Dec. 3, 1940. A. SCHELLENBERG 2,223,858

WASHING AND RINSING MACHINE

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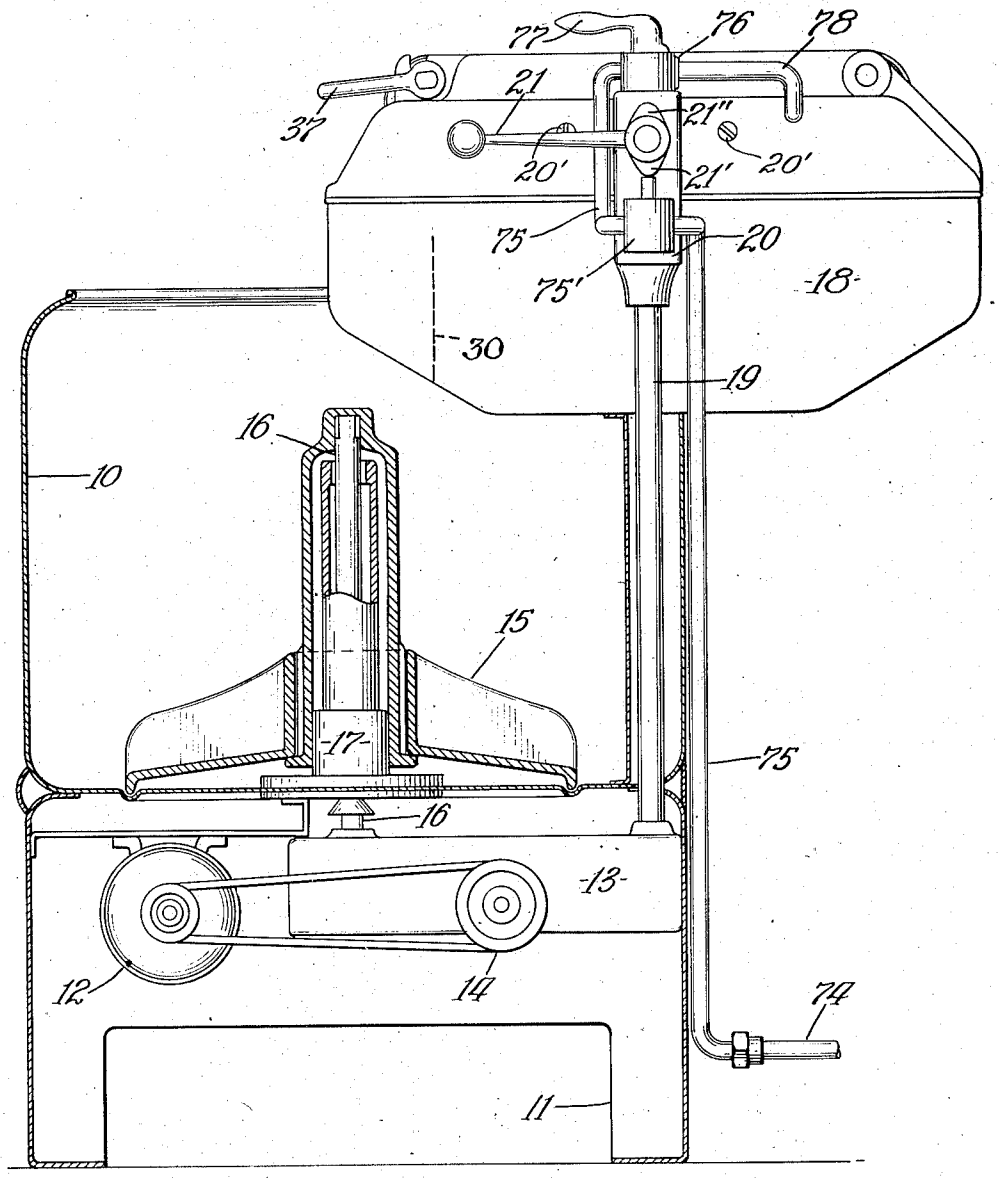


Fig. 1.

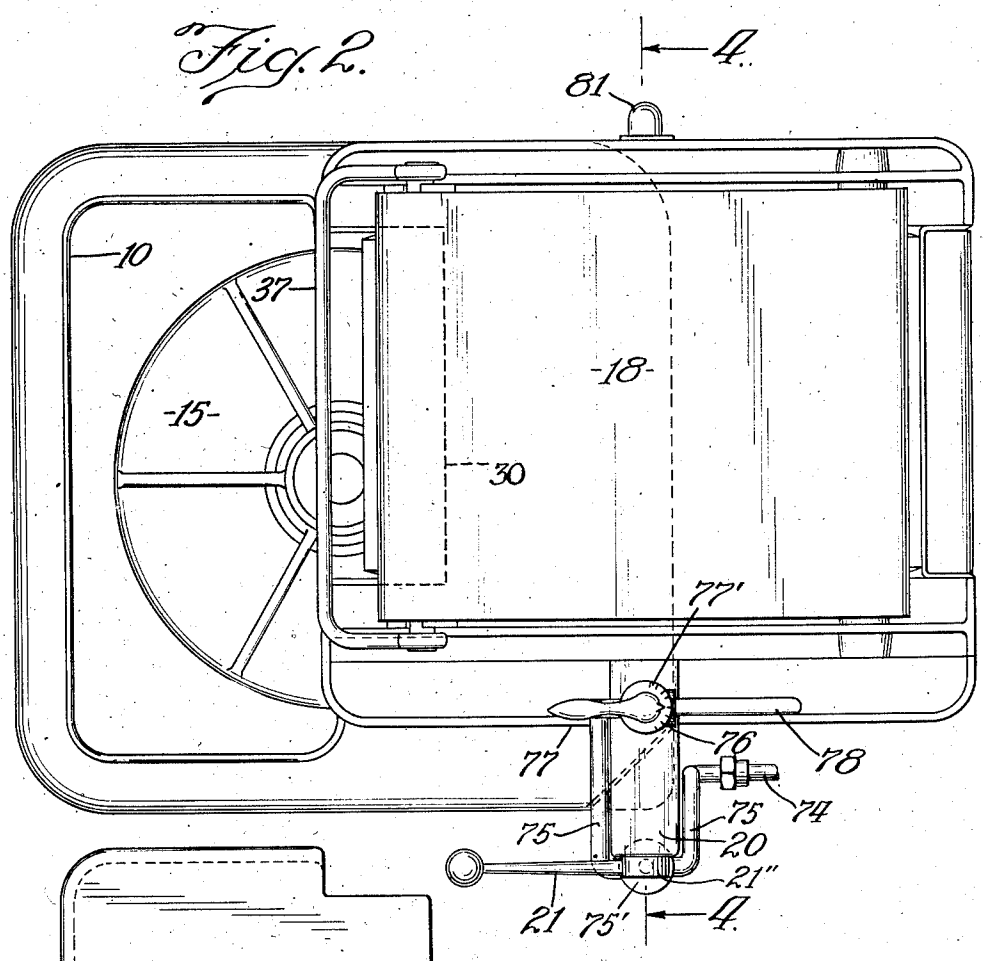
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WASHING AND RINSING MACHINE

