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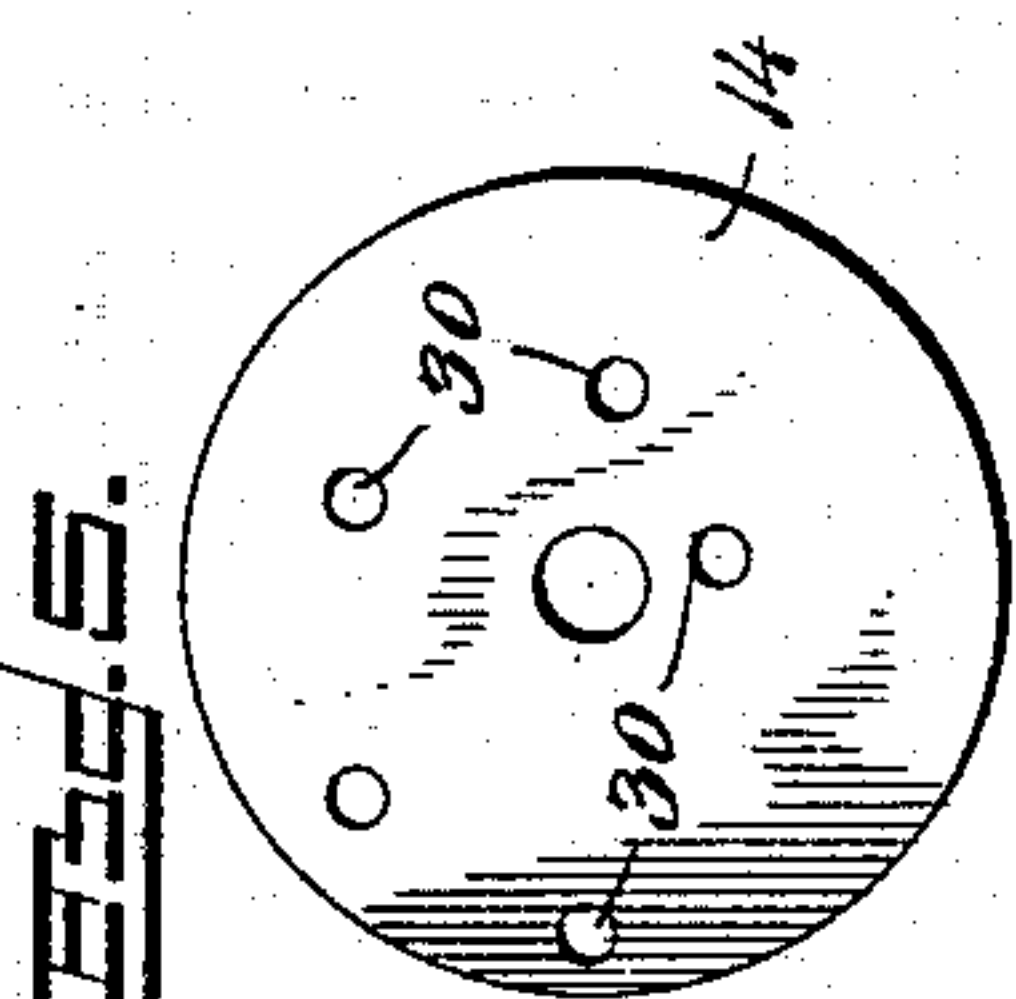
