

(No Model.)

2 Sheets—Sheet 1.

H. L. FREEMAN.  
DYEING MACHINE.

No. 549,063.

Patented Oct. 29, 1895.

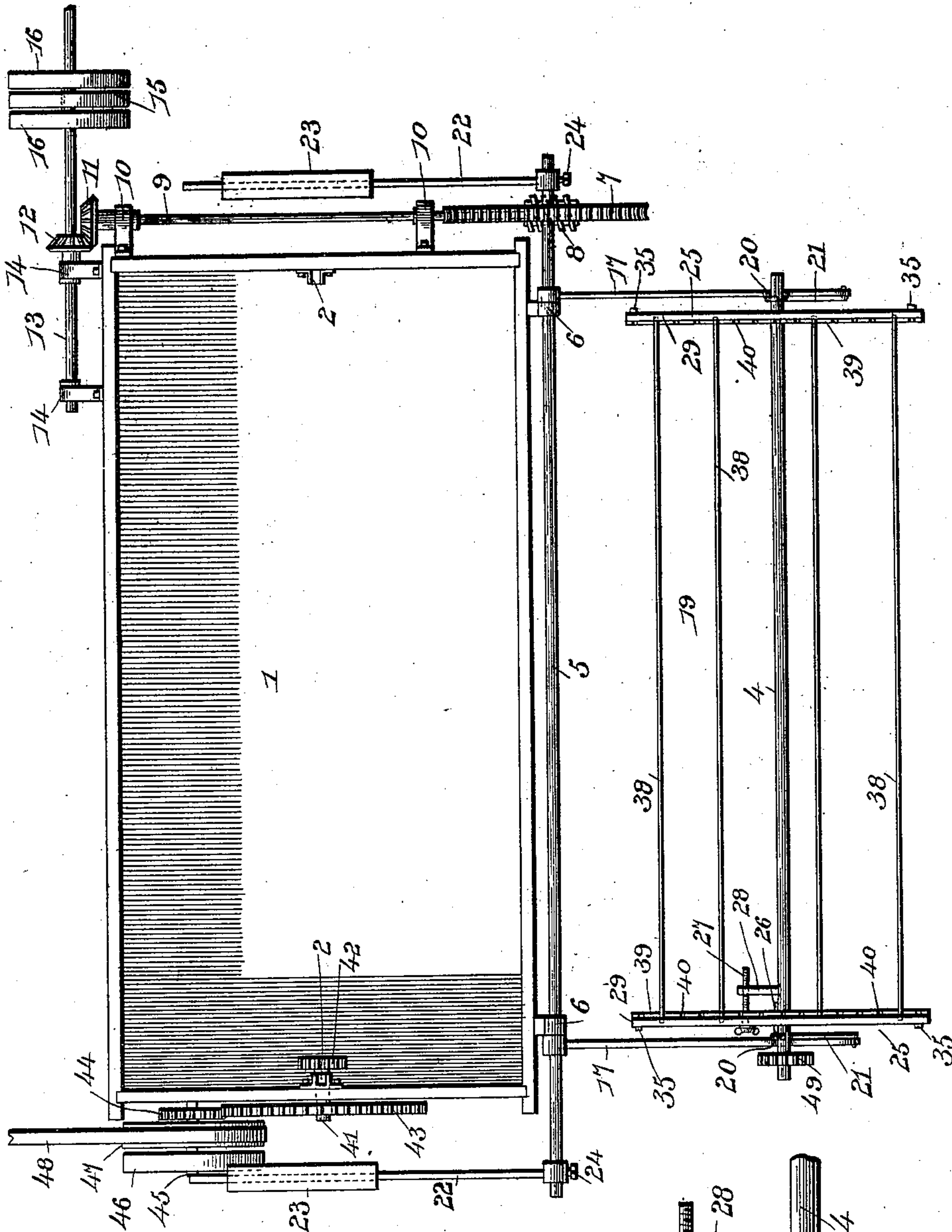
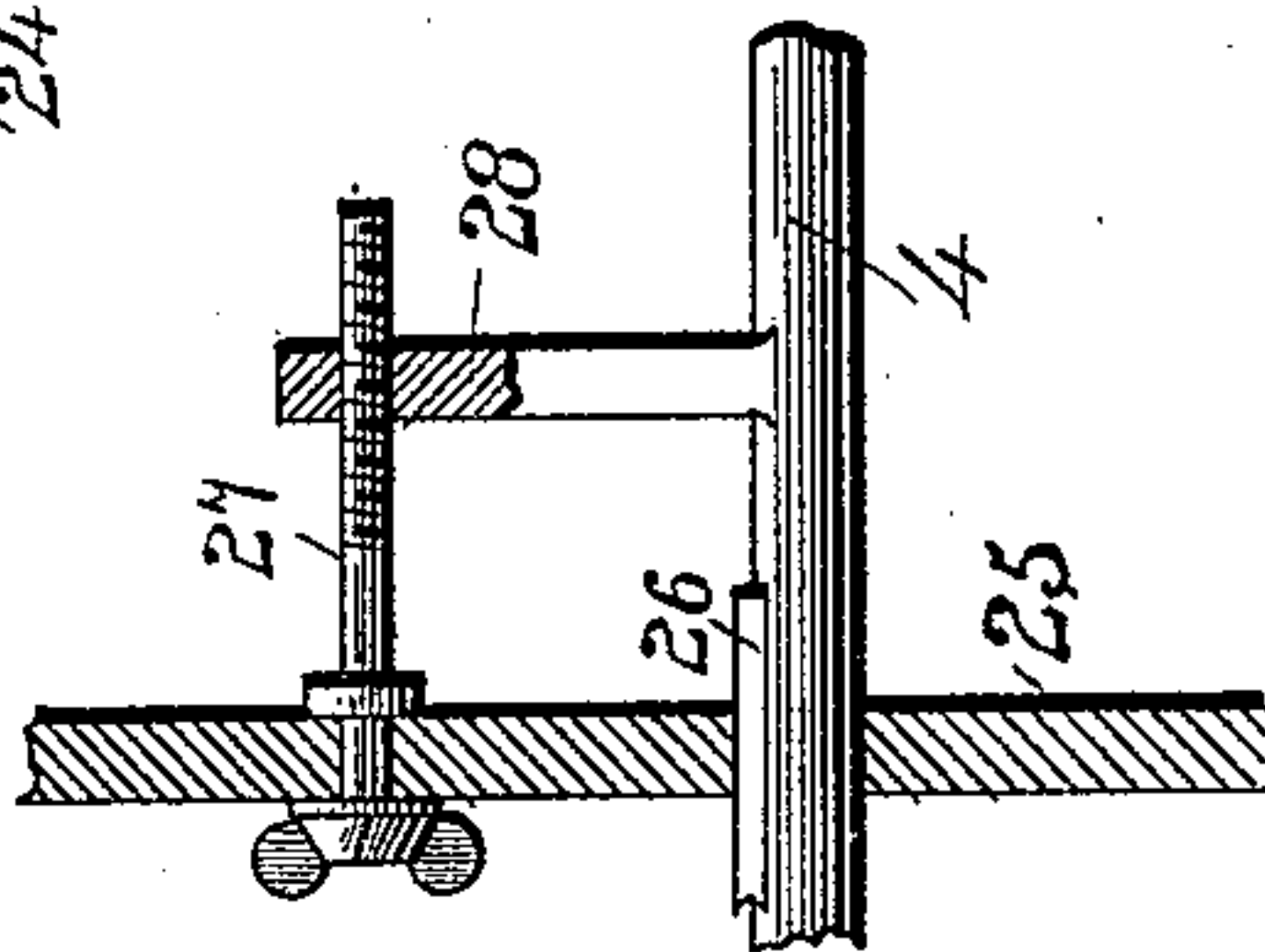


FIG. 1.

FIG. 5.



