(No Model.)

E. ZIMERMAN.

WASHING MACHINE.

No. 414,176. Patented Oct. 29, 1889.

Fig. 1.

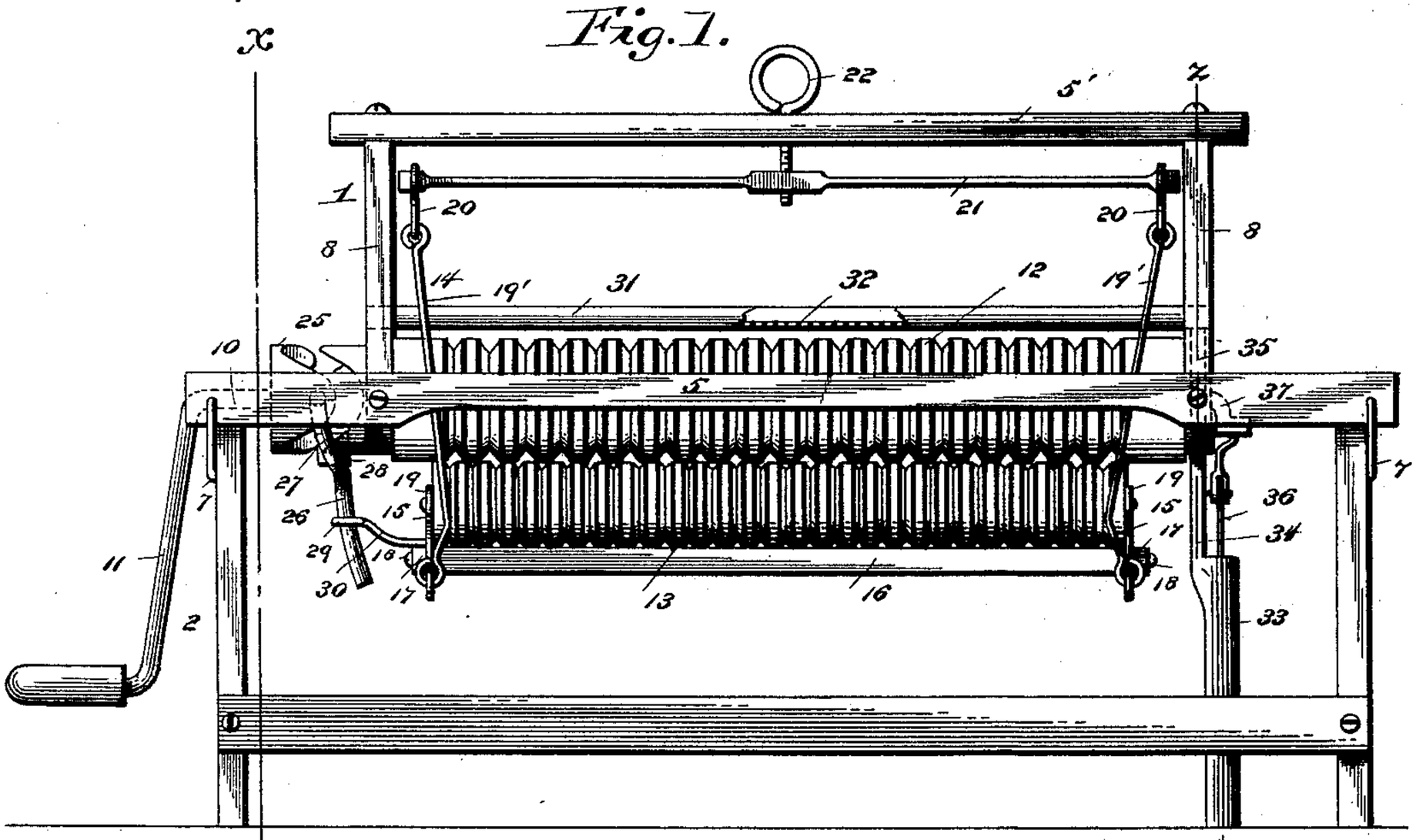

Fig. 2.

