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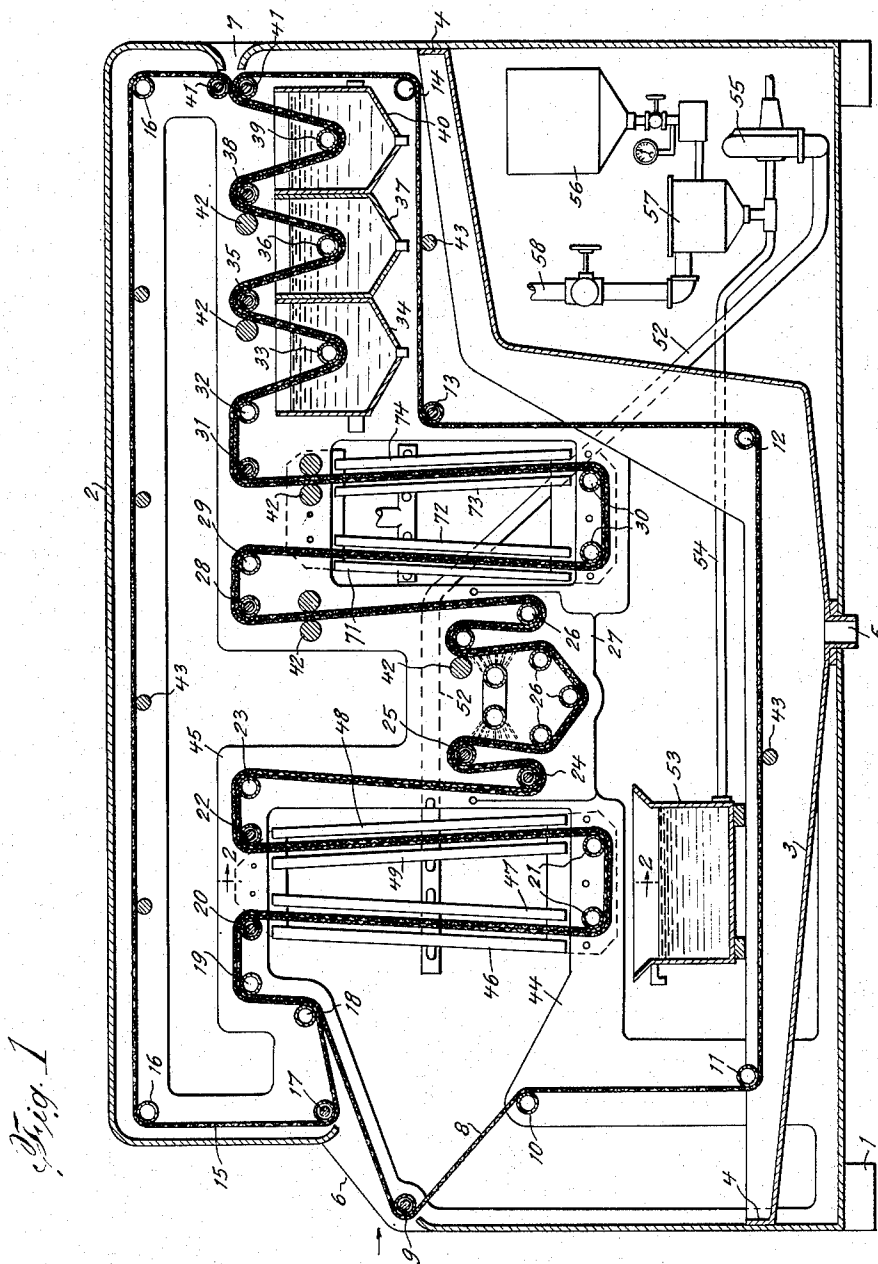
J. WALDSTEIN

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CONTINUOUS FLATWORK LAUNDERING MACHINE

