2 Sheets—Sheet 1.

# J. C. GRANNAN.

## WASHING-MACHINES.

No. 194,144. Patented Aug. 14, 1877.

Fig. 1

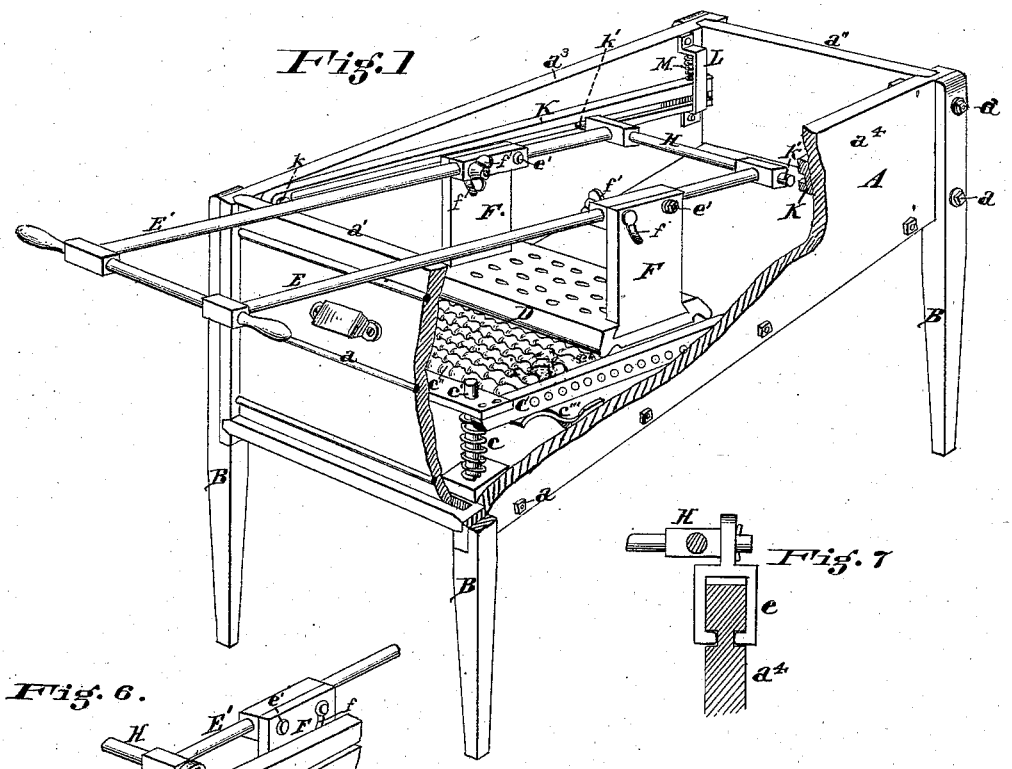






Fig. 7

Fig. 6.

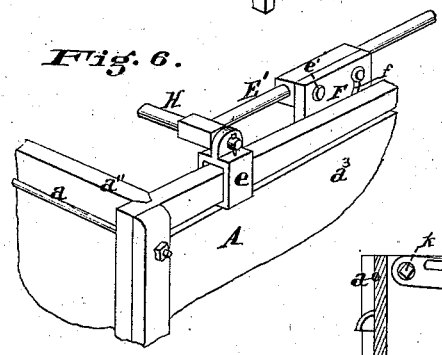
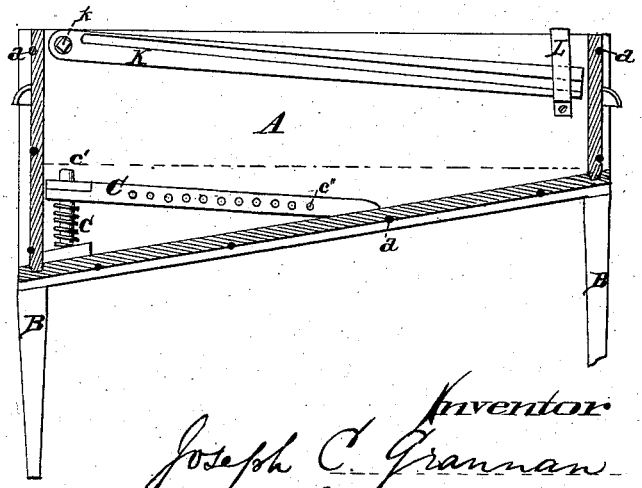



Fig. 2

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2 Sheets—Sheet 2.

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## WASHING-MACHINES.

No. 194,144. Patented Aug. 14, 1877.