Inventor

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Witnesses

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By His Attorneys,

C. A. Snow & Co.

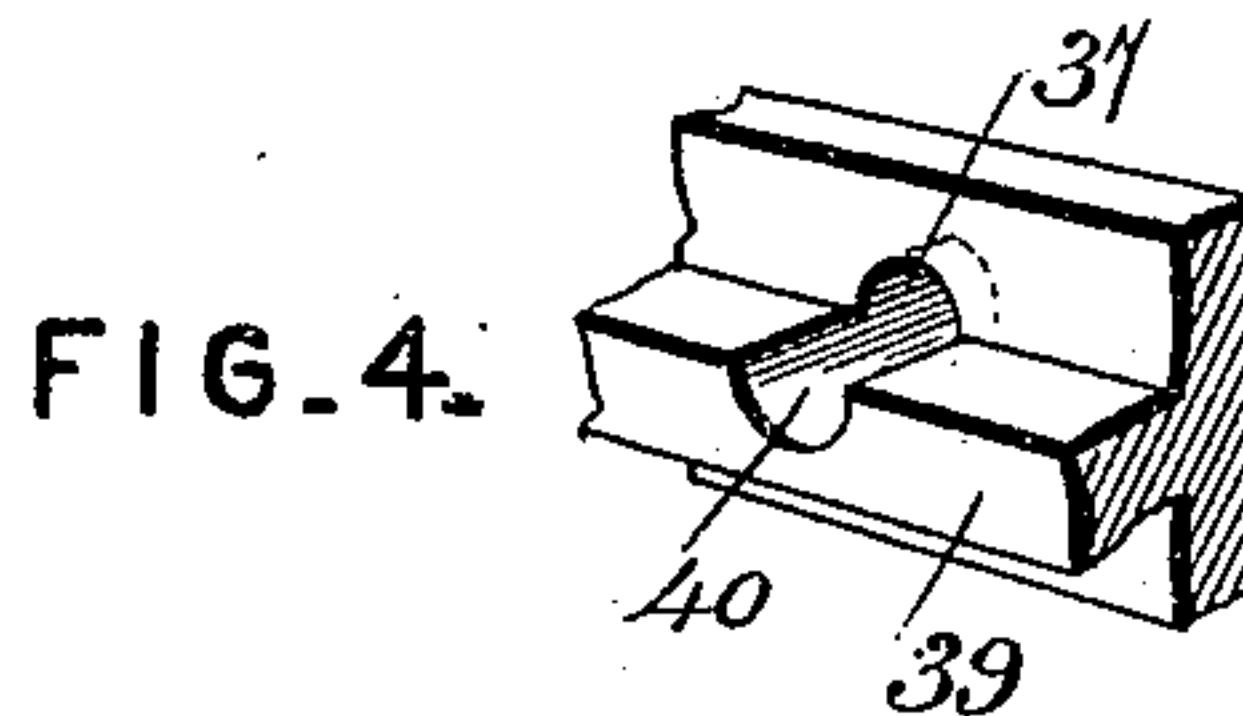
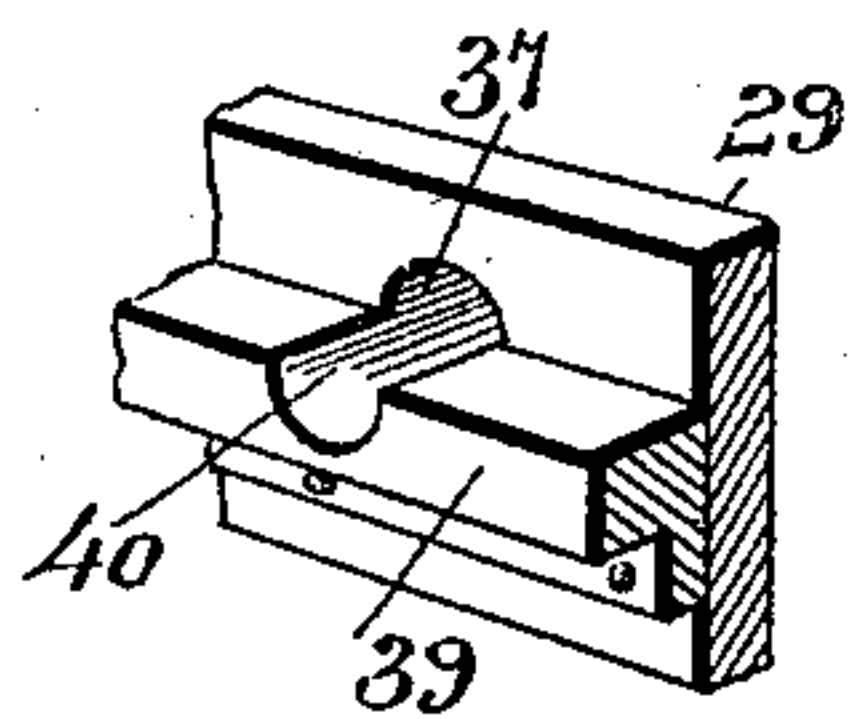
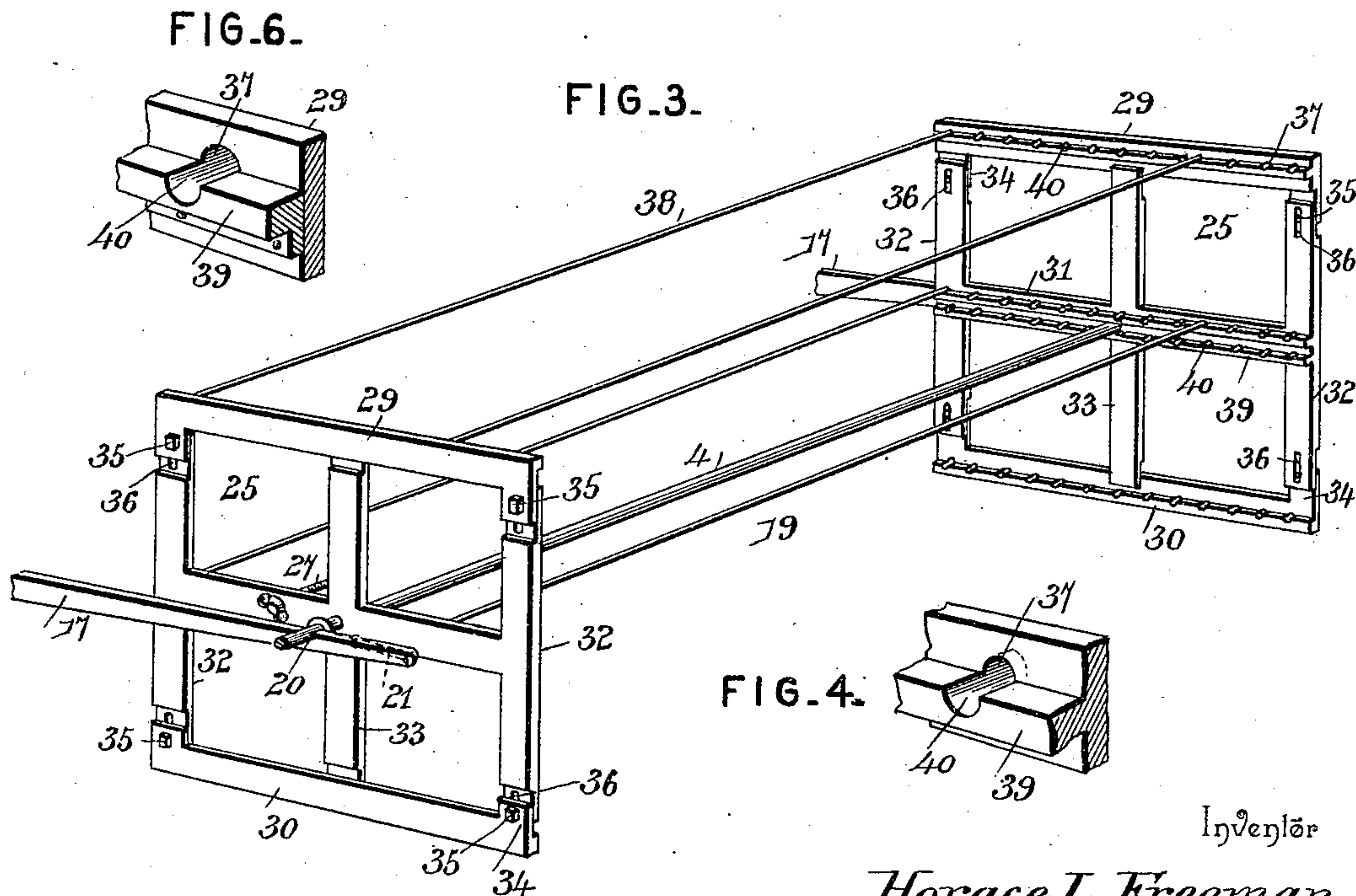