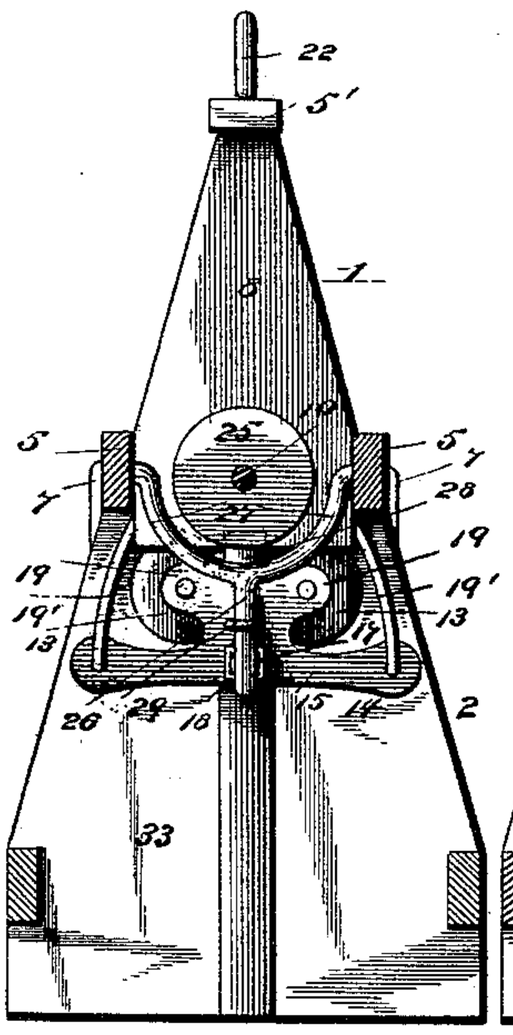

Fig. 3.

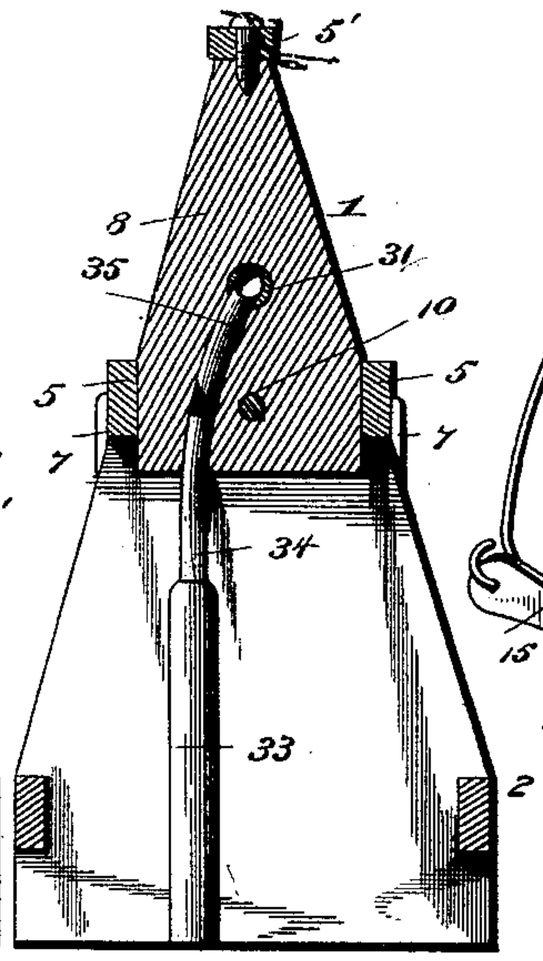

Fig. 4.