Filed July 1, 1943

2 Sheets-Sheet 1



INVENTOR.
JEROME WALDSTEIN

BY ATTORNEY

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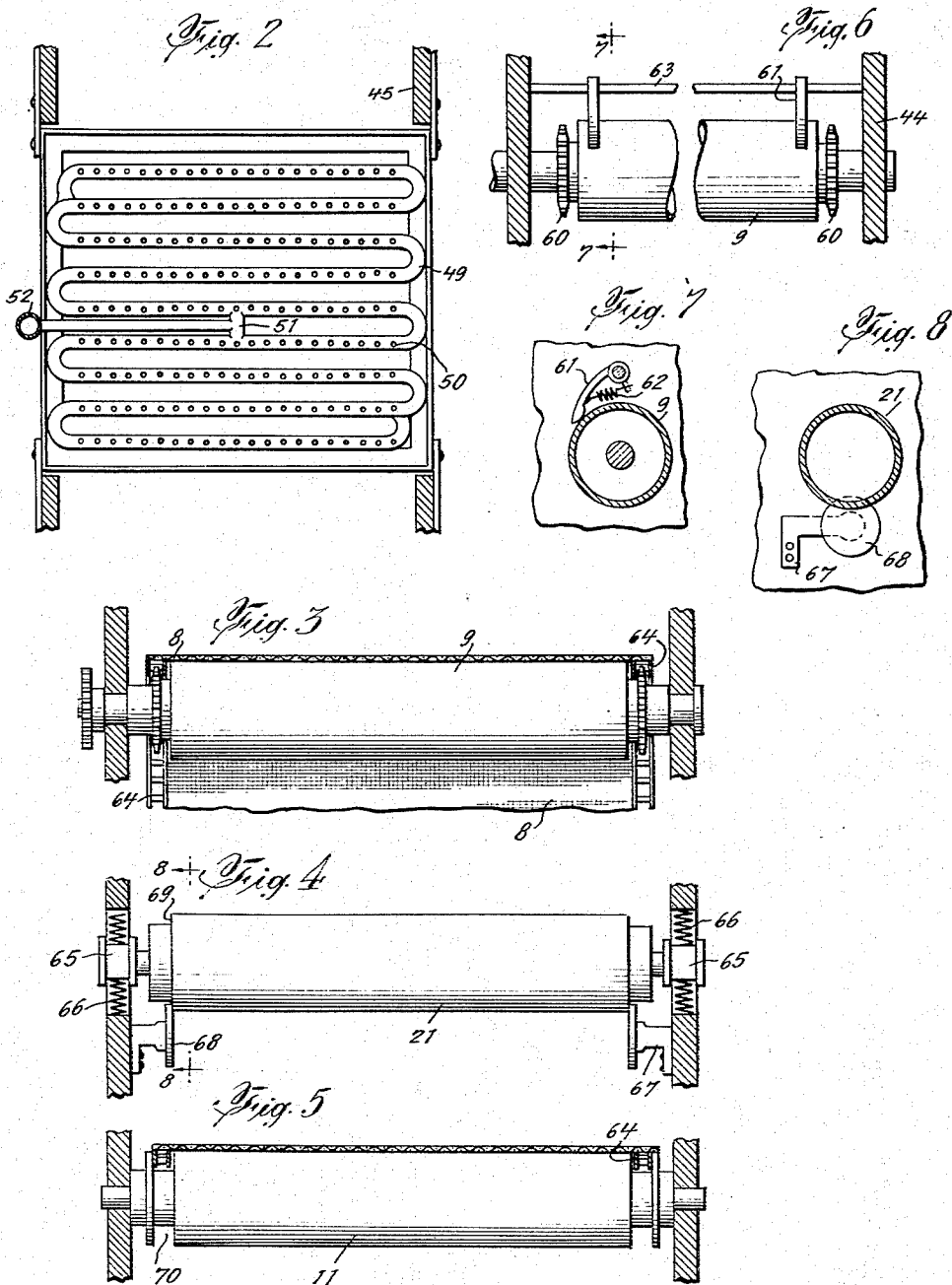
J. WALDSTEIN

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INVENTOR.
JEROME WALDSTEIN

BY

H. B. Berman
ATTORNEY

UNITED STATES PATENT OFFICE

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CONTINUOUS FLATWORK LAUNDERING
MACHINE

Jerome Waldstein, Brooklyn, N. Y.