Fig. 3

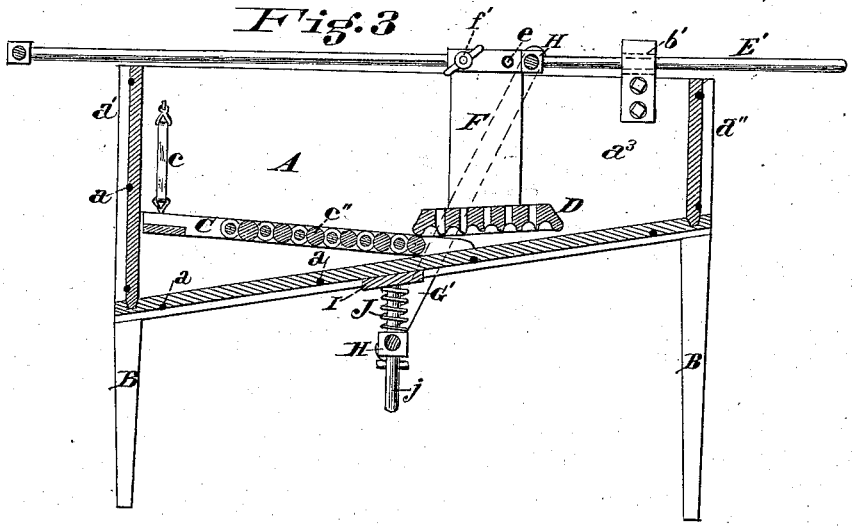



Fig. 4

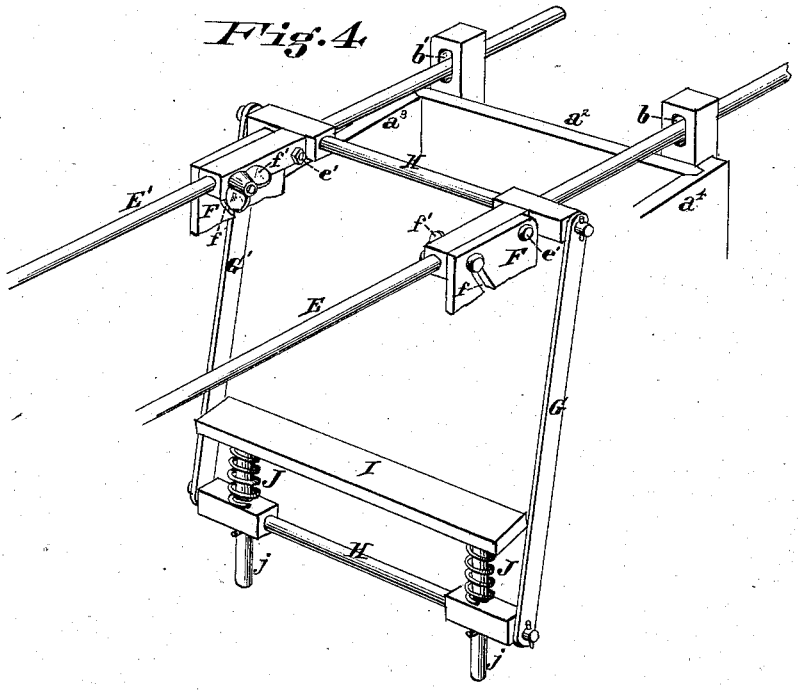
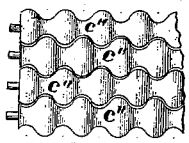



Fig. 5




Attest

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# UNITED STATES PATENT OFFICE.

JOSEPH C. GRANNAN, OF CINCINNATI, OHIO.

## IMPROVEMENT IN WASHING-MACHINES.

Specification forming part of Letters Patent No. **194,144**, dated August 14, 1877; application filed February 27, 1877.

*To all whom it may concern:*

Be it known that I, JOSEPH C. GRANNAN, of Cincinnati, Hamilton county, State of Ohio, have invented an Improvement in Washing-Machines, of which the following is a specification:

My invention relates to the class of washing-machines embracing a straight stationary or localized rubbing-frame within a tub, on which the clothes rest, and a moving rubber reciprocated by hand; and my invention consists, first, in the combination of a tub and localized rubber-frame, so constructed and arranged, with relation to each other, that a descending plane forms the bottom of the tub, and the rubber-frame is located over the lowest end of it, so that the water is collected at one end of the tub, where the rubbing is done, and the other end can be kept comparatively free from water, and violent agitation of water thereby avoided; second, in the provision, at the pivot end of the handles, which support the reciprocating rubber, of springs or yielding connections, for the purpose of enabling the reciprocating rubber to yield upward at points in the motion where the localized rubber is illy adapted to yield downward, and in this way to make the yielding power or flexibility of the rubbing-surfaces nearly uniform throughout the stroke; third, in a device for fixing the handles to the standards of the reciprocating rubber-frame, so that the height of the handles may be adjusted to suit the requirements of the operator, and combining, with these adjustable handles and the reciprocating rubber, slotted ways, in which the cross-bar of the handles slides, the ways being pivoted at one end, and provided with a spring at the other, to secure the flexibility necessary to the proper operation of these parts.

