Jan. 27, 1931. W. E. SKELTON 1,790,392

WASHING MACHINE

Filed April 16, 1928 4 Sheets-Sheet 1

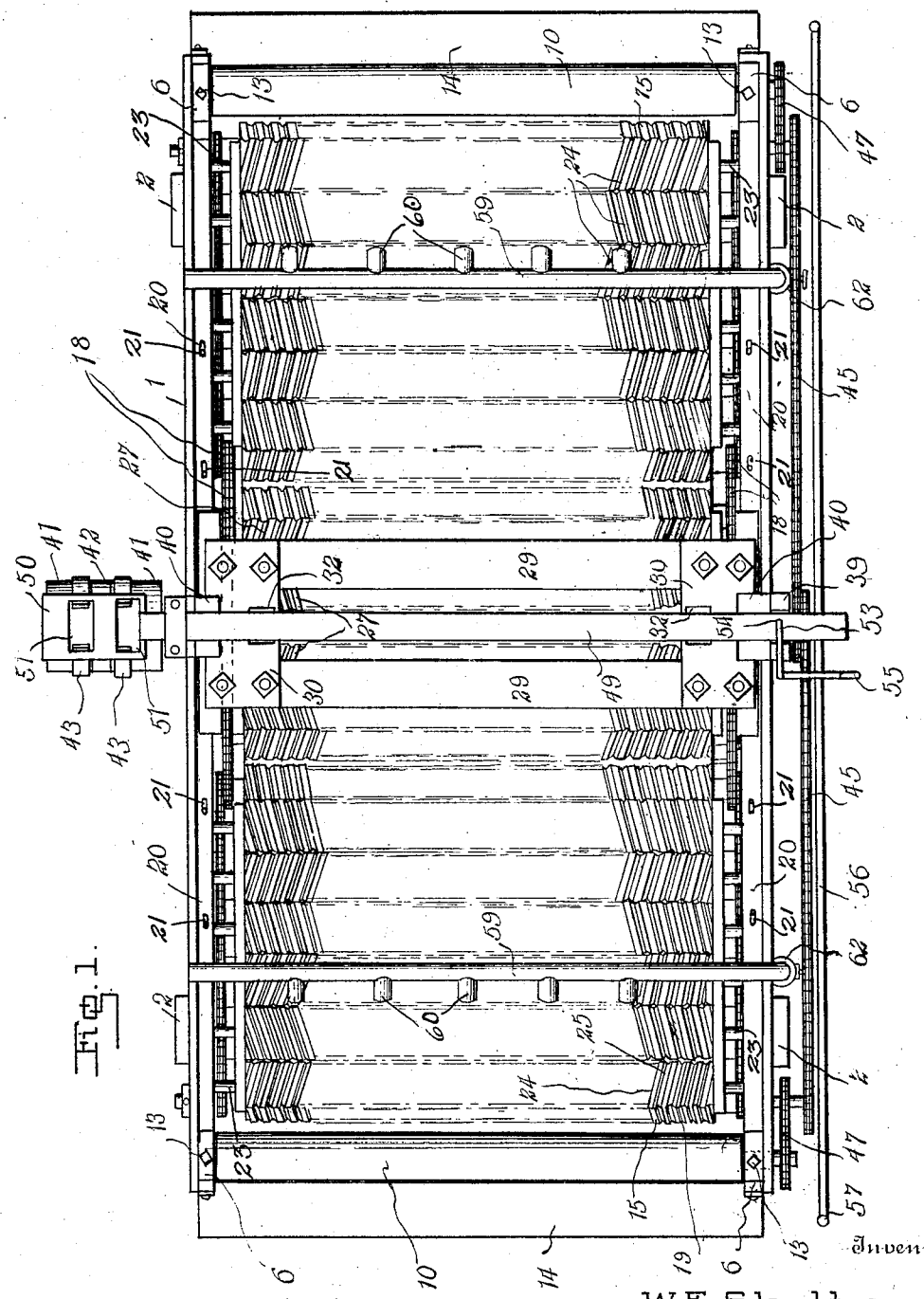


Fig. 1.