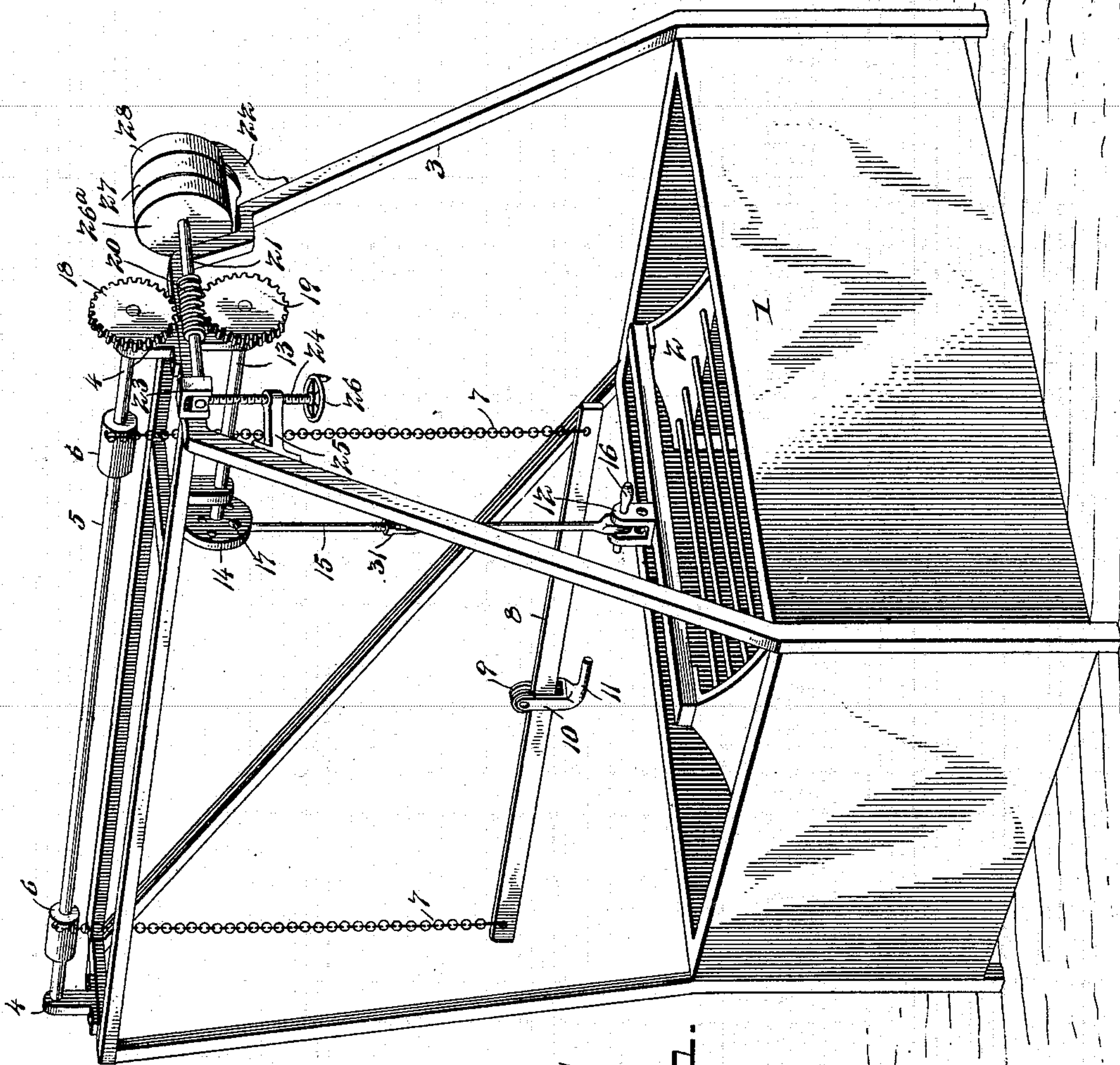
Patented Oct. 11, 1898.

