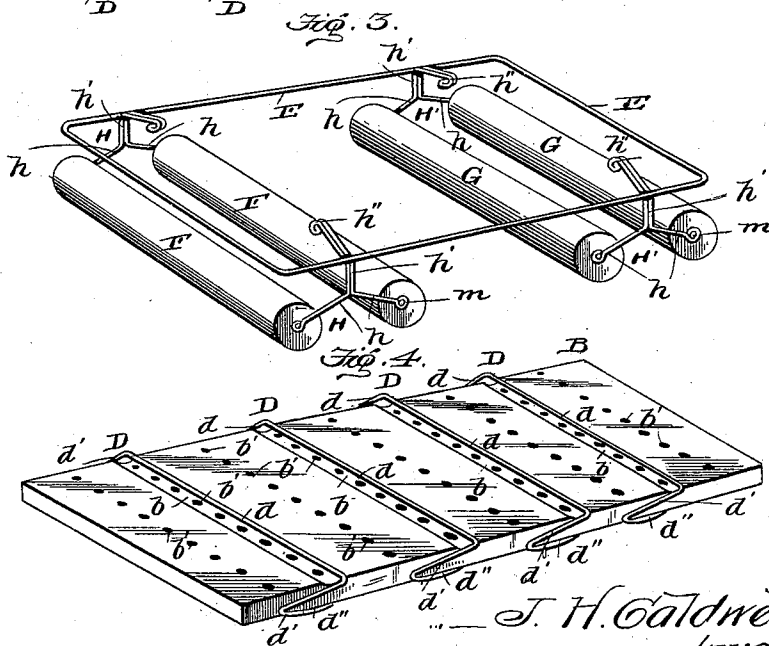
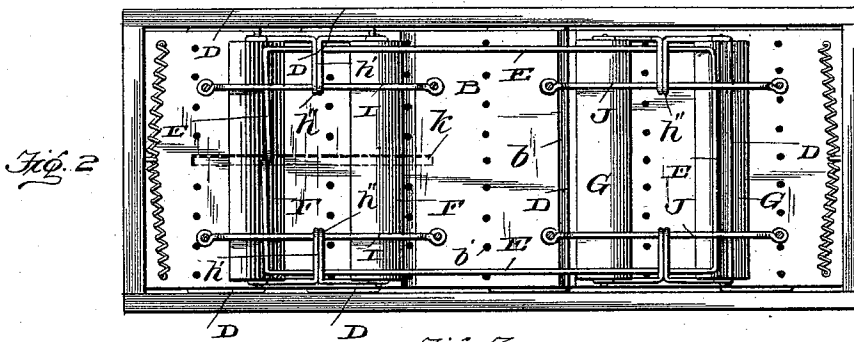
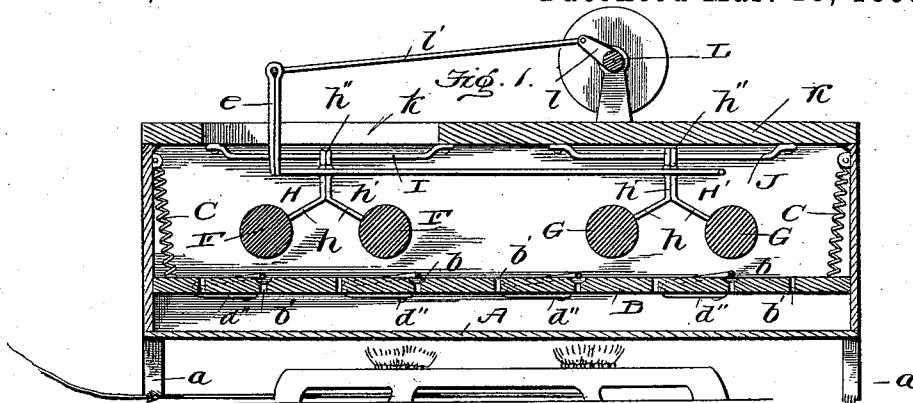


(No Model.)

J. H. CALDWELL.
WASHING MACHINE.

No. 536,127.

Patented Mar. 19, 1895.



Witnesses:
 M. O. Cashiey
 H. B. Bomber

J. H. Caldwell
Inventor:
—By— *Edron Burt*,
Att'y.

UNITED STATES PATENT OFFICE.

JOHN HARVEY CALDWELL, OF PHILADELPHIA, PENNSYLVANIA.