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Fig. 2.



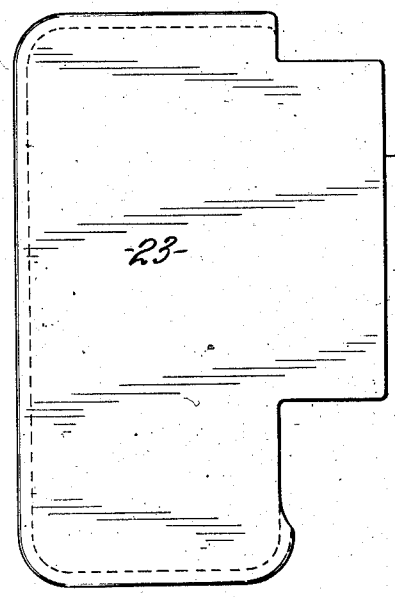


Fig. 3.

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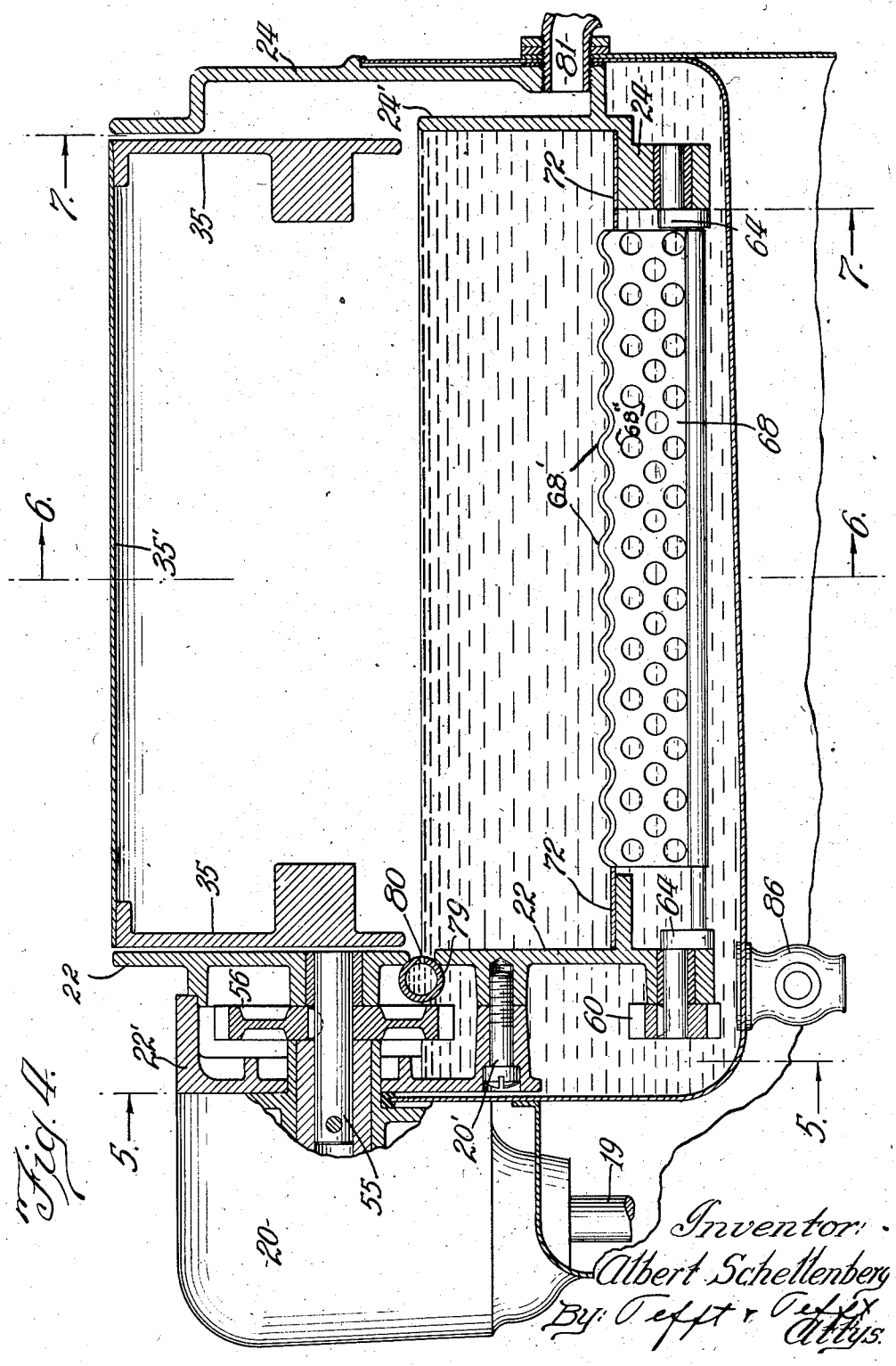


Fig. 4.

