

W. J. GOING.
YARN TREATING MECHANISM.
APPLICATION FILED NOV. 8, 1917.

1,333,481.

Patented Mar. 9, 1920.
2 SHEETS—SHEET 1.

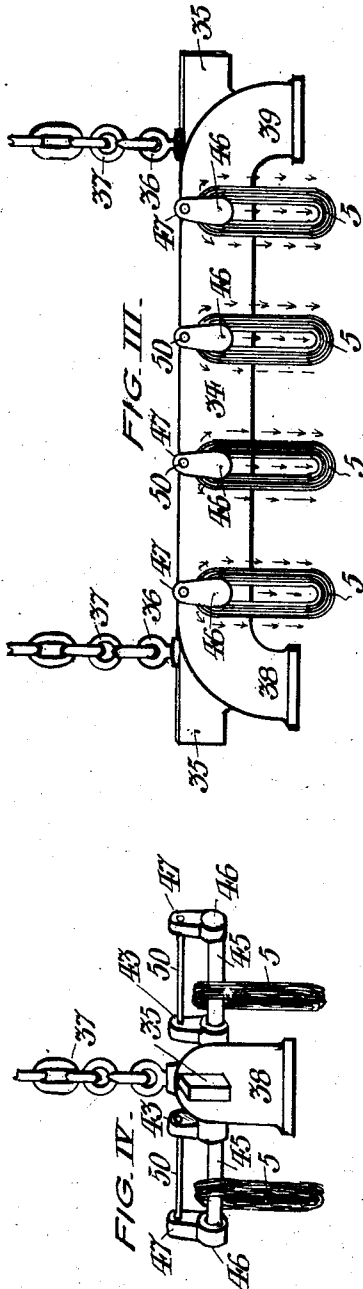


FIG. II.

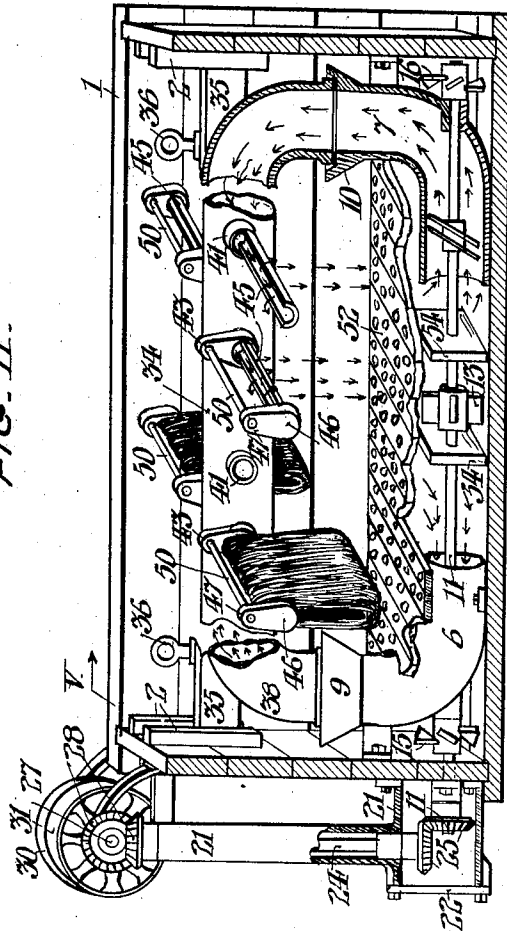
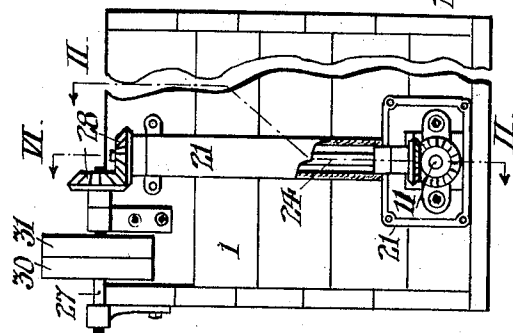


FIG. I.

