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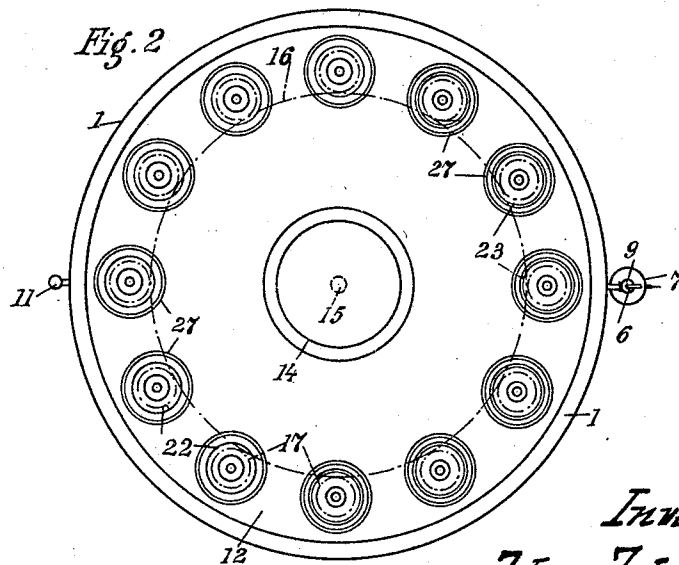
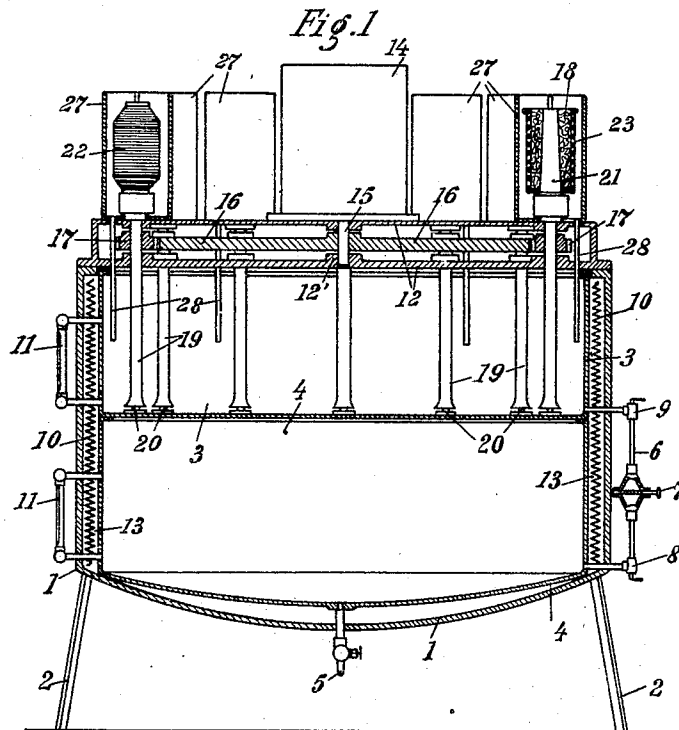
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1,902,042