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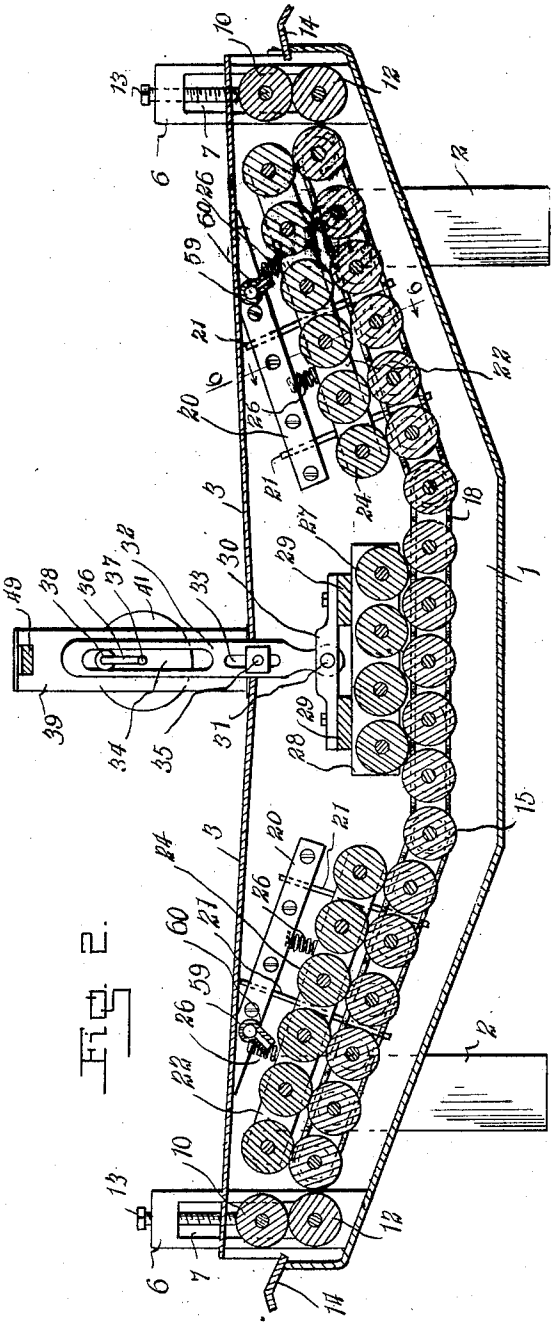


Fig. 2.

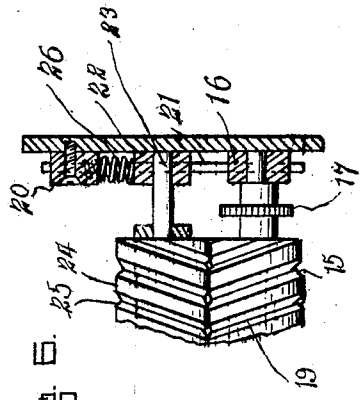


Fig. 6.

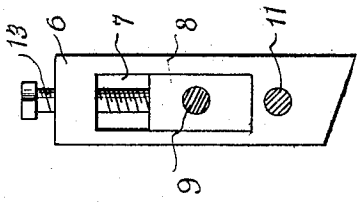


Fig. 5.