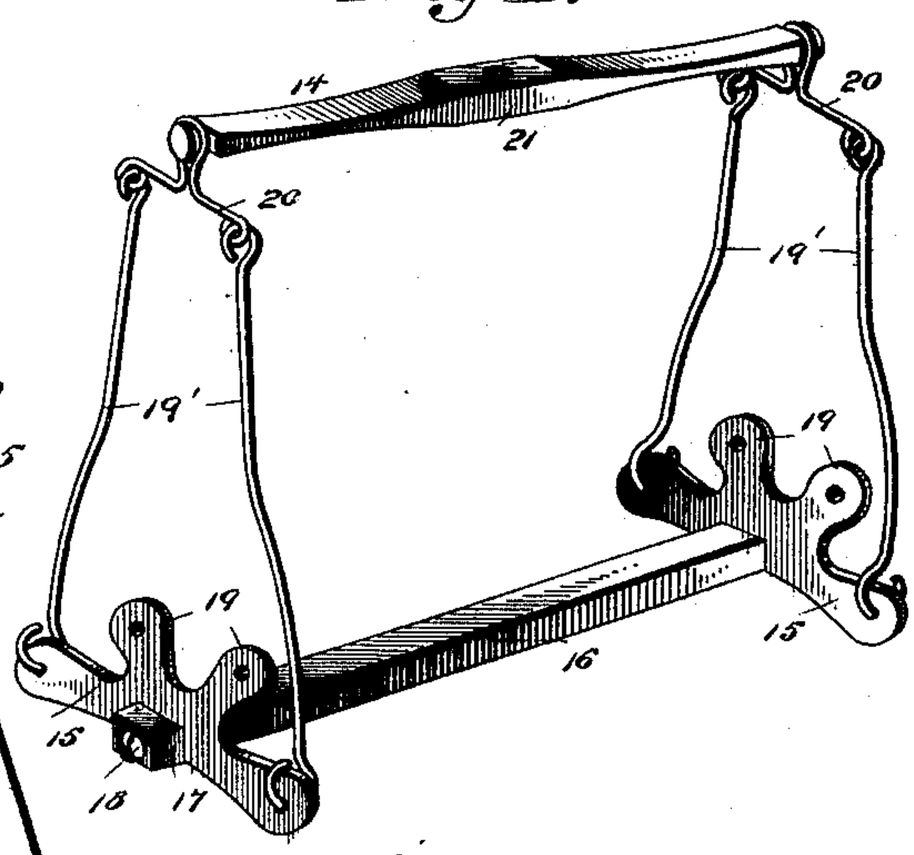

Fig. 5.

WITNESSES

L. L. Lashkee

Arthur L. Bryant

INVENTOR

E. Zimerman

By Edson Bros

Attorneys.

UNITED STATES PATENT OFFICE.

ELI ZIMERMAN, OF PAMELIA FOUR CORNERS, ASSIGNOR TO CHARLES E. MAKEPEACE, OF WATERTOWN, NEW YORK.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 414,176, dated October 29, 1889.

Application filed May 25, 1889. Serial No. 312,098. (No model.)

To all whom it may concern:

Be it known that I, ELI ZIMERMAN, a citizen of the United States, of Pamelia Four Corners, in the county of Jefferson and State of New York, have invented certain new and useful Improvements in Washing-Machines; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

My invention relates to improvements in washing-machines; and it has for its object to provide roller mechanism for exerting a combined rubbing and squeezing action and pressure on the fabrics, as well as to secure a vertical yielding pressure which closely imitates the hand-pressure applied to fabrics washed against an ordinary wash-board, whereby fabrics of all sizes are thoroughly and expeditiously cleansed with a minimum expenditure of labor. With these primary objects in view and such others as pertain to my invention, I provide a removable frame which carries the operative mechanisms and is adapted to be detachably secured to a wash-tub or clothes-receptacle or to a main frame. In this removable frame is journaled a driving-shaft, which carries a grooved roll arranged between the sides of the removable frame and a rotary grooved cam, in which rides a friction-roll loosely journaled between the bifurcated arms of a yoke or lever, which is fulcrumed at its upper end in the removable frame, and connected at its lower end to a vibratory frame which is arranged below the roll on the driving-shaft. This vibratory frame is suspended, in the manner hereinafter described, from a spring presser-bar, which is carried by the removable frame and capable of vertical adjustment by means of an adjusting-screw; and said vibratory frame carries a pair of grooved rollers which are spaced laterally to ride against the lower under surface of the roll on the driving-shaft. This vibratory frame and rollers carried thereby are capable of an endwise or longitudinal play, which is imparted thereto by the cam and lever from the driving-shaft and of a vertical play due to the resiliency of the spring in order to secure the necessary pressure against the large roll on the roll-driving shaft, thus securing a pressing and rubbing action by said rolls on the fabrics passed between them.