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WASHING AND RINSING MACHINE

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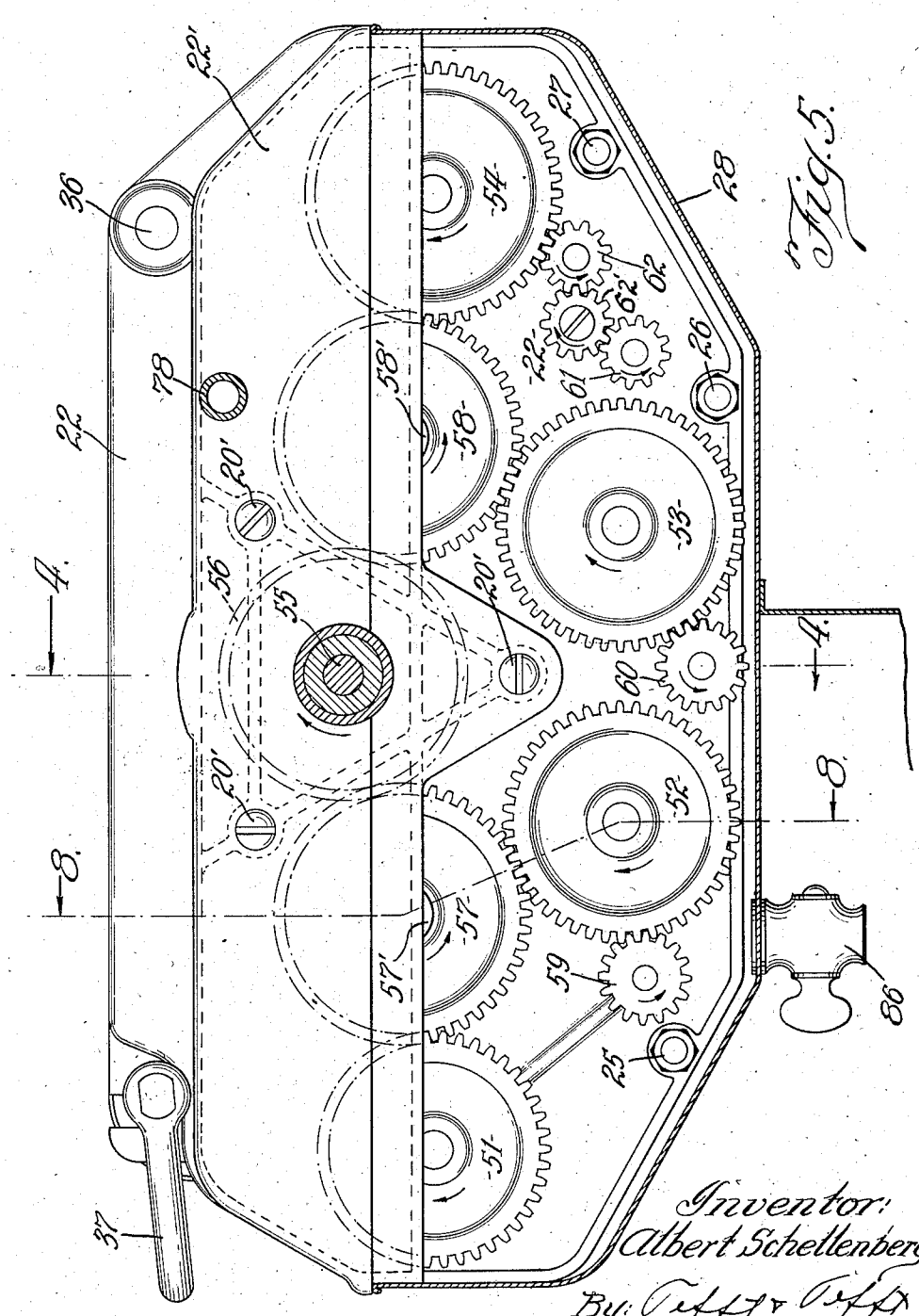


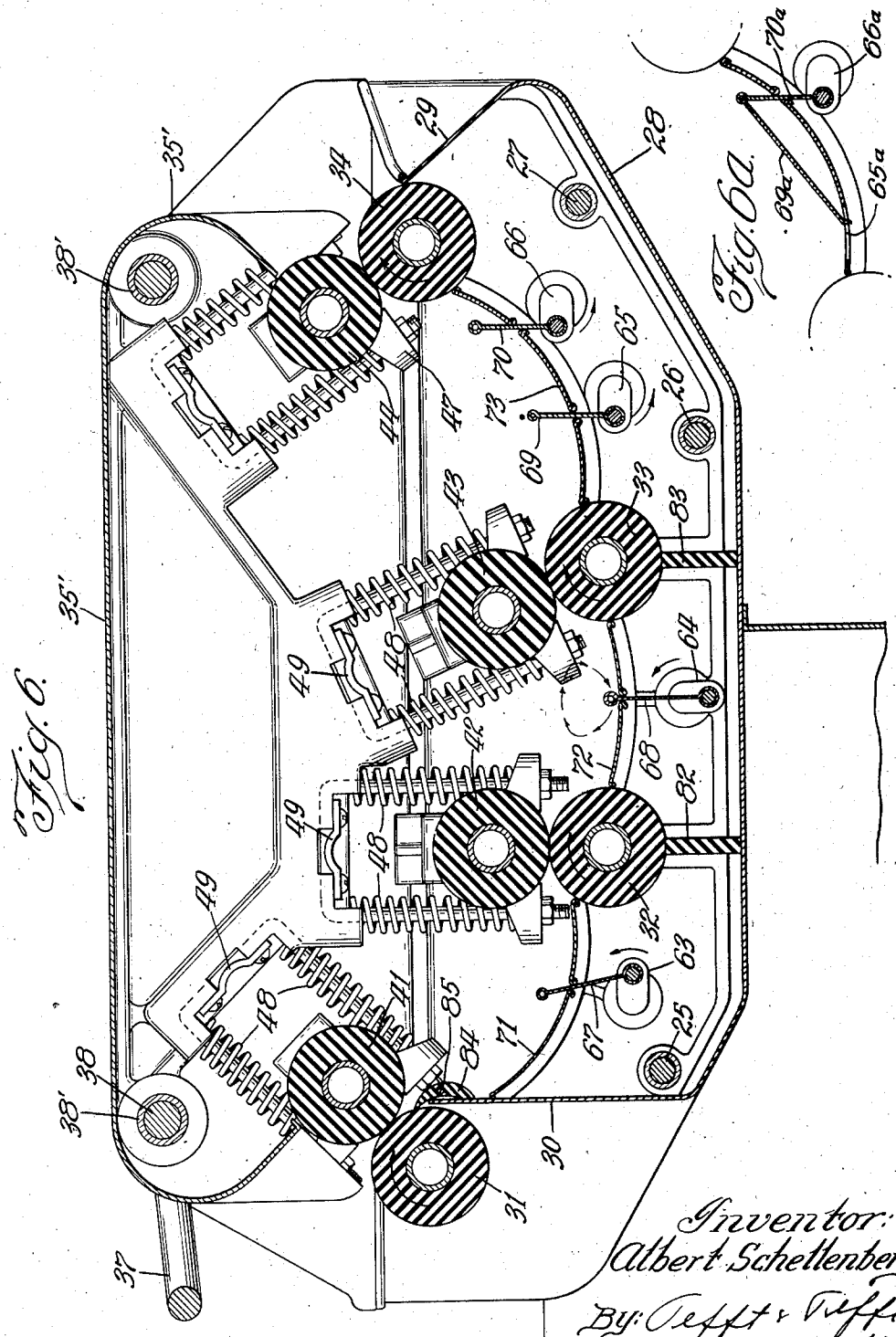
Fig. 5.

