March 25, 1924. 1,487,914

J. L. BOOTH

WASHING PROCESS AND MACHINE

Filed March 12, 1923 2 Sheets-Sheet 1

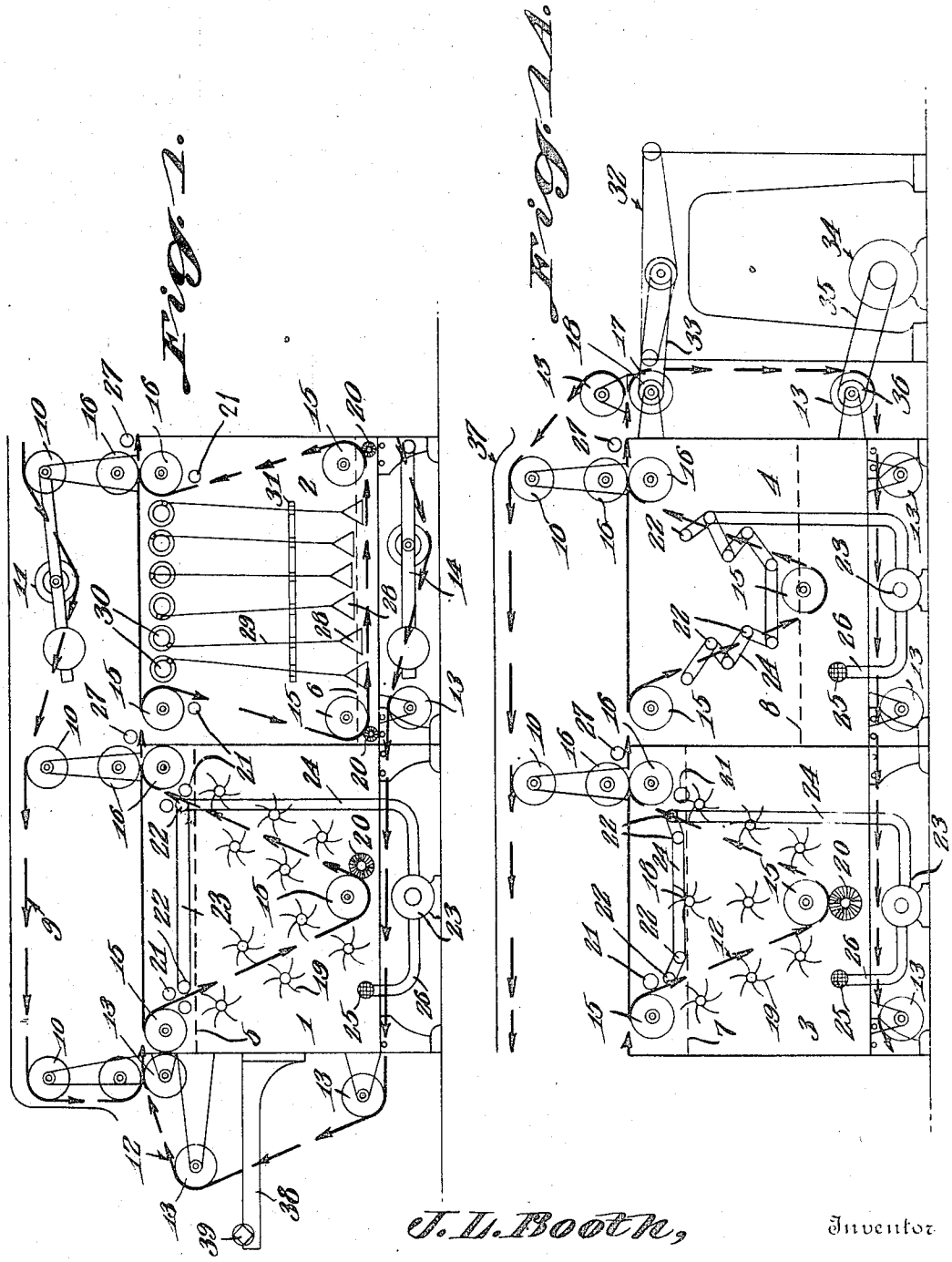


Fig. 1.

Fig. 1a.

