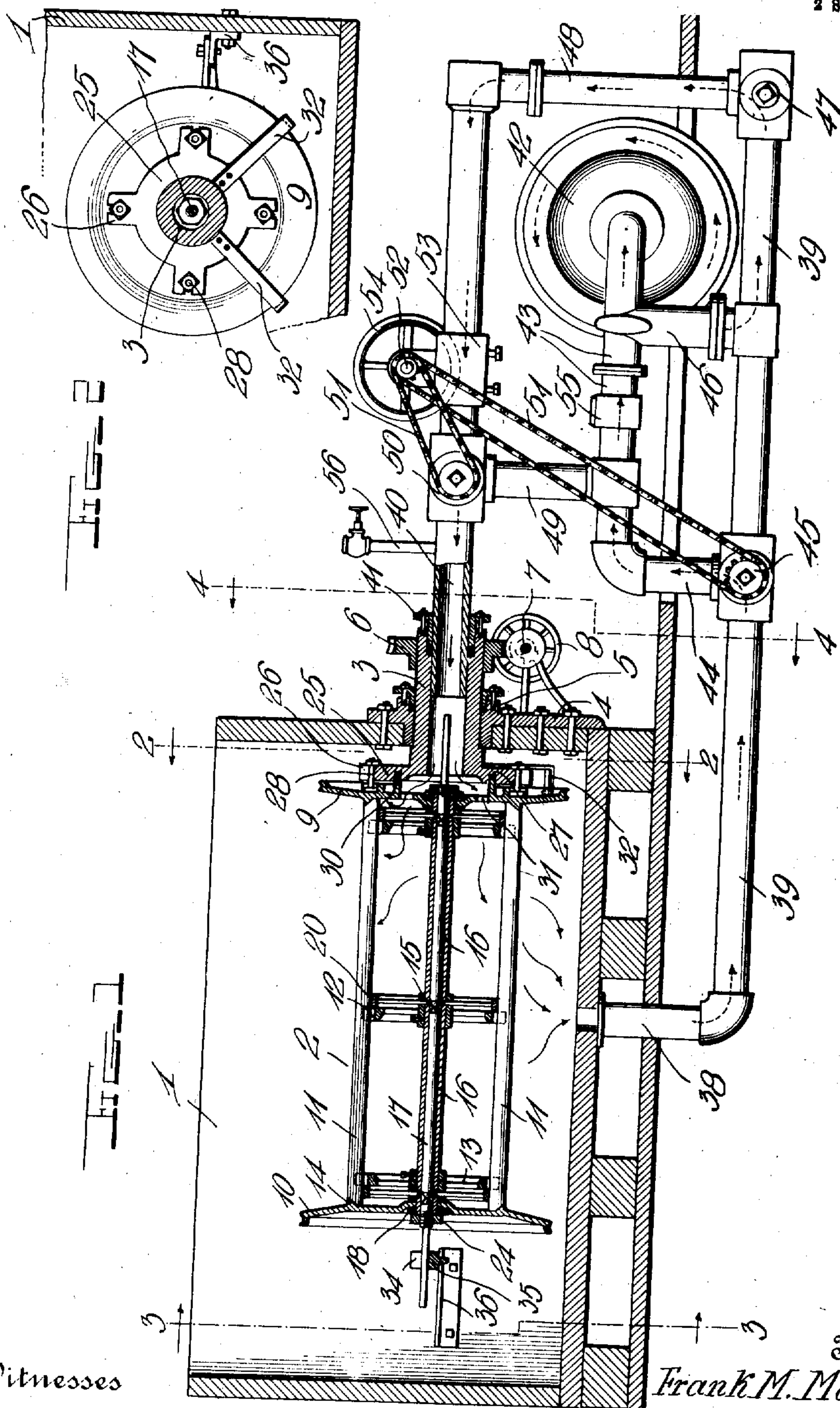


F. M. MORTON.
 COLLAPSIBLE REVOLVING BEAM VACUUM DYEING MACHINE.
 APPLICATION FILED AUG. 1, 1910.

975,269.

