No. 675,069. Patented May 28, 1901.

F. G. SARGENT.

WOOL WASHING MACHINE.

(Application filed May 3, 1899.)

(No Model.) 3 Sheets—Sheet 1.

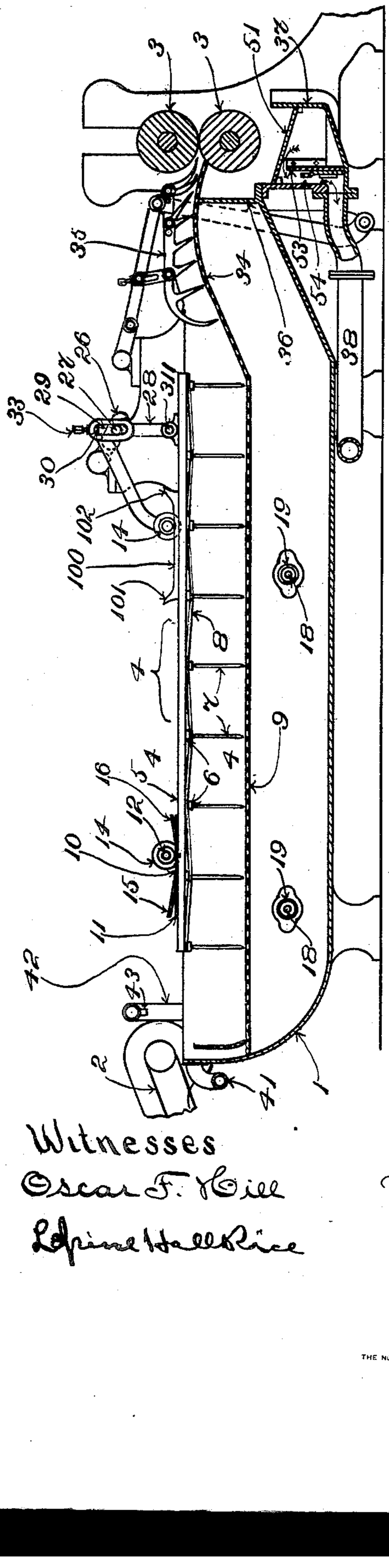

Fig. 2.

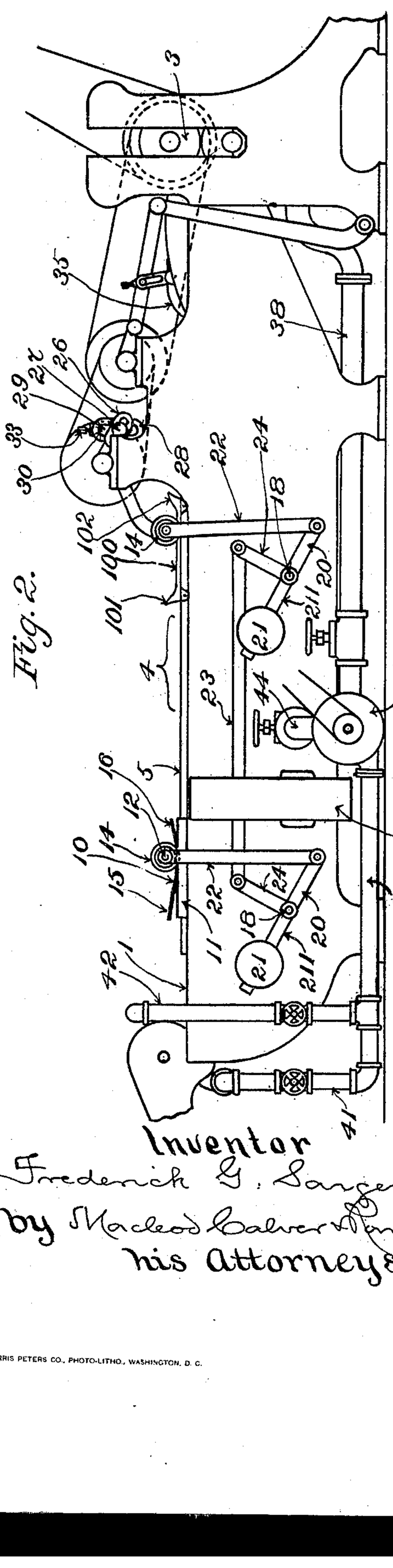

Fig. 1.

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WOOL WASHING MACHINE.

(Application filed May 3, 1899.)

(No Model.) 3 Sheets—Sheet 2.

