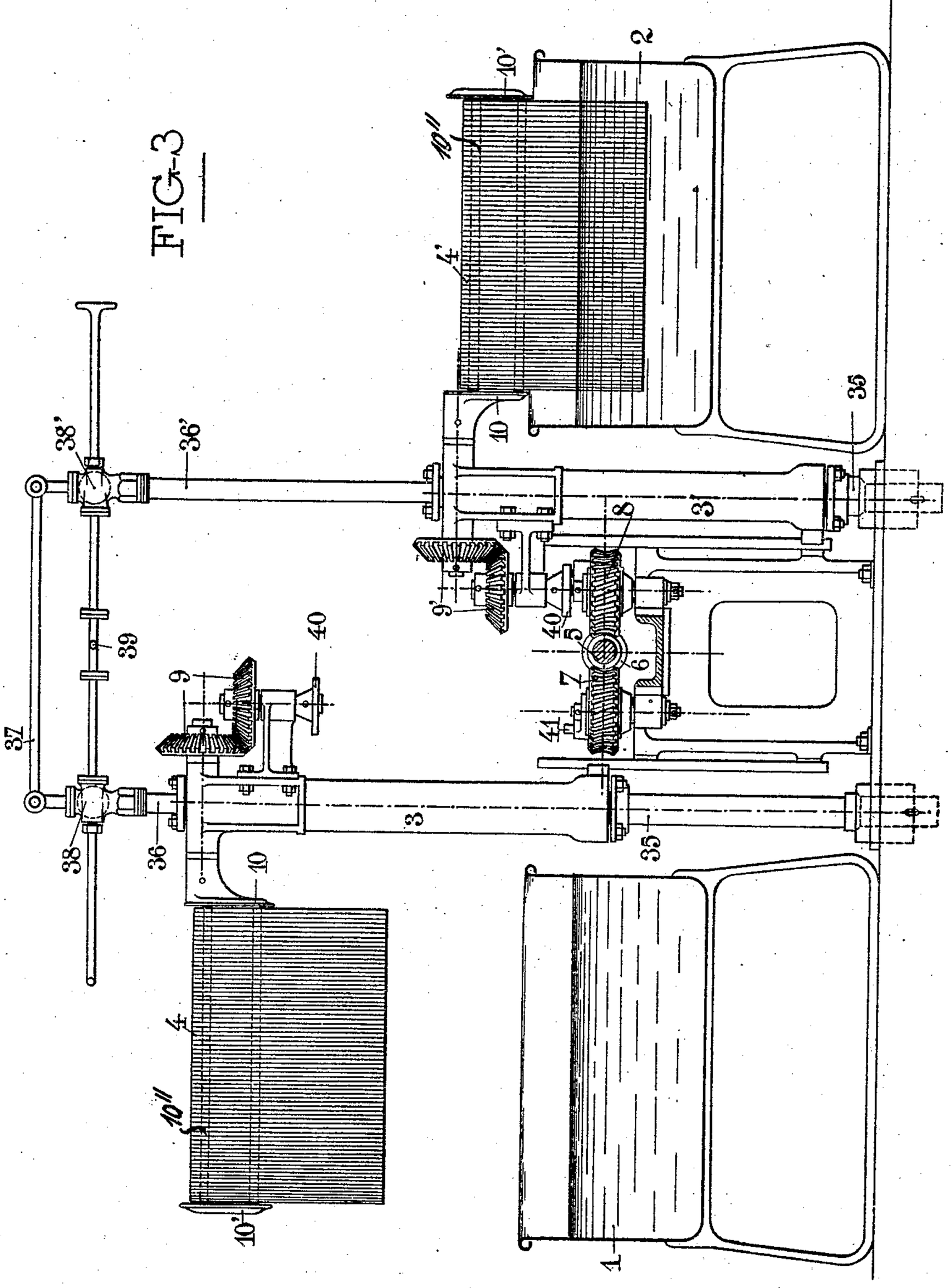
4 SHEETS—SHEET 3.