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WASHING MACHINE

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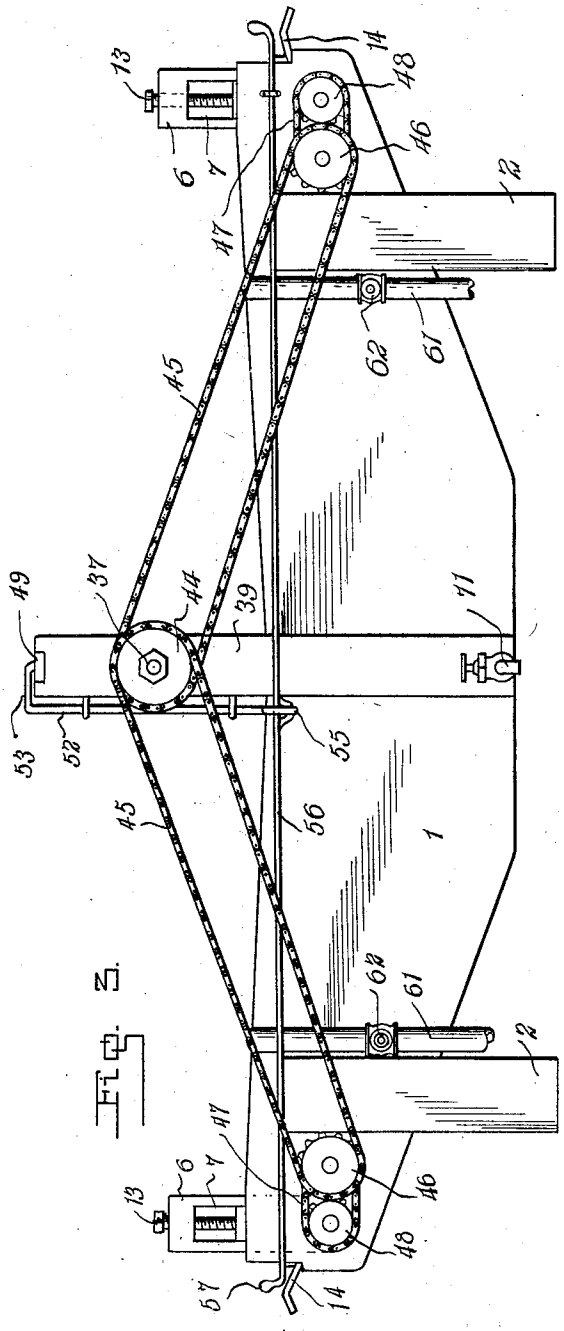


Fig. 5.

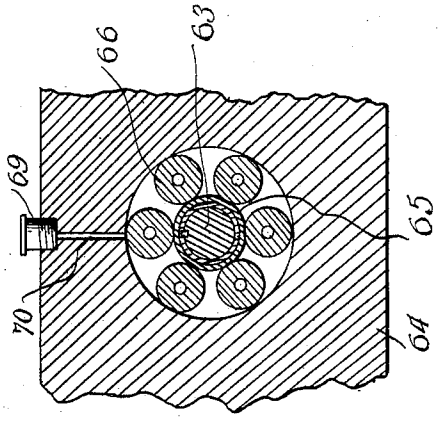


Fig. 6.

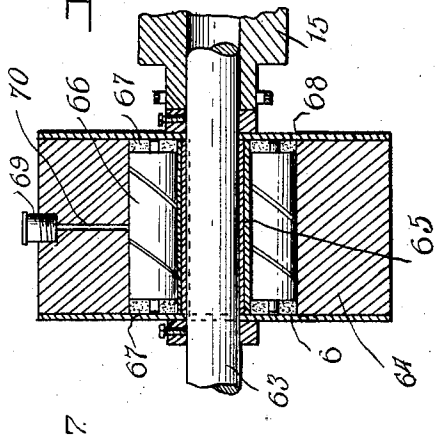


Fig. 7.

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WASHING MACHINE

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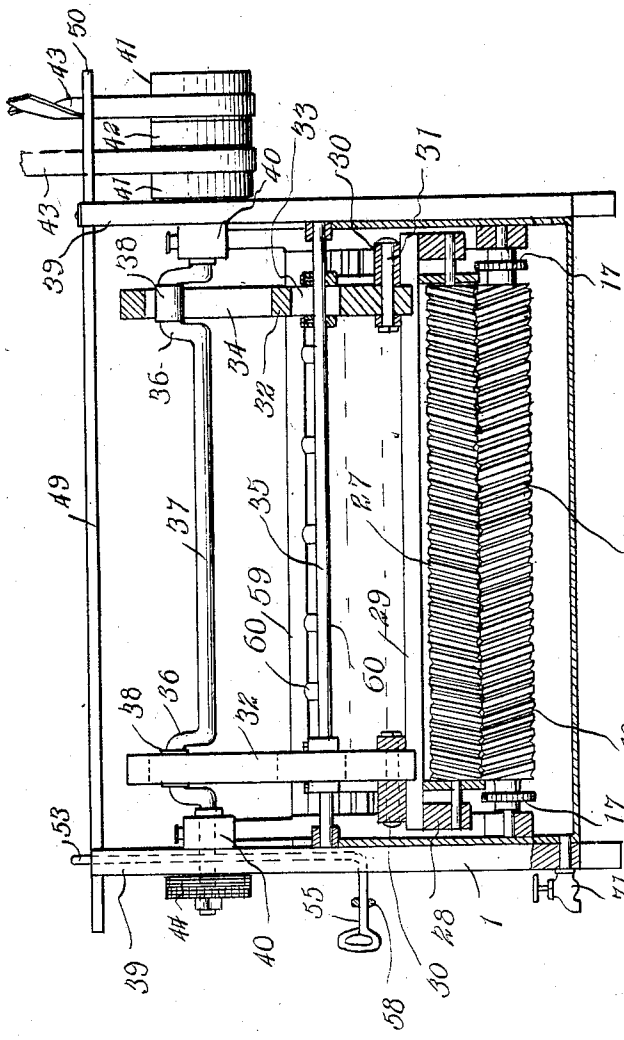