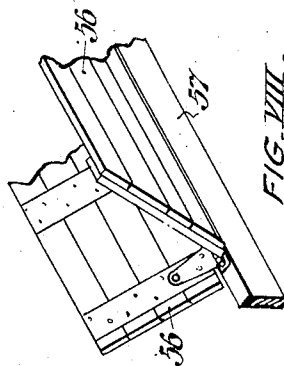
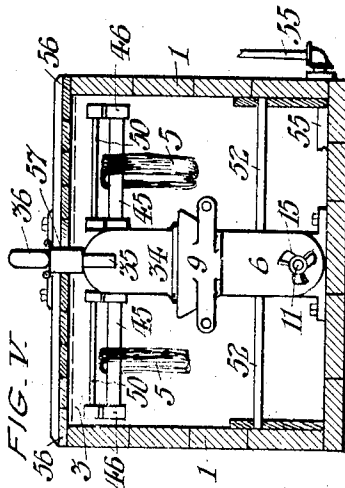
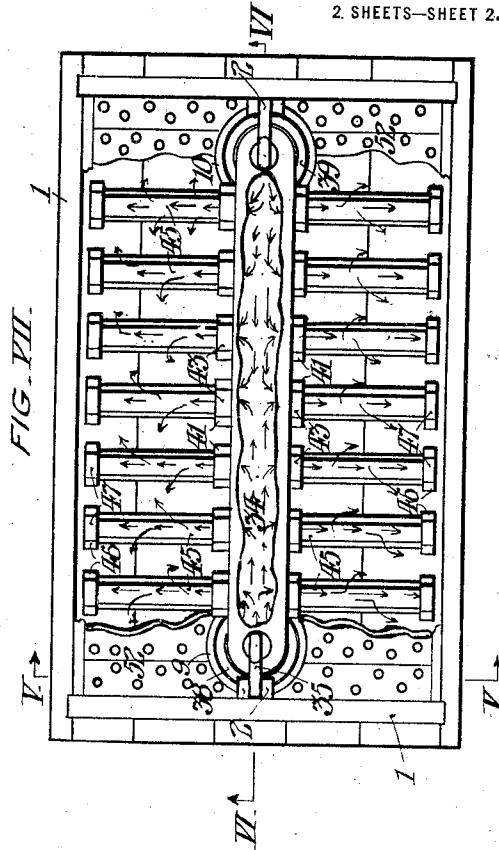
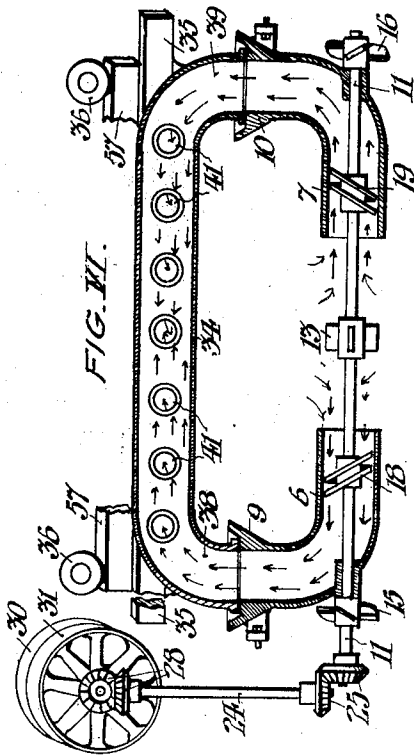


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UNITED STATES PATENT OFFICE.

WILLIAM JOSEPH GOING, OF TRENTON, NEW JERSEY.

YARN-TREATING MECHANISM.

1,333,481.

Specification of Letters Patent.

Patented Mar. 9, 1920.

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To all whom it may concern:

Be it known that I, WILLIAM JOSEPH GOING, a citizen of the United States, residing at Trenton, in the county of Mercer and State of New Jersey, have invented a certain new and useful Improvement in Yarn-Treating Mechanism, whereof the following is a specification, reference being had to the accompanying drawings.

10 My invention relates to apparatus for treating yarns in skeins, and is adapted for washing, scouring, dyeing, and any other operation of subjecting yarn to the action of a liquid.

