Jan. 28, 1941. E. N. HURLEY, JR., ET AL 2,230,059

DOMESTIC LAUNDRY APPARATUS

Filed June 4, 1938 3 Sheets-Sheet 1

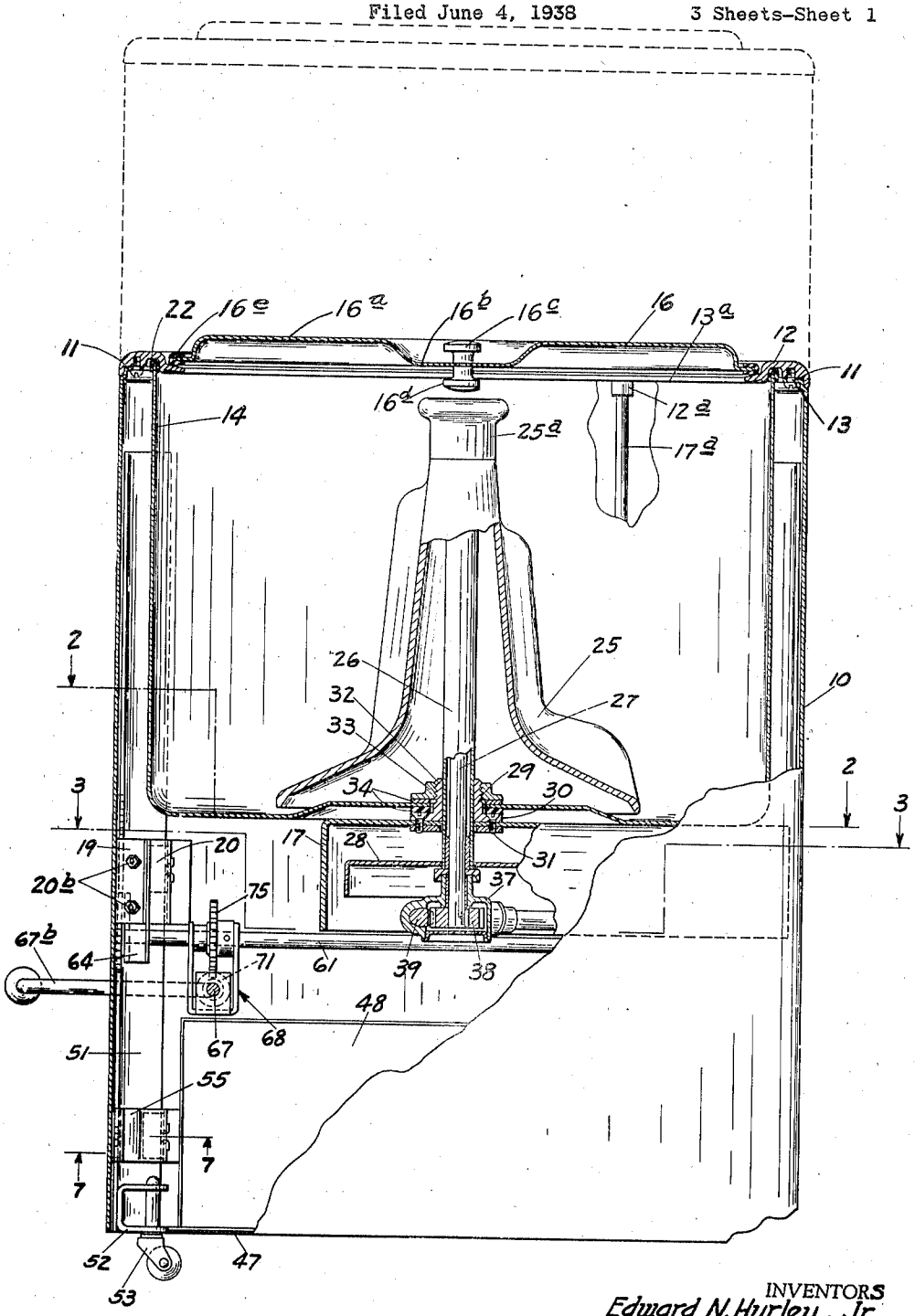


FIG. 1.

INVENTORS
Edward N. Hurley, Jr.
Joseph W. Jensen.

BY A. W. Molinare
ATTORNEY.