Fig. 4.

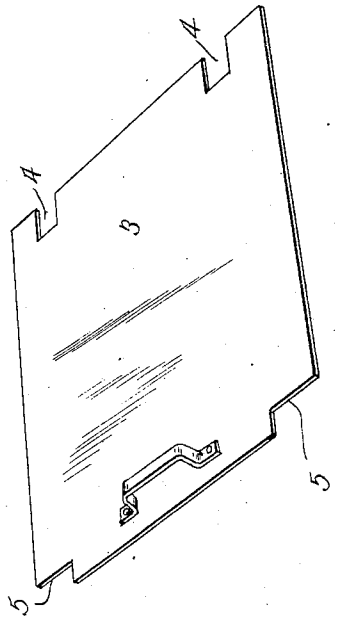


Fig. 5.

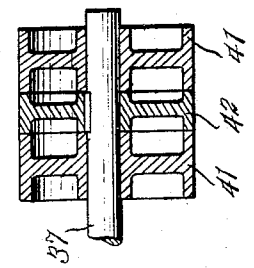


Fig. 10.

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Patented Jan. 27, 1931 1,790,392

UNITED STATES PATENT OFFICE

WILLIAM E. SKELTON, OF LAGRANGE, GEORGIA

WASHING MACHINE

Application filed April 16, 1928. Serial No. 270,419.

The object of this invention is to provide an efficient machine by the use of which clothes may be rapidly and thoroughly cleansed and subjected to the direct action of hot water or steam directed thereonto in a plurality of fine streams or jets. The invention also includes means whereby the clothes will be subjected to an oscillatory movement transverse to their line of travel without injury while passing through the machine and will also be subjected to an efficient rubbing action. The invention resides in certain novel features of construction and arrangement which will be hereinafter first fully described and then more particularly defined in the appended claims.

The invention is illustrated in the accompanying drawings, in which

Figure 1 is a top plan view of the machine with the covers removed;

Fig. 2 is a central longitudinal vertical section through the machine;

Fig. 3 is a side elevation of the same;

Fig. 4 is a central transverse vertical section;

Fig. 5 is a detail view illustrating the manner of mounting the wringer rolls;

Fig. 6 is a detail section on the line 6—6 of Fig. 2;

Fig. 7 is a detail section of the form of bearing which will preferably be employed;

Fig. 8 is a central transverse section through the parts shown in Fig. 7;

Fig. 9 is a detail view of a cover plate, and

Fig. 10 is a detail view of a part of the driving mechanism.

In carrying out the invention, there is provided a tub 1 which may be of any approved form having sufficient strength and durability and supported in any convenient manner, as by legs 2. The tub is preferably rather shallow, as shown in Fig. 2, and includes covers 3 which will prevent the water, suds and steam escaping through the top of the tub and will retain the same therein so that they will act thoroughly upon the clothes. Each cover 3 comprises a plate having notches 4 at its inner edge whereby it is adapted to fit around the rubber hangers and at its outer corners is formed with recesses 5 whereby it is adapted to fit around the standards or posts in which the bearings for the wringer rolls are mounted. At each end of the tub I secure posts or standards 6 having vertical slots 7 formed in their upper portions, as shown most clearly in Fig. 5, and in the said slots are slidably mounted bearing blocks 8 receiving the trunnions 9 of upper wringer rolls 10, while the trunnions 11 of lower wringer rolls 12 are fitted in the respective standards or posts below the slots. Mounted in the upper end of each standard is an adjusting stop screw 13 which is adapted to bear against the top of the bearing block 8 and thereby limit the upward movement of the same, and these several screws can respectively be adjusted so as to hold the upper roll to the clothes with any desired degree of pressure. Immediately adjacent the wringer rolls, at the outer sides thereof, an apron or drain board 14 is carried by the end wall of the tub so that any water which may drip or be expelled from the clothes passing from between the rollers at the outer sides thereof will be deflected back into the tub.