C. A. HUNT, JR.
APPARATUS FOR DYEING HANKS.

(Application filed Aug. 30, 1897.)

(No Model.)

2 Sheets—Sheet 1.



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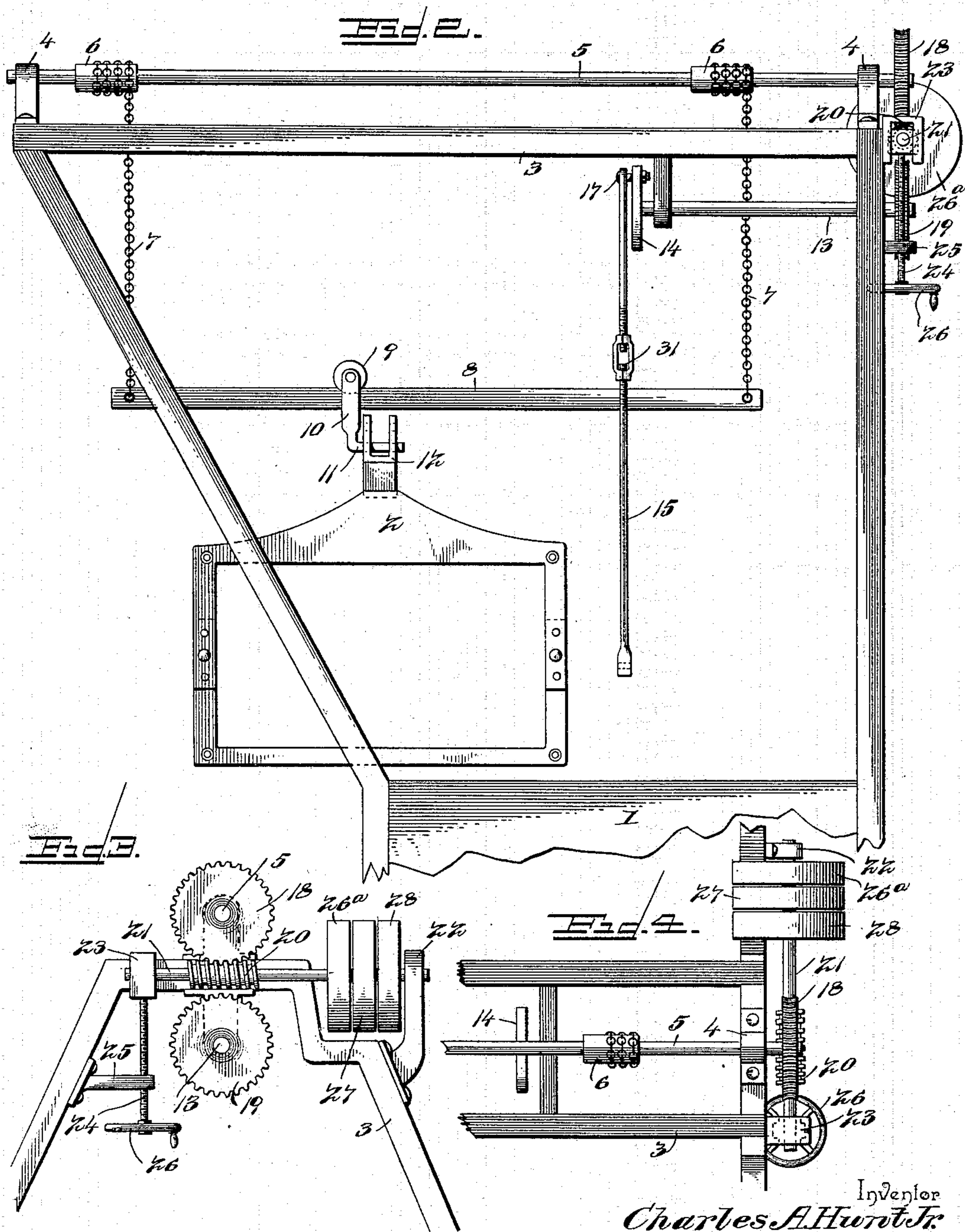
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UNITED STATES PATENT OFFICE.

CHARLES ANDREW HUNT, JR., OF LEXINGTON, NORTH CAROLINA.

APPARATUS FOR DYEING HANKS.

SPECIFICATION forming part of Letters Patent No. 612,343, dated October 11, 1898.