Jan. 28, 1941. E. N. HURLEY, JR., ET AL 2,230,059

DOMESTIC LAUNDRY APPARATUS

Filed June 4, 1938 3 Sheets-Sheet 2

FIG. 2

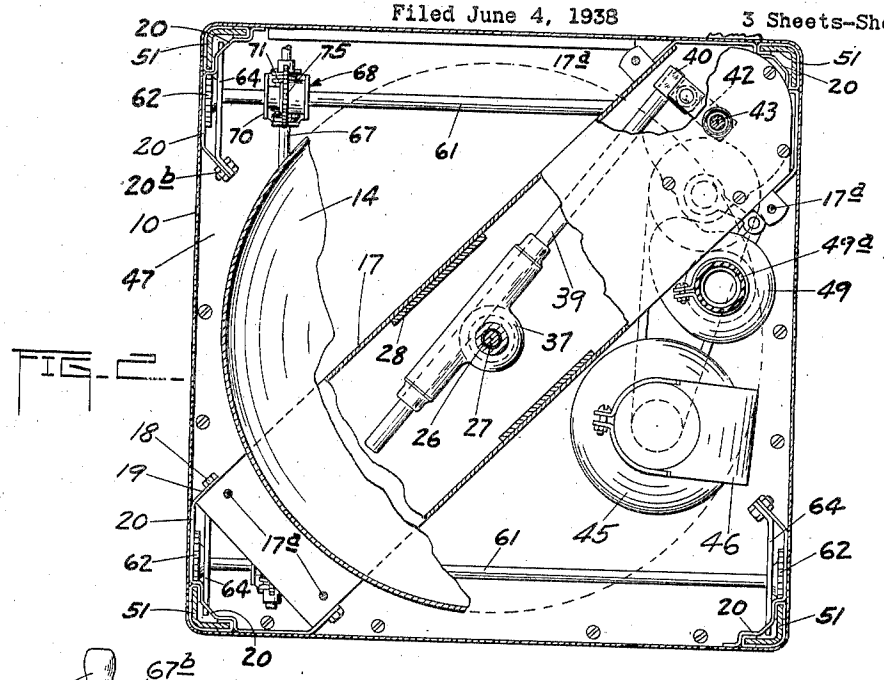
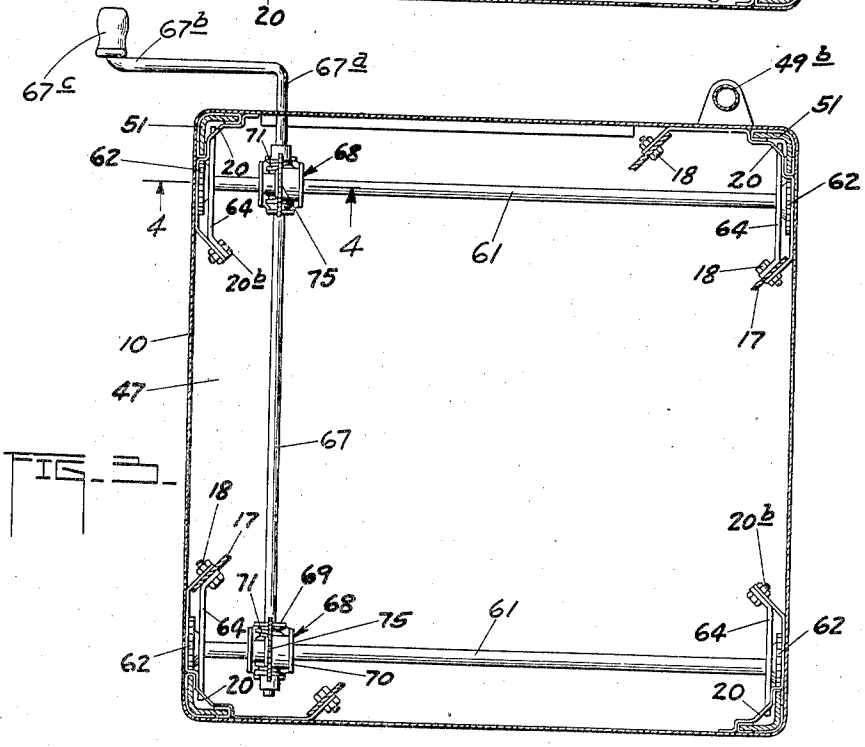


FIG. 3



INVENTORS.
Edward N. Hurley, Jr.
BY Joseph W. Jensen.
A. W. Molinare
ATTORNEY.

