

No. 864,127.

PATENTED AUG. 20, 1907.

G. W. FROELICH.
WASHING MACHINE.
APPLICATION FILED DEC. 29, 1903.

5 SHEETS—SHEET 1.

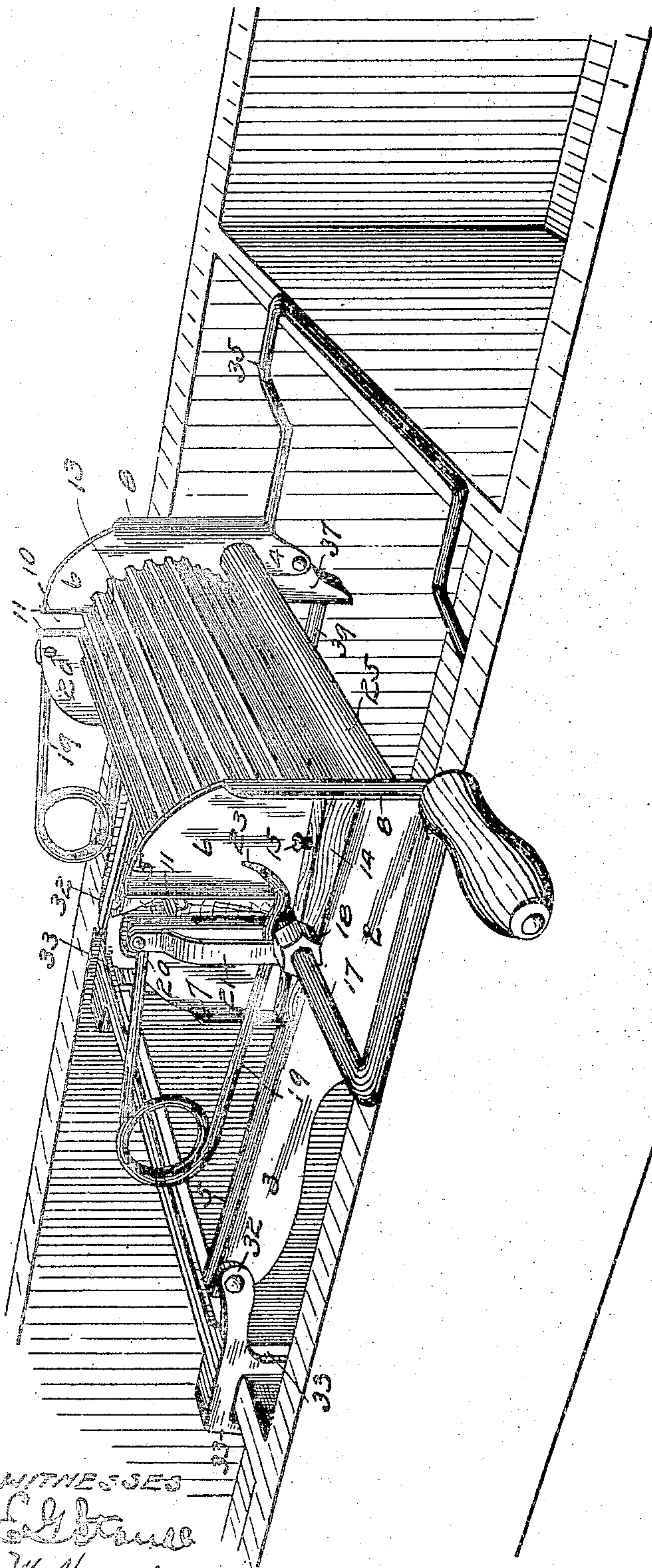


FIG. 1.