Application filed August 30, 1897. Serial No. 650,021. (No model.)

To all whom it may concern:

Be it known that I, CHARLES ANDREW HUNT, Jr., a citizen of the United States, residing at Lexington, in the county of Davidson and State of North Carolina, have invented a new and useful Hank-Dyeing Apparatus, of which the following is a specification.

My invention relates to machines for dyeing yarn in hanks or skeins, and it is more particularly designed as an improvement upon the apparatus for dyeing patented to me July 28, 1896, by United States Letters Patent No. 564,619.

The primary object of the present invention is to reduce to a minimum the number of elements or working parts required to give to the yarn cage or receptacle the necessary reciprocating motion in the dye-vat.

A further object of the invention is to provide improved mechanism for varying the amplitude of the vertical reciprocating movement of the hank or skein cage.

A further object of the invention is to provide improved mechanism for raising or lowering the hank or skein cage into and out of the vat to enable said cage to be rolled on a track to or from the dye-vat; and a further object of the invention is to so combine the mechanism for giving the reciprocating play to the cage with the mechanism for raising or lowering the cage from or into the vat that either mechanism may be driven from a single power-shaft, it only being necessary to operate an adjusting device to throw either mechanism into or out of service.

To the accomplishment of these ends the invention consists in the combination, with a reciprocating hank or skein cage and a track-bar on which a trolley of said cage is adapted to travel, of a shaft having operative connections with said cage to impart reciprocating movement or play thereto when arranged in the dye-vat, an adjusting-shaft operatively connected with said track for the cage, and a power-shaft having suitable driving-pulleys and situated between the two shafts before mentioned to be thrown into gear with either shaft for the purpose of operating the one shaft to reciprocate the cage and of driving the other shaft to raise or lower the cage; and the invention further consists in the novel combination of elements and in the con-

struction and arrangement of parts, as will be hereinafter fully described and claimed.

To enable others to understand my invention, I have illustrated the same in the accompanying drawings, forming a part of this specification, in which—

Figure 1 is a perspective view of my machine for dyeing hanks or skeins of yarn, cotton, thread, and other strands. Fig. 2 is a side elevation. Fig. 3 is an end view, and Fig. 4 is a top view. Fig. 5 is a detail face view of crank-disk to impart variable movement to the hank-carrying cage.

Like numerals of reference denote corresponding and like parts in all the figures of the drawings.

1 designates a dye-vat, and 2 is a cage adapted to reciprocate vertically therein in order to raise and lower the hanks or skeins in the dye liquor for the purpose of agitating the hanks while immersed in the dye liquor to secure a better and quicker saturation of the hanks or skeins. On the vat is erected a supporting-frame for the mechanism, by which the cage 2 may be reciprocated and by which the cage may be raised and lowered in order to facilitate the introduction of the loaded cage into the vat or its withdrawal therefrom, as may be required.

The dye-vat 1 and the hank-cage 2 may be of the construction substantially shown by my prior patent, to which reference has been made, or any other suitable construction of these parts may be adopted in so far as my present invention is concerned.

In the present instance I aim to simplify the mechanism by which the reciprocating motion is given to the cage and by which the cage may be lowered into or withdrawn from the dye-vat. To attain these ends, I provide the supporting-frame 3, which is erected on the dye-vat, to occupy an overhead position with relation to the hank-cage, and on the top of this frame are fastened the standards or hangers 4, which are arranged in central relation to the frame to extend upwardly therefrom. In the shaft-bearings of these standards or hangers 4 is mounted a horizontal shaft 5, and on the shaft are secured the short drums or pulleys 6. Chains or cables 7 are attached at their upper ends to these drums 6 of the shaft 5, and said cables

or chains are adapted to be coiled on or uncoiled from said drums of the shaft, according as it is desired to raise or lower the cage from or into the vat. These cables or chains sustain the track-rail 8, which is suitably fastened to the lower ends of said chains or cables, and this suspended track-rail furnishes a support for the traveling roller or trolley 9, which is journaled in a suitable framework 10, that is constructed or provided with a pendent hook 11, that is adapted to engage with an eye in a hanger 12, suitably fastened to the hank-carrying cage 2.