Patented Nov. 8, 1910.

2 SHEETS-SHEET 1.



Witnesses

C. C. C. C. C.

O. B. Hopkins

by

A. B. Wilson & Co.

Attorneys

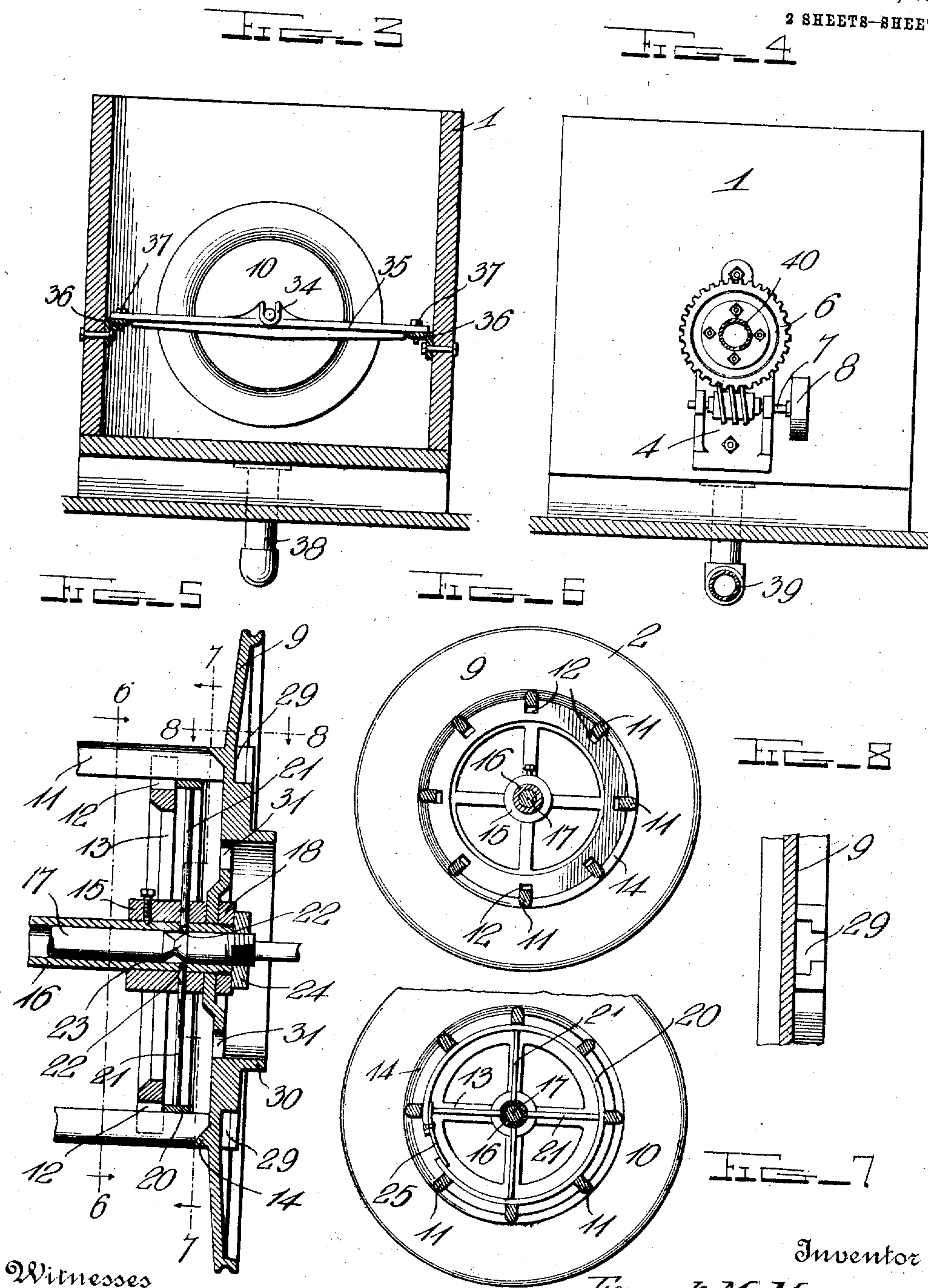
Inventor
 Frank M. Morton

F. M. MORTON.
 COLLAPSIBLE REVOLVING BEAM VACUUM DYEING MACHINE.
 APPLICATION FILED AUG. 1, 1910.

975,269.