Referring more particularly to Figs. 2 and 3, it will be noted that the bottom of the tub inclines upward from its central portion toward each end and extending parallel with the bottom of the tub are lower rollers 15 forming a continuous series extending from one pair of wringer rolls to the other pair of wringer rolls. These lower rubbing or presser rolls are each provided with trunnions or axles fitted in bearing boxes 16 secured on the side walls of the tub and between said bearing box and the working portion of each roll a sprocket gear 17 is secured upon the axle or trunnion. Sprocket chains 18 are trained about the sprockets 17 in series, as will be understood on reference to Fig. 1 so that all the lower rolls will be caused to rotate in unison. The rolls are formed upon their peripheries with annular grooves 19 which are disposed obliquely or spirally and the grooves upon adjacent rolls are arranged reversely relative to each other. As a result of this reverse arrangement, the rolls in operation not only act to feed the

clothes through the tub but also impart thereto a transverse movement alternately in opposite directions as the clothes pass through the tub. It will be observed upon reference to Fig. 2 that the outermost roll at each end of the series of rolls 15 is disposed approximately in the same horizontal plane with the adjacent lower wringer roll and the series of rolls follows the form of the bottom of the tub and is disposed parallel therewith throughout the length of the machine. Secured to the side walls of the tub over the inclined end portions of the series of rolls 15 are rails or guide blocks 20 in which are secured guide pins 21 extending downwardly from the rails to pass between or through the subjacent supports for the lower rolls and slidably mounted upon these pins are carriers 22 in the form of bars arranged substantially parallel with the rails 20 and of similar form and each forming bearings for the journals or trunnions 23 of upper rollers 24. The rollers 24 are similar in form and dimensions to the rolls 15 and have annular grooves 25 which are arranged reversely to the grooves in the immediately subjacent rolls 15 so that clothes received between the two sets of rolls will be effectually engaged and not only fed through the machine but also shifted transversely in opposite directions alternately so as to be subjected to a thorough rubbing action. Expansion springs 26 are disposed between the rails 20 and the respectively subjacent carrier bars 22 and act upon said bars to yieldably hold the upper rolls toward the lower rolls and thereby maintain the desired pressure upon the clothes without binding upon them so tightly that the clothes will be damaged.

Obviously, the central portion of the series of lower rolls will be disposed substantially horizontally. To cooperate with the central portion of the series of rolls, I provide a rubber comprising a plurality of rolls 27 which, like the rolls 15 and 24, are provided with annular grooves arranged obliquely or in spirals and in reversed relation to the grooves upon adjacent rolls. These rolls 27 have their trunnions or axles mounted in end blocks 28 which are connected by cross bars 29, and upon the cross bars at the ends thereof are secured bearing plates or caps 30 carrying pivot pins or bolts 31 upon which are pivotally mounted the lower ends of hangers 32, said hangers passing through the notches 4 of the covers 3 when the parts are all assembled and the machine is in operation. In their upper portions, the hangers are each formed with slots 33 and 34, as shown clearly in Figs. 2 and 3, the lower slots receiving a fulcrum rod 35 which is secured in the side walls of the tub and extends entirely across the tub, this arrangement permitting vertical movement of the hangers and also causing them to oscillate or rock about the rod as a center. The upper slots 34 of the hangers receive the crank portions 36 of a driving shaft 37 so that, as the shaft is rotated, the cranks will impart an oscillatory movement to the hangers and thereby cause the rubber rollers 27 to move back and forth over the clothes and by their travel over the clothes held upon the central rollers 15 will loosen any particles of dirt which may be clinging to the clothes so that as the clothes emerge from the tub they will be thoroughly cleaned, it being understood that the action of the water and steam delivered into the tub is to remove all surface dirt and also drive from the clothes any grease or other matter which may have collected in the fabric. To minimize the frictional wear between the cranks 36 and the walls of the respective slots 34 in the hangers, bushings 38 are fitted around the cranks to extend through the slots, as will be readily understood.