MACHINE FOR DYEING, BLEACHING, AND THE LIKE OF LOOSE YARNS OR BOBBINS

Filed July 26, 1929

2 Sheets-Sheet 1



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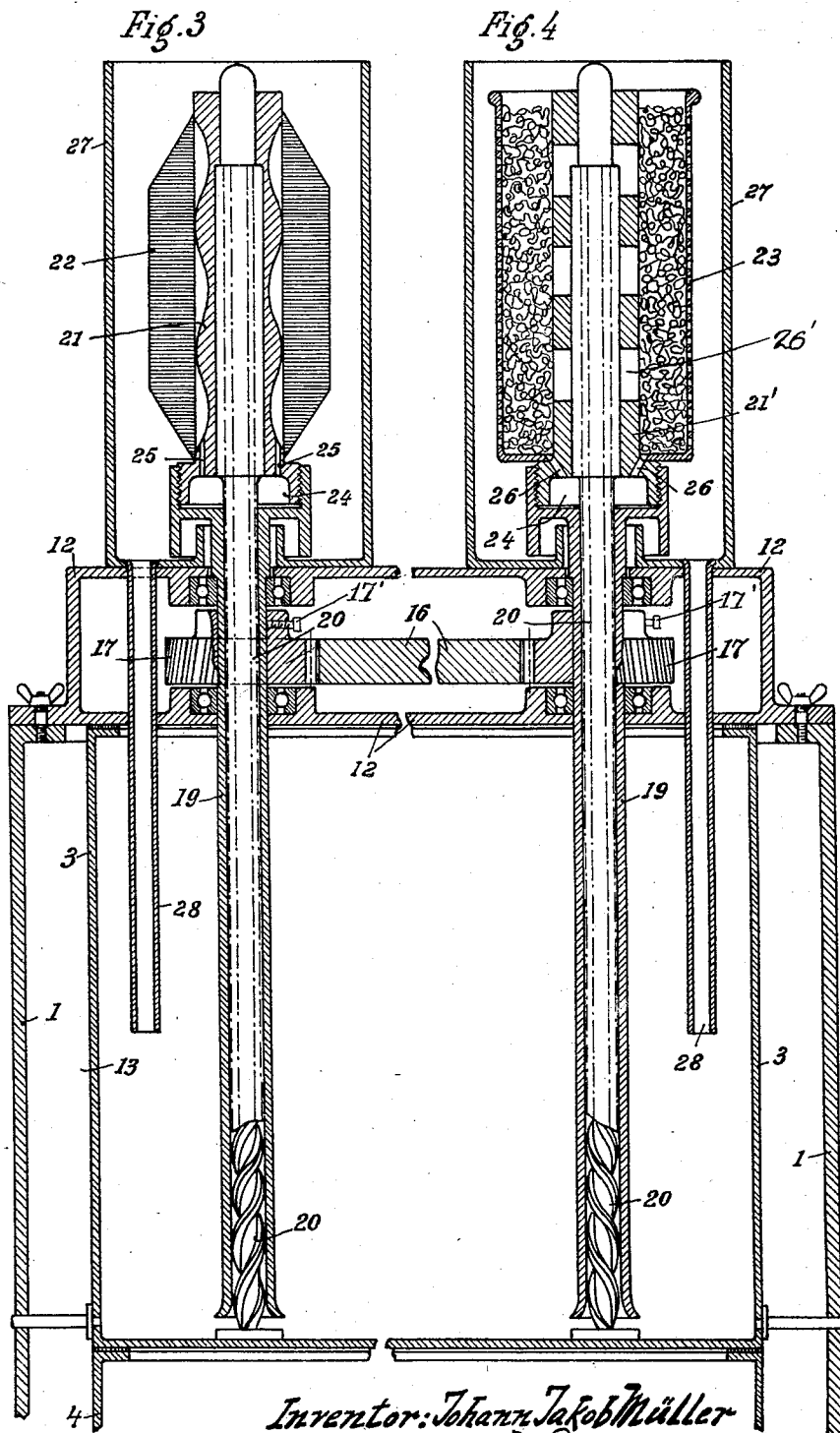
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## UNITED STATES PATENT OFFICE

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## MACHINE FOR DYEING, BLEACHING, AND THE LIKE OF LOOSE YARNS OR BOBBINS

Application filed July 26, 1929, Serial No. 381,106, and in Switzerland June 12, 1929.

The arrangements and methods which have become known for dyeing of loose yarns or yarns in bobbins require special devices, a greater number of apparatus and supply conduits, and special packing systems as for instance boxes, rakes and the like. These, for the greatest part very complicated installations do not permit of a rational working, as not only the changing to another colour, but also the repacking requires much time and great skill of the attendants. There exists the further inconvenience that the dyeing of smaller quantities, as for instance for testing purposes, is far too expensive owing to the large installations, and that larger quantities cannot be dyed perfectly and uniformly, as great quantities exclude the individual effect of the dyeing which is possible for smaller quantities.