WITNESSES
E. J. Starnes
W. H. Hagerty

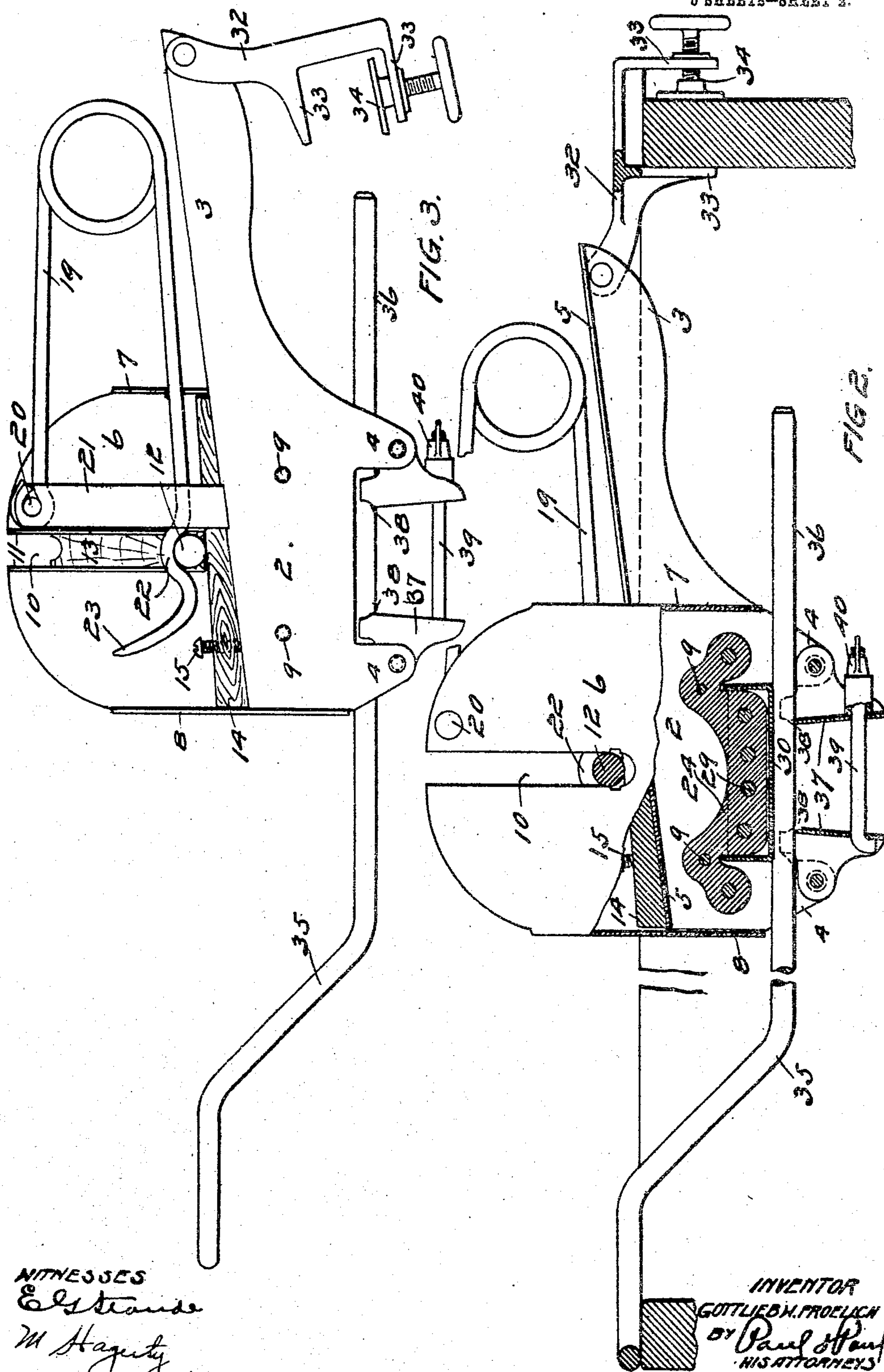
INVENTOR
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5 SHEETS-SHEET 2.



