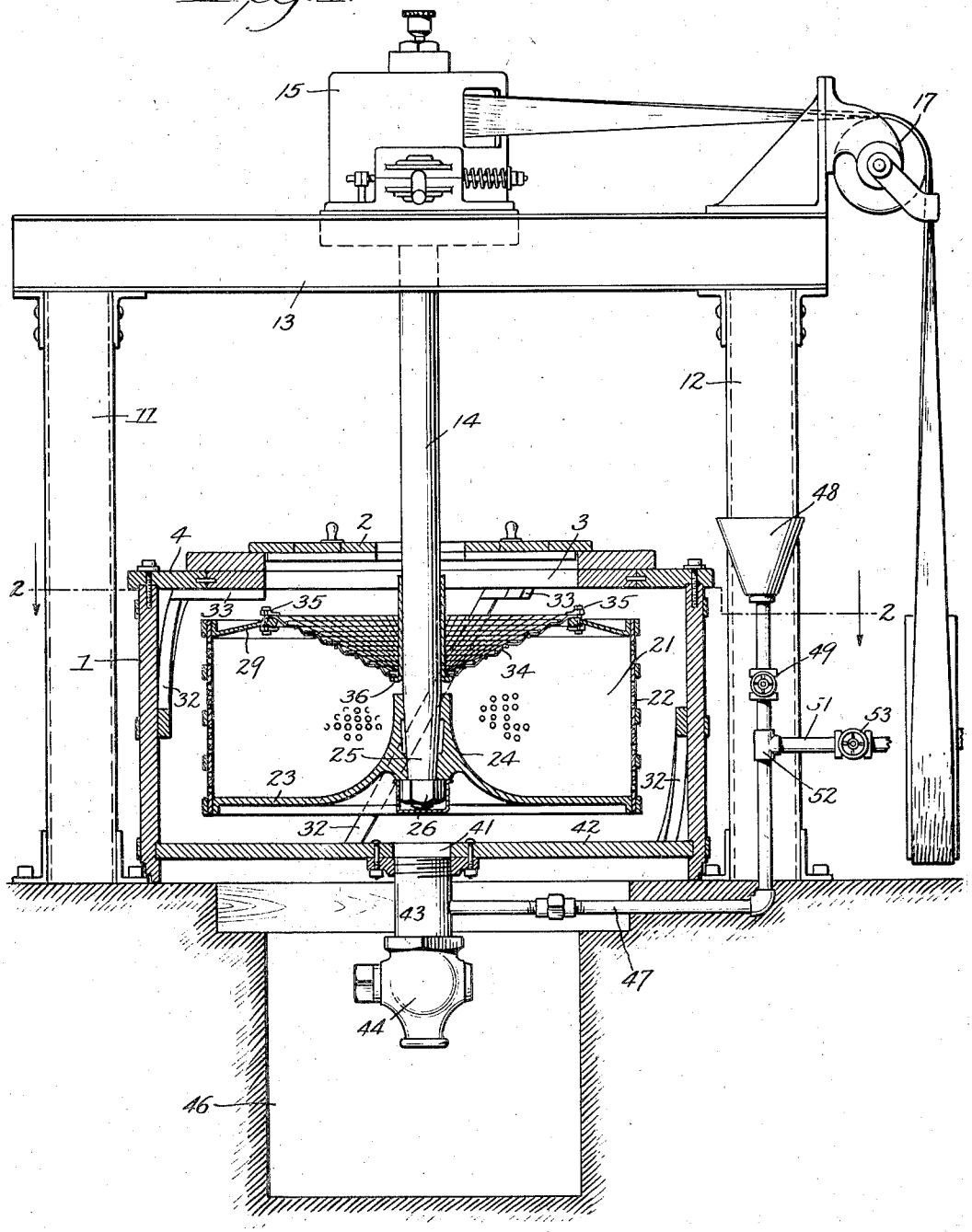
Jan. 7, 1930. T. A. BRYSON ET AL 1,742,196

MACHINE FOR TREATING FABRICS

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Fig. 1.



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Fig. 2.

