Sept. 4, 1928. 1,683,325

O. BERG

PROCESS AND APPARATUS FOR WASHING FABRICS

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Fig. 1.

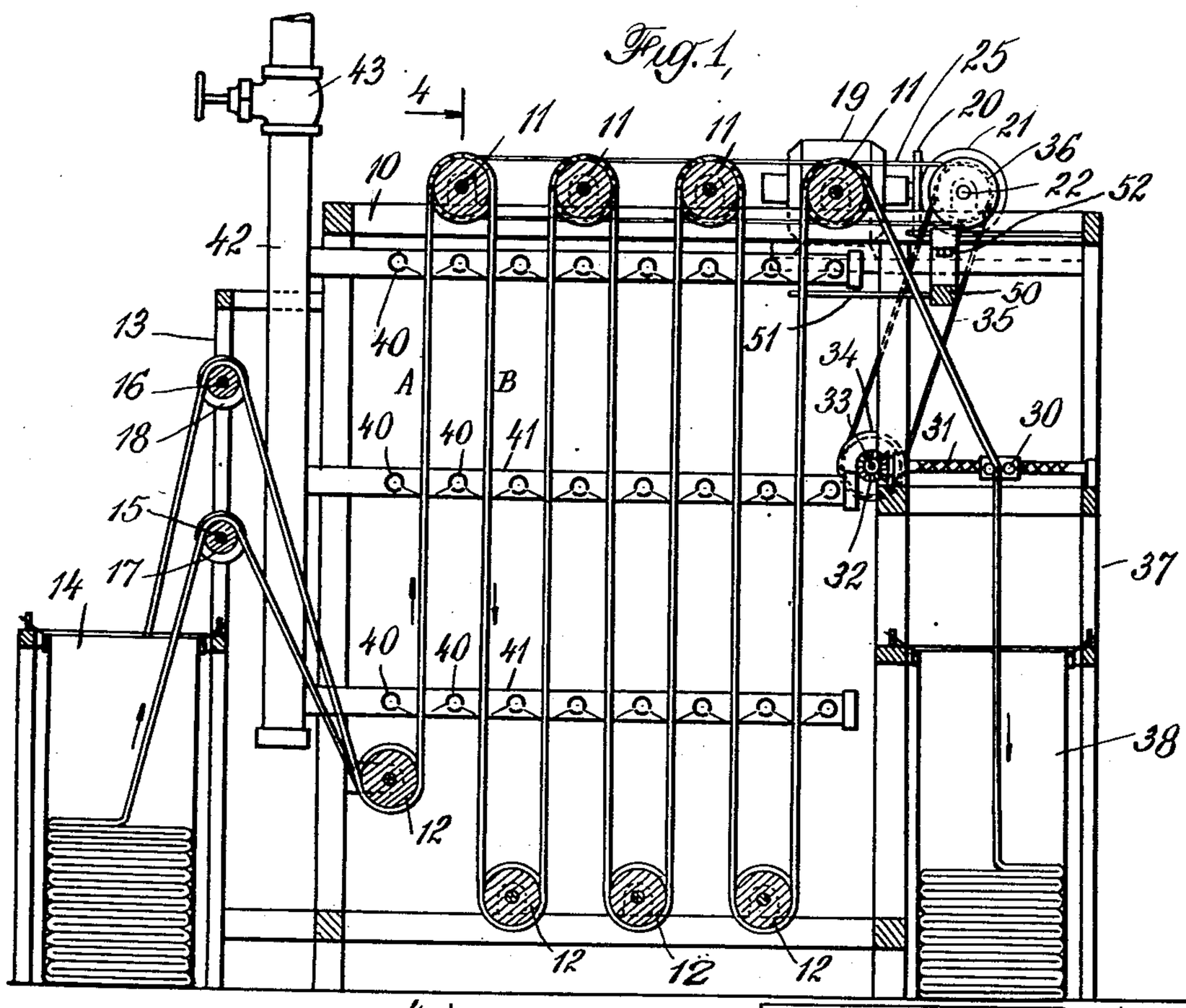

Fig. 2.