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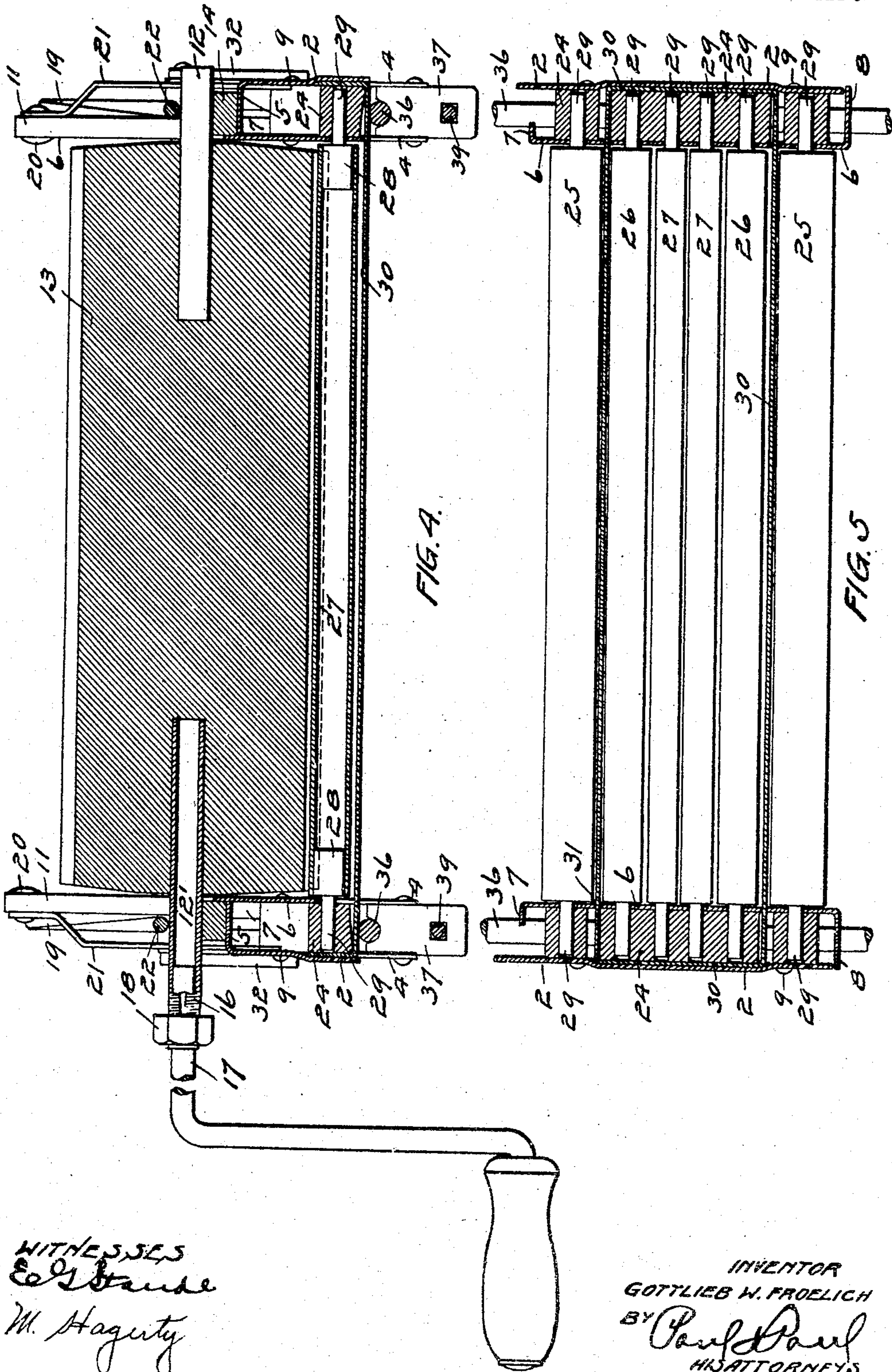
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5 SHEETS—SHEET 3.