FIG-3



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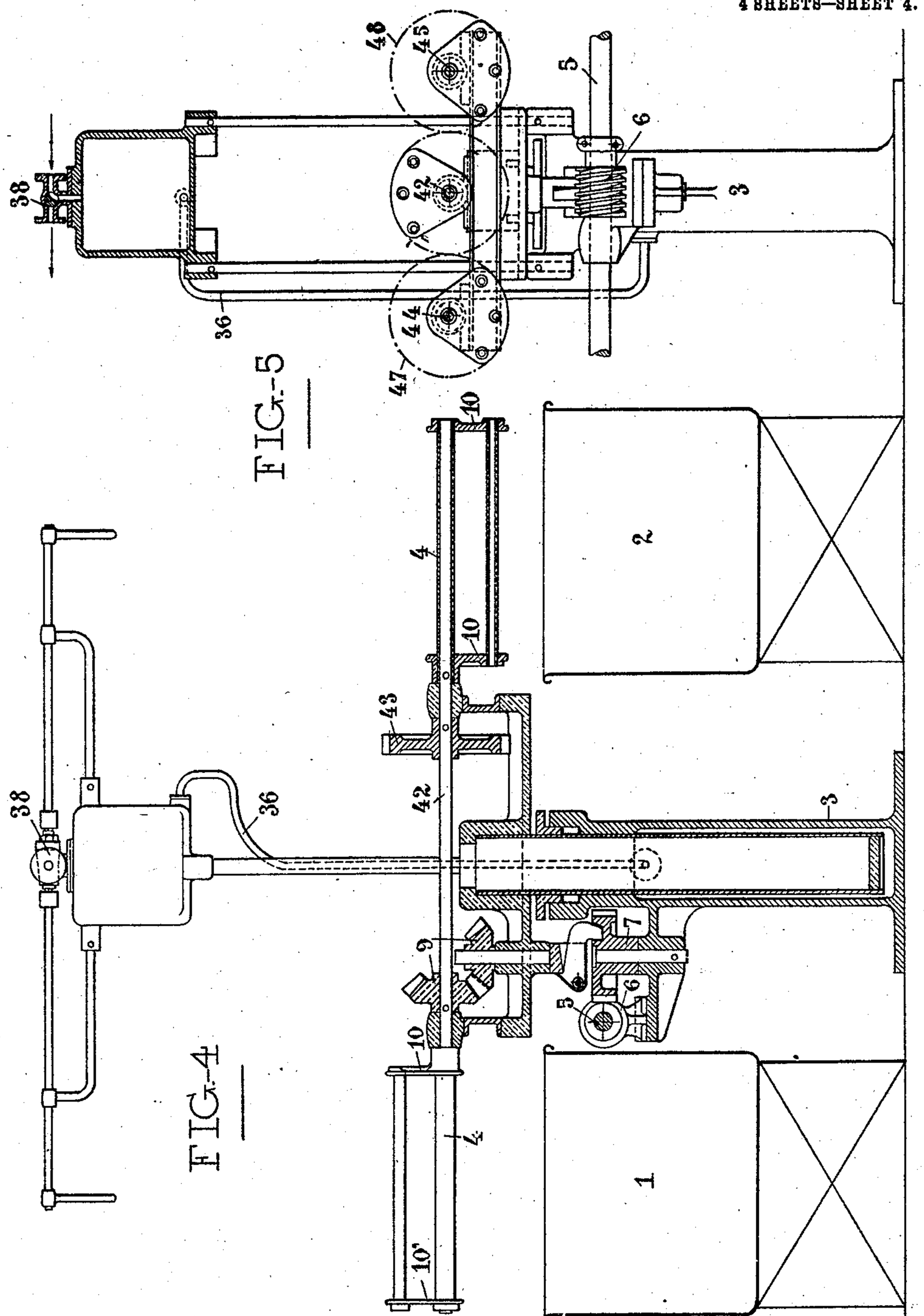

FIG.-5

FIG.-4

Witnesses:

Jean Germain

Guillaume Pioche

Inventor:

Cyr Corron

UNITED STATES PATENT OFFICE.

CÉSAR CORRON, OF ST. CHAMOND, FRANCE.

APPARATUS FOR DYEING YARNS, FABRICS, AND THE LIKE.

No. 929,562. Specification of Letters Patent. Patented July 27, 1909.

Application filed November 28, 1908. Serial No. 464,856.