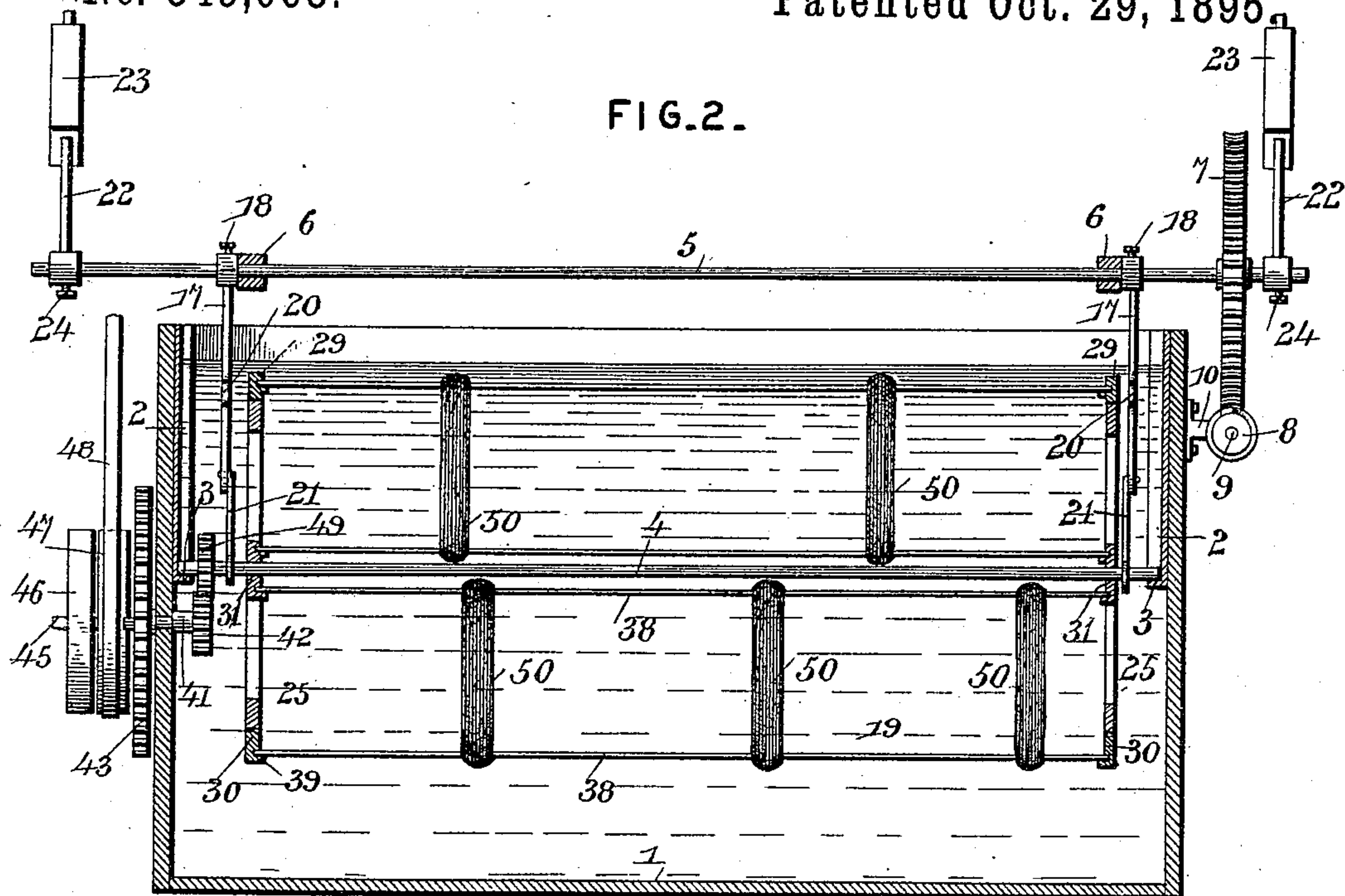
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2 Sheets—Sheet 2.