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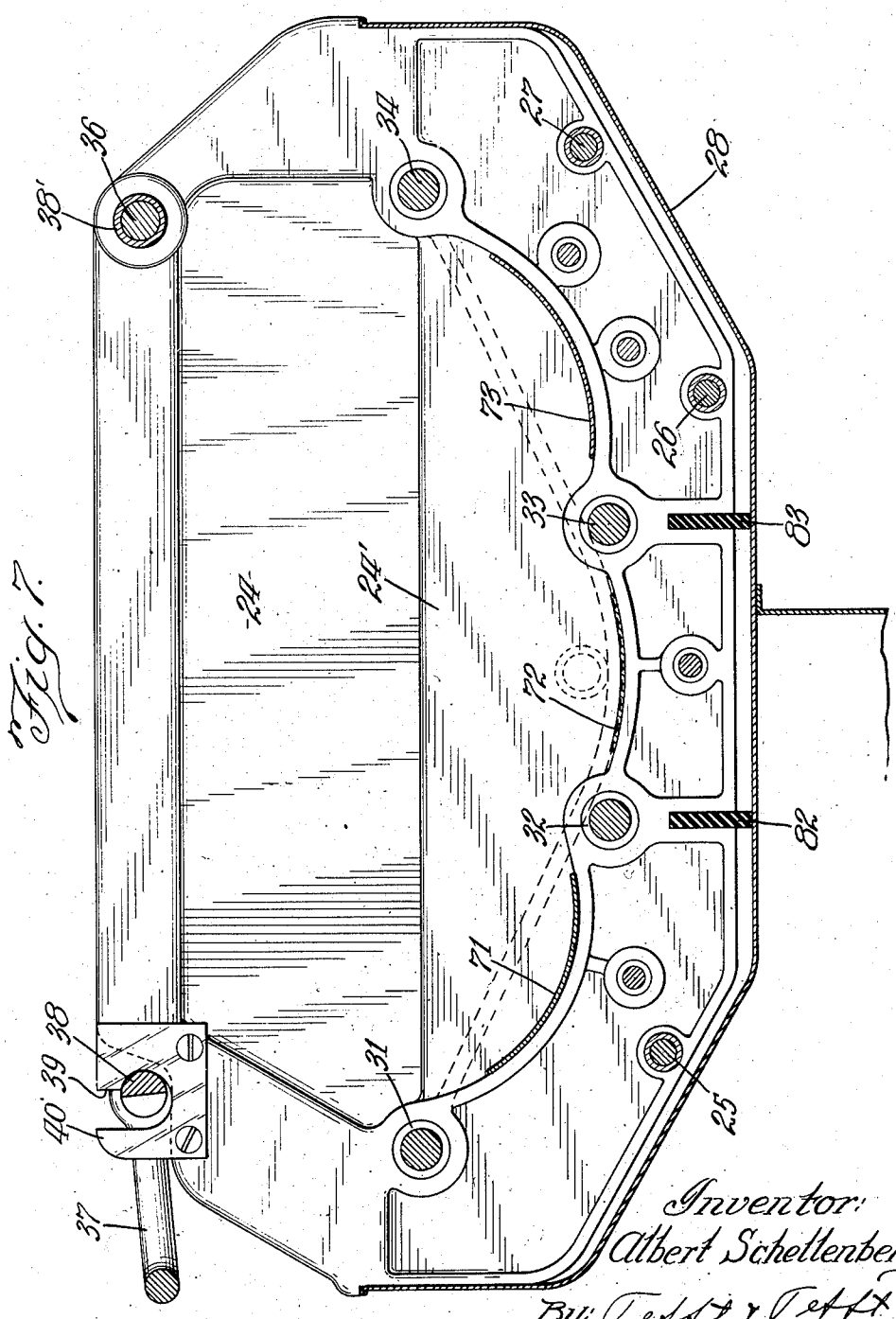


Fig. 7.

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Dec. 3, 1940. A. SCHELLENBERG 2,223,858

WASHING AND RINSING MACHINE

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Fig. 8.