To all whom it may concern:

Be it known that I, CÉSAR CORRON, a citizen of the French Republic, residing at St. Chamond, Loire, in France, have invented certain new and useful Improvements in Apparatus for Dyeing Yarns, Fabrics, and the Like, of which the following is a specification.

The present invention relates to improvements in apparatus for dyeing yarns, fabrics and the like.

The improved machine is especially suitable for dyeing yarns and the like and small or large quantities of material can be treated thereby. The machine is provided with a series of yarn reels or frames which can be simultaneously or independently actuated so as to perform all the various operations necessary for dyeing the yarn. The skeins, yarns, or the like, are automatically given all the necessary movements in the dye vat.

An embodiment of the invention is shown in the annexed drawings, in which—

Figure 1 is a front elevation with the yarn reels omitted; Fig. 2 an end elevation; Fig. 3 a section on the line 3—3 of Fig. 1, and Figs. 4 and 5 front and side elevations respectively of a modified construction, Fig. 4 having certain parts in section.

Between the dye vats 1 and 2 two parallel rows of hydraulic presses 3, 3^1, 3^{11}, etc., are arranged, the cylinders of which are movable and each support a rotatable frame or reel 4, 4^1, on which the skeins or the like are suspended.

A main shaft 5 situated between the two rows of presses is alternately rotated in a forward and backward direction and similarly rotates the reels which gives the desired motion to the yarn. A construction whereby this is effected is as follows. The said main shaft 5 is provided with a series of worms 6, 6^1, alternately of right and left handed pitch; each of which meshes with a horizontal worm wheel 8, 8^1. The said worm wheels actuate the reels or frames by means of intermediate bevel-wheel gearing 9, 9^1.

A movement of rotation being given to the main shaft 5 each reel will be rotated in a reverse direction to that adjacent thereto by reason of the worms of alternate opposite pitch, which impart to the worm wheels 8, 8^1 movements of rotation in opposite directions. This construction prevents any danger of entanglement of the threads of skeins on adjacent reels.

The reels or frames 4, 4^1 comprise two end plates 10, 10^1 connected by a series of parallel tubes or the like 10^{11} on which the skeins are suspended. The reel is arranged eccentrically with regard to the axis of rotation in such a manner that during the movement of said reel the skeins or yarns are displaced on the reel in the direction of the movement of rotation thus automatically moving the yarn in the dye. Owing to the eccentricity of the reel on its axis of rotation and the reversal of the direction of rotation, the skeins are given a to and fro movement in the vat.

The main shaft 5 as previously stated, is alternately given a movement of rotation in one direction and the other, the change of direction of movement being effected automatically. For this purpose the said shaft carries three pulleys 11, 12, 13, arranged side by side, of which 11 is keyed to the shaft and 12 and 13 are free to rotate thereon. The driving is effected by two driving belts 14 and 15 arranged side by side, of which 14 is open and 15 crossed. These belts are driven from a single pulley, and according as one or other of the belts is shifted on to the fixed pulley 11 the shaft 5 rotates in one or other direction. Each belt while idle is running on one or other of the loose pulleys, 12 or 13. The change of direction of rotation is effected automatically as follows. The main shaft 5 carries at its end a worm 16 meshing with a worm wheel 17 loose on a short shaft 18 at right angles to the main shaft 5. This short shaft carries at each end toothed pinions 19 and 20 of different sizes and loosely mounted on said shaft. The toothed pinions are fixed to ratchet wheels 21, 22 having teeth of opposite direction. The worm wheel 17 is provided at each side with a pawl 23, 24 which respectively engage the ratchet wheels 21, 22 and drive the same, thus causing the rotation of one or other of the pinions 19, 20, according to the direction of rotation of the worm wheel 17. The two toothed pinions 19, 20 respectively mesh with two other pinions 25, 26 keyed on a second short shaft 27 parallel with the shaft 18. The said shaft 27 carries at one end a double-armed lever 28 which in its movement of rotation, lifts a counterweight 29, which when it arrives at a vertical position rocks and moves a lever 30 connected by two rods 31, 32 to a ⊥ shaped

lever 33, the long arm of which is thus caused to move a belt shifting device 34, which displaces the belts and produces the change of rotation of the entire system.