In the accompanying drawings, Figure 1 is a perspective view of a machine embodying my invention, the figure being partly sectioned. Fig. 2 is a longitudinal section of the same with the reciprocating rubber removed. Fig. 3 is a longitudinal section of the machine with the rubber in place and at the extreme forward end of its stroke, and a modified arrangement of the device for giving flexibility to the rubber-frame at the forward end of its stroke. Fig. 4 is a skeleton perspective view of the handles of the rubber, with the modified arrangement of the means for giving the flexible movement at the forward end of the stroke, which is shown in Fig. 3. Fig. 5 is a plan of the arrangement of the roller in the localized rubber-frame. Figs. 6 and 7 represent a perspective view and cross-section, respectively, of a modified construction of sliding ways for the reciprocating rubber, this modification not embracing the flexible movement shown in Figs. 1, 2, 3, and 4.

A is the tub or vessel for containing the water and clothes, and B the legs or standards of the same. The ends, sides, and bottom are put together tongue-and-groove style, as shown, the tongues being held in the grooves, and the ends, sides, and bottom therefor securely joined by bolts or screw-rods *a*, and these rods I prefer shall be let into the wood composing the sides and bottom, as shown in Figs. 2 and 3, so that they may pull as near the center of the wood as possible. The front end $a'$ of the the tub is deeper than the rear end $a''$, and the sides $a^3$ $a^4$ are made tapering to match, so that the bottom, when in place, will present a descending plane, and thus cause a collection of water having a gradually-decreasing depth from $a'$ to $a''$, and over this sloping bottom I place my localized rubber-frame C. The forward end of this frame rests on the bottom of the tub and the other end rests on the springs *c*, which may be elastic straps, as shown in Fig. 3, or coiled springs around pins $c'$, on which the frame may be guided, and the space left between this frame and the bottom of the tub is of sufficient capacity to contain nearly all the water necessary for washing, and there is, consequently, but little water forward of the rubber-frame liable to be violently agitated by the motion of the moving parts of the machine.

Although I prefer that the operator shall stand at the end $a'$ of the tub, I have constructed my machine so that the frame C may be turned end for end, and the reciprocating rubber (which will be hereinafter explained) be correspondingly adjusted, so that the operator can change ends and have the shallow part of the tub next to him, although the washing, as before, is done at the deep end.

In order to make the surface of frame C a roll-

ing-surface, and still free from large apertures or spaces, I make it of rollers $c''$, journaled at the ends and corrugated longitudinally, and so arranged with relation to each other that the convexities of each roller will fit corresponding concavities of rollers adjacent to it, as shown in Figs. 1, 3, and 5.

D represents my reciprocating rubber. Its lower surface is undulating, and it is perforated at frequent intervals, so that the water may feed through the holes in the motion of the machine. E E′ are the handles of this rubber, and F the side pieces.

The handles, where flexibility of the rubbing parts is desired, may slide in slots $b$ $b'$, Figs. 3 and 4, and the handles be connected by links G G′ to cross-head H, between which and the bottom piece I, attached to the under side of the tub, springs J are introduced around studs $j$, on which the cross-head slides, and where no such flexibility as these springs give is desired the handles may be attached to sliding blocks $e$, moving in grooves in the sides $a^3$ $a^4$, as shown in Figs. 6 and 7; but I prefer the following construction: I provide two side bars, K, pivoted at $k$, and grooved to receive the trunnions $k'$, which are adapted to slide and partially turn therein. The free ends of these bars are inclosed by the staples L, and between the upper ends of these staples and the upper edges of the side bars coiled springs M are introduced.

In the action of the machine, when the rubber D is near the end $a'$ the desirable flexibility is obtained almost entirely from the springs $c$; but when the rubber is at the other end it has but little power to compress springs $c$, owing to loss of leverage. It is then that the springs M are called into play, and they give way freely in this condition, and less freely as the rubber leaves this end. By reason of these two springs, therefore, the flexibility or yielding character of the rubbing-surfaces is nearly uniform throughout the stroke.

To give the necessary adjustment of the rubber D before spoken of, I pivot the side pieces F to the handles E E′ at $e'$, and make curved slots $f$ in the side pieces, and with set-screws $f'$, and by these slots and pivots I am enabled to swing the rubber D into the proper relation with the handles E E′, and with the rubber-frame C.

In place of coiled springs $c$ or J, the flat springs $c'''$, Fig. 1, may be used.

I claim—

1. The combination, substantially as specified, of the tub having a continuous inclined bottom, the rubber-frame over the deepest portion of the tub, having a yielding support at the deepest end of the tub, and resting at the other end on the bottom of the tub and the reciprocating rubber.

2. The combination of vessel A, yielding rubber-frame C, reciprocating rubber-frame D E E′, the latter having, at the end opposite frame C, a yielding connection with the vessel A, substantially as and for the purpose specified.

3. The combination, substantially as specified, of the reciprocating rubber-frame, the handles pivoted and adjustably fixed to the standards thereof, the slotted pivoted ways, in which the cross-bar of the handles plays, and the springs M.

In testimony of which invention I hereunto set my hand.

JOS. C. GRANNAN.

Witnesses:

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EDGAR J. GROSS.