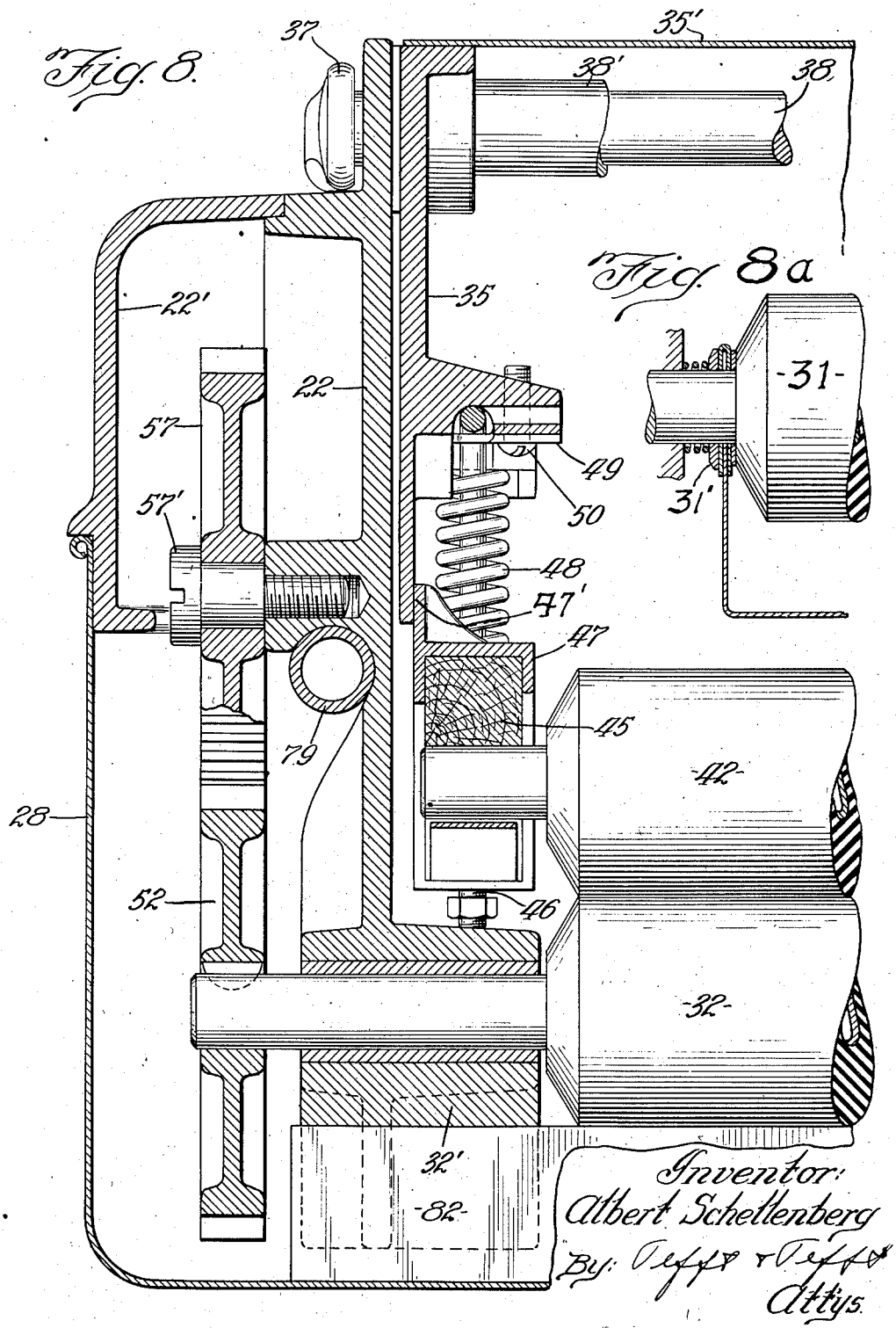


Fig. 8a

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2,223,858

UNITED STATES PATENT OFFICE

2,223,858

WASHING AND RINSING MACHINE

Albert Schellenberg, Joliet, Ill.

Application October 2, 1939, Serial No. 297,520

7 Claims. (Cl. 68—22)

This invention relates to a combined washing and rinsing machine and will be described as applied to a domestic clothes washer.

The popular conventional domestic clothes washer has heretofore been an incomplete apparatus in that it provided only mechanical means for washing the clothes in soapy wash water, and a power driven wringer for drying the clothes, facilities for properly rinsing the garments being absent and left entirely to the discretion of the operator.

The importance of effective rinsing is well understood in the laundry art, it being appreciated that soap is a very objectionable form of fabric soil, which has the serious effect of weakening fabric by chemical action, as well as being seriously objectionable from a sanitary standpoint. To properly remove soap from fabrics, thorough rinsing in several clean rinse waters is necessary. The most valid and serious criticism of common home laundry methods is based on improper rinsing.

This objectionable improper rinsing not only applies to the home laundry equipped with conventional wringer type machines, where the rinsing facilities are left to the discretion of the operator, but even more seriously to centrifugal drier equipment machines. In these latter type machines, the saturation water in the clothes is thrown out by centrifugal action in a manner which practically strains the soapy water through and into the fabrics in a most undesirable way. Commercial laundries never extract soapy water from clothes,—in fact, they never place clothes in an extractor until after they have been thoroughly rinsed.

The popular submerged agitator and power wringer type domestic washer is a very effective machine for removing soil from clothes,—a fact which is proven by its general acceptance and use in a high percentage of American homes. The submerged agitator, with its combined mechanical and water action, very effectively removes soil from garments where it is dissolved or suspended in the soapy wash water solution. The rubber roll wringer is an important factor in this washing because it compresses the fabrics and flushes the wash water and soil out of the fabric in a very rapid and effective combined washing and wringing action. Competent investigators and observers have proven over a period of years that the rubber roll wringer is a very effective adjunct to the washer. It is a fact then, that the washing job is normally very well done as the clothes come from the wringer, except for the fact that they are wet with soapy wash water carrying a variable solution of soap and soil, together with such suspended soil as the clothes may have picked up and which was not flushed out in the wringing operation. As the clothes leave the wringer, they immediately expand from their tightly compressed condition and absorb air. In many types of fabrics such clothes will float in the rinse water. All clothes when wrung into rinse water should be unfolded, manipulated, or doused for thorough rinsing (an operation which is usually not well done), then wrung through the wringer again and into a second rinse, again doused and manipulated, and then wrung again. The arrangements for proper rinsing, including an adequate supply of at least two clean rinse waters, are commonly not good; the unfolding, manipulating, and dousing is usually slighted or neglected; and the general result of this common washing method is that, what should be a very effective job of washing, is sadly nullified by a poor job of rinsing.