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5 SHEETS—SHEET 4.

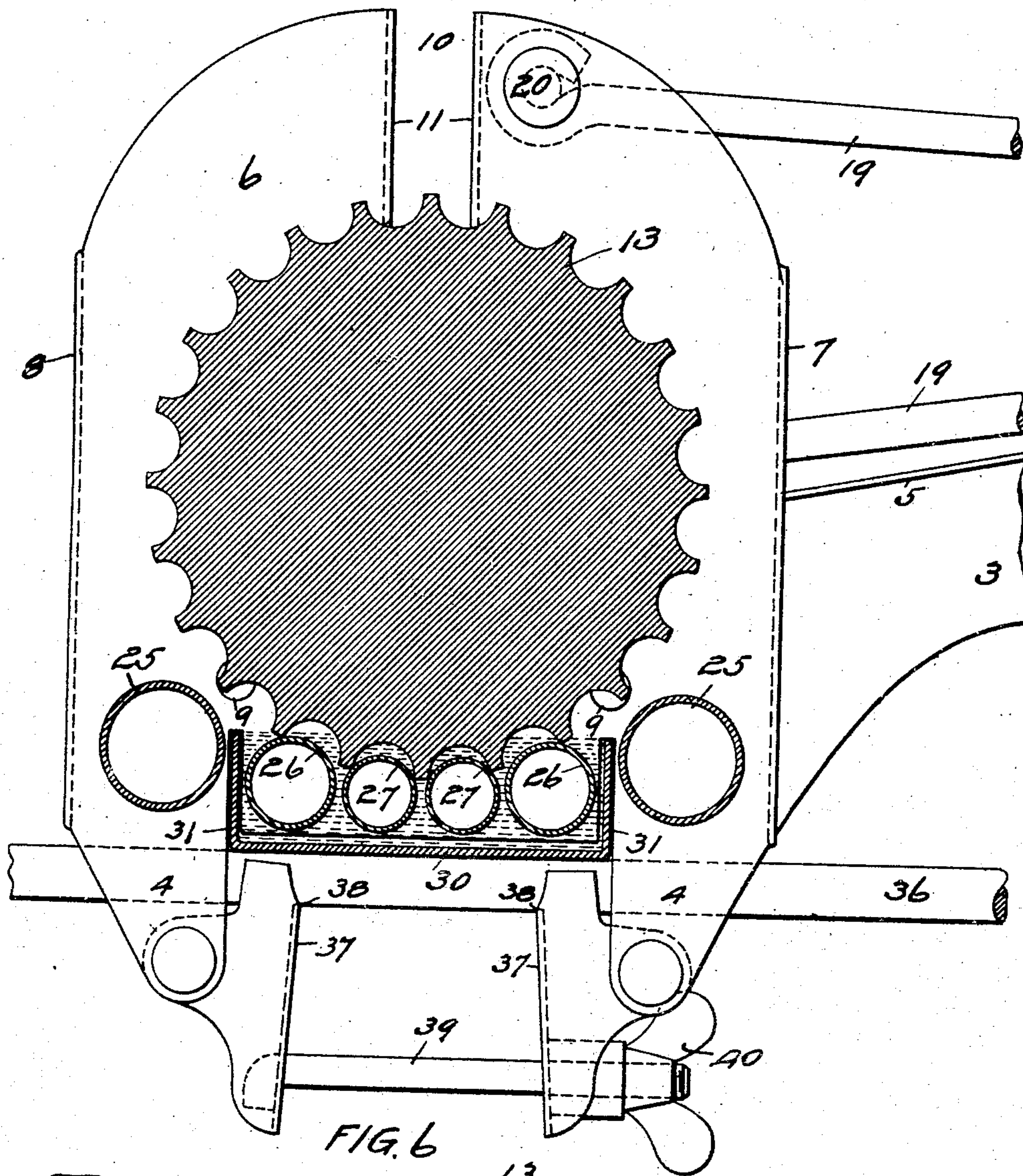


FIG. 6

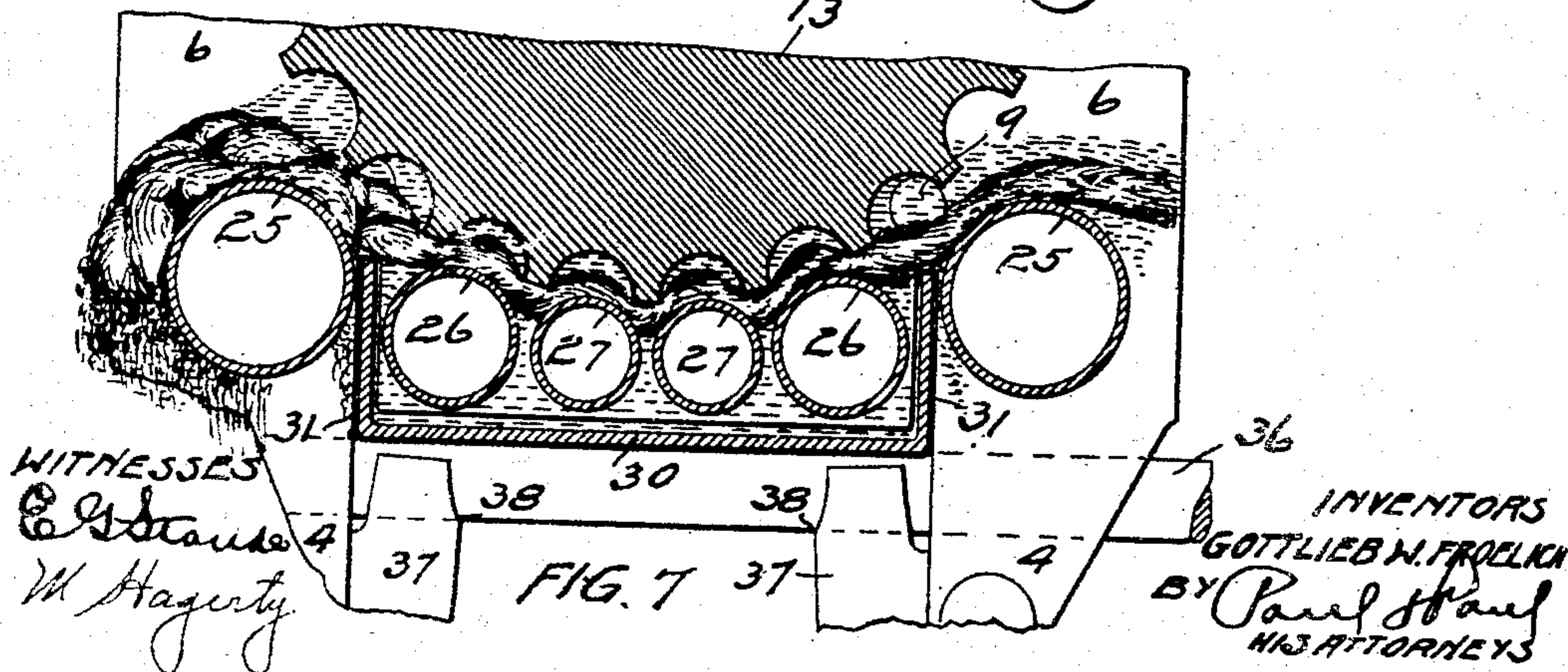


FIG. 7

WITNESSES

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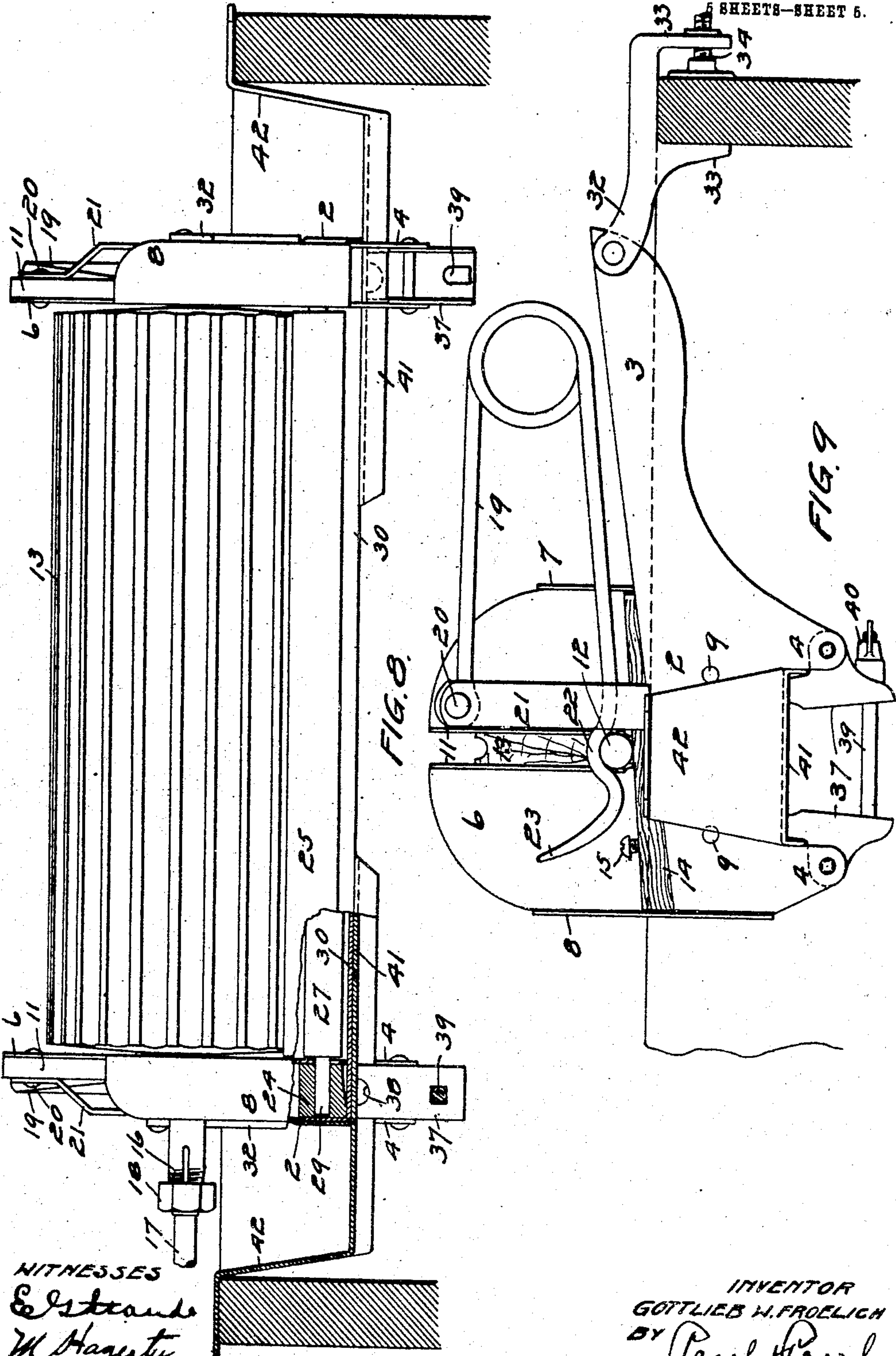
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6 SHEETS—SHEET 5.



WITNESSES

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UNITED STATES PATENT OFFICE.

GOTTLIEB W. FROELICH, OF ST. PAUL, MINNESOTA, ASSIGNOR TO FROELICH MANUFACTURING COMPANY, OF ST. PAUL, MINNESOTA, A CORPORATION OF MINNESOTA.

WASHING-MACHINE.

No. 864,127.

Specification of Letters Patent.

Patented Aug. 20, 1907.

Application filed December 29, 1903. Serial No. 186,943.

To all whom it may concern:

Be it known that I, GOTTLIEB W. FROELICH, of St. Paul, in the county of Ramsey, State of Minnesota, have invented certain new and useful Improvements in Washing-Machines, of which the following is a specification.

My invention relates to washing machines of the roller type.

In washing clothes by hand it is customary to make short bends or folds in the clothes and rub them back and forth over a wash board to force the water through the fabric and soften the dirt.

The object of my present invention is to provide a washing machine, which, in its manner of working on the clothes, resembles as nearly as possible the method of rubbing them on a board by hand.

A further object is to provide a machine which will have a large capacity, will be easy to operate and will not cause undue wear on the clothes.