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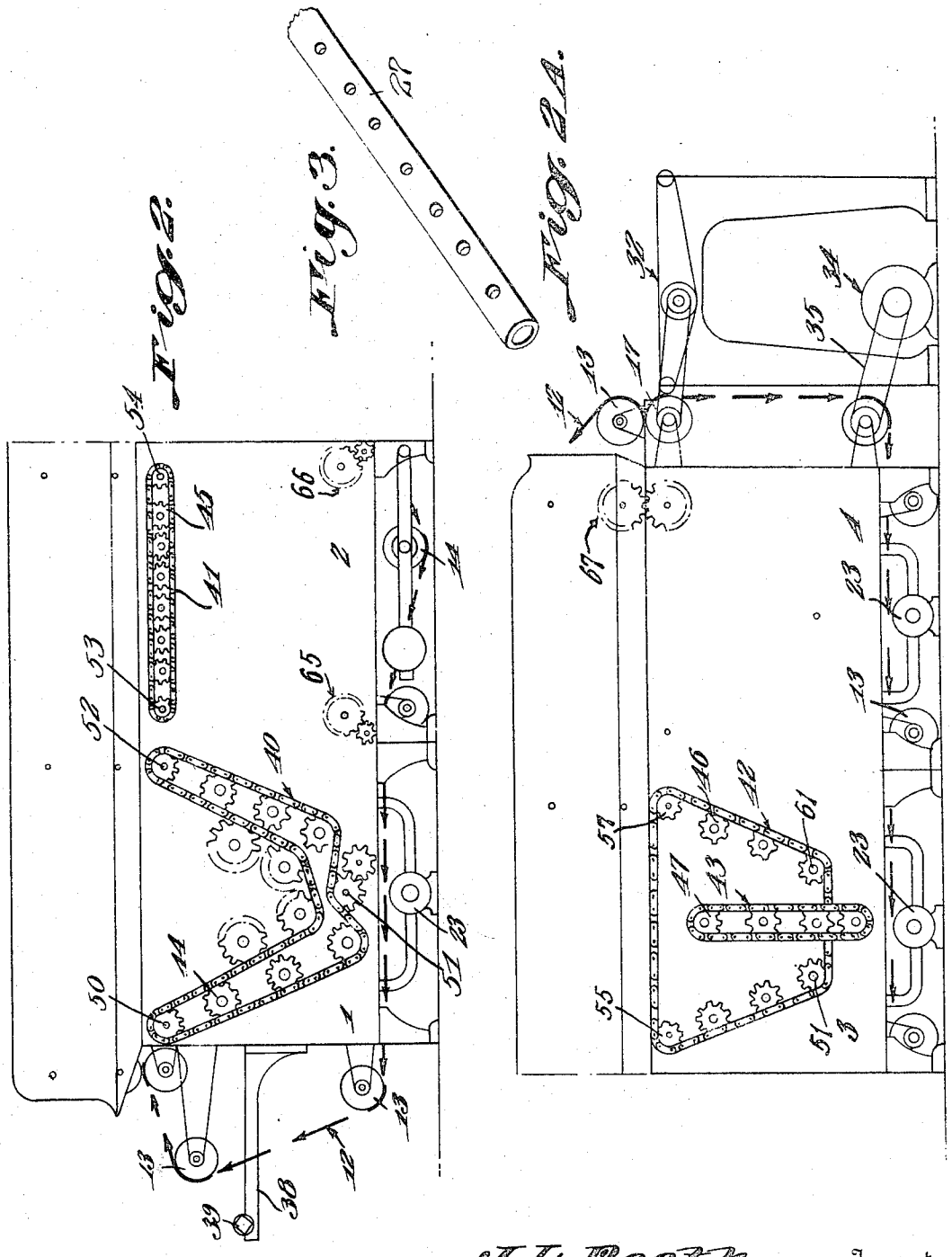


Fig. 3.

Fig. 3a.

Fig. 2.

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UNITED STATES PATENT OFFICE.

JOSEPH LEIGH BOOTH, OF VIRGINIA, MINNESOTA.

WASHING PROCESS AND MACHINE.

Application filed March 12, 1923. Serial No. 624,577.

To all whom it may concern:

Be it known that I, JOSEPH L. BOOTH, a citizen of the United States, residing at Virginia, in the county of St. Louis and State of Minnesota, have invented a new and useful Washing Process and Machine, of which the following is a specification.

This invention relates to a process of cleansing soiled clothes and the like, and to a machine for carrying out the process.

The process consists in feeding the articles to be cleansed through a series of tanks containing various fluids and subjecting such articles to the fluids during their passage through the vats, the fluids being agitated in some tanks and in some of them steam and water are sprayed onto the passing articles. The articles as they leave each vat are subjected to the action of squeezing or stripping rolls to remove, as far as possible, the fluid with which they have been treated before reaching the next tank.

Another object is to provide a process and a machine of the continuous conveyor type so constructed that a great saving in labor, time and washing material is effected.

Another object is to provide a machine of this character which is constructed to convey the clothes through a plurality of tanks or vats in which they are treated with liquids of different character by agitation, spraying and the like, and by means of which the clothes are conserved, this treatment being much easier on the goods than by rubbing by hand or machinery.

With the foregoing and other objects in view which will appear as the description proceeds, the invention resides in the combination and arrangement of parts and in the details of construction hereinafter described and claimed, it being understood that changes in the precise embodiment of the invention herein disclosed may be made within the scope of what is claimed without departing from the spirit of the invention.