In order to properly cleanse the smaller articles of apparel—such as handkerchiefs, &c.—which usually remain near or at the top of the water in the tub, I provide means for distributing water over the rolls and upon the fabrics as they pass between the same, which distributing means comprises a perforated trough secured in a fixed position longitudinally of the removable frame above the set of pressure-rolls, and a lift-pump which is suspended from said removable frame in such a manner that the water elevated by the piston thereof passes through a conduit on said removable frame to the distributing perforated trough, the piston-rod of said pump being linked to a rotary crank on one end of the crank-shaft.

To enable others to more readily understand my invention, I will now proceed to a detailed description thereof in connection with the accompanying drawings, in which—

Figure 1 is a side elevation of my improved washing-machine. Figs. 2 and 3 are vertical cross-sectional views thereof on the planes indicated by the dotted lines *x x* and *z z*, respectively, of Fig. 1. Fig. 4 is a detail view of the suspended vibratory frame which carries the lower pressure-rolls. Fig. 5 is a detail view.

Like numerals of reference denote corresponding parts in all the figures of the drawings, referring to which—

1 designates the removable frame of a washing-machine constructed in accordance with my invention. In the drawings I have shown this removable frame detachably secured to a stationary main frame 2; but I do not restrict myself to the use of this main frame, as the removable frame can be applied directly to the wash-tub and secured detachably thereto by the same devices or in the same manner as herein shown for connecting said removable frame to the main frame. As shown herein, the main frame is provided with notches 4 at the upper corners of the

sides 2 of said main frame to receive the ends of longitudinal rails 5 of the removable frame 1, which carries the operating mechanisms of the machine. The longitudinal rails 5 of the removable frame are secured detachably, but in a firmly-fixed manner, to the wash-tub or to the main frame 2 by means of hooks 7, which take into suitable eyes or apertures in the bars 5 of the removable frame, whereby the frame 1 can be readily removed from the wash-tub or the main frame 2 to repair any of the parts of the operating mechanism. This removable frame comprises the longitudinal rails 5 and a pair of uprights 8, which are permanently secured to said rails at intermediate points of the length thereof, and in these uprights of said removable frame is journaled a driving-shaft 10, which has a crank 11 at a point outside of the frame 1 and main frame 2, or a wash-tub for rotating said shaft by hand.

Between the uprights or standards of the removable frame is arranged a large presser-roll 12, which is fixed on and carried by the driving-shaft, and below this large roll 12 is arranged a pair of smaller presser-rolls 13, which are arranged parallel with each other in the same horizontal plane and spaced or separated laterally to adapt them to ride and bear against the lower or under side of the larger presser-roll. These lower presser-rolls are carried by a vibratory frame 14, which consists of a pair of end pieces 15 and a longitudinal tie-bar 16, which is fitted at its ends in a central socket 17 in the end pieces and secured in place by means of screws 18. These end pieces are provided with upwardly-projecting lugs 19, in which are journaled the shafts or trunnions of the presser-rolls 13, and this vibratory frame is suspended at its four angles or corners by means of vertical rods 19′, which are arranged at the side of the rolls and connected at their upper ends to hangers 20, which are connected to the ends of a spring or spring-bar 21, which is arranged longitudinally of the removable frame 1 above the larger upper roll. This spring-bar is suspended by means of an adjusting-screw 22, which is fitted in the middle of the longitudinal bar 5′ of the removable frame 1 and works in a threaded opening in the spring or spring-bar in order to adjust said bar and the vibratory frame vertically and thus vary the pressure of the lower and upper rolls on the fabrics that may be passed between them. It will be noted that this vibratory frame is capable of a vertical play when the fabrics are passed between the rolls, which is due to the resiliency of the spring from which the vibratory frame is suspended, and in order to secure a rubbing action on the fabrics when they are passed through the presser-rolls, which are grooved as shown, I have provided mechanism for imparting an endwise or longitudinal movement to said frame and lower presser-rolls, which movement of the frame and rolls is permitted without injury to the parts by the links or rods by which the vibratory frame is suspended from the spring. The mechanism for imparting this endwise play to the vibratory frame consists of a rotary grooved cam 25 and a lever 26. The cam is rigidly secured to the driving-shaft at a point outside of the standard at one end of the frame 1, and the upper end of the lever 26 is bifurcated, as shown in Fig. 2, to provide the arms 27, which are pivoted to the rails 5 of the removable frame 1, as shown. At the juncture of the arms of the lever I provide a friction-roller 28, which fits and rides in the cam-groove of the rotary cam to oscillate the vertical lever back and forth, and the lower end of said lever fits in an eye 29 on the outer extremity of an arm 30, which is rigidly secured to the vibratory frame at one end.