A further object is to provide a washing machine wherein thin garments or those with fringes can be washed without danger of winding on the rolls.

A further object is to provide a washing machine which can be easily fastened to a common wash tub or to a stationary tub, such as is found in modern residence laundries.

A further object is to provide a washing machine by means of which the clothes can be thoroughly washed with a comparatively small supply of water.

A further object is to provide a machine which will wash thick or folded garments, or thin garments without being folded, with equal facility.

The invention consists generally in various constructions and combinations, all as hereinafter described and particularly pointed out in the claims.

In the accompanying drawings, forming part of this specification, Figure 1 is a perspective view showing the application of my invention to a stationary wash tub. Fig. 2 is a transverse section of the machine through the bearings at one end thereof and showing in section the walls of the tub and the manner of supporting the machine thereon. Fig. 3 is an end view showing the machine detached from the tub. Fig. 4 is a longitudinal vertical section through the frame, the fluted roller and the smaller pressure rollers beneath. Fig. 5 is a horizontal section taken between the large and small rollers. Fig. 6 is a transverse section, full size, through the rollers, showing the pressure rollers arranged within the water pan and the fluted roller in its lowest position. Fig. 7 is a similar view showing the position that the fluted roller assumes when the clothes are passing through the machine and the water being forced through the garments. Fig. 8 is a

side view of the machine showing a modified means for supporting it in the tub. Fig. 9 is an end view of the same.

In the drawings, 2 represents outer end plates provided at each end of the machine and having rearwardly extending arms 3, depending lugs 4 and an inwardly turned flange 5. 6 represents the inner plates at each end of the machine, having outwardly turned edge flanges 7 and 8 and secured to the plates 2 by bolts 9. The plates 6 have vertical centrally arranged slots 10 with flanges 11 formed on each side thereof, said slots being adapted to receive gudgeons 12 and 12' in a fluted roller 13. Tapered blocks 14 are arranged upon the flanges 5 to support the gudgeons 12 and are provided with adjusting screws 15 by means of which one end of the said blocks can be raised or lowered to vary the vertical adjustment of said fluted roller according to the character of the garments to be washed. The blocks are preferably of wood and are held against longitudinal movement by the flanges 7 and 8.

The plates 2 and 6 form heads at each end of the machine and are stamped or pressed out of sheet metal, preferably steel. The gudgeon 12' has a split threaded end 16 that is adapted to receive an operating crank 17 secured therein by means of a lock nut 18, in the well known way.

The fluted roller is yieldingly held against vertical movement by means of U-shaped springs 19, that are pivoted at one end on pins 20 and oscillate thereon between the plates 6 and the guiding straps 21. The free ends of the springs 19 have arched or upwardly curved portions 22 that normally rest upon the outer ends of the gudgeons 12 and 12' and terminate in upwardly turned ends 23 that overhang the said gudgeons when the springs are tilted to permit the removal of the fluted roller. When it is desired to return the springs to their normal position the operator will press down on the looped portion of each spring, and the upwardly turned end 23 thereof will slide up over the gudgeons of the fluted roller until the curved portion 22 bears upon the gudgeons. These upwardly turned ends 23 allow the springs to be tilted up or down to adjust them in their operative or inoperative position without the necessity of lifting said ends.

Between the plates 2 and 6 at each end of the machine, I provide castings or bearing blocks 24 through which the bolts 9 pass and secure said castings rigidly between the head plates. Mounted in bearings at each end of these castings are idle feed rollers 25 and between these feed rollers are a series, preferably four, of pressure rollers 26 and 27 arranged below the middle of the fluted roller and cooperating with the corrugations thereon. All these feed and pressure rollers are

made preferably of steel tubing, provided in their ends with blocks 28 that terminate in pins 29 projecting through holes in the inner head plates 6 and journaled in the castings 24. The fluted roller is preferably of wood and the idle and pressure rollers of metal to obtain the desired strength and prevent the clothes, particularly fringes, from clinging thereto. The rollers and the head of the end plates and their connections are galvanized to present smooth non-corrosive surfaces to the clothes. The two inner pressure rollers are of smaller diameter than the outer pressure rollers, as shown clearly in Fig. 6, and when the fluted roller is in its lowest position each of the smaller pressure rollers will contact at two points with the fluted roller while the outer pressure rollers will each contact at one point only with the fluted roller. In other words, the middle or smaller pressure rollers project within the flutes of the fluted roller when it is in its lowest position, and each contacts with two of the corrugations, while the outer pressure rollers barely extend into the flutes and each contacts with but one of the corrugations, (see Fig. 6).

By arranging the smaller middle rollers nearer the flutes there will be formed when the fluted roller is raised by the insertion of the clothes into the machine, a substantially uniform space between the fluted roller and all the pressure rollers, owing to the fact that the fluted roller, when raised, will move in a direct line with respect to the smaller pressure rollers and obliquely with respect to the larger ones. When, therefore, the fluted roller is raised it will assume a position equidistant substantially from all the pressure rollers and there will be a uniform pressure on all the clothes and an increase in the bearing or washing surface of the machine, which will result in a more rapid and perfect cleansing of the garments.