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3 Claims. (Cl. 68—9)

The present invention is directed to laundering, more particularly, to the washing of flat pieces of fabric such as sheets, towels, and the like.

In present day operations in washing of fabrics, a number of individual and independently operated units are provided. It is necessary to move the fabric by hand, or otherwise, from one unit to another for the several treatments, and the operations as a whole are relatively complicated, costly and inefficient.

The present invention is intended to provide a system wherein a fabric to be washed may be introduced into an apparatus and be automatically carried through the same, being discharged from said apparatus in a fully laundered state.

It is among the objects of the present invention to provide a unitary piece of apparatus with the provision of traveling belts which automatically carry the fabric into the system, thoroughly cleanse the same, and then discharge it therefrom.

In the accompanying drawings, constituting a part hereof, and in which like reference characters indicate like parts:

Fig. 1 is a longitudinal cross-sectional view showing the general nature of the present invention;

Fig. 2 is a vertical cross-sectional view taken along the line 2—2 of Fig. 1;

Fig. 3 is an enlarged elevational view of a drive roller;

Fig. 4 is an elevational view of a spring-pressed tension roll;

Fig. 5 is an elevational view of a guide roll;

Fig. 6 is a fragmentary elevational view of the intake drive roll showing means for holding fabric in position;

Fig. 7 is a vertical cross-sectional view thereof taken along the line 7—7 of Fig. 6; and

Fig. 8 is a vertical cross-sectional view taken along the line 8—8 of Fig. 4.

On the base 1 is mounted an enclosure 2 having a catch basin 3 secured thereto at the sides 4 near the bottom of the enclosure. Said basin has an outlet 5 for the removal of liquid from the system. At one end of enclosure 2 is an opening 6 for the introduction of fabric to be cleaned and at the opposite end there is an opening 7 to allow removal of laundered fabric.

Within the enclosure is an endless foraminous belt 8 which is mounted on drive roller 9, passes over guide rolls 10, 11 and 12, drive roll 13 and guide roll 14 at the lower portion of the enclosure. A similar foraminous belt 15 passes over guide

rolls 16 and is driven by drive roll 17. At the entrance opening 6 belts 8 and 15 come in contact, and as they pass from left to right in the apparatus, as shown in Fig. 1, they are engaged successively by guide rolls 18 and 19, drive roll 20, tension rolls 21, drive roll 22, guide roll 23, drive rolls 24 and 25, and then by guide rolls 26 held in container 27. They then pass over drive roll 28, guide roll 29, tension rolls 30, drive roll 31, guide rolls 32 and 33 and into tank 34. Passing upwardly out of the tank, they are engaged by guide roll 35, then downwardly being engaged by guide roll 36 in tank 37. The belts then pass upwardly over drive roll 38 and down over guide roll 39 contained in tank 40. They then pass over drive rolls 41 and separate the belt 8 passing downwardly and back to the starting point, while belt 15 passes upwardly and back to the starting point, at opening 6. Squeeze rolls 42 are placed at various points as the belts emerge from a treatment, whereby excess liquid is removed from the fabric and the belts prior to the next operation. Various idler rolls 43 are placed at a number of points to support the belts.

Within the enclosure is a frame 44 at the lower part thereof, the tension rolls 21 being mounted in said lower frame. An upper frame 45, also within the enclosure, provides means for supporting the upper rolls as well as other portions of the apparatus.