Patented Nov. 8, 1910.

2 SHEETS-SHEET 2.



Witnesses

O B Hopkins

Inventor

Frank M. Morton

by

A. B. Wilson & Co

Attorneys

UNITED STATES PATENT OFFICE.

FRANK M. MORTON, OF PHOENIX, ALABAMA, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO COLUMBUS TRUCK AND SUPPLY MFG. CO., OF COLUMBUS, GEORGIA, A CORPORATION OF GEORGIA.

COLLAPSIBLE REVOLVING-BEAM VACUUM DYEING-MACHINE.

975,269.

Specification of Letters Patent.

Patented Nov. 3, 1910.

Application filed August 1, 1910. Serial No. 574,775.

To all whom it may concern:

Be it known that I, FRANK M. MORTON, a citizen of the United States, residing at Phoenix city, in the county of Lee and State of Alabama, have invented certain new and useful Improvements in Collapsible Revolving-Beam Vacuum Dyeing-Machines; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to improvements in machines for dyeing yarn upon a revolving beam or drum.

One object of the invention is to provide an improved machine of this character which will be simple, practical and efficient in operation and in which the dye-liquor may be forced through the yarn from the inside of the beam outwardly or sucked from the outside of the beam inwardly through the yarn.

Another object of the invention is to provide in a machine or apparatus of the character mentioned, an improved collapsible beam which may be collapsed or reduced in size before it is placed in the dyeing liquor so as to slacken or reduce the tension of the yarn wound on the beam for the purpose of insuring perfect saturation of the yarn by the dye-liquor.

A further object of the invention is to provide in a machine of the character mentioned improved means for detachably mounting the revolving yarn-carrying beam.

With these and other objects in view the invention consists of certain novel features of construction, combination and arrangement of parts as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 is a vertical longitudinal section through a dyeing machine or apparatus embodying my invention. Figs. 2, 3 and 4 are detail sectional views taken respectively on lines 2—2, 3—3, and 4—4 in Fig. 1. Fig. 5 is an enlarged detail longitudinal section through one end of the collapsible beam, and Figs. 6, 7 and 8 are detail sectional views taken respectively on the lines 6—6, 7—7, and 8—8 in Fig. 5.

Referring more particularly to the draw-

ings, 1 denotes a suitable receptacle for the dye-liquor which may be a tub or tank of any form and construction, and 2 denotes my improved revolving and collapsible yarn-carrying beam. One end of the beam 2 is detachably connected to a tubular trunnion 3 rotatably arranged in a bearing formed in a plate or bracket 4 bolted or otherwise secured to the wall of the tank 1. A stuffing box 5 is provided to prevent the escape of the dye-liquor through the bearing. Any means may be provided for rotating the trunnion 3, but I preferably fix to the outer end of the latter a worm gear 6 which meshes with a worm on a transverse shaft 7 mounted in bearing brackets projecting from the plate 4 and provided with a suitable belt wheel or pulley 8.