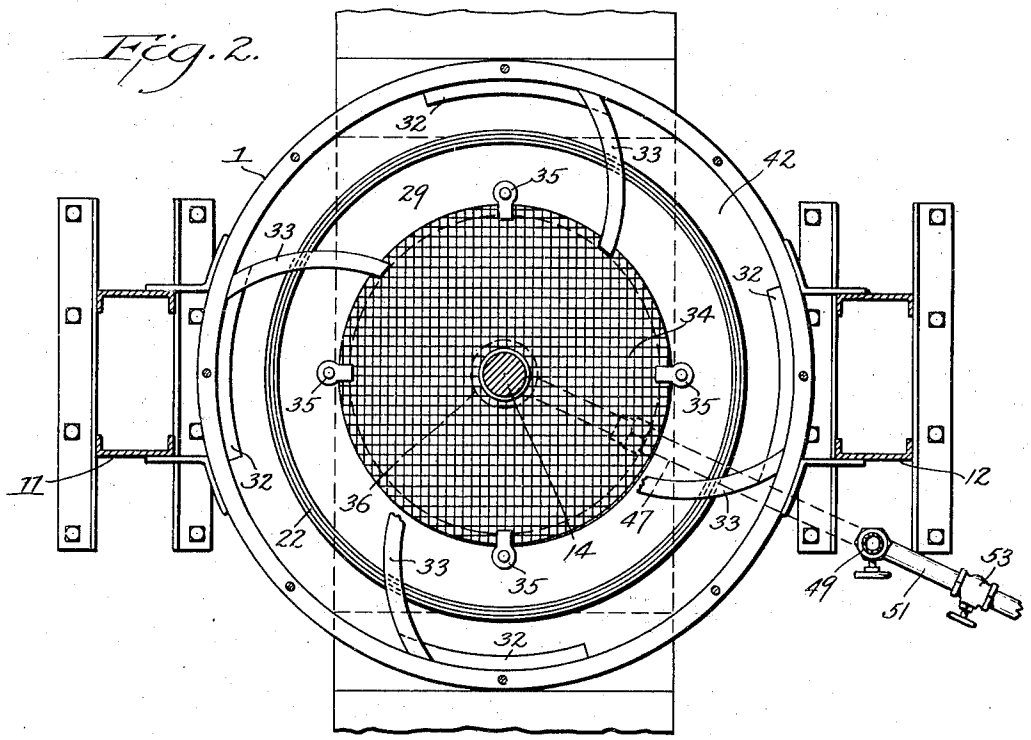
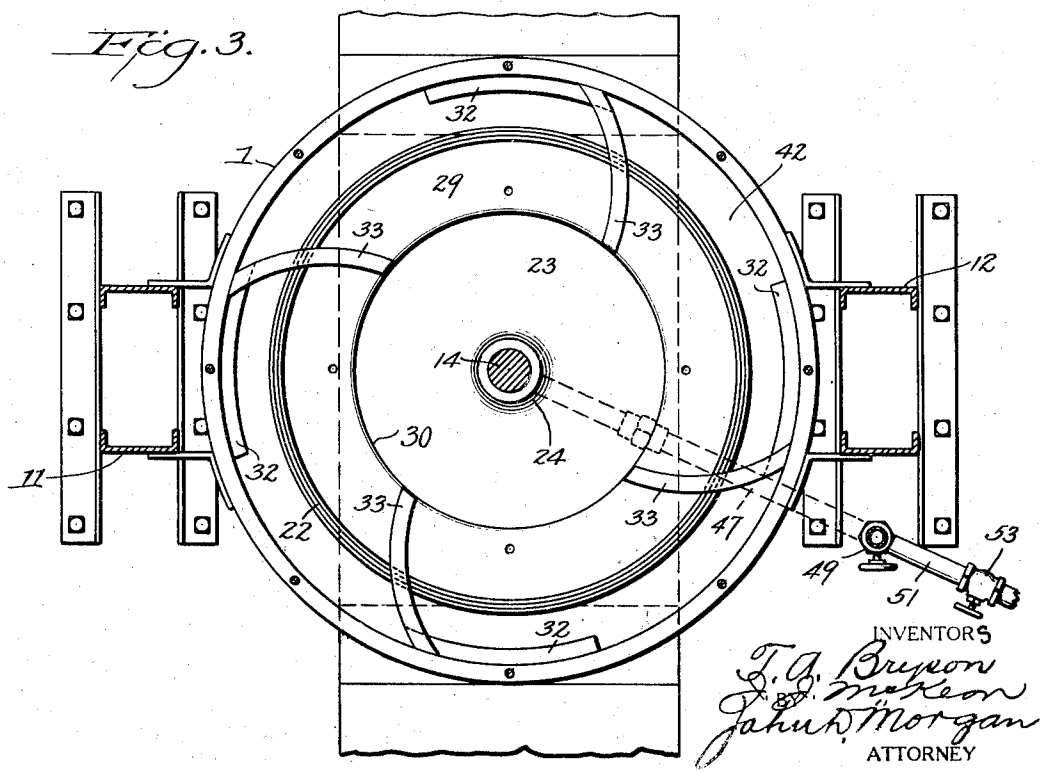