In the upper part of the frame 3, to occupy a central position over the dye-vat 1, is arranged a short shaft 13, which is journaled in suitable hangers attached to the upper part of the frame 3, said shaft 13 occupying a position below the shaft 5, parallel therewith. On one end of this shaft 13 is rigidly secured a crank disk or wheel 14, and to this crank disk or wheel is operatively connected a suspension-rod or pitman 15, the lower end of which is detachably connected to the hanger or bracket 12 of the cage 2. This suspension-rod or pitman 15 is connected to the cage bracket or hanger 12, preferably by means of a removable pin 16, which passes through aligned openings in the bracket 12 and the lower end of the rod or pitman 15. The upper end of the pitman or rod is connected to the crank-disk 14 by means of a crank-pin 17, and thus the rod or pitman is operatively connected with the shaft 13 and with the cage to impart reciprocating movement or play to the cage when the latter lies within the dye-vat to immerse the hanks or skeins in the liquor thereof.

The ends of the shafts 5 and 13 terminate in substantially the same vertical plane at one end of the overhead frame 3. The shaft 5 is provided at one end with a worm-gear 18, while the corresponding end of the shaft 13 is provided with a worm-gear 19. These worm-gears of the two shafts lie in the same vertical plane, but at a suitable distance from one another to accommodate between them a worm 20. This worm 20 is carried by a horizontal driving-shaft 21, which is arranged at right angles to the shafts 13 5 and in a plane between said shafts, and this worm-carrying driving-shaft is arranged to have a limited movement or play between the worm-wheels 18 19 on the shafts 5 13 sufficient for the worm to clear one wheel when it is engaged with the other wheel, whereby the driving-shaft 21 is arranged to actuate the worm-wheels separately. One end of this driving-shaft is mounted in a bearing of a standard 22 to have a limited play sufficient to enable its worm to clear the teeth of either worm-wheel on the shafts 5 13, and the other end of this driving-shaft is provided with an adjustable bearing 23, which is slidably attached to the frame 3. This adjustable bearing for the driving-shaft is controlled and held by means of an adjusting-screw 24, which

is suitably attached or swiveled to the bearing 23. Said adjusting-screw finds a threaded bearing in a bracket 25, which is fastened to the frame 3 in a suitable manner, and the free end of said adjusting-screw has a hand-wheel 26 or other suitable device by which the screw may be rotated for the purpose of moving the bearing 23 to adjust the worm of the shaft into or out of gear with the worm-wheels on the shafts 5 13. This driving-shaft 21 is provided with three pulleys 26 27 28, two of which are loose pulleys and the other is fast on the shaft. One pulley is rotated by a straight belt to drive the shaft 21 in one direction, while the other pulley is driven by a crossed belt to drive the shaft in the other direction. I have not deemed it necessary to illustrate the straight and crossed belts nor the shipper mechanism by which either belt and its pulley may be brought into or out of service, because such details may be readily supplied by a skilled mechanic.

It is often desirable to vary the reciprocating movement or play of the hank-carrying cage in the dye-vat, and to attain this end in a simple and durable manner I have constructed the crank-disk in a manner to provide for the adjustment of the crank-pin to vary the throw thereof and to correspondingly change the movement of the cage. I therefore provide the crank-disk with a series of apertures 30, located at different distances from the center of the disk, and these apertures are spaced or arranged in the disk in a manner to enable the crank-pin to be changed or adjusted with ease and freedom. I thus provide an exceedingly simple device by which the amplitude of the reciprocating motion of the cage may be varied or changed to meet the requirements of the service. The pitman or rod 15 is also provided with a turn-buckle 31, by which the rod can be lengthened or shortened to vary the stroke or play of the cage.