Jan. 28, 1941. E. N. HURLEY, JR., ET AL 2,230,059

DOMESTIC LAUNDRY APPARATUS

Filed June 4, 1938 3 Sheets-Sheet 3

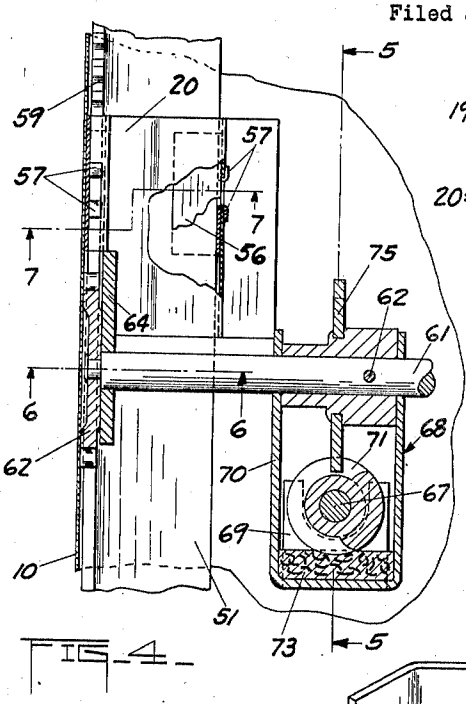


FIG. 4.

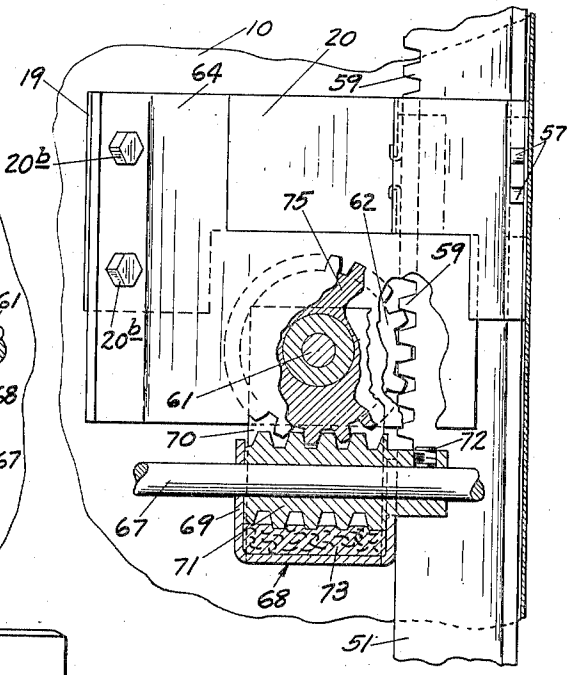


FIG. 5.

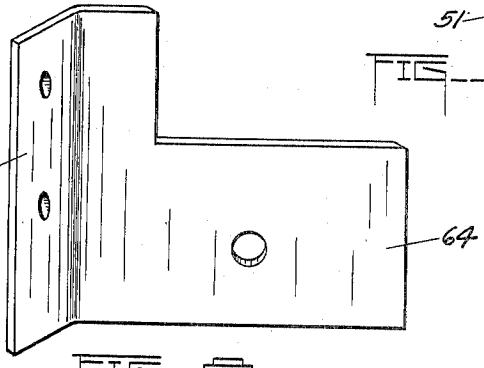


FIG. 8.

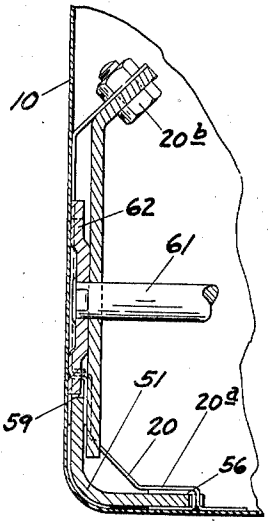


FIG. 6.

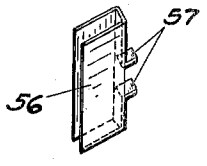


FIG. 9.

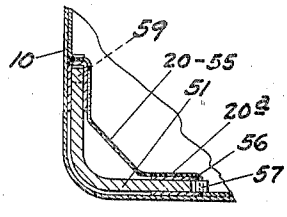


FIG. 7.

INVENTORS.
Edward N. Hurley, Jr.
Joseph W. Jensen.

BY A. W. Molinare
ATTORNEY.

Patented Jan. 28, 1941 2,230,059

UNITED STATES PATENT OFFICE

2,230,059

DOMESTIC LAUNDRY APPARATUS

Edward N. Hurley, Jr., Wheaton, and Joseph W. Jensen, Berwyn, Ill.; said Jensen assignor to Electric Household Utilities Corporation, Chicago, Ill., a corporation of Illinois

Application June 4, 1938, Serial No. 211,758

3 Claims. (Cl. 312—151)

The present invention relates to improvements in laundry apparatus and, more particularly, to washing and ironing machines of the type used in the household.