The ends of the driving shaft 37 extend through standards 39 secured to and rising above the sides of the tub and are journaled in bearing boxes 40 carried by said standards, as will be understood. Upon one end of the driving shaft are mounted loose pulleys 41 and a fast pulley 42 between the loose pulleys, belts 43 being provided to cooperate with the pulleys and transmit motion thereto from any convenient source of power, it being noted that one of the belts is straight and the other is crossed, and the driving shaft will be driven in one or the other direction accordingly as one or the other belt is shifted onto the fast pulley. When the machine is not in operation, the belts will be trained around the respective loose pulleys, as shown in Fig. 4, but when the machine is to be used, the belts are shifted so that one or the other will pass around the fast pulley, and to accommodate the belts in either of their shifted positions, the loose pulleys are twice as long as the fast pulley or the width of the belts. At the opposite end of the driving shaft, I secure thereto sprocket gears 44 about which are trained sprocket chains 45 which pass from the respective gears to the ends of the tub and are there trained around sprocket pinions 46 secured upon the outer extended ends of the trunnions of the outermost rollers 15 whereby rotation is imparted to the pinion 17 on said trunnion and the chains 18 driven. The last-mentioned trunnions carry pairs of sprocket pinions outside the tub and the inner sprocket of each pinion is operatively connected by a sprocket chain 47 with a sprocket pinion 48 on the trunnion of the adjacent lower wringer roll. It will thus be seen that the rubber is oscillated, the lower rollers 15 are positively driven, and the lower wringer rolls are also positively driven from the single driving shaft, and the wringer rollers 15 and the lower rubbing rolls are rotated in the same direction.

To shift the driving belts 43, a shifting bar 49 is mounted transversely and slidably in the upper ends of the standards 39 and carries at one end a yoke 50 provided with slots 51 engaging around the respective belts whereby if endwise movement be imparted to the shifting bar the belts will be likewise shifted so that they will be set in a desired position to cause rotation of the driving shaft in either direction or to stop the operation of the machine. Mounted upon that standard 39 more remote from the driving pulleys is a vertically disposed rocking arm 52 provided at its upper end with a crank 53 which extends over the shifting bar 49 and is engaged in a socket or recess 54 in said bar so that, when the arm is rocked, the crank 53 will impart an endwise movement to the shifting bar. At its lower end the rocking arm 52 is provided with a laterally extending crank 55 which forms a convenient handle whereby the arm may be rocked by an attendant standing adjacent the center of the tub. As it is frequently desirable to control the operation from the ends of the tub, a rod 56 is slidably supported in any convenient manner upon the side of the tub and extends from end to end thereof, being provided with any convenient form of handle 57 at each end. Adjacent its center, this shifting rod 56 is formed with an eye or loop, indicated at 58, which is engaged around the crank 55 so that any movement imparted to the rod 56 will be transmitted directly to said crank and through the same to the rocking arm 52.

Secured in the sides of the tub adjacent the ends thereof and over the presser rollers 24 are supply pipes 59 each of which is closed at one end and is provided at intervals with depending nozzles or jets 60 directed toward the subjacent rollers 24, as shown clearly in Fig. 2. The open ends of these pipes 59 are coupled into pipes 61 which are mounted on the side of the tub and extend to a boiler (not shown) to lead steam and hot water into the tub, and in the said pipes 61 are mounted valves 62 whereby the flow of steam and hot water may be cut off or regulated.