The beam or drum 2 comprises two circular heads 9, 10 between which are arranged an annular series of radially shiftable longitudinally extending members or slats 11 around which the yarn is wrapped. The slats or bars 11 are supported in notches 12 in the rims of wheels 13, and the ends of said slats are beveled to engage annular stop flanges 14 formed on the opposing faces of the heads 9 and 10, said stop flanges being adapted to limit the outward movement of the slats. The wheels 13 have hubs 15 secured by set screws or other fastening means to a hollow shaft or sleeve 16 through which latter extends a longitudinally shiftable shaft 17. The heads 9, 10 are fixed to the sleeve 16 and against the ends of the hubs of the outer wheels 13 by means of nuts 18 screwed on threaded extremities of the sleeve 16. For the purpose of forcing the slats or bars 11 outwardly and maintaining them in their distended position so that the yarn may be wound upon the beam, I provide expanding wheels or frames, shown more clearly in Figs. 1, 5 and 7, and each consisting of a split, resilient ring 20 to which is secured at suitable intervals inwardly extending, radially disposed spokes 21 in the form of rods having their inner ends slidably arranged in radial openings in the hubs 15 of the wheels 13 and in the sleeve 16. The inner extremities of the spokes or members 21 are cone-shaped or tapered, as shown at 22, for engagement with inclines 23 on the shaft 17, said inclines being preferably formed by making double cone-shaped an-

angular grooves in said shaft, as will be readily understood on reference to Fig. 5. The outer ends of the shaft 17 are screw-threaded for engagement by nuts 24 which latter when adjusted enable the shaft 17 to be shifted longitudinally in the sleeve 16 for the purpose of causing the inclines 23 to either expand the split rings 20 of the expanding frames or permit said rings to contract and thereby release the tension of the yarn wound upon the spools 11. The split ends of the rings 20 are yieldably connected by leaf springs 25, each of which has one of its ends riveted or otherwise secured to one end of one ring 20 and its other end bearing loosely against the opposite ends of said rings, see Fig. 7. Owing to this construction it will be seen that by adjusting the nuts 24 so that the shaft 17 may be shifted longitudinally, the beam may be readily collapsed after the yarn has been wound upon it and before it is placed in the tank 1. In Fig. 1 the beam is shown in expanded position for the sake of clearness.

In order to detachably mount the beam on the trunnion 3, the latter has its inner end formed with a radially projecting flange 25 formed around its edge with notched lugs 26, and on its inner face with an annular packing groove 27. The notched lugs 26 receive bolts 28, the heads of which latter enter T-shaped notches 29, see Fig. 8, in lugs or enlargements formed on the head 9. Said head 9 is also formed with an annular flange 30 adapted to enter the groove 27 to prevent the escape of the dye-liquor between said head and the flange 25. The head 10 is solid or closed, but the head 9 is formed within the flange 30 with an annular series of openings 31 so that the dye-liquor may pass from the tubular trunnion 3 into the space within the beam inclosed by the yarn that is wound upon the latter. Owing to the provision of the bolts 28 it will be seen that the beam may be readily applied to or removed from the flange 25, and in order to conveniently support the head 9 when said bolts are being applied or removed, I secure to the head 25, as shown in Figs. 1 and 2, two angular arms 32.

The extremities of the shaft 17 are reduced as shown in Fig. 1, one entering the trunnion 3 and the other being removably arranged in a bearing recess 34 formed on the center of an adjustable cross-bar 35. The extremities of the latter are slidably arranged on angular brackets 36 secured to the opposing walls of the tank 1 and they are retained in position by removable pins or bolts 37, see Fig. 3.

Communicating with the bottom of the tank 1 is a vertical pipe 38 connected to a horizontal pipe 39, and extending into the outer end of the trunnion 3 is an upper horizontal pipe 40, a stuffing box 41 being at