When it is required to reciprocate the cage in the dye-vat after the cage has been lowered into the vat, the screw 24 is rotated in a direction to lower the shaft 21 and bring the worm 20 thereon into engagement with the worm-gear 19 in order to drive the shaft 13 from the shaft 21. The shaft 13 thus rotates the crank-disk 14 to reciprocate the cage, and the hanks or skeins are thus moved up and down in the liquor of the dye-vat. When the cage is to be raised out of the dye-vat, the frame 10 of the trolley is engaged with the bracket 12 of the cage, and the trolley is adjusted to ride upon the bearing-rail 8. The screw 24 is now adjusted to raise the bearing 23 and with it the shaft 21, and the shaft is thus moved to withdraw its worm from the wheel 19 of the shaft 13 and move the worm into engagement with the worm-wheel 18 of the shaft 5. The pitman 15 having been disconnected from the cage-bracket 12, the pulley having the straight belt is thrown into service, and the shaft 21 thus

drives the shaft 5 to wind or coil the cables or chains 7 on the drums 6 until the track-bar and the cage have been raised the required distance. The cage is now run along the track-rail until it clears the dye-vat, after which the pulley, with the crossed belt, is brought into service in order to drive the shaft 21 in the reverse direction and uncoil the cables or chains 7 to lower the cage and its load to the floor. Another cage with a fresh load is now attached to the track-rail, and the operation just described is repeated to lower the cage into the vat, after which the pitman is connected to the cage-bracket and the shaft 21 adjusted to operate the shaft 13 to reciprocate the cage.

I am aware that changes in the form and proportion of parts and in the details of construction of the devices herein shown and described as the preferred embodiment of my invention may be made by a skilled mechanic without departing from the spirit or sacrificing the advantages of the invention. I therefore reserve the right to make such modifications and alterations as fairly fall within the scope of the invention.

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

1. In a hank-dyeing machine, the combination with a carrying-cage, and a raising and lowering mechanism detachably connected thereto, of a mechanism for suspending and giving variable reciprocating motion to said cage when disconnected from the raising and lowering mechanism, comprising an overhead rotatable shaft, a crank-disk having apertures at different distances from its center, a crank-pin to be fitted in either of said apertures, and a suspending-pitman attached to the adjustable crank-pin and detachably connected to the cage, substantially as described for the purposes set forth.

2. The combination with a hank-carrying cage, of a raising and lowering shaft having means for connection with said cage, another

shaft having means for connection with said cage and adapted to reciprocate the same vertically when lowered into a vat, and a common driving mechanism adapted to be thrown into or out of engagement with either of said shafts, as and for the purposes described.

3. The combination with a reciprocating cage, of mechanism for imparting reciprocating motion to said cage when suspended in a dye-vat, means for raising and lowering said cage from or into the vat, and a shiftable driving mechanism arranged for use in connection either with the mechanism for reciprocating the cage or the mechanism for lowering and raising the cage, as and for the purposes described.

4. The combination with a cage, of mechanism for lowering or raising said cage and having a shaft, 5, mechanism for reciprocating said cage and having a shaft, as 13, a driving-shaft situated between said shafts, 5, 13, and provided with means for rotating said driving-shaft in either direction, and mechanism for adjusting the driving-shaft to move it into gear with either of said shafts, 5 or 13, as and for the purposes described.

5. The combination with a cage, of a shaft, 5, having means for detachably connecting the same to said cage for raising or lowering the same, another shaft, 13, having a crank-wheel and pitman for imparting reciprocating motion to the cage, a driving-shaft journaled between the shafts, 5, 13, an adjustable bearing for the driving-shaft, a screw for moving the shaft and its bearing, and means whereby the driving-shaft may be operatively connected with either shaft 5 or 13, as and for the purposes described.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

CHAS. ANDREW HUNT, JR.

Witnesses:

F. M. PINNIX,

W. H. MENDENHALL.