Fig. 3.



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UNITED STATES PATENT OFFICE

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MACHINE FOR TREATING FABRICS

Application filed January 18, 1924. Serial No. 686,986.

The invention relates to a novel and useful apparatus for treating fabrics, for instance, dyeing stock, yarn, piece goods, and other materials, for impregnating, carbonizing, washing, stripping, bleaching, etc.

Objects and advantages of the invention will be set forth in part hereinafter and in part will be obvious herefrom, or may be learned by practice with the invention, the same being realized and attained by means of the instrumentalities and combinations pointed out in the appended claims.

A preferred embodiment of the invention is illustrated in the accompanying drawings. Of the drawings:—

Fig. 1 is an elevation of a centrifugal mechanism embodying the mechanical features of the invention and adapted to be advantageously used in carrying out the process; and Fig. 2 is a top view partly in section taken on the line 2—2 of Fig. 1; and Fig. 3 is a top plan corresponding to Fig. 1.

The process phase of this invention is covered in our copending application Serial No. 755,398, filed December 12, 1924.

In the practice of the process, which is exemplarily described as applied to dyeing, broadly considered, the materials to be dyed are subjected to centrifugal action while at the same time the various, or successively-used, liquids are forced through the materials, preferably by force or pressure exerted on the liquid due to the rotation of the basket.

In the preferred manner of effecting this step, the materials in the basket are rotated relatively slowly, with the basket submerged in the wetting down water, the dye liquor, or the wash water, although such liquid may be otherwise supplied. When such submergence is practiced, the liquid is contained in a tank, and the tank is preferably partially or entirely closed. The basket has preferably perforate cylindrical walls and an open top, and vanes carried either on the basket walls or tank walls are preferably utilized to force the water or other liquid in at the top or center of the rotating basket.

The invention also includes the novel and advantageous step of treating the liquid while it is centrifugally acting on the fabric, or the like, such as boiling the dye liquor during one or more of the operations just described, and particularly during the concomitant centrifugal action and forcing of the dye liquor through the material from the center of the basket outwardly.

In practice, and referring exemplarily to fabric dyeing, preferably the dye liquor is gradually brought up to boiling and maintained there as long as desired during the dyeing operation. This heating and boiling is conveniently done by blowing steam at any suitable point or place into the dye liquor, although other ways for effecting this may be utilized, such as steam pipes within the tank, heating means below the tank, or other means. Other steps may be practiced during the operation just described, such as the addition of mordants, fixers, or other steps, dependent upon the nature or requirements of the particular dyeing operation.

It is also preferable in practice that the dye liquor be drawn off completely before the subsequent washing of the dyed materials, instead of the washing being in its first stages a mere diluting of the dye liquor, and a gradual progression therefrom. Preferably also the basket is speeded up after the draining of the dye liquor, thereby substantially completely throwing off the dye liquor.

Thereafter the wash water is applied and circulated centrifugally through the fabric or other material. Usually, most conveniently, the tank is filled with wash water, in such case submerging the basket, and the water may be heated or boiled as desired. If desired, it may be satisfactory and efficient to flow the water, or other fluid, into the centrifugal by a hose or otherwise. On completion of the washing, the wash water is drawn off from the tank, and the basket spun rapidly to dry the material.