WASHING-MACHINE.

SPECIFICATION forming part of Letters Patent No. 536,127, dated March 19, 1895.

Application filed November 13, 1894. Serial No. 528,646. (No model.)

To all whom it may concern:

Be it known that I, JOHN HARVEY CALDWELL, a citizen of the United States, residing at Philadelphia, in the county of Philadelphia and State of Pennsylvania, 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 of that class which employ a yielding bed in connection with a reciprocating rubber; and the objects of the present improvements, are, first, to provide an improved construction by which the fabrics can be washed and cleansed near the surface of the water contained in the tank or suds receptacle, in order to keep the fabrics from being immersed in the sediment contained in the water at the bottom of the tank, and to secure the full benefit of the detergent quality of the live soap suds; secondly, to provide means whereby the fabrics are held firmly against the rubbing appliances to secure the best action on the fabrics without injuring the same; thirdly, to provide means whereby the fabrics are raised and separated after the rubber acts thereon in order that the water may pass through and saturate the fabrics before the next stroke of the rubber; and finally, to simplify and cheapen the construction, render it efficient in operation, and durable in service.

With these ends in view, my invention consists in the combination with a suds receptacle or tank, and a bed hung or suspended therein, of a rubber consisting of rollers hung in groups from yielding hangers which are connected together for simultaneous operation.

My invention further consists in the construction of the rubber, and the means for suspending and guiding the same within the tank, comprising a series of guides arranged in pairs on the lower side of the top or lid of the receptacle or suds box, a carrying frame within the suds tank and connected by an arm, working in a slot, with a driving or power mechanism, rollers arranged in pairs which are journaled in a pair of yielding or

spring hangers, which have arms fastened to the carrying frame or bail, and said arms extended to engage with the guides on the lid or top, whereby the hangers are moved back and forth with the carrying frame or bail and engage with the guides, in order to sustain the rubber in operative relation to the bed.

My invention further consists in the combination with a suds box or tank, a rubber operating therein, and a bed suspended within the tank, of a series of spring lifters, supported by said bed at suitable intervals thereon, and arranged to be depressed by the action of the rubber as it is reciprocated over the bed, said lifters being preferably made of spring metal and yieldingly held on the rubber-bed, to lift or raise themselves above the bed as the rollers pass, to lift and separate the fabrics and insure the circulation of the water through the fabrics, in order to saturate the same; and the invention further consists in the novel combination of devices, and the peculiar construction and arrangement of parts, which will be hereinafter fully described and claimed.

To enable others to more readily understand my invention, I have illustrated the preferred embodiment thereof in the accompanying drawings, forming a part of this specification, and in which—

Figure 1 is a vertical longitudinal sectional view through a washing machine constructed in accordance with my invention. Fig. 2 is a horizontal sectional view, on the plane indicated by the dotted line *x-x* of Fig. 1, looking down upon the rubber and the bed, and showing the position of the guides which suspend the rubber within the suds tank and enable it to have the proper reciprocating movement therein. Fig. 3 is a detail perspective view of the reciprocating rubber detached from the suds tank. Fig. 4 is a like view of the rubber-bed, showing the yielding clothes-lifters thereon.

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

A designates the suds tank of my improved washing machine. In the practical construction of this suds tank, I make it out of metal, or of part wood and part metal, and to enable

a heating apparatus to be placed beneath the tank, for the purpose of keeping the water therein up to the desired temperature, but the heater may be dispensed with, if desired.