The gears 19, 25 and 20, 26 are calculated so as to produce unequal alternate movements. The advantage of this is that the movement of that part of the skein or the like which is in the bath is not arrested at the moment of the change of rotation so that uniformity of action of the dyeing bath is assured.

The reels are put out of action by being raised by the cylinders of the hydraulic presses which support them.

Each hydraulic press is formed of a movable cylinder 3, 3^1, 3^{11}, which carries the reel, said cylinder being traversed by a fixed column 35, 35^1, 35^{11}, of which the lower part forms a piston while the upper part 36, 36^1, 36^{11}, which is of smaller diameter, is hollow and serves for the introduction or exhaust of the liquid under pressure for raising the reels. The liquid is introduced by means of a pipe 37 common to several presses and passes through three way cocks 38, 38^1, 38^{11}, with which each support is provided, to the respective hydraulic press. The reels are lowered by the action of gravity only by setting the three way cocks to a position which allows the exhaust of the liquid through an outlet pipe 39.

When a reel is raised, the skeins are lifted out of the bath and the beveled pinions 9 driving the reels are put out of action. When a reel is lowered a disk or the like 40 mounted on the spindle of the horizontal beveled pinion of the pair 9 is moved downward together so that said disk is brought on to the worm wheel 7 of the particular reel driven by the main shaft. Each worm wheel 7 carries a spring catch 41 which engages in a recess in the disk 40 so that said disk and worm wheel are clutched together and the disk is rotated, the movement being transferred to the frames by the beveled pinions aforesaid.

It will be readily understood that any desired number of reels can be put in or out of action, it being sufficient to raise those which are not required by operating the three way cock with which each lifting device is provided.

The machine may be constructed so as to operate on both sides of the main shaft or on one side only.

Several frames may be carried on one hydraulic support for instance, Figs. 4 and 5 show a machine provided with two groups of three reels. In this case the main shaft 5 is provided with a worm 6 which actuates a worm wheel 7 the movement of which is transmitted by beveled pinions 9 to a shaft 42 on which are fixed two reels 4, 4^1 and a toothed pinion 43. On each side of the reels further reels are arranged supported on shaft 44, 45 actuated by pinions 47, 48 gearing with the above mentioned toothed pinion 43. The remainder of the machine is similar to that previously described.

The details of construction may be varied according to requirements.

What I claim as my invention and desire to secure by Letters Patent of the United States is:—

1. Apparatus of the character described comprising a vat, a plurality of reels revolubly mounted over the vat, and means for imparting movements alternately in opposite directions at different rates of speed to the reel driving means.

2. Apparatus of the character described comprising a vat, a plurality of reels revolubly mounted over the vat, means for driving alternate reels in opposite directions, and means for imparting movements alternately in opposite directions at different rates of speed to the reel driving means.

3. Apparatus of the character described comprising a vat, a plurality of reels mounted to rotate eccentrically over the vat, means for driving alternate reels in opposite directions, and means for imparting movements alternately in opposite directions at different rates of speed to the reel driving means.

4. Apparatus of the character described comprising a vat, a plurality of reels mounted to rotate eccentrically over the vat, means including worm gearing for driving the reels, and means for imparting movements alternately in opposite directions at different rates of speed to the reel driving means.

5. Apparatus for the purpose set forth comprising a vat, a series of reels for supporting the goods revolubly mounted over said vat and eccentric to the axis of rotation, means for driving alternate reels in opposite directions, means for imparting alternate and unequal movement in opposite directions to the reel driving means, hydraulic presses each carrying a reel, and means whereby said presses may be operated to raise any or all of the reels at will.

6. Apparatus for the purpose set forth comprising a plurality of vats, a series of reels for supporting the goods revolubly mounted over each vat and eccentric to the axis of rotation, means for driving alternate reels in opposite directions, automatic means for imparting alternate and unequal movement in opposite directions to the reel driving means, hydraulic presses carrying the reels and disposed in series between the vats and means whereby said presses may be operated to raise any or all of the reels at will.

In witness whereof I have signed this specification in the presence of two witnesses.

CÉSAR CORRON.

Witnesses:

JEAN GERMAIN,

GUILLAUME PIOCHE.