Longitudinally above the larger presser-roll and below the pressure-spring is arranged a stationary trough 31, which is rigidly secured in any suitable manner to the uprights or standards of the removable frame and is perforated, as at 32, throughout its entire length, to uniformly distribute water over the presser-rolls and the fabrics passed between the same. Water is supplied to this distributing-trough by a lift-pump 33, which is suspended from the removable frame and operated by connections with the driving-shaft. The barrel or cylinder of this pump has an outlet-pipe 34, which communicates with a conduit 35, that leads to and communicates with one end of the trough, and the piston 36 of the pump is linked to a rotary crank 37 at one end of the driving-shaft.

The operation of my invention is obvious from the foregoing description, taken in connection with the drawings.

I do not restrict myself to the exact details of construction and form and proportion of parts herein shown and described as an embodiment of my invention, as I am aware that changes therein can be made without departing from the spirit or sacrificing the advantages of my invention.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. In a washing-machine, the combination of a driving-shaft carrying a presser-roll and a cam, a spring pressure-bar arranged longitudinally above said shaft, a vibratory frame arranged below the presser-roll on the driving-shaft and suspended from said pressure-bar, a pair of lower presser-rolls journaled in said vibratory frame, and a lever operated by the cam and connected to the vibratory frame to reciprocate the latter endwise, all arranged and combined for service, substantially as described, for the purpose set forth.

2. In a washing-machine, the combination of a removable frame adapted to be detachably secured to a wash-tub, a driving-shaft journaled in said removable frame and having an upper presser-roll and a grooved cam, a vibratory frame arranged below said upper

roll and carrying a pair of spaced lower rolls, a lever pivoted on the removable frame and having a friction-roller which rides in the groove of the rotary cam, a connecting-arm secured to the vibratory frame and having a sliding connection with said lever, a longitudinal spring-bar suspended in the removable frame above the upper presser-roll, and vertical links intermediate of said spring-bar and the vibratory frame to suspend the latter, substantially as and for the purpose described.

3. In a washing-machine, the combination of a removable frame having the longitudinal rails adapted to be seated in notches in a wash-tub and detachably held in place thereon by suitable locking devices, substantially as described, a driving-shaft journaled in the removable frame, a longitudinal spring-bar connected to said removable frame by an adjusting-screw, a vibratory frame below said driving-shaft, the suspending-links intermediate of said spring-bar and the vibratory frame, the presser-rolls carried by said driving-shaft and vibratory frame, a cam fixed to the driving-shaft near one end, a lever operated by said cam and connected to the vibratory frame, a stationary perforated trough arranged longitudinally within the removable frame above the presser-rolls, and a depending pump suspended from the removable frame to communicate with said trough, and having its piston connected to a crank on the driving-shaft, whereby all the operating parts of the machine are carried by the removable frame, and the vibratory frame and pump are actuated from a common shaft, all arranged and combined substantially as herein shown and described, for the purpose set forth.

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

ELI ZIMERMAN.

Witnesses:
C. E. MAKEPEACE,
FRED A. BALDWIN.