5 Any suitable form of heater may be used in connection with the suds tank, although in Fig. 1 of the drawings I have indicated an oil stove or furnace for heating the water in the tank. The suds tank is substantially rectangular in outline, and it is supported at the proper elevation on the legs or standards, *a*.
 10 Within the suds tank, *A*, is suspended the rubber-bed, *B*, which is shown as consisting of a flat piece of wood or metal. This rubber bed is proportioned to fit snugly in the suds-tank, and it is suspended and sustained therein, at a suitable distance above the bottom of the tank, by means of the yielding hangers, *C*, *C*. These hangers may be of any suitable
 15 form, but in the drawings I have shown them as consisting of coiled springs attached to the corners of the bed, *B*, and to the ends of the suds-tank, *A*. The yielding bed is provided with rows of perforations, *b'*, which extend
 25 transversely across the bed, and which rows are spaced at suitable intervals from each other along the bed in the direction of its length; and said bed, *B*, of the machine is further provided with a series of grooves or channels, *b*, *b*, which likewise extend transversely
 30 across the bed, in the upper surface thereof, and are spaced at suitable intervals from each other. These channels or grooves are designed to receive the spring lifters, *D*, *D*,
 35 which are provided on the bed for the purpose of raising up the fabrics or clothes thereon after the rollers of the rubber have passed over the fabrics and the lifters, so that the fabrics are raised and separated for the water
 40 to pass through and to saturate them before the next stroke of the rubber. I prefer to make these lifters, *D*, from a single piece of rod or wire metal, and this metal is bent to provide the straight cross bar, *d*, the arms, *d'*, *d'*,
 45 which are reversed or bent upon themselves, and the lateral prongs, *d''*. The reversed or bent arms, *d'*, extend at right angles to the straight bar, *d*, and the lifter is applied to the bed, *B*, by fitting the bar, *d*, in the groove or
 50 channel therein, and by adjusting the arms, *d'*, against the side edges of the bed, the prongs, *d''*, fitting underneath the bed, to receive the screws or nails by which the lifter is fastened to the bed. It will be noted that the reversed
 55 or bent arms, *d'* impart to the lifter a certain degree of elasticity or resiliency, and when the lifter is properly applied to the bed, the arms, *d'*, *d'*, operate to normally throw or elevate the cross bar *d* above the surface of the
 60 bed. The lifters are connected to the bed, *B*, to bring the bars, *d*, immediately over the grooves or channels, *b*, and when the rollers of the rubber operate upon the fabrics in passing over the grooves or channels, the bars, *d*, of the lifters are forced or depressed into these grooves or channels. As soon as the
 65 rollers pass one of the lifters, the arms, *d'*,

operate to raise the bar, *d*, and the fabrics on the bed immediately over the lifter-bar are thus raised up, partly above the bed, so that
 70 the water can pass through the fabrics, to thoroughly saturate them.

I will now proceed to a detailed description of my improved rubber, and to the means for suspending and guiding the same within the
 75 suds-tank, *A*. The rubber consists of a carrying frame or bail, *E*, the rollers, *F*, *F*, *G*, *G*, arranged in pairs or groups, and the hangers *H*, *H'*, grouped in pairs at the ends of each pair of rollers, said hangers being connected
 80 with the carrying frame or bail and with the guides, *I*, *J*, the latter being attached to the under side of the lid or cover, *K*, of the suds tank. This lid or cover may be hinged, or otherwise connected, at one edge or end to
 85 one of the walls of the suds-tank, to enable the cover to be raised for the purpose of introducing the fabrics into the tank or receptacle, *A*; and said lid or cover is provided with a longitudinal slot, *k*, through which projects an arm, *e*. This arm, *e*, is rigid with
 90 the carrying frame or bail, *E*, and the upper end of said arm is connected with a suitable operating mechanism by which the bail or frame, *E*, and the rollers attached to the yokes
 95 or hangers, *H*, *H'* may be reciprocated. This driving mechanism may be of any suitable form or construction, such for example as a lever or a crank, but in the drawings I have shown, as one embodiment of the driving
 100 mechanism, a shaft *L*, journaled in suitable bearings on the top or lid of the tank, *A*, and provided with a crank, *l*, to which is connected a pitman, *l'*, which pitman is in turn connected with the arm, *e*, whereby the bail
 105 and the rubber may be reciprocated.

Referring now more particularly to Figs. 1, 2 and 3, which illustrate the construction of the rubber in detail, the carrying frame or bail, *E*, is made substantially rectangular
 110 in outline, and of metallic rods or wires of such strength as to stand the strain in practical operation. I have shown the rubber as provided with two pairs of rollers, one pair of which is designated by the letters, *F*, *F*, and
 115 the other pair by the letters, *G*, *G*; and each of these pairs of rollers is supported by two yokes or hangers *H*, *H'*. Each yoke or hanger is preferably made from wire bent to the appropriate form to provide the diverging
 120 prongs, *h*, *h*, and the double wire arm, *h'*, which extends at right angles to the length of the prongs, *h*, *h*, to enable the arm *h'*, to be attached to the bail or frame, *E*, and to be formed with a loop, *h''*, which fits or takes
 125 over and around the longitudinal guide wire on the bottom of the lid or cover, *K*. The rollers forming the pair are provided with trunnions, *m*, which are journaled in the eyes or loops on the ends of the hanger prongs, to enable
 130 the rollers to have free rotation in the hangers when the rollers are pressed down upon the fabrics, in order to rub and press the same. By constructing the hangers or