The invention relates to a machine for dyeing, bleaching and other treatments of loose yarns or yarns in bobbins, which unite all the arrangements necessary for dyeing, washing and drying and consequently exclude the above mentioned inconveniences. The machine works, so to say, according to the large batch system and dyes nevertheless perfectly and uniformly smaller or larger quantities, owing to its individual working manner.

According to the invention at least two vessels communicate with each other, elements for receiving the material, conveying elements for the working media and collecting elements for collecting and returning the media into one of the vessels being provided. The whole installation is arranged so that the procedures necessary for the moistening, washing and drying can be carried out consecutively in any desired succession without the necessity of discharging the dye bath wholly from the machine.

An embodiment of the invention is illustrated by way of example in the accompanying drawings in which:

Fig. 1 is a vertical section, and

Fig. 2 is a top plan view of the machine.

Fig. 3 shows in vertical section a holding element with a bobbin.

Fig. 4 is a similar view of a slight modifi-

cation, showing a holding element with a perforated drum filled with loose material.

The machine consists of a circular frame 1 with feet 2. In the frame 1 two vessels 3, 4 are arranged, the one above the other. The lower vessel 4 has a downwardly curved bottom plate, at the center of which a discharge cock 5 is mounted. The upper vessel 3 serves as a dye-container and communicates with the vessel 4 by a pipe 6, having a screen 7 at the center end cocks 8, 9 at opposite ends thereof. In the concentric space 13 between the vessels 3, 4 and the frame 1 electric heating bodies 10 are arranged. On the outer sides of the vessels level indicators 11 are arranged. The vat is closed by a double cover plate 12 fixed on the frame 1 by means of screws as shown in Figures 3 and 4. In the space between the two cover plates a driving spur wheel 16 is located, keyed on a driving axle 15 and having a diameter approximately  $\frac{4}{5}$  of the diameter of the vessels 3, 4. This spur wheel 16 meshes with pinions 17 arranged around the same.

The driving motor or engine 14 can be adjusted by a governor of known type, which is not shown, to any number of revolutions, the revolving speed being selected according to the desired color tone and to the consistence of the bobbin and the diameter of the same or according to the density of the layers of yarn in the drum.

Supply tubes 19 arranged around the driving wheel and journaled in the cover plate, (preferably by means of ball bearings) extend into the lower vessel or container 3. In each of these tubes 19 a rotatable conveying screw 20 is arranged which revolves with its tube 19 and serves as a regulator. In the form shown in Figure 1 the pinions 17 are rigidly fixed on said tubes 19, and a head piece or spindle 21 of frusto-conical form is mounted on the upper end of each tube and is designed to carry a bobbin 22 or dyeing drum 23. It will be seen that a bobbin is shown at the left of Figure 1 and a dyeing drum at the right, this being to illustrate that either may be used. At the joint between the head piece 21 and the tube 19 a conveying space 24 is arranged through which channels 25, 26

respectively extend, which lead towards the circumference of the head piece or to the inner side of the bobbin or drum. In the form shown in Figure 4, the structure is quite similar but each tube carries a head piece or spindle 21' which is built up of annular sections in such manner that intervals or spaces 26' are formed between adjacent sections.

The drums 23 are preferably made of perforated sheet metal or wire gauze and designed to hold loose material. The drums are used for instance for dyeing spools consisting of cardboard-sleeves containing loose yarn or raw material which, owing to its shape or property, cannot be mounted on the head piece.

Glass cylinders 27 enclose the head pieces, bobbins and drums and from each glass cylinder 27 extends a discharge tube 28 into the vessel 4. The dye bath thrown off by the bobbin or drum is collected in the glass cylinder and returned through the discharge tube 28 into the vessel 3. The glass cylinders enable observation of the dyeing process, so that any disturbances which should occur can be instantaneously regulated.