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# UNITED STATES PATENT OFFICE.

HORACE L. FREEMAN, OF LEXINGTON, NORTH CAROLINA, ASSIGNOR OF ELEVEN-TWENTIETHS TO J. D. NEAL AND L. F. HANES, OF SAME PLACE.

## DYEING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 549,063, dated October 29, 1895.

Application filed April 22, 1895. Serial No. 546,761. (No model.)

*To all whom it may concern:*

Be it known that I, HORACE L. FREEMAN, 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 Machine for Dyeing Woolen or Cotton Yarns, of which the following is a specification.

This invention aims to provide an improved machine to facilitate the dyeing of woolen and cotton yarns and threads in the hanks, and diminish the labor attendant upon this class of work and increase the output of a single workman and insure an even and uniform coloring of the threads as the latter are agitated while in the vat.

The improvement consists of a reel of peculiar construction, and which is adapted to be loaded with the hanks of yarn and thread to be colored, and which is placed within the vat by mechanical appliances, rotated slowly, and removed from the vat by the same means, and which reel is adapted, after the coloring or dyeing of one batch or load, to be replaced by another of like construction loaded with the hanks to be dyed.

The improvement also consists of the novel features and the peculiar construction and combination of the parts which hereinafter will be more fully set forth and claimed, and which are illustrated in the accompanying drawings, in which—

Figure 1 is a top plan view of the invention, showing the reel exterior to the vat. Fig. 2 is a vertical longitudinal section showing the reel within the vat. Fig. 3 is a detail perspective view of the improved reel. Fig. 4 is a detail view of a rod-supporting bar. Fig. 5 is a detail view of the means for adjusting the movable head of the reel upon its supporting-shaft. Fig. 6 is a detail view of a modified form of rod-supporting bar.

The vat 1 may be of any desired shape and form, and, as illustrated, is rectangular, and is provided on the inner side of its ends with vertical ways 2, which are preferably castings, secured in any desired manner to the ends of the vat, and these ways are closed at their lower ends, as shown at 3, to support the reel-shaft 4, and extend to about a point midway be-

tween the top and bottom edges of the vat ends to which they are attached. A shaft 5 extends longitudinally of the vat and is journaled in brackets 6, made fast to a side of the said vat and having their upper ends projecting above the top of the vat, so as to bring the shaft 5 in a plane slightly above the vat. A worm gear-wheel 7 is keyed to one end of the shaft 5 and is adapted to mesh with a worm 8 on a shaft 9, journaled in bearings 10, secured to an end of the vat, and said shaft 9 has a bevel-pinion 11, which meshes with a corresponding bevel-pinion 12 on a shaft 13, mounted in bearings 14, secured to the rear side of the vat, and upon the shaft 13 are placed a tight pulley 15 and loose pulley 16, which are connected in the usual manner with corresponding pulleys on a countershaft by means of an open and crossed belt.

Arms 17 are mounted upon the shaft 5 and are secured thereto so as to revolve therewith, being preferably held in place by binding-screws 18, which pass through their hub ends and bear laterally against the shaft 5.