yokes with the diverging arms, h, h , which carry the pair of rollers, the hangers are enabled to impart to the rollers a certain amount of elasticity or resiliency, and at the same time the hangers are rigidly connected to the frame or bail E, so as to move or reciprocate therewith when the power mechanism is operated, and they also serve to sustain the bail or frame and the rollers in an operative position on the lid or cover, K, of the tank A. It will be noted that the arms, h', h' of the pairs of hangers for each pair of rollers extend inwardly, across and over the bail, E, so as to be connected to the guides or rods, I, J, on the lid, K, and this connection between the hangers and the guides or rods is made by looping the ends of the arm, h' , around the rods, I, J, to permit the hangers to slide back and forth on the rods. The hangers may be fastened in any suitable way to the bail or frame, E, and the guides or rods, I, J, are fastened at their ends to the lid or cover, K, by means of screws, i , or other fastenings, the middle part of the rods, I, J, being straight and arranged a short distance below the under face of the cover, K, to enable the looped ends of the hangers to have the proper movement or play on the rods I, J.

Although I have described in detail the particular form of guide rods, and the manner of connecting the hangers thereto, and have also described that the rubber consists of two pairs of rollers and their appropriate hangers, yet I would have it understood that I do not strictly limit myself to this particular form of guide rods, and connection of the hangers therewith, nor to the particular number of rollers which may be used in the construction of the rubber, because I am aware these details can be modified without departing from the spirit of my invention.

By the employment of hangers to yieldingly sustain the group of rollers, and the yieldingly suspended bed, C, I am able to provide a clothes cleaning mechanism which will have its operative parts brought into close intimate contact with the fabrics to be cleansed, and which at the same time will yield to accommodate itself to a bunched group so as to avoid wear thereon or of tearing of the fabrics. As the rubber is reciprocated, the rollers press and squeeze the fabrics in order to eliminate the dirt therefrom, and the spring lifters, D, operate to raise up and open the fabrics after the rollers pass over them, so that the water is free to pass through and saturate the fabrics, thereby contributing to the efficiency and rapidity of the operation of washing the clothes. The sediment and dirt eliminated from the fabrics settle at the bottom of the tank, A, and by suspending the bed some distance above the bottom of the tank, I am able to operate on the fabrics in the water near the

surface and to utilize the live or most efficient part of the soap suds in the tank, A.

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 with a suds-tank, and a rubber, of a rubbing bed within the tank, and automatic clothes-lifters carried by the bed, for the purposes described, substantially as set forth.

2. In a washing machine, the combination with a tank, and a rubber, of a bed provided with transverse channels or grooves, and the yielding clothes lifters attached to the bed and adapted to be depressed into the channels thereof by the rubber as it is reciprocated over the bed, substantially as and for the purposes described.

3. In a washing machine, the combination with a tank, and a rubber, of a rubbing bed yieldingly suspended in the tank, above the bottom thereof, and a series of yielding clothes lifters arranged across the top surface of the bed and provided with spring arms which are attached to the bed, substantially as and for the purposes described.

4. In a washing machine, the combination with a tank, and a reciprocating rubber, of a perforated rubbing bed provided with transverse channels or grooves, and a series of clothes lifters arranged across the bed at suitable intervals, over the channels therein, and each having a pair of spring arms that take over the edges of the bed and are attached or fastened thereto, substantially as and for the purposes described.

5. In a washing machine, the combination with a tank, and a rubbing bed, of longitudinal fixed guides within said tank, slidable hangers provided with yielding arms, a bail connecting the slidable hangers and movable therewith, rollers journaled in the yielding arms of said hangers, and a driving mechanism connected to said bail, substantially as and for the purposes described.

6. In a washing-machine, the combination of a tank having a cover K, the guide rods I, J, fastened to the under side of the cover, K, a reciprocating frame or bail, E, the yielding hangers each provided with the diverging arms, h, h , and with the rigid arm h' which is fastened rigidly to the bail or frame and has a sliding connection with one of the guides, I or J, and the group of rollers journaled in the diverging arms, h, h , of the pair of hangers, substantially as described.

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

JOHN HARVEY CALDWELL.

Witnesses:

F. W. LEYPOLDT,
J. C. MÖLLER.