Between rolls 20 and 21 are two sets of coil pipes 46 and 47, each set being on one side of the contacting belts. Each of the coil pipes is provided with a set of sprays whereby detergent liquid may be forced into and through the belts. The sprays from both coils 46 and 47 are forced in opposite directions and through the belts. A similar set of spray coils 48 and 49 are placed on both sides of the contacting belts between rolls 21 and 22.

As shown in Fig. 2, each of the coils has a series of small openings 50 constituting spray nozzles or jets. A pipe 51 in the central portion of each set of coils introduces the solution centrally thereof, said solution being conducted by pipe 52 to the coils. Below the coils is a tank 53 in such a position as to act as a catch basin for used solution. By means of pipe 54, a part thereof may be introduced through pump 55 into pipe 52 to be re-used. At the same time, fresh solution is provided by suitable detergents in container 56, which are caused to flow into intermediate holder 57, and fresh water 58 is introduced into said holder to mix with the detergent

and provide the desired solution for spraying on the fabric.

As shown more particularly in Figs. 6 and 7, the drive roll 9 at the entrance opening 6 is provided with sprockets 60 for moving the belts through the system. All of the drive rolls are so equipped. However, the entrance roll is provided with fingers 61 pressed by springs 62 onto the surface of the belt on said roll 9, said fingers being held in position on rod 63 held in the enclosure. This serves as a means for pressing the belts together while the fabric is dry in order to prevent wrinkling or displacement of the fabric. After the first wetting thereof, no such special means for holding the fabric in place is necessary.

The belts are provided with downwardly extending members 64 at both sides thereof. These depending members are of such form as to mesh with gears 60, whereby both of the belts may be driven in unison. By reason of this arrangement, all of the drive rolls will drive the belts at the same speed through the apparatus. It is to be noted that the extending members 64 are on only one side of each of the belts, leaving the upper side of each belt as contacting faces, so that they may grip and hold flat pieces of fabric therebetween.

In order to maintain the fabric in extended position through the washing operations, particularly in the spraying operations, tension rolls 21 and 30 are provided. They are mounted as shown in Fig. 4, on suitable shafts 65 which are mounted on springs 66, so that they may move upwardly and downwardly during the traveling of the belts, thus always maintaining the sections within the spray area suitably taut.

In order to prevent shifting of the belts, a number of guide rolls, particularly the lower ones, are provided with disks 68 held on brackets 67 and fitted into shoulders 69. As shown in Fig. 5, other guide rolls such as rolls 11 are provided with end grooves 70 into which the extending portions 64 are adapted to fit, thereby holding the belts in proper position against endwise movement.

In the washing operation, flat pieces of fabric are introduced on belt 8 at inlet opening 6 of the enclosure. As the belts 8 and 15 travel to the right, they pass downwardly between sets of sprays 46 and 47 where a detergent solution is forced through the fabric, then upwardly between sets of sprays 48 and 49 where a similar action takes place. While as shown, the same detergent solution is introduced into both sets of sprays, different detergents may be used, as for example, in one set an alkali solution may be provided and in the other, a soap solution may be introduced. After the washing operation is complete, the belt traveling further to the right brings the belts into container 27 wherein a bleaching solution is provided, the belts passing through such solution, or, if desired, such solution may be sprayed through the belts by suitable spray members.

As the belt travels further, the excess bleach is removed by squeeze rolls 42 and the belts with the fabric pass downwardly through a set of sprays 71 and 72, then upwardly between sets of sprays 73 and 74, being subjected to rinse water, usually under hydrant pressure.

The belts, in passing further through the apparatus, are subjected to squeeze rolls 42 and then into tank 34 where a suitable sour solution is provided for neutralizing any alkali detergent or bleach which may remain in the fabric. The belts then pass through tank 37 where the fabric

is blued and then through tank 40 where it is starched. In passing between drive rolls 41, excess of starch is removed and the damp fabric passes out through opening 7 to be dried and ironed, as usual.