In the accompanying drawings:—

Figure 1 represents a diagrammatic longitudinal section of a portion of a washing machine constructed in accordance with this invention.

Fig. 1ª represents a similar view of the remaining portion thereof.

Fig. 2 is a side elevation similar to Fig. 1 showing the means for operating the conveyors, and

Fig. 2ª is a view similar to Fig. 1ª showing the remainder of the machine, a portion of which is illustrated in Fig. 2.

Fig. 3 is a detail perspective view of a portion of one of the air lines.

The machine illustrated for carrying out the process is mounted in a suitable frame and comprises a plurality of tanks or vats any desired number of which may be employed, four being shown and numbered respectively 1, 2, 3 and 4. These vats may be constructed of wood or metal and of various sizes, the number being increased or decreased according to the class and kind of work for which the machine is to be used. The tank 1 constitutes the soaker, tank 2 the washer, tank 3 the rinser and tank 4 the bluing tank.

The liquid levels are indicated in these tanks at 5, 6, 7 and 8 respectively. A top conveyor 9 passes over suitable rollers 10 and is equipped with a belt tightener 11. This conveyor 9 extends over the tanks above mentioned and cooperates with a bottom conveyor 12 which extends down into each of the tanks and up over the top passing around suitable rollers 13 located at the ends and under the bottoms of the tanks and over other rollers 15 mounted at the tops and in the bottom of the tanks. These conveyors may be composed of any suitable material, preferably of perforated flexible metal or screen wire.

The bottom conveyor is also provided with a suitable tightener 14. The power driven rollers 10 over which the top conveyor passes may be of any desired number, seven being here shown and which are mounted on suitable standards, said rolls operating to carry and drive the conveyor 9. Similar rolls 13 referred to above, are provided for the bottom conveyor 12, eight of which are here shown. The rolls shown at 15 are power driven rollers over and under which both the top and bottom conveyors travel.

A plurality of wringer or stripper rollers 16 are shown mounted in the respective tanks, eight being here shown arranged in pairs, while a perforated roller 17 equipped with a stationary perforated air pipe 18 is shown at the end of the machine and is for a purpose hereinafter to be described.

A plurality of wheels or agitators 19 extend transversely of tanks 1 and 3 any desired number of which may be employed, eighteen being shown in the drawings and these agitators may be run in the same direction or in opposite directions, being de-

signed to agitate the contents of these tanks so that the clothing passing therethrough will be more readily cleansed. A plurality of brushes 20 is used in the respective tanks, four being here shown. These brushes 20 are designed to operate through the conveyors to assist in cleansing the clothes.

A plurality of steam spray lines 21 run the entire width of the machine, four being here shown arranged in the upper portions of the tanks 1 and 2 adjacent the rollers over which the conveyors travel. A plurality of water spray lines 22 run the entire width of the machine, sixteen being shown in the drawing and water is delivered through these lines by means of pumps 23, three of which are shown in the drawings. These pumps are connected with water spray lines 22 by means of pipes 24. Mounted in each of the tanks 1, 3 and 4 are suction screens 25 attached to suction lines 26 of the pumps and through which the liquid in the tanks is drawn and forced up through a pipe 24 and out through the spray lines 22 onto the clothing.

Four perforated air lines indicated at 27 extend transversely across the top portion of each tank at one side thereof and are designed as auxiliary dryers or aerators being positioned adjacent the wringing or squeezing rolls.

Mounted in the washing tank 2 are a plurality of vacuum caps 28 any desired number of which may be employed and which are connected by rods 29 with eccentrics 30 by means of which the cups are reciprocated. A guide rack 31 is located in the tank 2 and through which the rods 29 pass for holding the cups in proper position.

An auxiliary conveyor 32 is located adjacent the end tank 4 to receive the articles after they have been cleansed and which is designed to deliver such articles to any desired machine for continuing the cleansing or drying process. This conveyor 32 is driven by a suitable belt or chain 33 driven by the roller 17.

A motor 34 for driving the various parts of the machine is shown located at the right hand end thereof and has a belt 35 passing over pulley 36 located on the end roller 13 and by means of which power is imparted to said roller and used for driving the conveyors.

A vent hood 37 is arranged over the machine for carrying off the fumes. A bracket 38 is shown at the left hand or feeding end of the machine and on which is designed to be supported the pole 39 which is employed for feeding the clothes to the conveyors.