The upper surfaces of the pressure rollers, owing to their difference in diameter, above noted, conform substantially to the arc of a circle, while their under surfaces are substantially on a level and near the bottom of a shallow water pan, hereinafter described, and keep the water in motion therein to prevent the dirt from settling. The pressure rollers are placed close together, as shown, so that there is no possibility of the clothes working down between them and becoming tangled, and lie near the flutes of the large roller and cooperate with the ribs thereon and loosen and soften the dirt, whether the garments are folded or not, and it is immaterial whether a heavy or folded fabric be fed into the machine, or a thin light article, the operation of removing the dirt will be as thoroughly and nearly as quickly performed in one case as the other.

In a machine of this kind it is desirable to provide a constant supply of water wherein the pressure or bed rollers are immersed, and it is also desirable to confine the water supply within a comparatively small space so that as the clothes pass between the rollers the water will be forced up between them and aid materially in removing the dirt. In carrying out this feature of my invention I provide a shallow, oblong pan 30, preferably of galvanized sheet metal, having a flat bottom and vertical side and end walls, the former extending up into vertical slots 31 in the end plates 6, and the latter fitting between the end plates 2 and the

castings 24, the said plates 2 being pressed outwardly slightly, as shown in Figs. 4 and 5, to receive the ends of the pan. The side walls of the pan extend up between the feed rollers and the upper edges are on a line substantially with the top of the pressure rollers 26 and serve to retain a considerable portion of the water that is brought up by the clothes. This pan connects the heads of the machine and holds them in place, and forms a very rigid, substantial connection and prevents twisting or racking of the machine and the binding of the rollers in their bearings. The pan is made of sufficient weight and strength to avoid the necessity of any other connection between the ends of the machine. The structure is thus simplified and the cost of manufacture materially reduced.

In the operation of the machine the pan will soon become filled with water which will be confined by the vertical side and end walls. The weight of the water squeezed out of the clothes, after the pan has been filled, pressing upon the water already in the pan, will force it up between the rollers and through the clothes and aid materially in loosening the dirt, (see Fig. 7). Some of the water in the pan will overflow the sides but a sufficient quantity will be forced up through the clothes and greatly facilitate the washing operation.

The uniform distance between the small pressure rollers and the fluted roller, and the fact that the former cooperate simultaneously with the corrugations on the latter, insures an even pressure and a uniform simultaneous action by the surface of the pressure rollers on the clothes, and when a garment is fed into the machine the rollers will assume, substantially, the position shown in Fig. 7, the fluted pressure roller yielding vertically to accommodate itself to the varying thickness of the clothes.

As shown plainly in Figs. 6 and 7 the pressure rollers co-act with the corrugations of the fluted roller, and the clothes passing between the pressure rollers and said corrugations will be bent and folded in very much the same manner as they would be by being rubbed over the corrugations of a wash board. The outer pressure rollers 26 are shown in contact each with one corrugation and the intermediate smaller pressure rollers in contact each with two corrugations, and as each corrugation and its cooperating roller acts on the clothes aided by the water to loosen and soften the dirt, it follows that by increasing the number of points of contact between the corrugations and the rollers I am able to obtain a corresponding increase in the efficiency and capacity of the machine.

In an apparatus of this kind it is desirable to provide means for attaching it to the stationary tub in a modern private laundry. I therefore provide brackets 32 pivotally connected to the arms 3 and having depending lugs 33 that straddle the walls of the tub, and one of said lugs at each end of the tub is provided with a clamping screw 34. The lugs are arranged with sufficient space between them to accommodate the device to tub walls of different thickness. Upon the opposite side of the machine from the bracket 32 I provide a U-shaped frame 35 having ends 36 that are adapted to slip in under the water pan and be engaged by clamps 37 that are pivoted on the lugs 4. The ends of said clamps are provided with grooves 38 that fit the curved surface of the

ends 36 and clamp the same firmly against the bottom of the water pan. The lower ends of the clamps are connected by rods 39 having threaded ends provided with thumb nuts 40 by means of which the pressure of the clamps on the ends 36 can be regulated.

In some instances it is desirable to support the machine at the ends of the rollers instead of the sides thereof, and I therefore provide plates 41 that are adapted to slip in between the lugs 4 and be held securely against the water pan by the clamps 37. These plates have upwardly and outwardly projecting ends 42 that rest upon the sides of the tub, as shown in Fig. 8, and form end supports for the machine. Whenever desired these end plates may be removed and the side supporting device, illustrated in Figs. 2 and 3, substituted therefor.