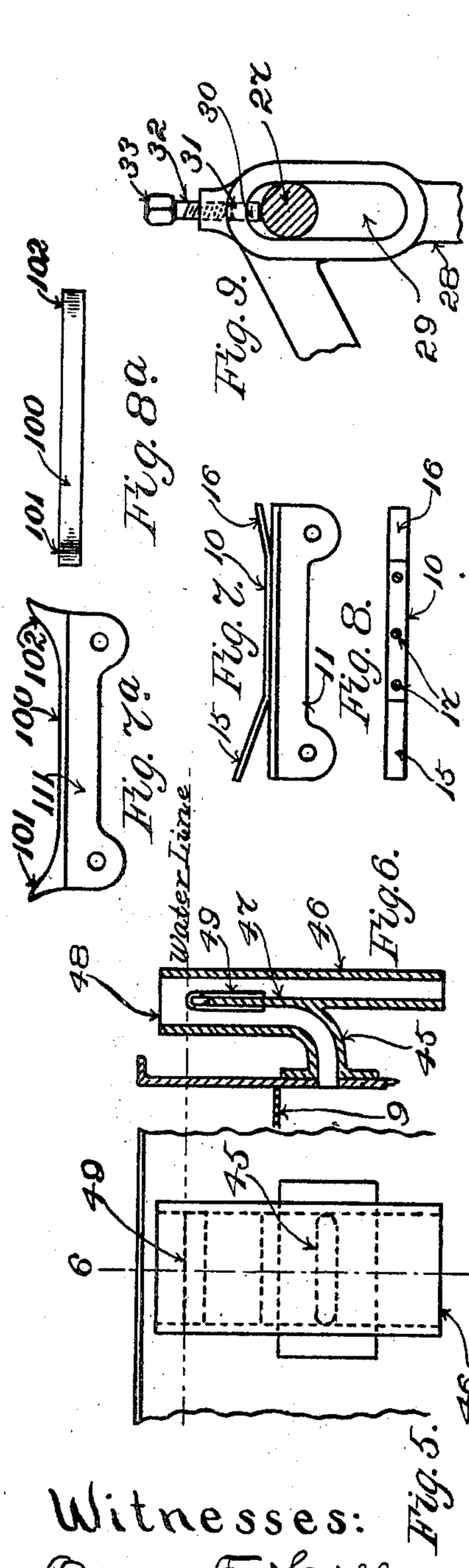

Fig. 5.

Fig. 9.

Fig. 8a.

Fig. 7a.

Fig. 7.

Fig. 8.

Fig. 6.