It is the particular object of this invention to provide integrally with a domestic washing machine means to automatically effect drying, rinsing and drying or to provide apparatus which can be associated with a washing machine to accomplish this result.

Another object is to combine with a domestic washing machine multiple pairs of wringer rolls to assist the washing and rinsing operation by subjecting the garments to repeated wringing operations while the clothes are submerged or otherwise saturated in clean rinse water.

A still further object is to prevent air from permeating the garments after being squeezed dry by immediately saturating them in clean rinse water as they leave the wringer rolls, then to manipulate the garments while saturated and repeatedly squeeze-dry them as they pass through clean rinse waters which are continuously supplied.

Other objects and benefits will be disclosed in the following descriptions and drawings in which:

Fig. 1 is a cross sectional elevation view of my washing machine showing my multiple roll rinsing mechanism;

Fig. 2 is a plan view of my washer;

Fig. 3 is a plan view of the washer lid;

Fig. 4 is a lateral cross sectional elevation view of my multiple roll rinse wringer apparatus as it would appear on the section lines 4—4 of Fig. 2;

Fig. 5 is a longitudinal cross sectional elevation

view of my rinse-wringer apparatus as it would appear on the section lines 5—5 of Fig. 4;

Fig. 6 is a similar longitudinal sectional view to Fig. 5 except showing my rinse-wringing apparatus as it appears on the section lines 6—6 of Fig. 4;

Fig. 6a is a broken sectional view showing an optional structure which will later be explained;

Fig. 7 is a similar longitudinal cross sectional view to Figs. 5 and 6 except taken on the section lines 7—7 of Fig. 4; and

Fig. 8 is an enlarged broken cross sectional elevation view of my rinse-wringer as it would appear from the section lines 8—8 of Fig. 5; and

Fig. 8a is a broken sectional view showing the water seal used on roll 31, as will later be explained.

Now referring to Fig. 1, I show a conventional type washing machine tub 10 mounted on a base 11. The washer is driven by an electric motor 12 through a conventional type gear case 13 through a belt and pulley transmission 14. The washing is accomplished by a separate removable submerged agitator 15 driven through an agitator shaft 16 mounted in an agitator post 17, by the gear case 13 in a conventional manner. It will be appreciated that although I show a submerged agitator type washing machine, any other desirable type of machine could be used to serve the same purpose.

My rinse-wringer apparatus generally designated by the numeral 18 is inset and mounted in the tub 10, as shown, and driven in a conventional manner by the drive shaft 19 from the gear case 13 and a conventional reversing gear head 20 controlled by the handle 21.

Now referring to Figs. 4, 5, 6, 7, and 8, and at the outset particularly to Fig. 4, it will be seen that I have two lower frame members 22 and 24. The lower frame 22 is supported in a base pan 26, the cover frame 22' is attached to frame 22 by cap screws 20', and the frames are tied together by cross rods 25, 26, and 27. This structure is further stiffened and strengthened by its support on the base pan 28 although it may readily be removed for cleaning. By referring to Fig. 6, it will be noted that the base pan 28 has two end depressions 29 and 30. The depression 29 is formed to accommodate the discharge of clothes from the discharge end, and the depression 30 is necessary to provide a drain return of the wash water to the tub 10 as the clothes are fed into my rinse-wringer. This explains the necessity for the extension 23' of the lid 23, as shown in Fig. 3, and will readily be understood by observing the position of the vertical transverse wall 30 shown in dotted outline in Figs. 1 and 2.

Mounted in the lower frames 22 and 24 are lower driven rolls 31, 32, 33, and 34. These rolls are properly journaled in submerged bearings 32', as clearly shown in Fig. 8.

As shown in Fig. 8a, the roll 31, having its shaft below the water line and passing through the side walls of the end depression 30, is equipped with a conventional type of water seal 31' which prevents the leaking of rinse water around the roll shaft.

Pivoted to the lower frame members 22 and 24 are dual right and left upper frame members 35, by the pivot pin 36 and the spreader tube 38'. The upper frame members 35 are covered by sheet metal cover members 35', thus forming a stiff enclosed upper frame member pivoted on the pivot rod 36. As clearly shown in Fig. 7, the outer ends of the frames 35 are urged downward and locked by the hand bail 37 attached to the cam bar 38 in the spreader tube 38' cooperating with the hook 39 and held in position by the end clips 40. This is a conventional type of releasable cam lock well understood in the art and will not be explained in further detail except that by counter-clockwise manipulation of the hand bail 37, the upper frame is drawn downward and locked in position, as shown in Fig. 7. By reverse or counter-clockwise movement of the bail 37, the cam bar 38 quickly is released from locked position, permitting the upper frame 35 to hinge upward on the hinge pin 36.

Journaled in the upper frame members 35 are upper driven rolls 41, 42, 43, and 44, as clearly shown in Fig. 6. These rolls are properly journaled in bearings 45, as shown in Fig. 8, which are retained in bearing clips 47 supported and guided by U-bolts 46 and guide brackets 47' while urged downward by compression springs 48. The U-bolts 46 are retained in the upper frames 35 by means of clamps 49 and bolts 50. This is a rather conventional upper roll spring structure and well understood in the art, and it will be appreciated that by this mounting the upper rolls 41, 42, 43, and 44 are held and guided in resilient contact with the lower rolls 31, 32, 33, and 34, respectively.

Now referring to Fig. 5, it will be observed that spur gears are mounted on the ends of the lower roll shafts, the gears 51, 52, 53, and 54 being attached to the rolls 31, 32, 33, and 34, respectively.