the end of the trunnion 3. These pipes are adapted to serve both as inlet and discharge pipes so that the flow of the dye-liquor may be either outwardly through the yarn or inwardly through the same. A suitable force pump 42 preferably of the centrifugal type, as shown, is provided for circulating the dye-liquor and this pump has connected to its eye or inlet a pipe 43 having a depending end 44 connected to a three-way valve 45 arranged in pipe 39. The outlet or discharge connection 46 of the pump 42 is connected to the pipe 39 as shown in Fig. 1, and the end of said pipe 39 is connected by a three-way valve 47 to a vertical pipe 48, which latter is connected to the outer end of the pipe 40. A vertically extending branch pipe 49 is connected at its lower end to pipe 43 and at its upper end to a three-way valve 50 arranged in the pipe 40. Owing to this construction and arrangement of parts it will be seen that when the pump is in operation and the valves are in the position shown in Fig. 1, the flow of the dye-liquor will be as indicated by the arrows in said figure, the flow being from the inside of the beam outwardly through the yarn. By shifting the valve 45 to close the pipe 44 and shifting the valve 50 to open the branch pipe 49, the pump will cause the dye-liquor to circulate in the reverse direction, that is to say, from the outside of the beam through the yarn to the inside of the same, as will be readily understood on reference to Fig. 1.

In order to permit valves 45, 50 to be simultaneously actuated they are connected by sprocket chain gearing 51 to an operating shaft 52 arranged in a bearing clamped as shown at 53, on the pipe 40 and provided at one of its ends with a hand wheel 54.

The three-way valve 47 has one of its branches open so that when this valve is in one of its positions, the dye-liquor may be drained from the tank 1.

In the pipe 43 I arrange a hose or water pipe connection 55 so that the apparatus and also the yarn on the beam may be washed out by fresh water.

56 denotes a valve controlled vent pipe which may be opened to admit air to the beam after the yarn thereon has been dyed and the liquor has been drained from the tub.

From the foregoing detail and description taken in connection with the accompanying drawings it is thought that the use, operation and advantages of the invention will be readily understood. It will be noted by making the beam collapsible, it may be reduced in size after the yarn has been wound upon it and before the beam is placed in the tank, so that the yarn will be slack or loose and consequently the dye-liquor will thoroughly saturate it. It will be further noted that the simple construction of the

device renders it strong and durable as well as inexpensive.

While I have shown and described in detail the preferred embodiment of my invention, I wish it understood that I do not limit myself to the construction set forth since the various changes in the form proportion and arrangement of parts and in the details of construction may be made within the spirit and scope of the claimed invention.

I claim:—

1. The combination of a tank for the dye-liquor, a tubular trunnion journaled in one wall of the tank, a collapsible beam consisting of heads, a sleeve uniting said head, wheels arranged on said sleeve, radially movable slats arranged on said wheels and extending between said heads, a longitudinally shiftable shaft in said sleeve and provided with inclines, expanding frames for the slats and having members engaged with the inclines on said shaft, means for detachably connecting one of said heads to said trunnion, the last mentioned head having openings affording communication between the interior of the beam and the trunnion, means for supporting the opposite end of said shaft, means for rotating said trunnion, and means for causing the circulation of dye-liquor through the tank, the beam and the trunnion.

2. In a collapsible beam of the character set forth, the combination of a sleeve, heads at the ends of the sleeve, wheels on the

sleeve, slats radially movable in the wheels, a longitudinally shiftable shaft in the sleeve and provided with inclines and expanding frames for the slats having members co-acting with the inclines on said shaft.

3. In a collapsible beam of the character set forth, the combination of a sleeve, a longitudinally shiftable shaft therein and provided with inclines, heads on said sleeve, radially movable slats between said heads, means for supporting and guiding said slats, stops to limit the outward movement of said slats, and expanding frames having members to co-act with the inclines on said shaft.

4. In a collapsible beam of the character set forth, the combination of a sleeve, a longitudinally shiftable shaft therein and provided with inclines, heads on said sleeve and formed with annular stop flanges, wheels fixed to the sleeve and provided with guide notches, slats radially movable in said guide notches and adapted to engage said stop flange on the heads, split expanding rings engaged with said heads, and radial rods extending inwardly from the expanding rings and co-acting with the inclines on said shaft.

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

FRANK M. MORTON.

Witnesses:

J. S. KIMBROUGH.

GEO. A. HAYS.