April 1, 1930. L. A. UTTRICH 1,752,712

DYEING APPARATUS

Filed June 6, 1927 2 Sheets-Sheet 1

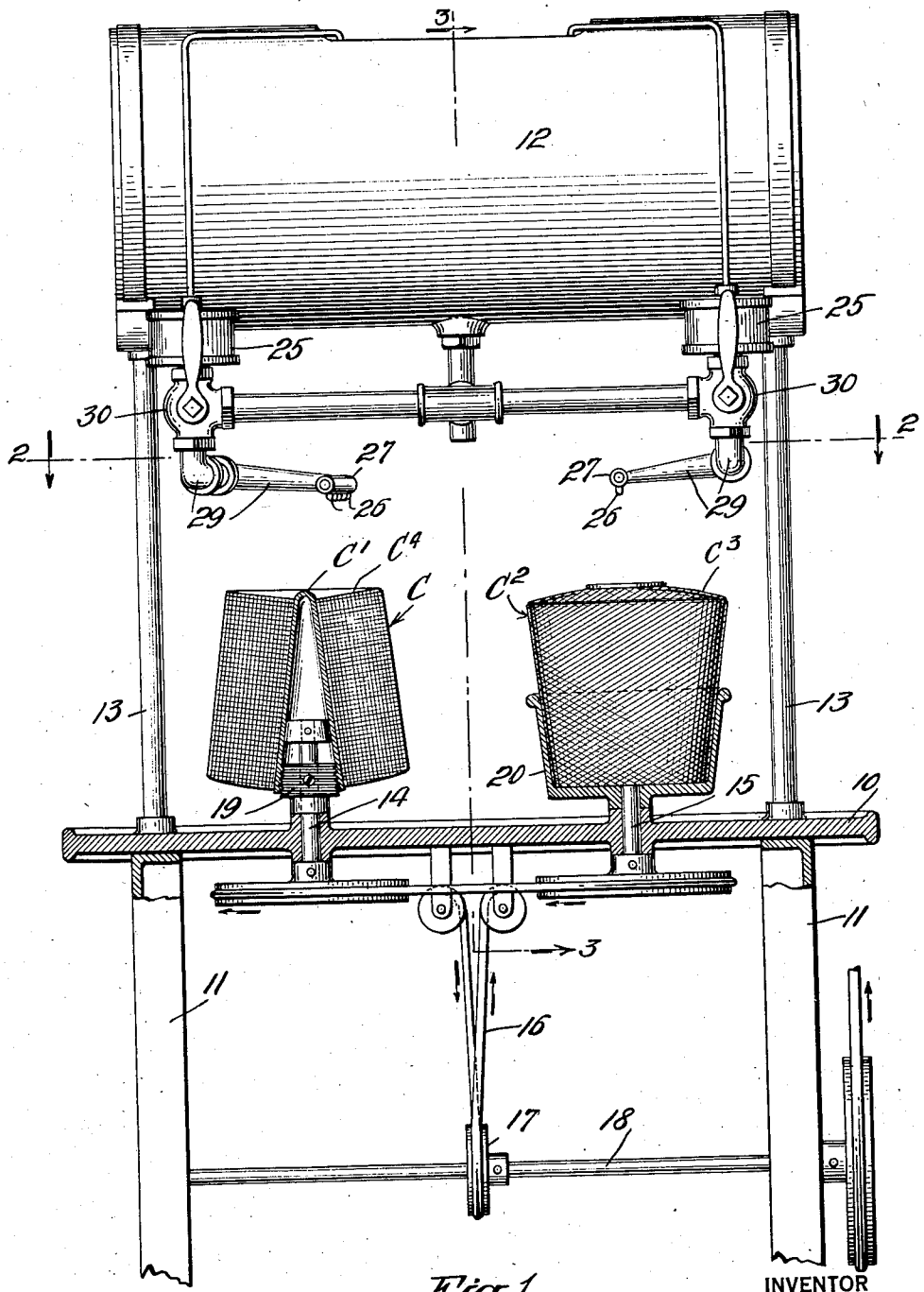


Fig. 1.