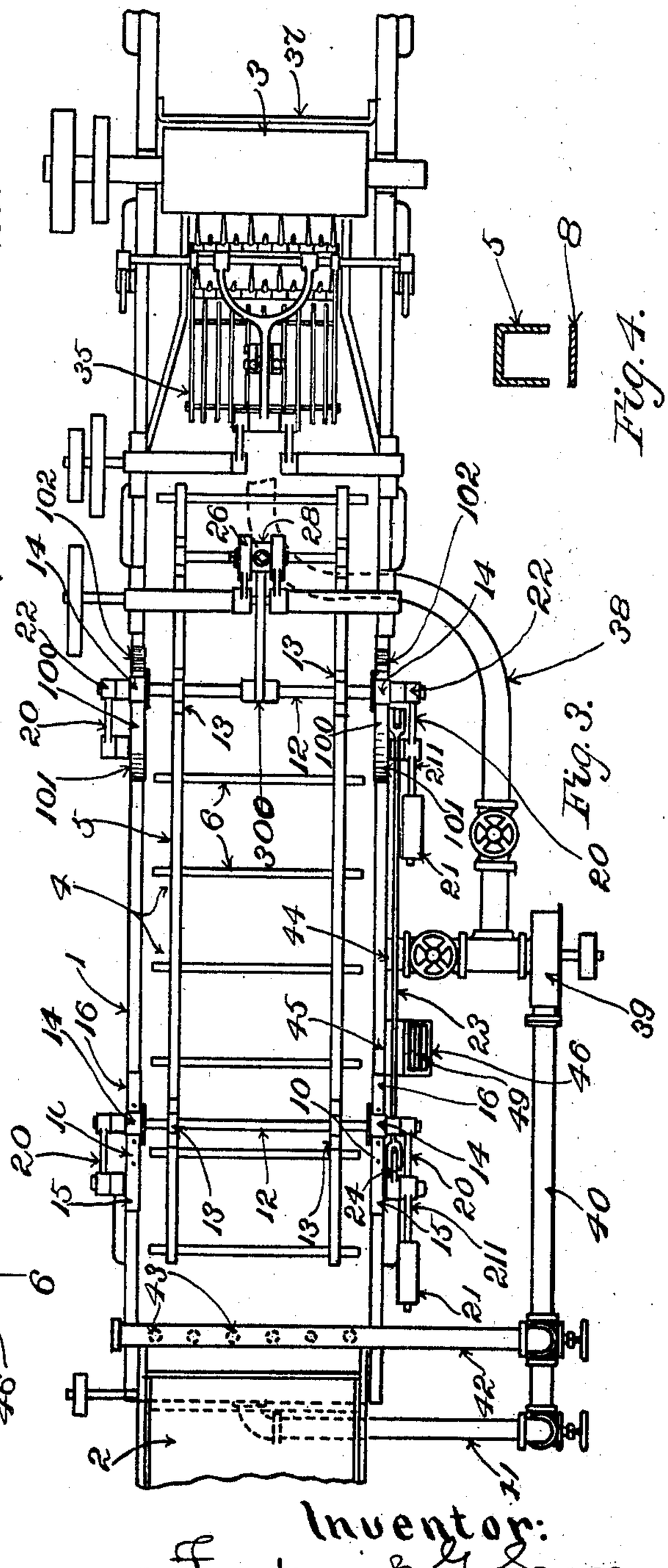

Fig. 3.

Fig. 4.

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WOOL WASHING MACHINE.

(No Model.) (Application filed May 3, 1899.) 3 Sheets—Sheet 3.

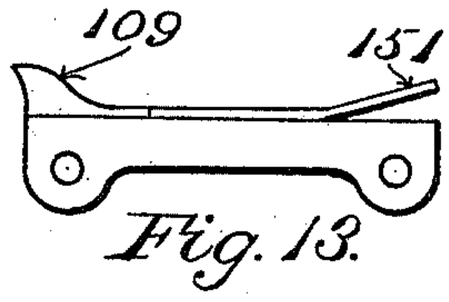

Fig. 13.

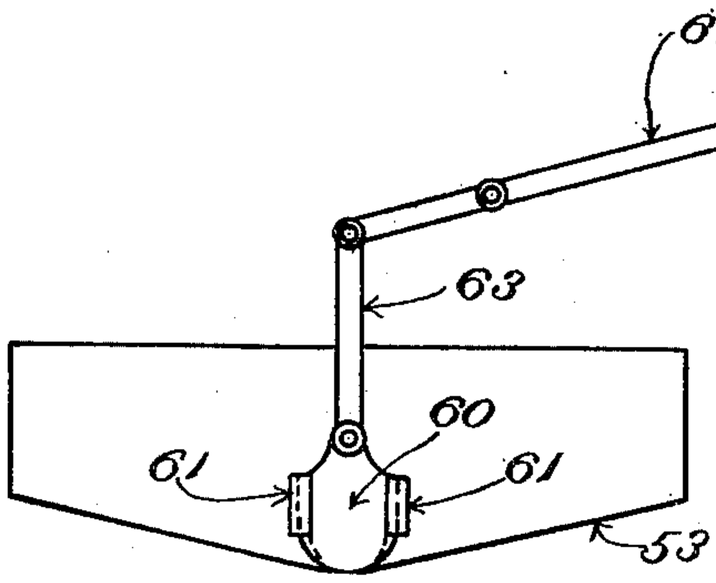

Fig. 12.