15 My invention is particularly applicable to machines of the rectangular tub type. In such machines as ordinarily constructed, the yarn is hung upon sticks or rods projecting from a rack frame, which is hung in the tub, and the dye or other liquid is circulated by propeller wheels in the tub, with a view of forcing the liquid through the yarn. However, the circulation of dye liquor, by such means, is insufficient, it frequently fails to penetrate the skeins where they hang upon the sticks or rods aforesaid, and the product is defective, "stick marked yarn." Although yarn may be dyed without such "stick mark" defects, in machines of the type wherein the yarn skeins are hung on sticks or rods carried by a reel which revolves half submerged in the dye liquor, so as to successively lower the skeins into such liquor and raise them from it, such apparatus has the disadvantage that the weight of the liquid with which the yarn is saturated when raised from the tub, stretches and strains the yarn so as to impair its loftiness, *i. e.*, such fluffiness as it has before being subjected to the action of the liquid.

It is the object of my invention to avoid the disadvantages of both of the aforesaid types of mechanism by maintaining the skeins submerged in the liquid in the tub, upon supports which are stationary during the operation, and actively circulating the liquid through said supports and the yarn resting thereon. To that end, the essential feature of my invention is the provision of a yarn rack which is a conduit for the liquid to which the yarn is to be subjected and has yarn supports which are conduits for such

liquid, adapted to direct the same to and through the yarn.

My invention includes the various novel features of construction and arrangement hereinafter more definitely specified.

In the drawings; Figure I is an end view of a rectangular tub provided with a convenient embodiment of my invention.

Fig. II is a partly perspective, irregular sectional view of said tub taken on the line II—II in Fig. I.

Fig. III is a side elevation of the tubular, liquid circulating, yarn skein rack; raised from said tub in which it is shown in Fig. II.

Fig. IV is an elevation of the left hand end of said rack as shown in Fig. III.

Fig. V is a cross sectional view of said tub, taken on the line V in Figs. II and VII, but including its cover, with its hinged leaves shut.

Fig. VI is a partly perspective, central, vertical sectional view of said rack; the complementary liquid circulating conduits; and appurtenant liquid circulating mechanism.

Fig. VII is a plan view of said tub with a partly sectional view of said rack, but without the rack yarn rods shown in Figs. II, IV, and V.

Fig. VIII is a fragmentary perspective view of said tub cover, with its hinged leaves open.

In said figures, the rectangular tub 1 having pairs of vertical guides 2 at respectively opposite ends thereof, as shown in Fig. II, is normally charged with liquid to the level 3 indicated in Fig. V and provided with means arranged to circulate said liquid through skeins of yarn 5 in said tub, including the two conduits 6 and 7, shown in Fig. II, having upturned bell flanged sockets 9 and 10 at respectively opposite ends of said tub. The horizontal propeller shaft 11 extends axially in both of said conduits 6 and 7, and projects exterior to said tub, as shown in Figs. I and II. The mixing paddle wheel 13, which is carried by said shaft 11, centrally in said tub and between said conduits 6 and 7, is arranged to drive said liquid transversely in said tub. The two screw propeller wheels 15 and 16, carried by said shaft, in said tub at respectively opposite, ends thereof, are oppositely

arranged to drive said liquid longitudinally in said tub and toward the center thereof. The two other screw propellers 18 and 19, carried by said shaft, as shown in Fig. VI, respectively in said conduits 6 and 7, are oppositely arranged to drive said liquid longitudinally in said conduits toward the respectively opposite ends of said tub, and respectively through said bell sockets 9 and 10. The liquid tight gear casing 21, shown in Figs. I and II, which is mounted on the exterior of said tub 1, and incloses the end of said propeller shaft 11, has the removable cover 22, affording access to the gears therein. The vertical counter shaft 24 is journaled in said gear casing 21 and operatively connected with said shaft 11 by the bevel gears 25. The main driving shaft 27 is mounted on said tub 1 and connected with said counter shaft 24 by the bevel gears 28, said shaft 27 is conveniently provided with tight and loose pulleys 30 and 31 whereby said shafts may be rotated, to continuously agitate said liquid in the tank, so as to prevent any sedimentation therein, and circulate said liquid upwardly through said conduits 6 and 7.