In Figs. 7 and 8, I have shown in detail the structure of the bearings in which the several rotating parts will be mounted, the details of this structure not appearing in the other figures, owing to the reduced scale of the latter. In Figs. 7 and 8, the numeral 63 designates a shaft or trunnion, as, for instance, the trunnion of one of the rollers 15. Within the bearing block 64, the trunnion has fitted thereon bushings 65 and around said bushings rollers 66 are mounted, as shown, packing washers 67 being provided between the ends of the rollers and the side plates 68 of the bearing, and these washers may be provided with openings receiving end trunnions of the rollers so as to hold the rollers in spaced relation. In the upper side of the bearing block 64 is mounted an oil cup 69 and a duct 70 leads from said oil cup through the bearing block to the bearing rollers so as to supply lubricant to the latter, and it will be readily noted that the packing washers 67 prevent the lubricant leaking from the bearing box so as to reach and soil the clothes.

From the foregoing description, taken in connection with the accompanying drawings, it will be seen that I have provided a very efficient and easily operated machine whereby clothes may be rapidly and thoroughly cleaned. As the main driving shaft is rotated, the hangers or pitmen suspended thereon will oscillate the rubber over the clothes and the slotted construction of the hangers permits the rubber to readily accommodate itself to the bulk of the clothes passing through the machine. To lighten the work, it is desirable that the clothes be permitted to soak within a vessel containing water and soap or some other cleaning agent before being passed through the washing machine. The wet clothes will be caused to enter the tub between the wringer rolls at one end thereof and surplus water will be thereby squeezed therefrom and this surplus water will be caught by the adjacent drain board 14 and directed into the tub. From the wringer rolls, the clothes are passed to and between the adjacent upper and lower rolls 24 and 15 and will be fed through the machine by the positive rotation of the lower rolls. The upper rolls will press yieldably upon the clothing so that it will be positively engaged by the grooved circumferences of the opposed rolls and will, consequently, be given a transverse vibratory movement as it passes through the tub so that loose surface dirt will be removed. At the center of the tub, the clothes will be acted upon by the rocking rubber and will then pass between the second set of rolls 24 and 15 to be discharged between the second wringer rolls. The hot water and steam which enters the tub over the respective yieldably mounted upper rolls will saturate the clothing and drive therefrom any dirt or other matter which may have penetrated the fabric so that, when the clothes are finally drawn from the tub, they will be thoroughly cleaned. The dirt removed from the clothes will, of course, settle at the bottom of the tub, and a drain valve 71 is provided to draw off the dirty water after the washing operation is completed.

Having thus described the invention, I claim:

1. A washing machine comprising a tub, a series of rolls mounted transversely in the tub and extending from end to end thereof, said rolls having obliquely disposed annular grooves in their peripheries, the grooves in adjacent rolls being relatively reversely arranged, series of yieldably supported rolls in the respective end portions of the tub above

and cooperating with the first-mentioned rolls to engage clothes to be washed, and means for positively rotating the first-mentioned rolls, the yieldably mounted rolls being also provided with obliquely disposed annular grooves in their peripheries with the grooves in each roll reversed relative to the adjacent roll in the same series and the respectively subjacent roll in the lower series.

2. A washing machine comprising a tub, a series of transversely disposed feeding and rubbing rolls arranged in the tub and extending from end to end thereof parallel with the bottom of the tub, means for positively rotating said rolls, carriers extending longitudinally of the tub and arranged over the rolls at the respective ends of the tub, rails secured to the sides of the tub above the carriers, series of rolls arranged in the respective carriers having means to cooperate with the first-mentioned rolls in engaging and agitating clothes to be washed, and expansion springs disposed between the rails and the carriers and bearing thereon to yieldably hold the carriers and the rolls therein toward the lower rolls.

3. A washing machine comprising a tub, a series of transversely arranged feeding and rubbing rolls arranged in the tub and extending from end to end thereof, means for positively rotating said rolls, a crank shaft supported over the tub at the center thereof, a fulcrum rod secured transversely in the tub at the center thereof and adjacent the top of the same, hangers having slotted portions receiving the crank shaft and other slotted portions receiving the fulcrum rod whereby the hangers may move vertically and also oscillate about the fulcrum rod, means for rotating the shaft, a frame pivotally attached to the lower ends of the hangers, and a plurality of rubbing and feeding rolls carried by said frame above and cooperating with the first-mentioned rolls in engaging and agitating articles to be washed.

In testimony whereof I affix my signature.

WILLIAM E. SKELTON. [L. S.]