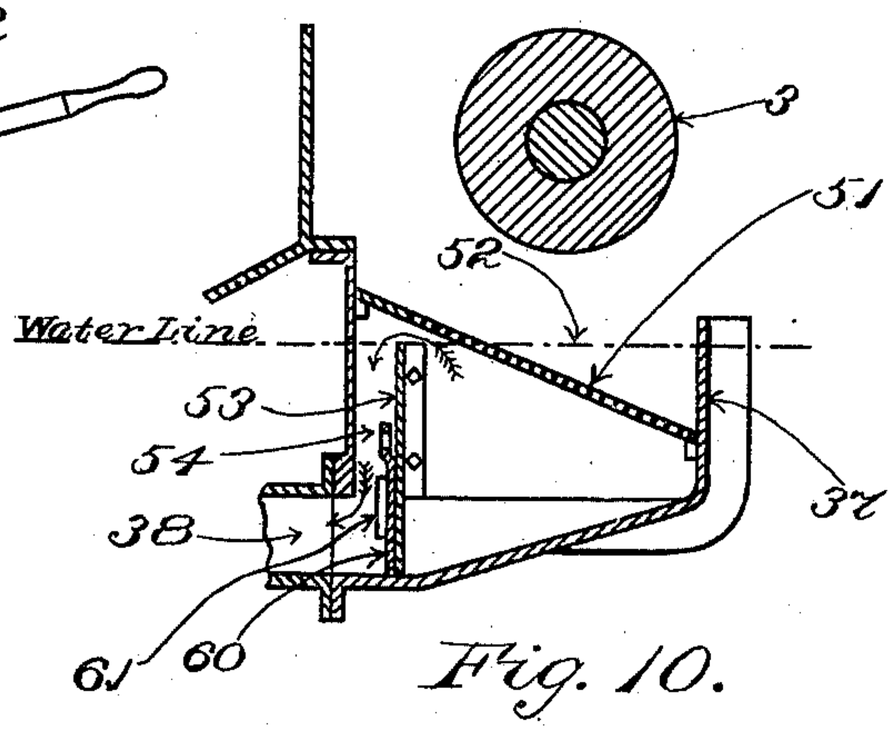

Fig. 10.