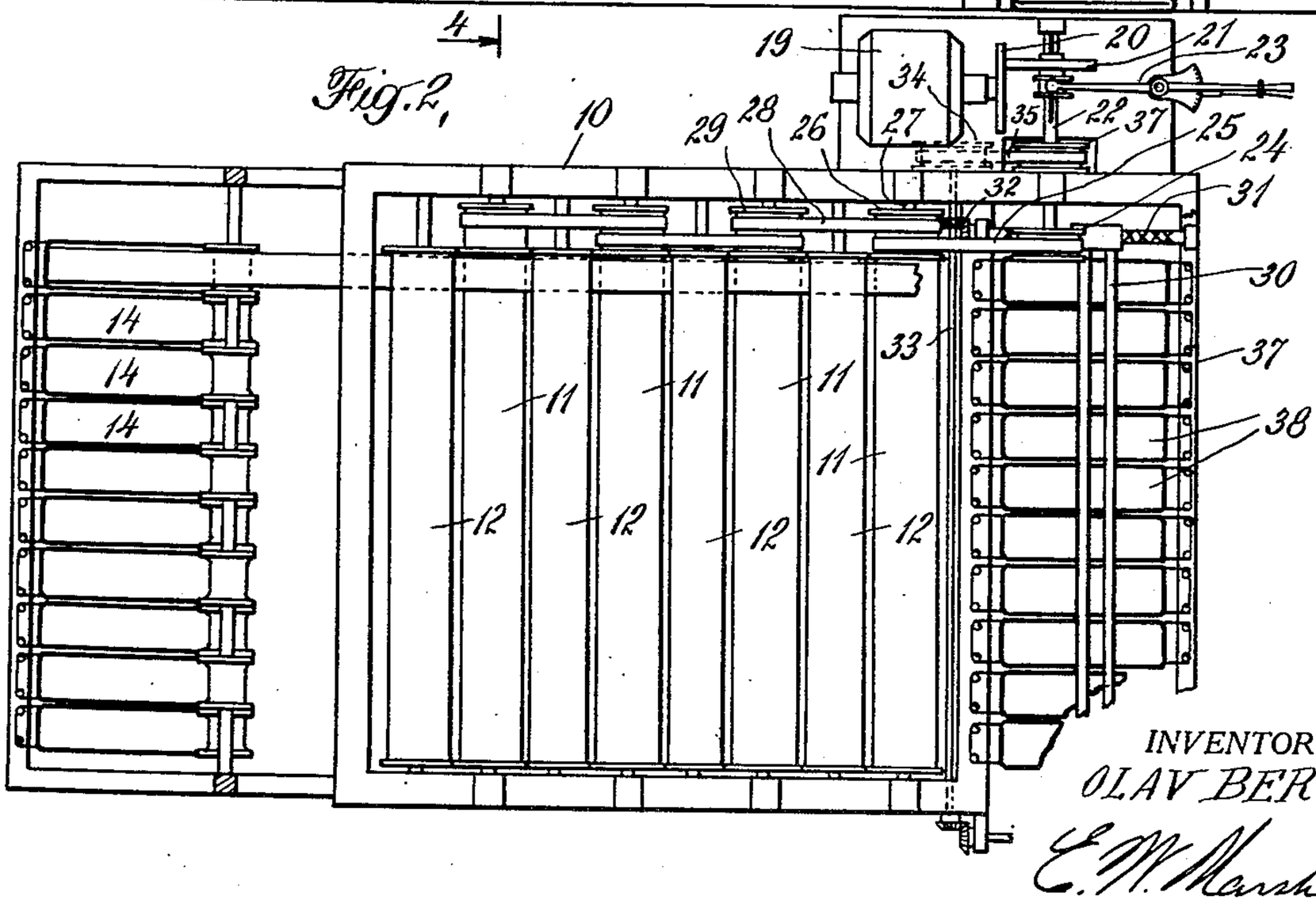

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Fig. 3,

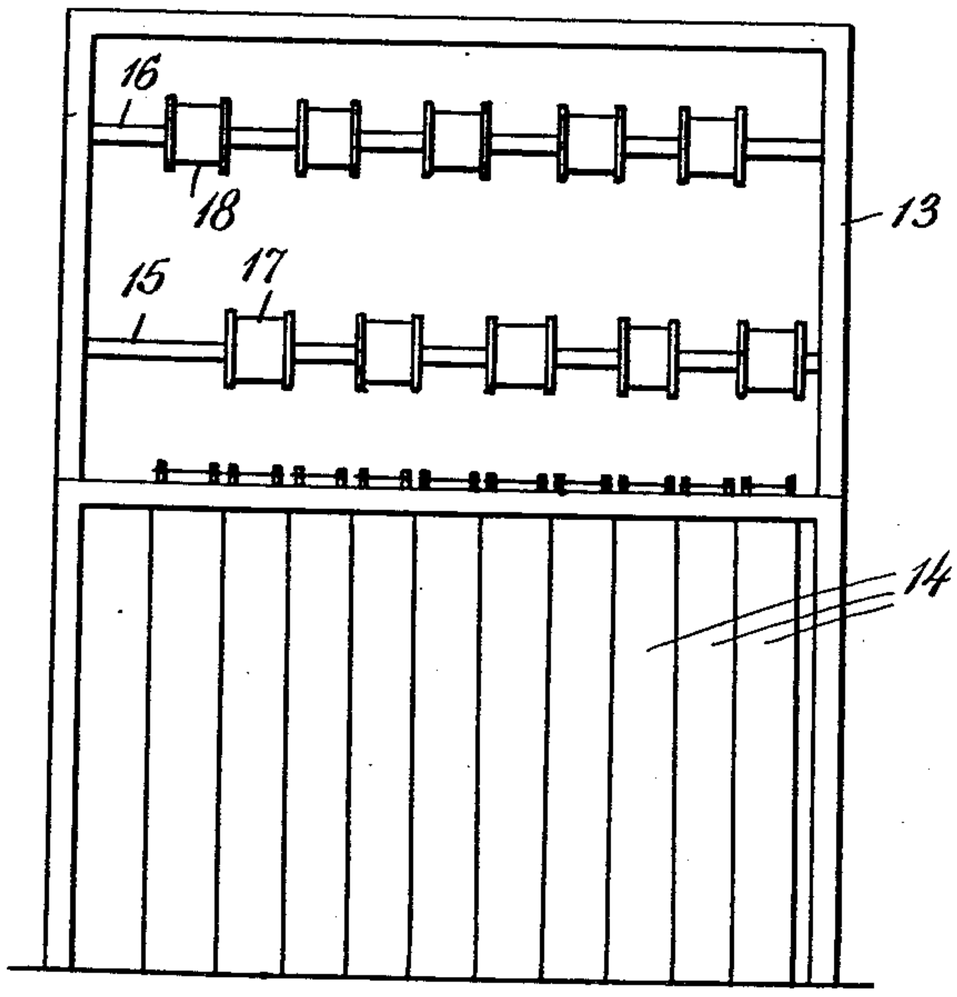


Fig. 4,

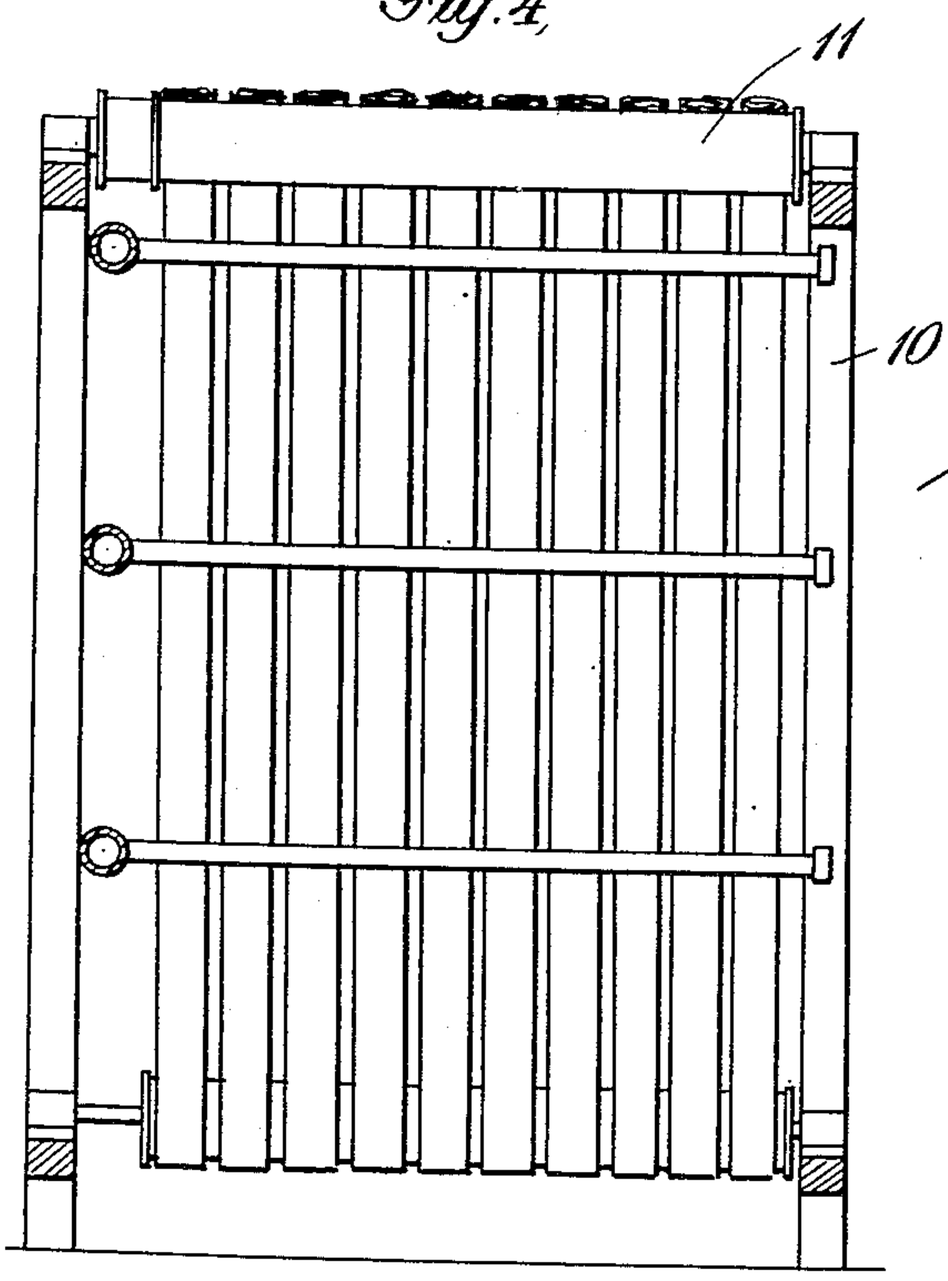


Fig. 5,

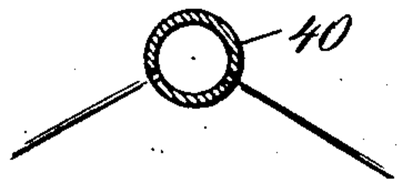


Fig. 6,

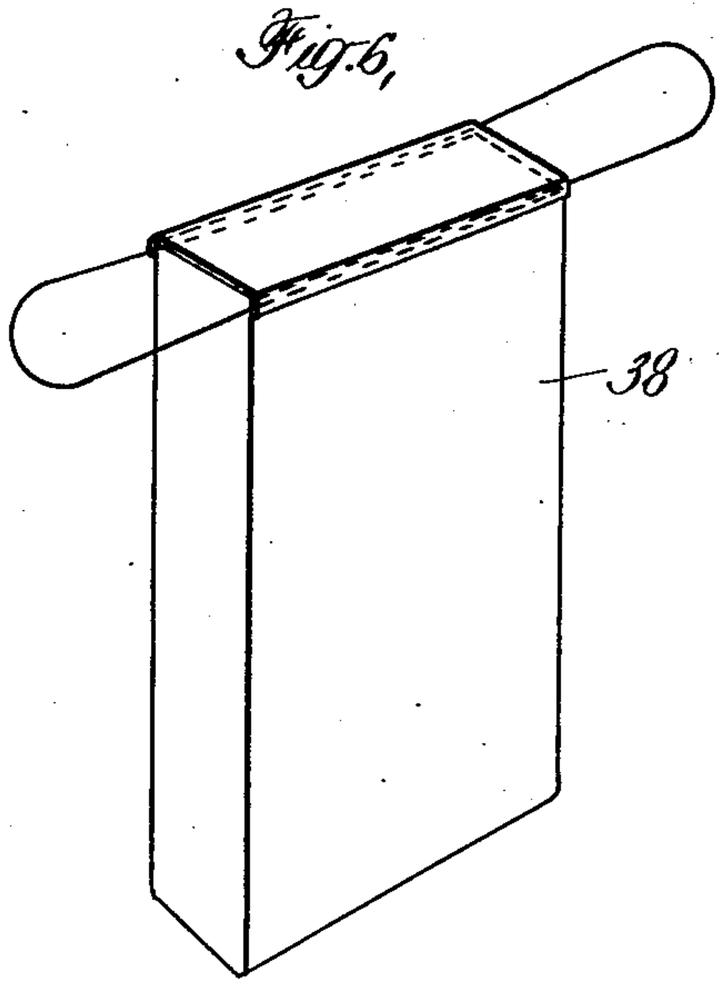
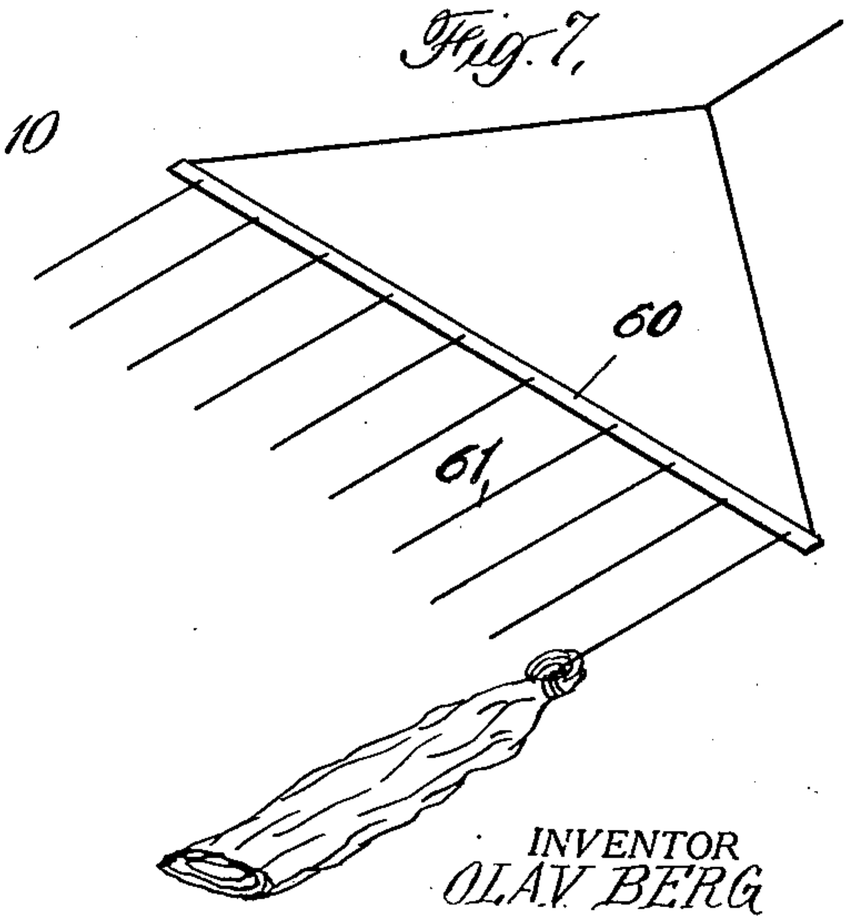


Fig. 7,



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Patented Sept. 4, 1928. 1,683,325

UNITED STATES PATENT OFFICE

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PROCESS AND APPARATUS FOR WASHING FABRICS.

Application filed February 1, 1923. Serial No. 616,233.

This invention relates to a process and an apparatus for washing fabrics and particularly to the washing of silk fabric.

As is well known in the silk art, silk fiber is more or less porous. In order to weight the silk, it is alternately treated with suitable chemicals such as tetra-chloride of tin and phosphates of alkali metals and is thereafter washed and dried or partially dried. The chemicals with which the silk is treated tend to form crystals in the fiber and these crystals are very objectionable since they cut and otherwise injure the fiber.

After the weighting process the silk fabric is again washed but it has been found to be very difficult to entirely free the silk from the excess chemicals, crystals and other foreign matter.

This invention has for its object therefore to provide an effective process for thoroughly and evenly washing silk or other fabric and for thoroughly cleansing the fabric of all chemicals and foreign matter after baths of chemicals.

Another object of the invention is to provide simple and effective apparatus for carrying out this cleansing process.

Another object of the invention is to provide apparatus for carrying out the cleansing process in a mininum amount of time.

Further objects of the invention will appear from the following description taken in connection with the drawings in which is illustrated one form of apparatus for carrying out the washing and cleansing process.