Now referring to Fig. 4, a drive shaft 55, extending from the gear head 20, drives a spur gear 56, and again referring to Fig. 5, it will be noted that the spur gear 56 through the idler gears 57 and 58, mounted on shoulder studs 57' and 58', as shown in Fig. 5, drives the lower roll gears 51, 52, 53, and 54. As a matter of convenience, and to provide access to these gears, I provide the auxiliary plate 22' to cover the gears, as shown in Fig. 8. It will be carefully noted that I arrange by properly varying the size of the gears, to pregressively drive the roll 53 faster than the roll 54, the roll 52 faster than 53, and the roll 51 faster than 52. By this arrangement it will be obvious that clothes fed to the wringer rolls will be drawn into my rinse-wringer faster than they are ejected. My purpose in this is to prevent any possibility of tearing the clothes, as would certainly occur if the reverse order of speed was used, and further, to provide means whereby the folded, flattened garments as they pass through the rolls are buckled, crumpled and thus loosened to permit better rinsing, as will later be explained in greater detail.

Again referring to Fig. 5, it will be observed that I provide small spur pinions 59, 60, 61 and 62 in driving relationship with the gears 52, 53 and 54, the pinion 61 being driven by an idler pinion 62' as shown, and that the counterclockwise rotation of these pinions is clearly indicated by the arrows thereon. By referring to Figs. 4 and 6, it will be noted that these small spur pinions are attached to crank members 63, 64, 65 and 66, corresponding with the gears 59, 60, 61 and 62. Affixed to the crank members are rinse feeder arms 67, 68, 69 and 70. These arms extend through slotted openings in cross plates 71, 72 and 73 supported on the lower frame members 22 and 24, as clearly shown in Fig. 4.

Now referring to Fig. 6, and particularly to the feeder arm 68, I show in dotted outline and arrows the path of the upper edge of the feeder arm 68 as it is actuated by the crank 64 turning

in the direction of the arrow and controlled by the slot in the plate 72. Consideration of the motion of the feeder arm 68 will reveal that the motion effectively acts upon clothes going through my rinse-wringer first to lift and agitate the loosened clothes, and next to urge them toward the succeeding roll in order that they may be effectively drawn through the rinse-wringer. It will be particularly noted that the feeder arms 69 and 70 act in parallel to effectively lift the garments into the bite of the rolls 34—44. By referring to Fig. 4, it will be noted that the feeder arm 68 has scallops 68' in its upper edge and perforations 68'' throughout its surface. The purpose of these openings is to reduce the paddle effect on the rinse water which otherwise might be impelled through the succeeding pair of rolls. The purpose of the scallops in the upper edge is to improve the contact of the feeder arms with the clothes and thus assist the feeder action. Although I have as above described the action of the feeder arm 68, the same or some similar coaction is effected by the feeder arms 67, 69 and 70.

In Fig. 6a I show an optional structure wherein to the feeder arm 70a, I attach a hinged deflector baffle 69a retained on its outer end in longitudinal slots 65a. The purpose of this deflector baffle is to prevent clogging and to assist in raising the clothes out of the water and into the bite of the rolls 34, 44.

From the foregoing it will be appreciated that I have provided a structure wherein the clothes are fed progressively slower through my rinse-wringer, causing effective loosening of the folded garments and then agitated and fed onward through the rolls by the feed arms as described. As will later be explained, this action all takes place under water, with the result that a very effective mechanical rinsing of the clothes is accomplished.

Now referring to Figs. 1 and 2, I show a rinse water inlet hose 74 which may be conveniently attached to any water faucet, but preferably to one wherein the rinse water could be regulated in temperature to best fit the conditions. For country homes where piped-water systems are not available, an elevated rinse water tank would be provided. The inlet hose is attached to a tube 75 which in turn leads through an off-and-on valve 75' controlled by cams 21' and 21'' on the lever 21, and thence through the valve 76 having a control handle 77 to regulate the flow therethrough with a flow indicator 77' for the control handle. The outlet from the valve 76 is a tube 78 which leads to a spray tube 79 on the interior of my rinse-wringer, as clearly shown in Fig. 4.

The spray tube 78 has spray nozzle openings 80 extending lengthwise longitudinally along the tube and level with the baffle 24' extending longitudinally across the lower frame 24.

It will be obvious from this structure that the flow of rinse water is only permitted when the control handle 21 is in the position to drive the rolls or my rinse-wringer is in operation, and that then the rinse water is permitted to flow through the valve 76 whereby the water will attain the level of the baffle 24' and will maintain this water level during operation of the rinse-wringer. By observing the water level as shown in Fig. 6, it will be clearly seen that clothes as fed through the rolls 31 and 41 will be immediately submerged in the water and that they will be continuously submerged as they pass through the rinse-wringer, until they emerge from the discharge rolls 34 and 44.

The immediate submerging of the clothes is an important feature of my invention because, as will be clearly understood, the clothes when compressed by the rolls 31 and 41, are immediately submerged in rinse water before they have an opportunity to absorb air. This not only permits the clothes to be readily sunk beneath the surface of the water, but also permits greater speed of saturation in the clear rinse water,—a most desirable result. Furthermore, the clothes being retained under the rinse water and repeatedly subjected to the squeezing and cleansing action of the three succeeding pair of rolls, while at the same time being agitated and loosened by the agitator arms, as previously described, there is thus provided a much speedier and more effective power rinsing means than has heretofore been discovered.

This effective action is further enhanced by the fact that rinse water sprayed through the nozzle openings 80 at the level of the water, quickly clear the surface of the water from soap scum or other impurities so that the rinse water is maintained in its clearest and most effective condition. This action is further enhanced by separating the various sections of my rinse-wringer by means of rubber baffles 82 and 83, as shown in Fig. 6. These baffles are held in firm contact with the rolls 32 and 33, and as a result, the various sections of my rinse-wringer are separated so as to provide progressively cleaner rinse water as the clothes travel through the device. The same effect might be accomplished by separate spray devices in each section to replace the sectional bodies of rinse water.

It will be appreciated that the idea of separating the device into compartments may be carried further than that disclosed in the present structure by even more effective structure to separate the device into compartments. However, experience has taught that the device as disclosed is practically effective for domestic laundry, and no further additional structure was provided on economic considerations.