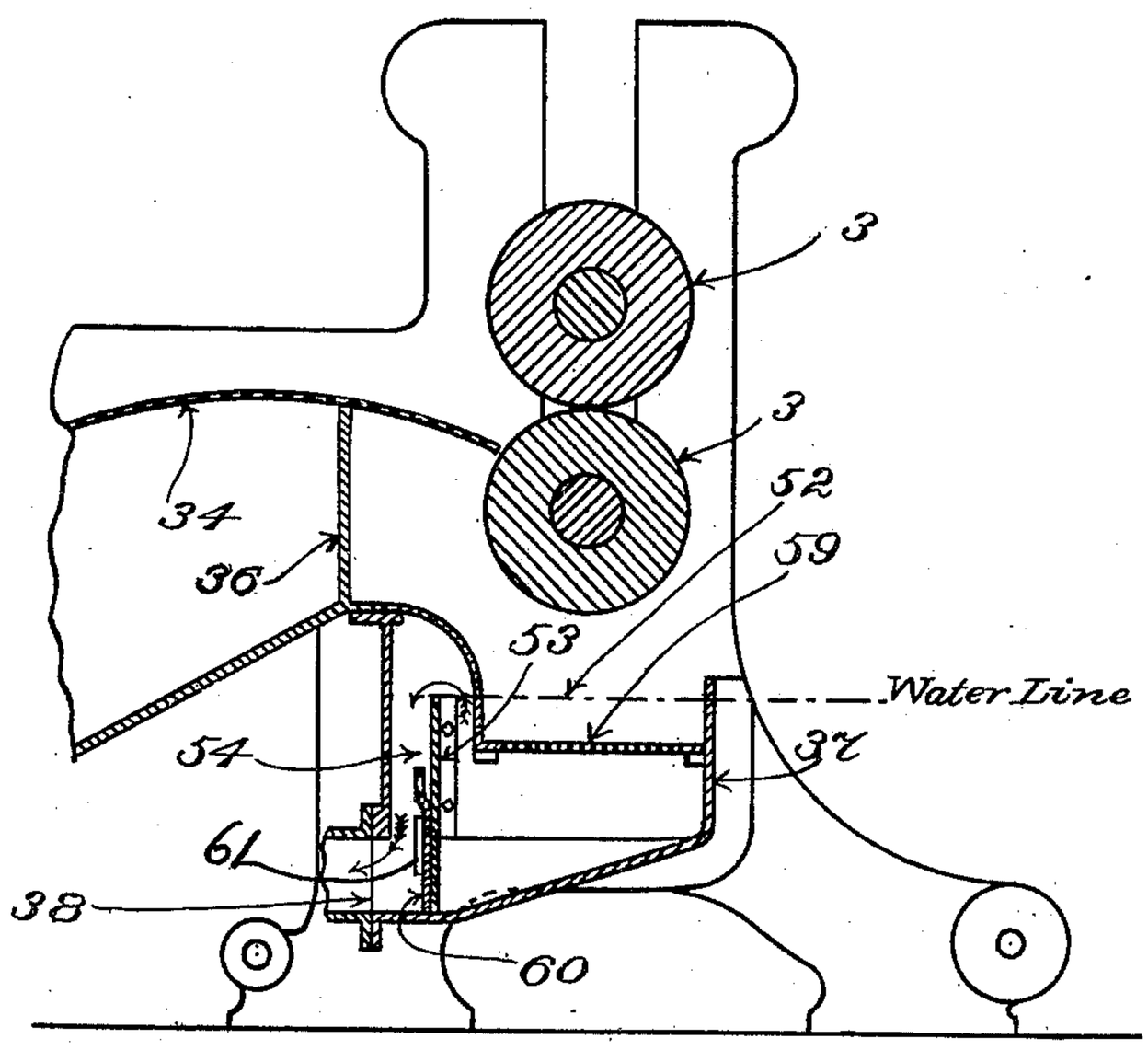

Fig. 11.

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UNITED STATES PATENT OFFICE.

FREDERICK G. SARGENT, OF GRANITEVILLE, MASSACHUSETTS.

WOOL-WASHING MACHINE.

SPECIFICATION forming part of Letters Patent No. 675,069, dated May 28, 1901.

Application filed May 3, 1899. Serial No. 715,491. (No model.)

To all whom it may concern:

Be it known that I, FREDERICK G. SARGENT, a citizen of the United States, residing at Graniteville, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Wool-Washing Machines, of which the following is a specification, reference being had therein to the accompanying drawings.

My invention will first be described with reference to the accompanying drawings, showing the best embodiment thereof which I have yet contrived, and afterward the essential characteristics of the invention will be particularly pointed out, and clearly defined in the claims at the close of this specification.

In the drawings, Figure 1 is a side elevation of a wool-washing machine embodying the improvements. Fig. 2 is a longitudinal vertical section of the same. Fig. 3 is a plan of the same. Fig. 4 is a cross-section of one of the side bars of the harrow and its tie-strap. Fig. 5 is an enlarged elevation of part of the tank and the overflow. Fig. 6 is a view of the same in section on the line 6 6 of Fig. 5. Fig. 7 is an elevation of one of the spring-tracks. Fig. 8 is a plan of the same. Fig. 7ª is an elevation of a solid track. Fig. 8ª is a plan thereof. Fig. 9 is an elevation of the slotted standard of the harrow and its cushion and adjusting-screw. Fig. 10 is a view in section, on an enlarged scale, of a portion of the delivery end of the machine. Fig. 11 is a similar section of a portion of the said delivery end of the machine, showing a modification. Fig. 12 is an elevation of the drainage-gate shown in Figs. 10 and 11. Fig. 13 shows a modified form of track.

My improvements are shown as applied to the type of wool-washing machine which comprises a long bowl 1 to contain a cleansing liquid, and at one end of which the wool enters, as by being fed in by an endless apron 2, while at the other end thereof the wool issues through a pair of squeeze-rolls, as 3 3, the latter expressing as much as possible of the cleansing liquid from the wool and delivering the latter to be thoroughly dried and further treated. In the bowl 1 is located a harrow 4, which is made up of side bars 5, that support a series of laterally-arranged rake-heads 6. From each of these rake-heads depends a row or rank of rake-teeth 7. Wool-washing machines of this type are sometimes built with a bowl that is upward of thirty feet in length, the harrow having a corresponding extent. The tendency of such a harrow is to sag at some point or points in its length. It is essential that the harrow should be light in weight in order that its movement may be smooth and easy. I have devised a novel construction of the side bars of the harrow and a means of stiffening the harrow which meet the requirements of the situation and obviate the difficulties that have been experienced heretofore, without any objectionable increase in the weight of the harrow. Thus I form each side bar 5 of the harrow of channel-iron, as shown in Fig. 4, the same being employed in inverted position—that is, with its side flanges extending downward, as in said figure. I also run a tie-strap 8, Figs. 2 and 4, along each side bar 5 beneath the same, the said tie-strap extending alternately under and over the successive rake-heads 6. Of course this description applies to the finished harrow. The mode of constructing the same will be to apply every second rake-head to the side bar, extend the tie-strap over the same and secure its ends, and then apply and secure over the tie-strap the intermediate rake-heads, thereby bringing the tie-strap into a state of tension and causing the whole structure to form a truss which effectually resists all tendency to sag, so that in the forward movement of the harrow the points of all its teeth will just clear the false bottom 9 of the bowl, as indicated in Fig. 2. The tie-strap does not project materially into the bowl, and therefore does not tend to become clogged with wool.