In the drawings, Fig. 1 is a vertical, sectional elevation of a washing machine constructed in accordance with the invention.

Fig. 2 is a top plan view, partly broken away and partly in section of the construction shown in Fig. 1.

Fig. 3 is a rear elevation of the bag supporting means and fabric web guiding means.

Fig. 4 is a vertical sectional elevation taken substantially on line 4—4 of Fig. 1.

Fig. 5 is an enlarged detail elevation of one of the water pipes from which jets are directed onto the fabric.

Fig. 6 is an enlarged perspective view of one of the fabric bags or containers and

Fig. 7 is a perspective elevation showing the frame used for initially directing the fabric toward the machine.

The invention briefly described consists of a process and apparatus for supporting and feeding fabric and for directing against the fabric streams of liquid, preferably under high pressure. These streams are directed against the fabric at an angle, preferably an acute angle, and the fabric is so supported and guided and the streams are so directed that the liquid engages the fabric on opposite sides thereof and also in opposite directions of the movement of the fabric. In the particular embodiment of the invention shown, the fabric is fed vertically and the streams are directed against the upwardly traveling and downwardly traveling laps of the fabric. In this way the silk or other fibers are effectively raised or turned back in both directions and the fabric is thoroughly cleansed of all chemicals or foreign matter.

The main supporting frame for the washing machine is indicated at 10 and may be of any desired construction. This frame 10 has journaled thereon a set of horizontally disposed rolls 11 mounted at the upper portion of the frame and a set of rolls 12 mounted on the lower portion of the frame. The rolls 12, as will be seen from the showing in Fig. 1, are disposed in alinement with the spaces between the rolls 11 and the left hand roll 12 is shown as positioned somewhat above the remaining rolls 12. By disposing the rolls 11 and 12 in this staggered relation, the fabric may be led around the rolls as shown in the drawing and will be fed substantially vertically.

At one end of the frame is shown a rack 13 for supporting a plurality of bags or containers 14 of fabric in rope form and the rack 13 also has mounted thereon upon shafts 15 and 16 a plurality of guiding and directing spools 17 and 18.

In the particular form of the invention shown the upper rolls 11 are positively driven from a motor 19 supported at the upper portion of the frame and connected by a friction drive 20, 21 to a shaft 22. The disc 21 is splined to the shaft 22 and may be adjusted by means of a lever 23 with respect to the disc 20 thereby varying the speed of rotation of the shaft 22. The shaft 22 carries a pulley 24 which is connected by a belt 25 to a pulley 26 mounted on the shaft 27 of the right hand roll 11 (see Figs. 1 and 2).

The pulley 26 is in turn connected by a belt 28 to a pulley 29 carried by the next adjacent roll and belt drive is continued in the same manner to drive the remaining rolls 11.

Means is also provided for receiving and

guiding the fabric after it leaves the last roll 11. This means comprises reciprocably mounted guiding means 30 mounted for reciprocation on a screw shaft 31, the member 30 and the shaft 31 being constructed in the well known manner whereby the guiding means will be alternately reciprocated in opposite directions. In the form of the invention shown the shaft 31 is driven through bevel gears 32 from a shaft 33 which in turn is driven by a belt and pulley drive 34, 35 and 36 the pulley 36 being mounted on the shaft 22.

In order to insure the proper spacing or location of the fabric ropes as they leave the last roll 11 and before they reach the member 30, a frame 50, having fingers 51, is secured to the frame 10 of the machine. The fingers 51 separate the adjacent ropes and properly space them. The frame 50 is adjustably secured to the frame 10 by a clamp 52.

The fabric receiving and guiding means is mounted in a rack 37 on which are mounted bags or containers 38 in which the ropes are folded as they leave the machine.

The fabric washing mechanism consists of a plurality of sets of pipes 40, these sets preferably being vertically spaced in the manner shown in Fig. 1 and the pipes of each set being horizontally spaced so that jets of water or other liquid will be directed from each pipe except the outside pipes of each set on both the upward and downward traveling laps of fabric. The jets are preferably directed against the fabric at an angle of 60 degrees or an acute angle thereto.

The pipes 40 are mounted on vertically spaced horizontally disposed pipes 41 which in turn are mounted on and communicate with a water main or supply pipe 42. The water passing to the pipes 40 and 41 may be controlled by a valve 43 and the jets are preferably operated at high pressure.