In many localities, homes are constructed without basements, so that the laundering operations are, by necessity, usually performed in the kitchen or on the back porch. It also frequently happens through circumstances and necessity that occupants of apartments, especially in larger cities, are obliged for convenience to do at least a portion of their washing and ironing in the kitchen of the apartment. The character of laundering apparatus now available does not lend itself practicably for use in such homes and apartments as above mentioned. At the present time it is possible to obtain a full-size washing machine, which occupies a substantial amount of space and, in general, is in the way when not in use, and in some instances, results in unduly crowding of the room or other locality where the machine is placed when not in operation, as well as presenting an unsightly appearance. It is also possible to obtain a relatively small washing machine, of the type sometimes termed "midget" machines, which while occupying a small amount of floor space are, as a rule, wholly impractical for properly and expeditiously washing a substantial volume of clothes. Furthermore, such small machines are not usually provided with power driven wringers, and hence the water must be removed from the clothes by hand, which operation is usually considered more laborious than the washing operation itself.

This invention is more particularly directed to an improved laundry apparatus which is especially suitable for use in homes and apartments as above mentioned, and which includes a washing machine of the type having a detachable power driven wringer.

One of the objects of the present invention is to provide a novel washing machine construction of the character indicated, which is of substantial capacity and which is so constructed as to permit quick and easy adjustment thereof to a desired height at which it is most convenient for the operator to utilize, and which may be readily and substantially reduced in height so as to permit convenient storing of the machine in small quarters, in an out-of-the-way location when not in use, such as under a kitchen sink or under a table.

Another object is to provide an improved washing machine construction of the type having a detachable power driven wringer, which machine is characterized by the provision of novel manually operated mechanism for quickly and easily varying the effective overall height of the machine and in which the cabinet of the machine is formed with a compartment in which the wringer may be stored when not in use.

A further object of this invention is to provide a novel form of raising and lowering mechanism for varying the effective height of the washing machine; said mechanism including self-locking features for automatically retaining the washing machine at any desired position of vertical adjustment within the normal range of movement thereof.

A still further object is to provide an improved washing machine of the character indicated which is of simple, practical, compact construction and which is capable of being embodied in a neat and attractive design so as not to appear unsightly in the living quarters of a home or apartment.

Other objects and advantages of this invention will be apparent from the following description, when taken in connection with the accompanying drawings in which:

Fig. 1 is a vertical sectional view through a washing machine embodying the novel features constituting the present invention.

Fig. 2 is a horizontal sectional view taken substantially as indicated at lines 2—2 on Fig. 1.

Fig. 3 is a horizontal sectional view taken substantially as indicated at lines 3—3 on Fig. 1.

Fig. 4 is an enlarged fragmentary sectional view through a portion of the raising and lowering mechanism, taken substantially as indicated at lines 4—4 on Fig. 3.

Fig. 5 is an enlarged fragmentary sectional view of the raising and lowering mechanism, taken as indicated at lines 5—5 on Fig. 4.

Fig. 6 is an enlarged detail sectional view through a portion of the operating mechanism and the casing of the washing machine, taken as indicated at lines 6—6 on Fig. 4.

Fig. 7 is an enlarged detail sectional view through a corner of the casing of the washing machine showing the relationship and connection of one of a supporting leg to the casing, taken substantially as indicated at either of the planes indicated by lines 7—7 on Figs. 1 and 4.

Fig. 8 is an enlarged perspective view of one of the brackets which serve to support the raising and lowering mechanism.

Fig. 9 is a perspective view of one of the liners which serves as sliding bearings to provide guidance for the supporting legs of the machine.