To the side bars of the harrow I secure by means of castings 13 13 two cross-rods 12 12, the ends of which project over and somewhat beyond the sides of the bowl. With the said ends I connect counterbalancing parallel-motion devices of suitable or known character—such, for instance, as those I have shown in the drawings. Thus the ends of each of the said cross-rods have fitted to them eyes at the upper ends of links 22 22, the lower ends of which are connected with arms 20 20 on a rock-shaft 18. Each rock-shaft 18 passes

through a pipe 19, Fig. 2, that is set in the bowl and extends from one side to the other of the latter, the ends of the said rock-shaft extending at the opposite sides of the bowl for the reception of the arms. Arms 24 24 on the respective rock-shafts 18 18 are connected by a rod 23, and thereby the said rock-shafts are caused to turn in unison. 21 21 designate weights carried by arms 211 211 on the rock-shafts 18 18 and serve to partially counterbalance the weight of the harrow. These devices operate to keep the harrow horizontal throughout all its movements.

The harrow is actuated, as usual, by means of a rotating crank 26, (see Figs. 1, 2, 3, and 9,) the pin 27 of the said crank working in the slot 29 of a member 28, which is attached at 300 and 311 to the harrow and operating to occasion alternately a forward motion of the harrow in the bowl and an elevated return motion thereof, as customary in machines of the class to which this invention relates. As is well known, during the lower half of its revolution the crank-pin acts simply to advance the harrow horizontally along the bowl; but when it has completed this half the crank-pin reaches the upper end of the slot 29 and thereafter during the upper half of the revolution of the crank-pin the harrow is carried upward, backward, and downward. The sudden contact of the crank-pin with the said upper end of the slot occasions shock and wear. One aim of my invention is to obviate these, and this I accomplish by locating a cushion 30 of yielding or elastic material, such as india-rubber, in the upper end of slot 29 to relieve the force of the impact of the crank-pin against such end of the slot. I insert the said cushion in a hole 31 and provide for adjustment, as for taking up wear, by means of a screw 32, fitting a tapped portion of such hole and having its head or upper end 33 suitably shaped for the application of a tool by which to turn the same.

Upon the opposite ends of the cross-rods 12 12 I mount or journal trucks or rollers 14 14, and at the opposite edges of the bowl I provide tracks along which the said trucks or rollers move during the horizontal forward movement of the harrow in the tank. These tracks serve for the support of the harrow during the forward travel thereof. For convenience the said tracks are provided on angle-plates 11, Fig. 7, and 111, Fig. 7ª, which are attached to the upper edges of the sides of the bowl. During the elevated return movement of the harrow the trucks or rollers 14 14 are raised off the said tracks. When the harrow descends at the completion of such return movement, the trucks or rollers take bearing against the said tracks, and they are upraised from the latter at the completion of the horizontal forward movement of the harrow. In order that the trucks or rollers may strike the tracks easily in the descent of the harrow, the forward ends of the said tracks are upturned or elevated, as at 15 15 in Figs. 1, 2, 7, and 8 and 101 in Figs. 7ª and 8ª, and in order to assist the crank in raising the harrow the opposite or rear ends of the tracks also are upturned or elevated, as at 16 and 102, same figures. In Figs. 7ª and 8ª and at the right in the main views of the drawings the tracks 100 are made solid with upturned ends 101 102, curved as shown. I have in practice employed such tracks next adjacent to the crank. In Figs. 7 and 8 and at the left in the main views of the drawings the tracks 10 10 are formed, respectively, of flat bars of steel. Each of such bars has its middle portion secured, as by screws 17 17, to the corresponding angle-plate 11, while the ends of the bar are upturned, as at 15 16, Figs. 7 and 8, forming springs. I have in practice employed such tracks in the positions more remote from the crank. The spring ends 15 cushion the descent of the harrow, absorbing all shock due thereto, thereby preventing slamming, while the spring ends 16 assist in lifting the harrow.

At the delivery end of the bowl the false bottom 9 of the latter rises to form a curved table 34, Fig. 2, over which the wool that has passed through the bowl is delivered to the squeeze-rolls 3 3. Such delivery may be effected as customary by a reciprocating carrier 35, which is shown as of known construction and operation, and whose parts therefore need not be described in detail. 36 is the vertical end wall of the bowl, which supports the crest of the table 34. Beneath the squeeze-rolls there is a tank 37 to receive the liquid expressed from the wool that passes through the rolls. From the said tank a pipe 38 leads to a pump 39, by means of which latter the liquid is returned through a pipe 40 to the bowl. The latter pipe is shown with branches, as 41 42. The branch pipe 41 leads into the feed end of the bowl, while the branch pipe 42 extends transversely across the bowl, just forward of the feed-apron 2, and has a row of nozzles 43 for spraying the incoming wool. There is also shown a pipe 44, running from the bowl to the pump, whereby liquid may be drawn from beneath the false bottom of the bowl as well as from the tank 37.