The tubular yarn rack 34 having guide ends 35 fitted to slide in said vertical guides 2 in the tub, has upwardly extending eyes 36 arranged to engage the chains 37, or other convenient means to raise and lower said rack. Said rack has downturned ends 38 and 39 respectively removably fitted to said bell sockets 9 and 10 so as to form a conduit for said liquid complementary to said conduits 6 and 7, when said rack is lowered to the operative position shown in Figs. II, V, and VI, and said rack 34 has two series of lateral nozzles 41, respectively upon opposite sides thereof, as shown in Fig. VII, with rod bearings 43 respectively above them, as indicated in Fig. III. The channeled yarn supports 45, which are trough shaped, as best shown in Fig. II, are removably fitted to said nozzles 41, to conduct liquid from said rack 34. The end caps 46 which are removably fitted to said yarn supports 45, have respective rod bearings 47 axially alined with the rod bearings 43 on said rack. The locking rods 50 respectively extending parallel with and spaced above said supports 45 are removably fitted in said rod bearings to lock the skeins of yarn 5 from floating off said supports.

The removable foraminous floor 52, in said tub 1, is spaced above the portions of said conduits 6 and 7 containing said propeller shaft 11, so as to insure the substantially uniform distribution of the down flowing liquid, throughout the area of the tub. The baffle partitions 54, at the bottom of said tub 1, and beneath said floor 52, as shown in Fig. II, extend transversely in said

tub upon respectively opposite sides of said mixing paddle wheel 13, to direct the liquid transversely in said tub, to and from said paddle wheel.

To use the apparatus above described to dye skeins of yarn 5, said rack 34 is raised from the position shown in Fig. II to the position in Fig. III with the locking rods 50 removed as shown in Fig. VII. The skeins of yarn 5 are then hung on said supports 45 until the latter are filled; and the locking rods 50 are then placed in position, as indicated in Fig. II, to keep the yarn from accidentally floating off said supports. Said rack 34 is then lowered from the position shown in Fig. III to the position shown in Fig. II, with its downwardly turned ends 38 and 39 respectively seated in the sockets 9 and 10 so that the dye liquor which is forced from the conduits 6 and 7 through said sockets, is conveyed by said rack to said channeled supports 45 and directed by the latter through the yarn, gently agitating the yarn as said liquor passes downwardly on its way through said floor 52 to be again driven upwardly through said conduits 6 and 7; the effect being to maintain the liquid continuously agitated and circulating through the yarn with sufficient force to thoroughly penetrate and thus evenly dye the yarn, without subjecting it to any detrimental strain.

Of course, said apparatus may be similarly used to subject yarn to the action of any liquid, whether dye liquor, scouring solution, or plain water; with the effect of thoroughly circulating any such liquid through the yarn. Therefore, I find it convenient to provide said tub 1 with the steam heating pipe 55, and the cover including the leaves 56 hinged to the beam 57, carried by said rack 34.

I do not desire to limit myself to the precise details of construction and arrangement above described, as it is obvious that various modifications may be made therein without departing from the essential features of my invention, as defined in the appended claims.

I claim:

1. In a machine for treating yarn in skeins; the combination with a rectangular tub, having vortical guides at respectively opposite ends thereof; of means arranged to circulate liquid through skeins in said tub, including two conduits, axially alined in said tub, and having upturned bell flanged sockets at respectively opposite ends of said tub; a horizontal propeller shaft extending axially in both of said conduits, and projecting exterior to said tub; a mixing paddle wheel carried by said shaft, centrally in said tub and between said conduits, arranged to drive said liquid transversely in said tub; two screw propeller wheels, carried by said shaft, in said tub at respectively op-

posite ends thereof, oppositely arranged to drive said liquid longitudinally in said tub and toward the center thereof; two other screw propellers, carried by said shaft, respectively in said conduits, oppositely arranged to drive said liquid longitudinally in said conduits, toward the respectively opposite ends of said tub and respectively through said bell sockets; means whereby said shaft may be rotated; a tubular yarn rack having guide ends fitted to slide in said vertical guides, and having downturned ends removably fitted to said bell sockets, and lateral nozzles, with rod bearings respectively above them; channeled yarn supports, removably fitted to said nozzles, to conduct liquid from said rack; end caps removably fitted to said yarn supports and having respective rod bearings axially alined with the rod bearings on said rack; locking rods, respectively extending parallel with, and spaced above, said supports, removably fitted in said rod bearings; a foraminous floor in said tub, spaced above the portions of said conduits containing said propeller shaft; and baffle partitions, at the bottom of said tub, beneath said floor; extending transversely in said tub, upon respectively opposite sides of said mixing paddle wheel.