Continuing the idea of separating the device into various compartments, it will be appreciated that various types of rinse waters might be provided progressively in the succeeding sections. For instance, bluing might be easily accomplished in the last section by means well understood and known in the art. Further, the rinse might be made of different temperatures or a souring rinse might be added, the purpose of which is well understood in the art and need not be explained in further detail. As stated initially in this specification, I am disclosing my invention as applied to a domestic washing machine, and, therefore, the refinements as above noted are not shown or illustrated because of economic limitations.

When the rinse water is ejected through the nozzles 80 and over the surface of the water, the soap scum or impurities, which naturally rise to the surface, are flushed off and fall into the trough between the baffle section 24' and the base frame 24. From this trough they are led to a drain through the drain elbow 91 by means of a hose or any other desired connection. I also provide a drain cock 86, as shown in Figs. 4 and 5, whereby my rinse-wringer may be completely drained during periods of non-use.

As shown in Fig. 6, I provide a baffle rubber 84 extending across the roll 31 and held in firm contact with it by the rod 85. This provides an effective means to strip any garment tending to

stick to the lower roll 31 and provides a baffle to prevent rinse water spilling into the wash tub, it being highly desirable, as heretofore explained, to maintain the level of the rinse water close to the bite of the rolls 31 and 41.

From the foregoing it is believed that the theory and structure of my machine will be well understood. I now desire to further explain its use and benefits.

My combined washing and rinsing machine employs the popular and effective submerged agitator washer principle combined with the roll wringer drying method, but largely eliminates their faults or objections.

As explained earlier in the specification, the agitator washer equipped with power wringer does a good job of washing that is commonly nullified by improper rinsing. My machine eliminates the necessity for rinse tubs precariously provided by operators, together with their cost, the difficulty of handling and arranging them in proper relation to the washer and wringer, all the labor of filling them with water, the necessary manual work of dousing and wringing through at least two rinse waters, and the time consumed in this labor. This is an important improvement in the art as it saves both time and labor, while decidedly improving the washing results,—but even more important, the device practically eliminates the danger to the operator from roll wringers.

Figs. 1 and 2 amply illustrate the closer and more convenient position of my rinse-wringer,—it being very much lower and closer to the operator than the conventional wringer. Moreover, it stays in this same position, and the operator is thus saved the annoyance and danger of rotating the wringer over various rinse tubs in awkward and dangerous positions. Experience teaches that most wringer accidents occur over rinse tubs where the operator is forced to feed clothes through the rolls from an awkward position.

Fig. 6 shows that the initial pair of wringer rolls 31 and 41 are positioned angularly away from the operator, the lower roll providing a most effective feed shelf, while the upper roll and the bite of the rolls are substantially removed from normal finger contact.

With my rinse-wringer the operator feeds the clothes into the rolls in a most convenient and safe position, regulates her rinse water to the requirements, and the clothes emerge at the other end ready for hanging out on the clothes line.

The quick saturation of the clothes in clean rinse water, with power agitation and repeated wringings, with the clothes always submerged in clean rinse water, with the soap and suspended dirt rising to the surface and there sprayed off, provides an effective and novel advance in the art.

Having thus described my invention, I claim:

1. In a rinse wringer, an elongated lower frame, a coextensive upper frame relatively movable with respect to the lower frame, multiple pairs of spring-urged co-acting resilient pressure rolls mounted transversely in said frame, drive means to rotate the rolls continuously in one direction to move garments through the wringer, rinsing means between the end pairs of rolls, said rinsing means including agitating means urging the garments through the successive pairs of rolls, and manual pressure and release means to draw the frames together with the rolls in co-acting pressure relationship or to release the frames and release roll pressure.

2. In a rinse wringer, a lower frame, an upper frame relatively movable with respect to the lower frame, multiple pairs of spring-urged co-acting resilient pressure rolls mounted in said frames, drive means to rotate the rolls continuously in one direction to move garments through the wringer, rinsing means between the end pairs of rolls, progressive differentials in the rotational speeds of the pairs of rolls to effect loosening of the garments and manual pressure and release means to draw the frames together with the rolls in co-acting pressure relationship or to release the frames and release roll pressure.

3. In a rinse wringer having progressive garment conveyor and squeeze means and a rinsing chamber, a rinse water valve controlling the flow of water to said chamber, a power mechanism to drive said squeeze means, a clutch for said power mechanism, a manual control for said clutch, and means responsive to the operation of said clutch control to actuate said rinse water valve.

4. In a rinse wringer having multiple pairs of spring-urged co-acting resilient pressure rolls and a rinsing chamber, a rinse spray in said chamber, control means for said spray, a power mechanism to drive said rolls, a clutch for said power mechanism, a manual control for said clutch, and means responsive to the operation of said manual clutch control to actuate said spray control means.

5. In a rinse wringer, a rinsing chamber, a pair of power driven intake wringer rolls to feed garments into said rinsing chamber, a pair of power driven discharge wringer rolls to convey garments out of said chamber, and differential driving means for said rolls to drive said intake rolls faster than said discharge rolls to loosen garments extending between said pairs of wringer rolls.

6. In a rinse wringer, a frame, multiple pairs of coacting resilient pressure rolls spaced apart from each other mounted transversely in the frame, drive means to rotate the rolls to move garments through the wringer, rinsing means between the spaced pairs of rolls, said rinsing means including impeller mechanism to rearrange and flex the garments while urging the garments to the next succeeding pair of rolls, and manual pressure and release means to force the rolls into pressure relationship or to release roll pressure.

7. In a rinse wringer, a water reservoir, a frame mounted in said water reservoir, multiple pairs of coacting resilient pressure rolls spaced apart from each other mounted transversely in the frame, drive means to rotate the rolls to move garments through the wringer, rinsing means between the spaced pairs of rolls, said rinsing means being mounted in said water reservoir in which the clothes are buoyantly supported, said rinsing means including impeller mechanism to loosen and flex the clothes while urging the clothes through the reservoir and into the next succeeding pair of rolls, and manual pressure and release means to force the rolls into pressure relationship or to release roll pressure.

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