The operation of my improved washing machine is as follows: The fluted roller having been adjusted, preferably so that its corrugations will be close to the pressure rollers without contacting therewith, the clothes are fed into the machine. The fluted roller will be raised against the tension of its springs away from the pressure rollers and the pan wherein the pressure rollers are immersed will be quickly filled with water brought up by the clothes, and will be kept filled during the washing operation, overflowing with sufficient frequency to prevent the accumulation of dirt therein. The operator will feed the clothes in between the fluted and pressure rollers and as the fluted roller is raised, a uniform distance will be established between its corrugations and the surface of the pressure rollers, insuring a uniform pressure on the clothes and a washing surface equal to the full width of the pressure rollers. The surfaces of the pressure rollers will cooperate with the corrugations as the fluted roller is revolved and will make short folds or bends in the garments, corresponding as nearly as possible to the operation of washing by hand on a board. The water brought up by the clothes after the pan has been filled will cause the water in the pan to be forced up through the meshes of the garments and aid materially in softening and loosening the dirt, and there being a constant supply of water around the pressure rollers, it is not necessary to operate the fluted roller rapidly to secure good results.

I claim as my invention:

1. In a washing machine, the combination, with a suitable frame provided with means for securing it to the top of a wash-tub, of a fluted roller having a vertical movement in said frame, a series of pressure rollers mounted in said frame and arranged beneath said fluted roller and a suitable pan or auxiliary water receptacle also secured upon said frame and within which said pressure rollers are arranged and said pan having side walls which confine the water therein and compel it to pass up between said pressure rollers.

2. In a washing machine, the combination, with a suitable frame, of a fluted roller mounted therein, U-shaped springs horizontally arranged in said frame and pivoted at one end above the bearings of said roller, the opposite ends of said springs being upwardly turned and normally resting upon the journals of said roller to yieldingly hold them in place, and said ends being disengaged from said journals by the upward tilting of said springs.

3. In a washing machine, the combination, with head plates 2 and 6 at each end of the machine, the former having inwardly-turned flanges 5, of tapered blocks resting on said flanges, adjusting screws mounted in said blocks and adapted to engage said flanges to move said blocks vertically, and a spring pressed roller journaled on said blocks and vertically adjustable therewith, substantially as described.

4. In a washing machine, the combination with a suitable frame provided with means for securing it upon the top of a wash-tub, of a fluted roller mounted in bearings upon said frame, a series of smooth surfaced rollers also mounted in bearings upon said frame, and arranged on the arc of a circle beneath said fluted roller, the smooth surfaced rollers in the middle being of less diameter than those at the outside, and a pan or auxiliary receptacle secured upon said frame and inclosing said smooth surfaced rollers and having side walls which confine the water in the pan and compel it to pass up between said rollers.

5. In a washing machine, the combination, with a suitable frame provided with means for securing it upon the top of a wash-tub, of a fluted roller mounted in bearings upon said frame, a series of smooth surfaced pressure rollers arranged beneath said fluted roller, feed rollers mounted in said frame and arranged on each side of said pressure rollers and a pan or auxiliary receptacle secured upon said frame and having its walls extended upward between the pressure rollers and the feed rollers.

6. In a washing machine, the combination, with the head plates having depending lugs at their lower edges, of clamps pivoted at points intermediate to their ends on said lugs, rods having adjusting thumb nuts connecting the lower ends of said clamps, and suitable supports adapted to be inserted between said head plates and the upper ends of said clamps, substantially as described.

7. In a washing machine, the combination, with the outer head plates having rearwardly extending arms, of a bracket connecting said arms and pivotally supported thereon and having depending lugs adapted to straddle the wall of a stationary tub, and clamping devices carried by said lugs.

8. In a washing machine, the combination, with the head or end plates and the guides thereon, of a U-shaped frame having ends that are slidable in said guides on said heads, and clamping devices for engaging and locking said ends.

9. In a washing machine, the combination, with the head plates 2 and 6 at each end of the machine, of castings arranged between said plates, bolts passing through said plates and said castings and securing them together, pressure rollers journaled in said castings, and a shallow water pan having its end walls inserted and clamped between said castings and said head plate 2 and in which pan said rollers are immersed.

10. In a washing machine, the combination with a vertically yielding fluted roller, of a series of smoothed pressure rollers provided beneath said fluted roller, the middle pressure rollers being of less diameter than those at the outside and arranged to partially enter the flutes of said fluted roller and each contacting with two of the corrugations of said fluted roller when it is in its lowest position, the outer pressure rollers each contacting with one only of said corrugations when said fluted roller is in said position and all of said pressure rollers being a uniform distance from said fluted roller when it is raised by the pressure of the clothes, whereby a uniform pressure on the clothes throughout the entire width of the washing surface of the rollers will be provided.

In witness whereof I have hereunto set my hand this 19th day of December 1903.

GOTTLIEB W. FROELICH.

In presence of—
RICHARD PAUL,
M. HAGERTY.