The reel 19 is supported by the arms 17, and its shaft 4 rests in notches 20, formed in the edges of the arms a short distance from their outer ends, and hooks 21 have pivotal connection with the extremities of the arms 17 and are adapted to hold the reel 19 in suspension when the reel is entering and leaving the vat. Weighted arms 22 are secured to the shaft 5 and extend in a diametrically-opposite direction to the arms 17, and are provided to counterbalance the reel 19 and its load, the weights 23 on the outer ends of the arms 22 being adjustable to allow for variation in the weight of the loaded reel. The arms 22 have hub portions at their inner ends which receive the end portions of the shaft 5 and through which extend binding-screws 24, by means of which the arms 22 are secured in the required position upon the shaft 5.

The reel 19 comprises the shaft 4 and similar heads 25, one head being rigidly attached to the shaft 4 and the other head being movable thereon and prevented from turning independently thereof by a feather-and-spline connection 26. The movable head is adjusted



on the shaft 4 in any manner, and suitable provisions will be had for effecting said adjustment, and, as shown, consist of a set-screw 27 passing through a portion of the head and forming a swiveled joint therewith and having its inner threaded end working through an arm 28, projecting laterally from the shaft 4. Thus it will be seen that by rotating the set-screw 27, which can be effected in a variety of ways, the head 25 connected therewith will be moved in a positive manner upon the shaft 4.

The heads 25 are of similar construction, and comprise upper and lower bars 29 and 30, an intermediate bar 31, side bars 32, and a middle bar 33, the bars 32 and 33 being integrally formed and the bars 29 and 30 being separate and having adjustable connection with the bars 32 and 33, thereby allowing for an adjustment between the bars 29, 30, and 31, according to the lengths of the hanks of yarn or thread to be loaded upon the reel for purposes of dyeing. Each of the bars 29 and 30 has extensions 34, which receive fastening-bolts 35, which operate in slots 36, formed in the ends of the side bars 32, by means of which adjustable connection is had between the bars 29 and 30 and the side bars 32. The several bars 29, 30, and 31 will be provided with a series of openings 37, in which the ends of supporting-bars 38 are fitted and retained in place when the reel is loaded. The middle bar 31 will be provided with two rows of openings 37, co-operating, respectively, with the openings in the upper and lower bars, as will be readily understood. Supporting-ledges 39 extend beneath each row of openings 37, and have semicircular notches 40 in register with the respective openings, and these notches 40 form seats to receive and support the ends of the rods 38 when the latter are placed upon the reel loaded with the hanks or skeins of yarn and thread. When loading and unloading the reel, the movable head is adjusted so that the bars or rods 38 will pass freely between the opposing sides of the heads 25, thereby admitting of the operation of loading and unloading being performed in a rapid and easy manner. After the rods 38 are placed in position upon the seats 40, the movable head is caused to advance inward a sufficient distance to compel the ends of the rods 38 to enter the openings 37, thereby preventing the accidental displacement of the said rods when immersing the reel in the dye and removing the same from the vat, as will be readily comprehended.

The reel-heads may be constructed of wood or metal, or a combination of the two, the latter construction being shown in Fig. 6, in which the ledge 39, with its seats 40, is separate and distinct from the bar of the reel and attached to the said bar in any desired manner.

A short shaft 41 is journaled in an end of the vat in such a manner as to provide a water-tight joint, and is supplied at its inner end

with a pinion 42 and at its outer end with a gear-wheel 43, the latter meshing with a pinion 44 on a short shaft 45, upon which are mounted tight and loose pulleys 46 and 47, and which co-operate with a belt 48, by means of which motion is transmitted to the shaft 45 for the purpose of operating the pinion 42 through the intermediate gearing just described, whereby a slow motion is imparted to the reel 19 when the latter is in the vat. A pinion 49, keyed upon the end of the shaft 4, is adapted to mesh with the pinion 42 when the reel is in the vat, this construction being shown most clearly in Fig. 2.