2. In a machine for treating yarn in skeins; the combination with a tub; of means arranged to circulate liquid through skeins in said tub, including two conduits, axially alined in said tub, and having upturned sockets at respectively opposite ends; a horizontal propeller shaft extending axially in both of said conduits; a mixing paddle wheel carried by said shaft, centrally in said tub and between said conduits, arranged to drive said liquid transversely in said tub; two screw propeller wheels, carried by said shaft, oppositely arranged to drive said liquid longitudinally in said tub and toward the center thereof; two other screw propellers, carried by said shaft, respectively in said conduits, oppositely arranged to drive said liquid longitudinally in said conduits, respectively through said sockets; means whereby said shaft may be rotated; a tubular yarn rack, having downturned ends removably fitted to said sockets, and lateral nozzles, with rod bearings respectively above them; channeled yarn supports, removably fitted to said nozzles, to conduct liquid from said rack; end caps removably fitted to said yarn supports and having respective rod bearings axially alined with the rod bearings on said rack; locking rods, respectively extending parallel with, and spaced above, said supports, removably fitted in said rod bearings; a removable foraminous floor in said tub, spaced above the portions of said conduits containing said propeller shaft; and baffle partitions, at the bottom of said tub,

beneath said floor, extending transversely in said tub, upon respectively opposite sides of said mixing paddle wheel.

3. In a machine for treating yarn in skeins; the combination with a tub; of means arranged to circulate liquid through skeins in said tub, including two conduits, axially alined in said tub, and having upturned sockets at respectively opposite ends; a horizontal propeller shaft extending axially in both of said conduits; a mixing paddle wheel carried by said shaft, centrally in said tub and between said conduits arranged to drive said liquid transversely in said tub; two screw propeller wheels, carried by said shaft, oppositely arranged to drive said liquid longitudinally in said tub and toward the center thereof, two other screw propellers, carried by said shaft, respectively in said conduits, oppositely arranged to drive said liquid longitudinally in said conduits, respectively through said sockets; means whereby said shaft may be rotated; a tubular yarn rack, having downturned ends removably fitted to said sockets, and lateral nozzles, with rod bearings respectively above them; channeled yarn supports, removably fitted to said nozzles, to conduct liquid from said rack; end caps removably fitted to said yarn supports and having respective rod bearings axially alined with the rod bearings on said rack; locking rods, respectively extending parallel with, and spaced above, said supports, removably fitted in said rod bearings; and a removable foraminous floor in said tub, spaced above the portions of said conduits containing said propeller shaft.

4. In a machine for treating yarn in skeins; the combination with a tub; of means arranged to circulate liquid through skeins in said tub, including two conduits, axially alined in said tub, and having upturned sockets at respectively opposite ends; a horizontal propeller shaft extending axially in both of said conduits; two screw propeller wheels, carried by said shaft, oppositely arranged to drive said liquid longitudinally in said tub and toward the center thereof; two other screw propellers, carried by said shaft, respectively in said conduits, oppositely arranged to drive said liquid longitudinally in said conduits, respectively through said sockets; means whereby said shaft may be rotated; a tubular yarn rack having downturned ends removably fitted to said sockets, and lateral nozzles, with rod bearings respectively above them; channeled yarn supports, removably fitted to said nozzles, to conduct liquid from said rack; end caps removably fitted to said yarn supports and having respective rod bearings axially alined with the rod bearings on said rack; locking rods, respectively extending parallel with, and spaced above, said supports, re-

movably fitted to said rod bearings; and a removable foraminous floor in said tub, spaced above the portions of said conduits containing said propeller shaft.

5 5. In a machine for treating yarn in skeins; the combination with a tub; of means arranged to circulate liquid through skeins in said tub, including two conduits, axially alined in said tub, and having up-
10 turned sockets at respectively opposite ends; a horizontal propeller shaft extending axially in both of said conduits; two screw propellers, carried by said shaft, respectively in said conduits, oppositely arranged to drive
15 said liquid longitudinally in said conduits, respectively through said sockets; means whereby said shaft may be rotated; a tubular yarn rack, having downturned ends removably fitted to said sockets, and lateral
20 nozzles, with rod bearings respectively above them; channeled yarn supports, removably fitted to said nozzles, to conduct liquid from said rack; end caps removably fitted to said yarn supports and having respective rod
25 bearings axially alined with the rod bearings on said rack; and locking rods, respectively extending parallel with, and spaced above, said supports, removably fitted in said rod bearings.