When the machine is being used for rinsing, a large quantity of water is introduced continuously into the bowl and escapes by the overflow about to be described. The said overflow (see Figs. 5 and 6) is in the shape of a pipe 45 of flattened cross-section, leading from beneath the false bottom 9 of the bowl. The said pipe extends upward nearly to the height of the edge of the bowl, and then doubles on itself and runs downward, as at 46, for connection with a waste-pipe. The upper bend of the pipe may be open, as at 48, for inspection of the conditions of flowage. The separating-wall 47, between the passages in these two portions of the overflow, is not so high as the outer walls of the said portions,

it being terminated slightly below the desired water-level in the bowl. During the working of the machine it is necessary to maintain the liquor or water in the bowl up to a certain distance on the table 34, in the present case substantially at the top thereof. Thereby the wool is taken up to the press-rolls more evenly, inasmuch as the water helps to float it. In some places the water-supply is more or less deficient, and unless suitable provision were made to compensate for the deficiency the amount of water flowing into the bowl would be insufficient to keep the water in the bowl up to the required line during the rinsing process. Accordingly I provide the outlet with an adjustable gate, as 49, Figs. 5 and 6, whereby the outflow from the bowl may be regulated. Herein the said gate is constituted by a plate of iron, which is doubled upon itself into U shape, as shown, and fitted over the upper edge of the separating wall or partition 47 between the two passages of the outlet or overflow. This plate constitutes an extension of the said wall or partition, which may be adjusted vertically by simply raising or lowering the same. Thereby the rate of inflow into the bowl is accommodated and the contents of the bowl are kept at the desired water-line. The plate is held in place on the separating wall or partition by frictional contact, or any approved means of securing it after adjustment may be employed.

The tank 37 beneath the rolls 3 3 receives the mingled liquid and fine fiber that falls from the said rolls. It is important that the liquid should be returned to the bowl for repeated use, while it is equally important that the fine fiber should be prevented from passing through and clogging the pump that withdraws the liquid. Screens have heretofore been employed for this purpose; but so far as my experience goes they soon clog up and necessitate a stoppage of the entire machine while they are cleaned out. Referring particularly to Figs. 10 and 11, it will be seen that the improvement I have made in the use of a screen consists in immersing the screen below the constant water-level of the contents of the tank. 51, Fig. 10, and 59, Fig. 11, designate the screen located below the water-level 52. The said water-level may be maintained by a cross-plate or dam 53, from which the outlet-passage 54 may connect with the pipe 38, leading to the pump. In Fig. 11 the screen is horizontal and wholly beneath the water-line, while in Fig. 10 the screen is inclined and its upper end extends a short distance above the water-line. I find that the immersed screen keeps from becoming clogged with fiber, although a current is constantly passing through it for a much longer time than is the case in former constructions, and consequently fewer stoppages of the entire machine are necessitated than heretofore.

I show a drainage-gate 60 in the lower part of the tank, which slides between cleats 61 (see Fig. 12) on the dam 53 and which may be raised by the lever 62 and link 63, when the settlings of the tank are to be drawn off.

In practice I have attained highly-satisfactory results with the form of tracks which is illustrated in Fig. 13 of the drawings. In this figure the end 109 of the track which receives the harrow in its descent is formed with a rigid upturned end solid with the body of the track, while the end from which the harrow rises is furnished with an upwardly-extending yielding portion 151, composed of a spring-piece fastened to the said body of the track.

I claim as my invention—

1. In a wool-washing machine, the combination with the bowl, the harrow working therein, and harrow-operating mechanism producing alternately forward motion of the harrow in the bowl and elevated return motion thereof, of fixed tracks located at opposite sides of the bowl, transverse rods applied to the said harrow and projecting at the sides thereof, trucks on the said rods working on the said tracks in the forward movement of the harrow and thereby supporting the harrow during such movement, and the counterbalancing parallel-motion devices having the links 22, 22, thereof connected with the said rods, substantially as described.

2. In a wool-washing machine, the combination with a bowl, a harrow working therein, and a driving mechanism for producing alternately forward motion of the harrow in the bowl and elevated return motion thereof, of tracks supporting the harrow during its forward motion and having upturned ends, substantially as described.