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DYEING APPARATUS

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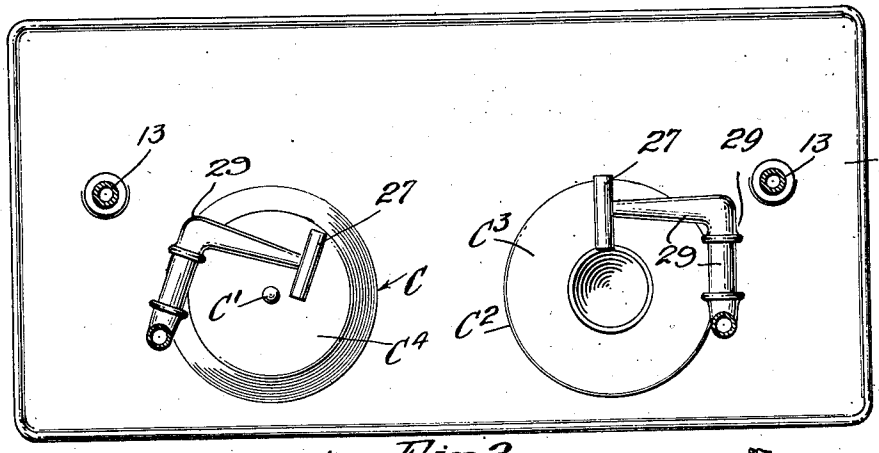


Fig. 2.

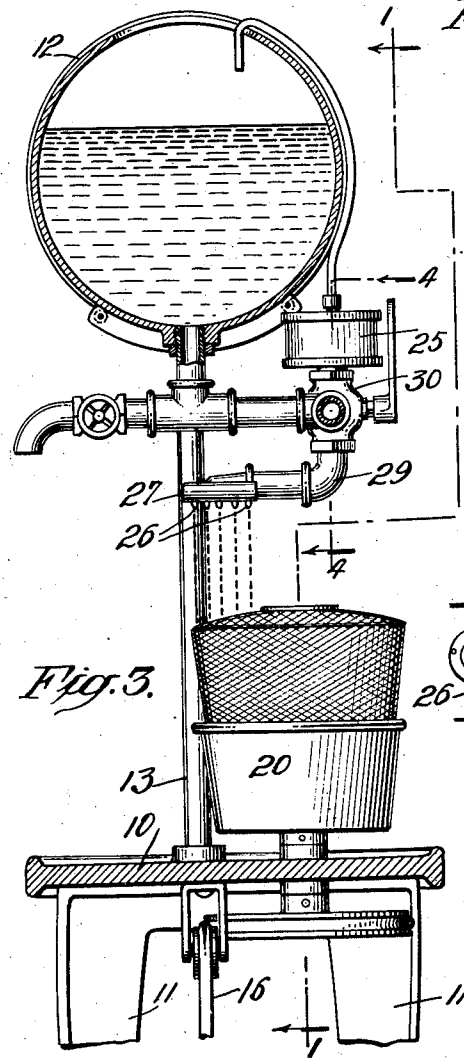


Fig. 3.

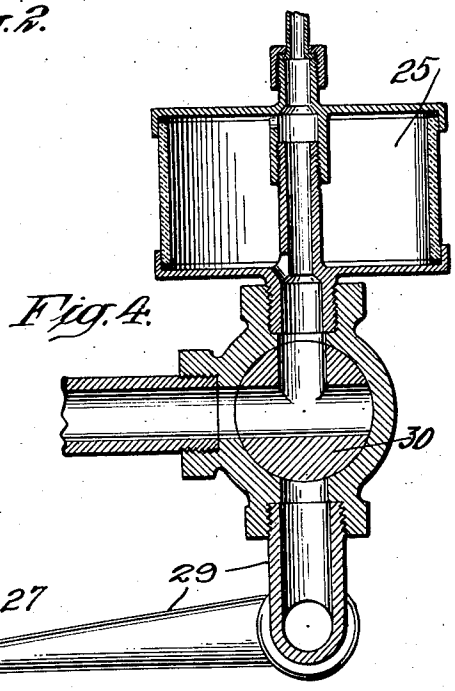
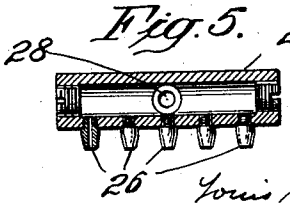


Fig. 4.

Fig. 5.



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UNITED STATES PATENT OFFICE

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DYEING APPARATUS

Application filed June 6, 1927. Serial No. 196,654.

This invention relates to dyeing apparatus and aims to provide means for dyeing the end portions of wound masses of yarn.

A machine embodying the invention provides means for utilizing the force of gravity to cause a penetration of dye into predetermined portions of a wound mass of yarn, such as a cone of yarn.

The invention may best be understood from a detailed description of the specific machine embodying it, which is shown in the accompanying drawings in which:—

Fig. 1 is a front elevation of the machine partially sectioned on the line 1—1 of Fig. 3;

Fig. 2 is a plan view of the lower part of the machine, showing the upper part of the machine sectioned on the line 2—2 of Fig. 1;

Fig. 3 is a side elevation of the machine sectioned on the line 3—3 of Fig. 1;

Fig. 4 is an enlarged view of one of the measuring cups and valves of the machine sectioned on the line 4—4 of Fig. 3; and

Fig. 5 is a detail of one of the drip nozzles sectioned on the line 5—5 of Fig. 4.