30 6. In a machine for treating yarn in skeins; the combination with a tub; of means arranged to circulate liquid through skeins in said tub, including two conduits, axially alined in said tub, and having up-
35 turned sockets at respectively opposite ends; a horizontal propeller shaft extending axially in both of said conduits; two screw propellers, carried by said shaft, respectively in said conduits, oppositely arranged to drive
40 said liquid longitudinally in said conduits, respectively through said sockets; means whereby said shaft may be rotated; a tubular yarn rack, having downturned ends removably fitted to said sockets, and lateral
45 nozzles, and channeled yarn supports, removably fitted to said nozzles, to conduct liquid from said rack.

7. In a machine for treating yarn in skeins; the combination with a tub; of
50 means arranged to circulate liquid through skeins in said tub, including two conduits, in said tub, having upturned sockets; a propeller shaft extending axially in both of said conduits; two screw propellers, carried by
55 said shaft, respectively in said conduits, oppositely arranged to drive said liquid longitudinally in said conduits, respectively through said sockets; means whereby said shaft may be rotated; a tubular yarn rack
60 having downturned ends removably fitted to said sockets, and lateral nozzles, with channeled yarn supports, arranged to conduct liquid from said rack.

8. In a machine for treating yarn in

skeins; the combination with a tub; of 65 means arranged to circulate liquid through skeins in said tub, including a conduit, in said tub, having an upturned socket; a propeller shaft extending axially in said conduit; a screw propeller, carried by said 70 shaft, in said conduit, arranged to drive said liquid through said socket; means whereby said shaft may be rotated; a tubular yarn rack having a downturned end removably fitted to said socket, and lateral nozzles, with
75 channeled yarn supports, arranged to conduct liquid from said rack.

9. In a machine for treating yarn in skeins; the combination with a tub; of means arranged to circulate liquid through 80 skeins in said tub, including a tubular yarn rack having lateral nozzles, with channeled yarn supports, arranged to conduct liquid from said rack; and means constructed and arranged to prevent the yarn from floating 85 off said supports, including rods respectively extending parallel with said supports, and having means detachably connecting said rods with said supports.

10. In a machine for treating yarn, the 90 combination with a tubular yarn rack having yarn supports, arranged to conduct liquid from said rack, and means arranged to force liquid through said rack; of means detachably connected with said supports 95 constructed and arranged to prevent the yarn from floating off said supports.

11. In a machine for treating yarn, the combination with a tubular yarn rack hav- 100 ing lateral nozzles and means arranged to force liquid through said rack and nozzles; of yarn supports, respectively detachably connected with said nozzles, and each including a channel open throughout its length at its top; and means, independently carried 105 by each of said supports, arranged to prevent the yarn from floating off the same, including a locking rod above the support having detachable connections at each end with the support. 110

12. In a machine for treating yarn, the combination with a tubular yarn rack hav- 115 ing lateral nozzles and means arranged to force liquid through said rack and nozzles; of yarn supports, respectively detachably connected with said nozzles, and each including a channel open throughout its length at its top; and means, independently carried 120 by each of said supports, arranged to prevent the yarn from floating off the same.

13. In a machine for treating yarn, the combination with a tubular yarn rack hav- 125 ing lateral nozzles and means arranged to force liquid through said rack and nozzles; of yarn supports, respectively detachably connected with said nozzles, and each including a channel open throughout its length at its top; and means detachably connected

with each of said supports constructed and arranged to prevent the yarn from floating off the same.

14. In a machine for treating yarn, a yarn
5 support having a channel open throughout its length at its top, and means arranged to prevent the yarn from floating off said support, including a locking rod, extending parallel with said support above said channel,

and means connecting said rod with said 10 support at each end of said channel.

In testimony whereof, I have hereunto signed my name at Philadelphia, Pennsylvania, this fifth day of November, 1917.

WILLIAM JOSEPH GOING.

Witnesses:

ARTHUR E. PAIGE,
CAROLYN E. REUTER.