In the washing operation, by sprays 46, 47, 48 and 49, it is often desirable that the detergent solution be reused, as in many cases, its potency has not been spent. Therefore, it is caught in tank 53 and returned in part to the system by pump 55. Preferably, but not necessarily, the solution passing through pipe 52 is about 50% fresh solution and 50% used solution. By reason of the high pressure of the sprays in the washing operation, said pressure being boosted by pump 55 above hydrant pressure, a thorough and rapid cleansing in a short distance of travel of the belts is obtained.

Although I have described a single embodiment of my invention, said embodiment has been described for purpose of illustration and it is not to be considered as limiting the invention to the exact details set forth. For instance, the coils containing the sprays may be of various forms and the number and type of jets may be varied at will. One or more of the operations in tanks 34, 37 and 40 may be omitted, other substituted for the same, or such operations consolidated into a lesser number. The pump need not be located within the enclosure, as various positions for the pump and auxiliary equipment may be found. In some cases, it may be desirable to have an additional pump for performing the functions of causing circulation of liquids in other parts of the apparatus than the washing operation.

These and other changes may be made in the details of the invention without departing from the spirit thereof, the scope of the invention being defined by the character of the claims appended hereto.

What I claim is:

1. A laundering machine comprising a base, an enclosure secured thereto, an endless foraminous belt mounted in the lower portion of said enclosure, a second such belt mounted in the upper portion thereof and contacting with said first belt from end to end of said enclosure to hold fabric therebetween, two sets of opposed vertical sprays at the intake end of said enclosure, said contacting belts passing vertically between said sprays, means for forcing detergent solution from said sets of sprays simultaneously through said contacting belts from opposite sides and into the fabric therebetween, horizontal rollers below said sprays, said belts and fabric being in a horizontal position between said rollers, the space between said rollers being free from sprays, a catch basin below said space to receive liquid from said sprays, a second group of substantially vertical sprays in proximity to the outlet end of said enclosure, said contacting belts passing between the sprays of said second set, and means for forcing rinsing water through said belts from opposite sides, a bleaching bath intermediate said two groups of sprays, said contacting belts passing through said bath.

2. A laundering machine comprising a base, an enclosure secured thereto, an endless foraminous belt mounted in the lower portion of said enclosure, a second such belt mounted in the upper portion thereof and contacting with said first belt from end to end of said enclosure to hold fabric therebetween, two sets of opposed vertical sprays at the intake end of said enclosure, said contacting belts passing vertically between said

sprays, means for forcing detergent solution from said sets of sprays simultaneously through said contacting belts from opposite sides and into the fabric therebetween, horizontal rollers below said sprays, said belts and fabric being in a horizontal position between said rollers, the space between said rollers being free from sprays, a catch basin below said space to receive liquid from said sprays, a second group of substantially vertical sprays in proximity to the outlet end of said enclosure, said contacting belts passing between the sprays of said second set, and means for forcing rinsing water through said belts from opposite sides, a bleaching bath intermediate said two groups of sprays, said contacting belts passing through said bath, and finishing baths between said second set of sprays and the outlet end of said enclosure.

3. A laundering machine comprising a base, an enclosure secured thereto, an endless foraminous belt mounted in the lower portion of said

enclosure, a second such belt mounted in the upper portion thereof and contacting with said first belt from end to end of said enclosure to hold fabric therebetween, two sets of opposed vertical sprays at the intake end of said enclosure, said contacting belts passing vertically between said sprays, means for forcing detergent solution from said sets of sprays simultaneously through said contacting belts from opposite sides and into the fabric therebetween, horizontal rollers below said sprays, said belts and fabric being in a horizontal position between said rollers, the space between said rollers being free from sprays, a catch basin below said space to receive liquid from said sprays, rolls for guiding said belts, and fingers associated with the roll at the intake end of said enclosure having spring pressed means contacting with the belt for preventing shifting of fabric before it is wetted.

JEROME WALDSTEIN.