The machine illustrated has a base plate 10 supported on legs 11, and, above the base plate, a dye tank 12 supported on the uprights 13. In the base plate are journalled two vertical spindles 14, 15 which may be rotated slowly (for example at 50 R. P. M.) by means of a belt 16 passing around a pulley 17 on the main shaft 18 of the machine. On the upper ends of the spindles 14, 15 are mounted holders 19, 20 for cones of yarn. The holder 19 is designed to support a cone of yarn C with its smaller end uppermost, by engagement with the inner surface of its core C^1; while the holder 20 is designed to hold a similar cone C^2 with its larger end uppermost, and for this purpose is given the form of a conical cup into which the smaller end of the cone of yarn may be inserted.

Means are provided for simply applying a limited quantity of dye to the smaller end of the cone on the holder 19 and a limited quantity of dye to the larger end of the cone on the holder 20. Such means include glass measuring cups 25 and sets of drip nozzles 26. The drip nozzles 26 of each set project from the lower surface of a short pipe 27, as best shown in Fig. 5. Each pipe 27 has a central inlet opening 28 to which is connected a bent pipe 29 which serves to support the nozzles and to conduct the dye to them from one of the measuring cups. As best shown in Fig. 2, one of the nozzle-holding pipes 27 extends radially across and above the annular upper end surface C^3 of the cone C^2 in the holder 20. The other may similarly be set radially across the smaller end surface C^4 of the cone C on the holder 19, but for convenience in manufacture, this pipe is set at a slight angle to a radius of the cone, so that notwithstanding the fact that this end surface is smaller than that of the other end of the cone, the pipes 27 may both be made of the same length, but the pipe 27 for the smaller end of the cone may have its inner end a short distance from the core of the cone so as not to drop too much dye on the small annulus of the surface of the small end of the cone immediately adjacent to the core, which annulus is of very small area compared to those further from the core.

Below each measuring cup 25 is a three-way valve 30 which provides for connecting the measuring cup alternately with the dye tank 12 and with the nozzles.

In the use of the machine, two cones of yarn turned in opposite directions when placed on the holders 19 and 20 shown in Fig. 1, and the spindles 14, 15 are slowly rotated. The three-way valves 30 are manipulated to trap dye in the measuring cups and then to allow these measured quantities to flow to the nozzles 26 from which the dye drips upon the upper end surfaces of the two cones. The dye thus applied to the end surfaces of the cones, penetrates into the mass of yarn under the influence of gravity. The rotation of the cones not only secures the even distribution of the dye over the end surfaces, but also causes intermittent application of dye to each sector of the end surfaces, so that the dye which has been applied to any specific sector has time to penetrate downward into the mass of yarn before any additional dye is applied to this sector. This avoids the flowing of the dye down the sides of the cones.

As soon as the two measuring cups 25 are empty, the rotation of the spindles is stopped and the two cones are removed from their holders and interchanged in position. The operation is then repeated, with the result that each end portion of each cone is dyed.

As the dye applied to the end surfaces of the cones flows directly downward into the masses of yarn, the length or depth of the dyed portion at each end of each cone is determined by the amount of dye applied. This amount is regulated in the filling of the measuring cups.

The machine may be used in the solid dyeing of cones of yarn to supplement another machine for dyeing the middle portions of the cones, or it may be used by itself to dye the end portions of the mass only and thus produce a spotted yarn.

What I claim is:

1. A dyeing machine, comprising a support for a wound mass of yarn, and means for intermittently applying dye to parts of the upper surface of the mass so that the dye applied to each part descends into the mass before dye is again applied to that part of the surface.

2. A dyeing machine, comprising means for holding a wound mass of yarn with its axis vertical, means for rotating the holder and msas about the axis of the mass, and means for dripping a limited quantity of dye upon the upper surface of the mass along a line extending substantially radially thereof.

3. A dyeing machine, comprising means for supporting a wound mass of yarn with its axis vertical, a reservoir for the dye, means for withdrawing a limited quantity of dye from the reservoir and dripping it upon the upper surface of the mass so that it penetrates into the mass by gravity, and means for regulating the amount of dye withdrawn from the reservoir and dripped upon the upper surface, to determine the distance to which the dye penetrates into the mass of yarn.

4. A dyeing machine, comprising two rotary holders, one of which is adapted to engage the inner surface of the core of a cone of yarn and to hold the cone with its smaller end uppermost and the other of which is adapted to engage the outer surface of the smaller end of the cone of yarn and to hold it with its larger end uppermost, and means for simultaneously dripping dye across the smaller end surface of the cone in the first holder and the larger end surface of the cone in the second holder.

In testimony whereof I have hereunto set my hand.

LOUIS A. UTTRICH.