Before the machine is started in operation the various ropes to be washed are led through the machine by means of a frame 60 illustrated in Fig. 7. This frame has a plurality of strands 61 disposed side by side and substantially equal distances apart and to each of the strands is attached one end of a fabric rope. However, before the strands are attached to the ends of the webs the fabric is drawn over the guiding spools 17 and 18. The ends having thereafter been attached to the strands, the frame 60 is passed around the rolls 12 and 11 and through the guiding means 30 at the discharge end of the machine.

In operation the web is fed continuously by the upper rolls 11. As the fabric is pulled around the rolls 11 and 12 the rolls act as wringers and thereby squeeze water from the fabric. The weight of the fabric and water carried thereby will also tend to free water from the fabric as the fabric passes over the upper rolls 11. Referring to Fig. 1, it will be seen that the upwardly traveling lap A is engaged by three sets of downwardly directed jets from the three sets of pipes 40 disposed on opposite sides thereof. The next lap or downwardly traveling lap B also is engaged by three sets of jets or streams but in this instance the fibers will be turned in the opposite direction from that in which they were turned when the lap was traveling upwardly. This process is repeated and the fibers are alternately turned in opposite directions in succeeding laps. It will thus be seen that the fabric is thoroughly washed and that by reason of the high pressure jets all foreign matter, such as crystals mentioned at the outset of the specification will be removed therefrom. Furthermore, it will be evident that the apparatus will handle a large quantity of goods since the fabric passes through the apparatus in rope form and a plurality of lengths will be cleansed simultaneously.

Although one form of apparatus for carrying out the process has been illustrated and described, it will be obvious that the process may be carried out in other ways and by other mechanisms and it should be understood that it is not the intention to limit the invention in any way to the particular form of mechanism shown and described.

What I claim is:—

1. The process of washing fabrics which consists of supporting and feeding a plurality of lengths of fabric in rope form, substantially vertically and directing liquid mainly at an acute angle and as a substantially wholly undercutting stream, against the upwardly travelling and downwardly travelling laps of said fabric, said liquid being directed against opposite sides of the fabric and in the same plane, whereby to deflect the fibers of the fabric and facilitate cleaning thereof, while maintaining a steady travel of the laps in their respective planes.

2. The process of washing fabrics which consists of supporting and feeding a plurality of lengths of fabric in rope form, substantially vertically and directing liquid under pressure mainly at an angle and as a substantially wholly undercutting stream, against the upwardly travelling and downwardly travelling laps of said fabric, said liquid being directed against opposite sides of the fabric and in the same plane, whereby to deflect the fibers of the fabric and facilitate cleaning thereof.

3. A machine for washing fabric comprising a plurality of substantially horizontally disposed, vertically spaced rolls and means for directing liquid jets mainly at an acute angle and as a substantially wholly undercutting stream, against upwardly traveling and downwardly traveling laps of fabric supported by and extending around said rolls the liquid directing means being so located

that the jets strike the opposite sides of the fabric in substantially the same plane.

4. A machine for washing fabric comprising means for guiding and supporting a plurality of lengths of fabric in vertical position, means for feeding the fabric longitudinally, and a plurality of vertically spaced sets of liquid directing means for directing liquid against the opposite sides of the fabric, and as a substantially wholly undercutting stream, the directing means of each set being so located as to direct liquid against the opposite sides of the fabric in the same plane and mainly at an acute angle thereto.

5. A machine for washing fabric comprising two sets of rolls, said sets being vertically spaced and each set comprising a plurality of single rolls, means for driving the rolls of the upper set and means disposed between the two sets of rolls for directing liquid jets against the fabric from opposite sides thereof, and as substantially wholly undercutting stream, the liquid directing means being so located that the jets strike the opposite sides of the fabric in substantially the same plane and mainly at an acute angle thereto.

6. A washing machine comprising a plurality of spools for guiding a plurality of lengths of fabric in rope form, initially supplied thereto, a plurality of sets of substantially horizontally disposed vertically spaced rolls, means for directing jets at an acute angle against upwardly traveling and downwardly traveling laps of fabric supported by and extending around said rolls, receiving means for said fabric ropes and spacing means intermediate the last supporting roll and said receiving means.

In witness whereof, I have hereunto set my hand this 19 day of January, 1923.

OLAV BERG.