Suitable driving belts or sprocket chains 40, 41, 42 and 43 are shown passing over series of sprockets 44, 45, 46 and 47 respectively, and which are designed for driving the paddle wheels and the vacuum cup eccentrics. The chain 40 actuates the paddle wheels 19 in tank 1 while the chains 42 and 43 drive those shown in tank 3. Chain 41 actuates the vacuum cup eccentrics. The sprockets 50 and 52 of series 44; 53 and 54 of series 45; and 55 and 57 of series 46 travel clockwise while sprockets 51 and 61 travel anti-clockwise. Trains of gears for driving rolls 15 in the lower part of tank 2 are indicated at 65 and 66 in Fig. 2, while similar gears are shown at 67 for driving rolls 16 in the upper right hand end of tank 4.

In carrying out the process constituting a part of this invention, the articles after having been classified are arranged on the poles 39 for convenient feeding into the machine. These articles after being fed onto the conveyor 12 are carried through the machines as follows:—passing first through tank No. 1 which contains the cold water which is agitated by the paddle wheels 19 and sprayed by the steam pipes 21 and the water pipes 22. The clothing passing out from tank 1 is passed between the stripper rollers 16 which removes the excess liquid. They then pass under the air line 27 and enter tank 2 which contains the suds or cleansing water. The liquid in this tank is agitated by the vacuum cups 28 and after the clothing passes through the tank and is subjected to the action of these cups, it enters between stripping rolls 16 located at the upper right hand corner thereof and is subjected to air from the air line 27. After this treatment, the clothes enter the rinsing tank 3 and are sprayed by steam and water entering through pipes 21 and 22 and after being subjected to the agitated liquid of this tank pass out through the stripping rolls 16 in the manner above described, being subjected to air from the pipe 27 and entering the bluing tank 4.

This tank 4 which contains the blue bath has a plurality of liquid spray pipes 22 opening along the path of the clothes which are conveyed and held between the two conveyors so that the clothes are thoroughly sprayed with bluing liquid. After being blued, the clothes pass out through the stripping rolls at the upper end of tank 4 and are subjected to air from the line 27. After being so treated, they pass under the roller 13 and over roller 17 which contains the air line 18 and are partially dried, thereby and then passing onto the auxiliary conveyor 32 from which they are conveyed to any suitable place of deposit.

The machine as shown, is designed for cleansing articles which are not badly soiled such for instance as bed sheets and the like.

When badly soiled articles are to be treated, the number of tanks will increase and enlarge and the order and arrangement of the tanks may be changed and increased or

decreased according to the condition under which the machine is operated or the classification of the articles. Each or any of the tanks may include any or all of the arrangements of air lines, stripper rolls, paddle wheels, sprays, vacuum cups and brushes shown in the drawing. It is of course understood that the nature of the liquid employed may be varied at the will of the user and that the temperature and the pressure in the air lines may be arranged to suit conditions.

From the above description it will be obvious that the process and machine herein described will save labor in a number of ways for instance in laundering a bed sheet the operators who now feed it into the flat work ironer could be positioned at the feed side of the conveyor washing machine and thus dispense with the services of the wash man employed with washing machines now in use. The wringer operator and the wringing machine will also be dispensed with as well as the tumbler, tumbler labor, and shaking out labor.

This machine will also save cleansing fluid and material since they may be used over and over and only discarded when too dirty for further use while in the machines now in use the liquids are run to the sewer after each washing operation.

Various changes in the form, shape, proportion and other minor details of construction may be made without departing from the principle or sacrificing any of the advantages of the claimed invention.

I claim:—

1. A process of cleaning fabrics which consists in passing the fabric over endless conveyors through a plurality of tanks containing cleansing fluid, removing the excess fluid in the passage from one tank to the next and subjecting the fabric to a current of air in its passage from one tank to the next.

2. A process of cleansing fabric which consists in passing the fabric over endless conveyors through a plurality of tanks containing cleansing fluid, subjecting the fluid in some of the tanks to agitation during the passage of the fabric, removing the excess fluid from the fabric in its passage from one tank to the next and subjecting the fabric during such passage to drying currents of air.

3. A process of cleansing fabrics which consists in passing the fabrics over endless conveyors through a plurality of tanks containing fluids to which the fabrics are to be subjected, agitating the fluids in some of said tanks and spraying steam and water onto the fabrics during their passage through some of the tanks, removing the excess fluid from the fabric in its passage from one tank to the next and subjecting the fabric during such passage to drying currents of air.

4. An apparatus for cleansing fabrics comprising a plurality of tanks containing fluids to which the material is to be subjected, endless conveyors passing through said tanks, agitators located in some of said tanks, spray pipes for discharging steam and water into some of said tanks, pumps for pumping the water through said pipes, and means for receiving the fabric from the tanks and conveying it to a suitable place of deposit.

5. A process of cleaning fabrics which consists in passing the fabric over endless conveyors through a plurality of tanks containing cleansing fluid, and subjecting the fabric to a current of air in its passage from one tank to the next.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

JOSEPH LEIGH BOOTH.

Witnesses:
L. A. PETERSON,
F. W. CASTREN.