The machine is further fitted with vacuum meters, pressure meters, thermometers, supply conduits, discharge conduits and, if necessary, with pumps which, being known, are not shown on the drawings.

A dyeing operation will be hereinafter briefly described. After the dye bath has been poured into the lower vessel 4, the electric heating bodies 10 are switched in to boil the bath. Into the upper vessel 3 washing water is filled to which, if necessary suitable substances are added. This washing water is conveyed through the rotating tubes 19, to the rotating head pieces 21, bobbins 22 and drums 23 uniformly by the conveying screws 20 and forced by the centrifugal force from the inner side through the material to be treated. The water thrown off from the outer side of the bobbins or drums is collected in the glass cylinders 27 and returned into the vat 3 through the discharge tubes 28. After the washing is finished the wash water is discharged into a reservoir. The dye bath, which in the meantime has been heated in the vessel 4 to the desired temperature, is then forced by pressure or vacuum through the connecting tube 6 into the vessel 3.

According to the consistence or according to the desired color shade, the material is rotated by the regulation of the driving mechanism at a number of revolutions in accordance with the diameter of the bobbin or the density of the yarn layers in the drum, the rotation being continued until the desired color shade has been obtained. The conveying screws 20 ensure that always the same quantity of dye bath is conveyed to the bobbins or drums. After the dye bath has been returned into the lower vessel 4 the bobbins

or the material in the drums are washed in the manner above described, or they are centrifugally dried by rapid rotation.

The dye bath in the vessel 4 is boiled again so that the upper vessel 4 is heated, whereby the drying of the material is accelerated. The dyed bobbins or the drums with the dyed material are removed after the drying, and fresh bobbins or drums inserted.

The machine can hold a considerable number of bobbins so that a great efficiency is ensured, the dyeing remaining however individual for every single bobbin, so that a perfect and uniform dyeing is obtained.

For the production of samples only certain bobbins being left loose by, for instance, unscrewing the set screws 17' which are shown as one conventional method of securing these pinions on their tubes. The observations made during the sampling and the numbers of revolutions used for the dyeing of the samples will be useful during the dyeing of great quantities so that absolutely uniform goods are obtained.

For the electric heating any other suitable heating may be substituted.

Obviously, the dye bath may be replaced by bleaching or other baths such as are used in treating yarn and the like, the operation being carried out in the manner described in relation to dyeing.

We claim:

1. A machine for dyeing, bleaching and the like of loose yarns or bobbins, comprising upper and lower vessels, the lower for heating the dye bath and the upper for washing and drying a double cover plate on said upper vessel, rotatable tubes extending from said upper vessel to above said cover plate the projecting portions of said tubes designed to hold bobbins or perforated drums with loose material, driving means for rotating said tubes, means connecting said lower vessel to said upper vessel, a collecting glass cylinder for each bobbin or drum, said tubes opening into the cylinders to supply liquid to the bobbins or drums, and a discharge pipe leading from each glass cylinder to said upper vessel for returning the dye bath or washing liquid to the upper vessel.

2. A machine as specified in claim 1, comprising in combination with the driving mechanism, means for regulating this driving mechanism for driving any number of the total number of bobbins.

3. A machine, as specified in claim 1, comprising in combination with the rotatable tubes holding the bobbins or perforated drums on the upper end, a conveying screw in the tube for conveying permanently uniform quantities of dye bath to the inner side of the bobbin or drum.

4. A machine as specified in claim 1, in which the several tubes may be rotated se-

lectively, the treating media being supplied  
to the bobbin or drum at the center of the  
material to be treated and forced through  
the same in outward direction by the cen-  
5 trifugal force.

In testimony whereof I affix my signature.

JOHANN JAKOB MÜLLER.

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