It will be understood that the foregoing general description of the process, as well as the following detailed description thereof, and of the mechanism or apparatus used preferably in carrying it out, are merely explanatory and exemplary, but are not restrictive of the invention.

Referring now in detail to the present pre-

ferred embodiment of the invention, as applied to dyeing, including the mechanism or apparatus features thereof, a tank 1 for the various liquids, such as the wetting-down water, the dye liquor, and the wash water is provided, this tank being preferably cylindrical in form and of sufficient diameter to leave a substantial space, proportioned for the practical requirements, between the cylindrical tank wall and that of the enclosed basket.

Preferably a completely closed tank is employed, although an open tank or a partially closed tank is sufficient and satisfactory in some instances. Access to the tank in such case, is preferably provided by an annularly shaped flat lid 2 adapted to fit about the basket shaft and to close the circular opening 3 in the flat top 4 of the tank.

The form of basket provided is preferably of the suspended type, as this avoids the presence of bearings and driving parts within the tank and its contained liquids. As embodied, a frame having uprights 11 and 12 and a horizontal top cross piece 13 is provided. The basket shaft 14 is suspended in a bearing within a housing 15, supported on crosspiece 13, within which also is a pulley drive for the shaft, the detailed construction of these parts being of standard or other suitable form. The driving means may be a belt 16 running over a belt pulley 17, or any other suitable form of drive.

At the bottom end of shaft 14, and suspended thereon to rotate therewith, is a basket 21, having cylindrical, perforate side walls 22, and an imperforate bottom 23. The hub 24 is fitted on to the tapered bottom end 25 of shaft 14, and is held in place by a nut 26, or other suitable fastening means. The basket is preferably provided also with a top ring, consisting of an annular inwardly directed or projecting plate 29 fastened to the top edge of the cylindrical side wall 22, and having a central opening 30, through which the materials are inserted into and withdrawn from the basket, and through which also the various liquids are forced under pressure during the rotation of the basket. The basket is preferably constructed so that there are no pockets, recesses or obstructions therewithin which would hold any of the material out of the natural path of the propelled currents of the dye liquor and other liquids employed in the process.

Further means are preferably provided for creating or increasing the enforced circulation of the various liquids in the manner described. In the preferred form thereof, helically-disposed vanes 32 are provided, preferably fixed to the inner wall of the tank, and also preferably extending from the bottom to the top thereof, and inclined in the direction of rotation of the basket, although they may be inclined, if desired, in the opposite direction. Preferably also vanes 33 extend inwardly along the underside of the top of the tank or casing from the upper ends of the vanes 32 to or toward the opening in the top of the basket.

Means are also provided for retaining certain kinds of materials within the basket during the various operations or steps, loose wool being an example of such materials. For this purpose, there is provided a circular or conical wire mesh lid or screen 34, the outer circular rim of which fits over the edges of the opening 30 in the top ring 29 of the basket, and is held in place by suitable means such as clamping devices 35, the screen having a central opening 36, fitting about the basket shaft.

Means are provided by the invention for admitting liquids to the tank and for withdrawing them therefrom, and also for heating the liquids in the tank during the various operations or steps. As embodied, this is effected through a port at the central bottom part of the tank. Such an opening 41 is provided at the center of the bottom 42 of the tank, this opening communicating with a chamber 43, which is provided with a drain valve 44, which discharges into any suitable piping in the space 46 beneath the machine.

The embodied form of means for introducing the wetting-down water, the dye liquor, the wash water or other fluids or materials into the tank, comprises a pipe 47 communicating with the port 41 and provided with any suitable form of supply means, shown herein as a funnel 48, a valve 49 being provided in the pipe 47 below the funnel.

The embodied form of means for heating or boiling the liquid within the tank comprises a steam pipe 51 communicating into the pipe 47 at 52 and provided with a suitable valve 53.

In the preferred form of carrying out the process in connection with dyeing and the illustrated apparatus, the material, say for example piece goods, is laid into the basket in any desired form, the basket being slowly rotated during this operation, if desired. After the material is in position in the basket, if it is loose stock, such as wool for example, the screen 34 is fitted into position to hold the material within the basket so that it will not be displaced by the circulation of the liquid. The lid 2 is then fixed in position upon the tank.