3. In a wool-washing machine, the combination with a bowl, a harrow working therein, and a driving mechanism for producing alternately forward motion of the harrow in the bowl and elevated return motion thereof, of tracks supporting the harrow during its forward motion and having upturned ends, the portions of the said tracks where the harrow takes and leaves them being constructed, respectively, to yield downward under the impact of the harrow and to assist the rise of the latter, substantially as described.

4. In a wool-washing machine, the combination with a bowl, a harrow working therein, and harrow-operating mechanism producing a substantially horizontal forward travel of the harrow and an elevated rearward travel or return, the said mechanism embracing a slotted member affixed to the harrow and a driving-crank having the pin thereof working in the slot of said member, of a cushion located in the upper end of the said slot in position to receive the impact of the pin of the driving-crank in the rotation of the latter, and means of adjusting the said cushion, substantially as described.

5. In a harrow-frame for wool-washing machines, the combination with the side bars, and a series of laterally-arranged rake-heads attached to the same, of the tie-straps located

adjacent to the side bars and running alternately over and under the successive rake-heads, substantially as described.

6. In a wool-washing machine, the combination with the bowl thereof, the carrier, and the squeeze-rolls, of the outlet having an adjustable gate whereby the desired water-line may be maintained and the working of the carrier is facilitated, substantially as described.

7. In a wool-washing machine, the combination with the bowl thereof, the carrier, and the squeeze-rolls, of the outlet having the communicating passages and the separating wall or partition, and the adjustable gate applied in connection with the said wall or partition, substantially as described.

8. In a wool-washing machine, the combination with the bowl thereof, the carrier, and the squeeze-rolls, of the outlet having the communicating passages and the separating wall or partition, and the gate consisting of a plate doubled upon itself, fitted over the said wall or partition, and adjustable thereon to enable the water-line to be varied, substantially as described.

9. In a wool-washing machine, the combination of the bowl, the harrow therein, the carrier, the squeeze-rolls for expressing the washing liquid from the wool, a separate tank beneath the said rolls to receive the mingled liquid and fiber that fall therefrom, the said tank having an outlet therefrom whereby the water-level of the tank is determined, and a screen for separating the said liquid and fiber, located in the tank beneath the water-level and between the said incoming mingled liquid and fiber and the said outlet, whereby the immersed condition of the said screen may operate to automatically retard the clogging of the same with fiber, substantially as described.

10. In a wool-washing machine, the combination of the bowl, the harrow therein, the carrier, the squeeze-rolls for expressing the washing liquid from the wool, a separate tank beneath the rolls to receive the mingled liquid and fiber that fall therefrom, the said tank having an outlet therefrom whereby the water-level of the tank is determined, and an inclined screen for separating the said liquid and fiber, located in the tank and extending beneath the said water-level and also disposed between the incoming mingled liquid and fiber and the said outlet, whereby the immersed condition of the said screen may operate to automatically retard the clogging of the same with fiber, substantially as described.

11. In a wool-washing machine, the combination with a bowl, a harrow working therein, and a driving mechanism producing alternately forward motion of the harrow in the bowl and elevated return motion thereof, of tracks supporting the harrow during its forward motion and having upturned yielding portions at the ends thereof on which the harrow descends to receive and cushion the harrow in its descent, substantially as described.

12. In a wool-washing machine, the combination with a bowl, a harrow working therein, and a driving mechanism comprising essentially a slotted member connected with the harrow and a crank working in the said slot, the said mechanism operating to produce alternately forward motion of the harrow in the bowl and elevated return motion thereof, of tracks supporting the harrow during its forward motion and having upturned yielding portions at the ends thereof from which the harrow rises, to lift the harrow and relieve the shock from contact of the crank with the end of the slot in which it works, substantially as described.

13. In a wool-washing machine, the combination with a bowl, a harrow working therein, and a driving mechanism comprising essentially a slotted member connected with the harrow and a crank working in the said slot, the said mechanism operating to produce alternately forward motion of the harrow in the bowl and elevated return motion thereof, of tracks supporting the harrow during its forward motion and having upturned ends to receive the harrow in its descent and render its encounter with the track easy, and also having upturned yielding portions at the ends thereof from which the harrow rises, to lift the harrow and relieve the shock resulting from contact of the crank with the end of the slot in which it works, substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

FREDERICK G. SARGENT.

Witnesses:
CHARLES G. SARGENT,
MARY H. SARGENT.