The operation of the invention is as follows: The rods or bars 38, which are preferably tubular, are provided in pairs and have the hanks or skeins of yarn or thread slipped thereon side by side, and after a pair of such rods or bars are filled they are placed in position upon the seats 40, and this operation is continued until the reel is loaded, the process of loading being accomplished from the center of the reel outward in each direction. After the reel is loaded, the movable head is adjusted so as to cause the ends of the rods or bars 38 to enter the respective openings 37, and the reel is then placed in position upon the arms 17, with the end of its shaft 4 resting in the notches 20, and the hooks 21 are engaged with the end portions of the shaft 4, and the shaft 9 being rotated the reel will be placed within the vat by the mechanism hereinbefore set forth. After the reel is in the vat, the shaft 9 is thrown out of gear in the usual manner and the shaft 41 is set in motion, thereby rotating the reel slowly and causing all portions of the yarn and thread to be subjected to the dye, whereby an even and uniform coloring is attained. After the dyeing has sufficiently progressed, the shaft 9 is again set in motion in a reverse direction, thereby causing the reel to be lifted from the vat and supported to one side thereof, as shown in Fig. 1. It will be remembered that two or more reels will be provided, and that while one reel is in active service another is unloading and loading, so as to take the place of the loaded reel when the latter is removed from the dye-vat. The reels are transported to and from the vat in any desired manner, either by truck or hand, as found most convenient.

Objects and advantages other than those set forth herein will become apparent to those skilled in the art, and it will be understood that changes in the form, proportion, and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention.

Having thus described the invention, what is claimed as new is—

1. An apparatus to facilitate the dyeing of woollen and cotton yarns in hanks or skeins, the same comprising a vat, a counterbalanced shaft journaled to one side of the vat and hav-



ing arms, a reel journaled to the outer ends of the arms and comprising end supports, and a series of pairs of rods for supporting the hanks or skeins, and grouped about the axis of the reel, actuating mechanism for the counterbalanced shaft to immerse the reel in the dye and remove it therefrom and means for rotating the reel within the vat, whereby the pairs of supporting rods are caused to travel and carry the hanks or skeins about the axis of the said reel, substantially as set forth, and for the purpose described.

2. An apparatus for the purpose specified, comprising a vat, a gear operating within the vat, a reel having a companion gear to mesh with the gear in the vat, provisions for removing and placing the reel within the vat and causing the gear of the reel to move away from and approach the gear in the vat, and bearings for supporting the reel within the vat and during its rotation by the meshing of the said gears, substantially as set forth.

3. An apparatus for the purpose set forth, comprising a vat, a counterbalanced shaft disposed in proximate relation to the vat and having outwardly-extending arms, swinging connections having attachment with the outer end of the said arms, a reel constructed to be supported by the said swinging connections, and actuating mechanism for positively operating the said counterbalanced shaft, whereby the reel is placed within and removed from the said vat, substantially as described for the purpose specified.

4. A reel for the purposes described, comprising a shaft having a relatively fixed and movable head, said heads having correspond-

ing openings adapted to receive yarn-supporting rods, substantially as set forth.

5. A reel for the purpose described, comprising a shaft and a relatively fixed and movable head, said heads having openings and projecting ledges, the latter having depressions in register with the respective openings to form seats to support the ends of the yarn-supporting rods, substantially as set forth.

6. A reel of the character set forth, comprising upper and lower bars and an intermediate bar having a series of openings, the outer bars being adjustable relatively to the intermediate bar, substantially as set forth.

7. The herein-specified reel, comprising a shaft and heads, the latter having side bars and upper and lower bars, said upper and lower bars having adjustable connection with the side bars, substantially as set forth.

8. An apparatus for the purpose described, comprising a vat having vertical guide ways, a shaft extending through a side of the vat and provided with a gear on its inner end in line with the adjacent guide way, a counterbalanced shaft provided with outwardly-extending arms, and a reel provided with yarn-supporting rods and having a gear to mesh with the gear within the vat and adapted to be operated by the said counterbalanced shaft, substantially as set forth.

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

HORACE L. FREEMAN.

Witnesses:

JOHN H. SIGGERS,  
HAROLD H. SIMMS.