The tank is filled with water, the basket being rotated at slow speed, and by means of the pipe connection, steam is blown into the water, bringing it to the desired temperature in case it is desired to heat the wetting-down water, as is usually done. During the rotation of the submerged basket in the closed tank, the water will be forced into the top and center of the basket and will be forced out through the perforate walls of the basket

thereby insuring rapid, thorough and uniform wetting-down of the material.

After the goods are thoroughly wetted-down, dye stuff properly mixed with water is let into the tank through the piping system. The submerged basket is rotated slowly to cause distribution and even impregnation of the dye liquor. The dye liquor is forced through the materials in the submerged, rotating basket in the manner already described for the wetting-down water, and a rapid, thorough and uniform dyeing of the material is thus effected.

The temperature of the dye liquor is gradually raised, in the present embodiment by blowing in steam, and is usually raised to the boiling point. The boiling is then continued during the centrifugal action, and the forcing of the dye liquor continuously through the material through the cooperation of the rotating basket and the vanes upon the tank walls. Any other agents or materials may be added to the dye liquor as desired or required for the particular dyeing operation, until the dyeing process is completed.

After the completion of this operation, the dye liquor is drawn off through the opening of the valve 44, and the rotation of the basket is preferably accelerated to high speed to remove the remainder of the dye liquor from the material.

Thereafter the valve 44 is closed and the tank is filled through the piping system with the wash water, and the wash water may be heated or boiled to any desired degree and for any desired time during the washing operation. During this operation also, the water is forced under pressure through the material thoroughly and uniformly by the centrifugal action and the pressure placed upon the water in the closed tank due to the rotation of the basket and the action of the vanes upon the tank walls as already described. When the washing operation is completed, the water is drained off and the basket is rotated at high speed to dry the material, which is then ready for removal from the basket.

It will be understood that changes may be made in the steps or sequence of steps of the process, or in the construction of the apparatus or mechanism, within the scope of the accompanying claims, without departing from the principles of the invention and without sacrificing its chief advantages.

What we claim is:—

1. In the rotatable basket of a centrifugal machine for use in dyeing, in combination means for supplying liquor to the basket with substantial uniformity when the basket is rotating including an annular liquor-deflecting member inclined inwardly and upwardly away from the basket walls and a perforate cover member releasably attached to said annular member at the inner periphery thereof and extending downwardly and inwardly therefrom.

2. A centrifugal machine for use in dyeing including in combination a tank, a basket rotatably supported from above said tank, an annular liquor deflecting member inclined upwardly and inwardly away from the top of the basket walls, downwardly and inwardly extending perforate material-retaining means attached to the annular member at the inner periphery thereof to receive the flow of liquor and allow substantially all of said liquor to be forced through the contents of the basket.

3. A centrifugal machine for use in dyeing including in combination a tank, a basket having an open top supported from above said tank, a retaining screen for said basket extending downwardly thereinto and upwardly and inwardly sloping liquor deflecting means associated with said basket tending to render the radially outward flow of liquor near the top thereof uniform with respect to the remainder of the basket.

4. A centrifugal machine for use in dyeing including in combination a tank, a rotatable basket having a bottom flat at its outer edge and sloping upwardly and inwardly at its center, an annular liquor deflecting member inclined upwardly and inwardly from the top of the basket walls, a perforate cover extending downwardly and inwardly and means for feeding liquor to the central portion of said basket, whereby on rotation a substantially uniform flow of liquor is produced within the basket.

5. In the rotatable basket of a centrifugal machine for use in dyeing, means for retaining material therein comprising a perforate member downwardly and inwardly directed and attached to the upper edge of said basket.

6. A centrifugal machine for use in dyeing including in combination, a tank, a rotatable basket in said tank, an annular ring attached to the upper edge of the basket means for retaining material within said basket comprising a perforate member downwardly and inwardly directed from the inner edge of said ring, and means for supplying liquids to the perforate member.

In testimony whereof, we have signed our names to this specification.

TANDY A. BRYSON.
JOHN J. McKEON.