In the embodiment of our invention selected for purpose of illustration, the washing machine includes a tubular casing 10 formed of sheet metal in substantially rectangular cross-section. It is to be understood that the cross-sectional form of the casing may be of any desired shape, preferably polygonal, which is to be understood as including any closed multi-sided form. The upper marginal portion of the casing is bent inwardly to form a marginal flange 11 on which is mounted a top 12 which is secured thereto by screws 13. Said top 12 is preferably a casting and is formed with a relatively large central (preferably circular) opening 13a registering with and constituting the opening for a tub 14 disposed within the casing and which is herein shown of circular cross-section. Said top 12 surrounding the opening 13a is formed with an annular recess or depression to constitute a seat for the marginal edge of a cover indicated at 16, which serves as a closure for the tub of the washing machine. Said cover, as may be seen in the drawings, is of circular outline and is formed with an upwardly offset concentric intermediate area 16a with a central area 16b appearing depressed with respect thereto. Connected centrally to said central area 16b and projecting from opposite sides thereof are handles or knobs 16c and 16d, respectively. It will be noted that due to the offset relation of the intermediate area 16a and central area 16b, the knob 16c does not project above the top surface of said intermediate area 16a, so that the cover may be permitted to rest relatively stable when inverted and placed on a flat top support, such as a table. Furthermore, the cover, when in position on the machine, may serve as a flat top for properly supporting articles. The knobs 16c and 16d may be connected together in any convenient manner (not shown), such as by a threaded stud carried on one knob threaded into the other knob. The marginal edge of the cover is embraced by a band 16e of U-shaped cross-section. Said band is preferably formed of resilient material, such as rubber, and when seated in the annular recess surrounding the opening 13a of the top 12, serves to provide a seal for the tub opening, and also serves to reduce noise in placement of the cover. It is to be understood that for purposes of appearance, said cover, which is formed of metal, is provided with a highly finished surface, such as chromium or nickel plating, or the cover may be made of aluminum and the surface thereof highly polished. As will be apparent, our novel form of cover construction may be utilized advantageously as a tray adapted to be supported by the handle or knob 16d for conveying washed fabric articles preparatory to hanging up for drying. Furthermore, the cover when thus inverted may, due to its ornamental and attractive appearance, be conveniently used as a tray for various other purposes in which case, the underside of the intermediate area 16a is, in effect, an annular trough with the knob 16d located a convenient distance above the bottom so as to permit convenient grasping by the hand.

The tub 14 may be of any desired construction and as shown, it is supported on a diagonally disposed structural member 17 in the form of a down-turned channel, the ends of which are secured by bolts 18 to the angular extensions 19 of brackets 20, which are rigidly attached to two contiguous walls of the casing 10, as by spot welding, in position to bridge the corners of said casing. The tub is additionally braced and held in fixed position in the cabinet by two sets of tie rods 17a, connecting opposite ends of the channel 17, with the top 12; said rods being threaded at their upper ends in bosses 12a formed on the underside of said top. The upper marginal edge of the tub 14 is embraced by a resilient band 22 of U-shaped cross-section, which serves the function of assisting in supporting and positioning the tub on the support 17 and also serves as a seal to prevent passage of the washing fluid over the upper marginal edge of the tub.

Mounted substantially centrally within the tub is an oscillatable agitator element 25, of conventional design, supported on a tubular standard 26, and driven by a vertically disposed drive shaft 27, extending upwardly through said standard 26. Said standard protrudes through the bottom of the tub and tht web of the structural channel 17 and terminates slightly below a transversely extending bracket member 28, which is rigidly attached to the flanges of the channel member 17. This arrangement thus provides two vertically separated supports for the standard 26, to insure proper positioning of same. Press-fitted onto the tubular standard 26 is a coupling member 29 having a flange 30 which is rigidly attached by means of screws 31 to the web portion of the channel 17. Said coupling member is also formed with an annular up-standing threaded portion 32 adapted to project through the opening in the bottom of the tub and on which is threaded a nut 33. Interposed between the flange 30 and the outside of the bottom of the tub and between the nut 33 and the inside of the bottom of the tub are gaskets 34, which seal said aperture in the bottom of the tub in a manner well understood in the art.

The agitator 25 is controlled in operation by mechanism located in the head 25a which, in the position shown, may be understood to be in driving engagement with the agitator drive shaft 27, and which may be vertically raised together with the body of the agitator for disengaging the drive connections to the agitator drive shaft. While this form of control does not constitute any part of the present invention, it may be understood to be similar in construction and operation to the agitator control disclosed in the co-pending application of A. H. Gerhardt and J. W. Jensen, Serial No. 218,266, filed July 9, 1938.

The lower end of the agitator drive shaft 27 extends into a cast housing 37 in which it is rigidly connected to a pinion 38 which, in turn, is meshed with a reciprocating rack bar 39, slidably guided in said housing 37. One end of the rack bar, as seen in Fig. 2, is rigidly connected to a block 40 which, in turn, is pivotally connected to the outer end of a pitman 42 mounted on the lower end of the wringer post drive shaft 43. This wringer post drive shaft may be understood to be operatively driven in a conventional manner by mechanism, not herein shown in detail, operatively connected to an electric motor indicated at 45 which is carried by brackets 46 secured to a bottom panel 47 which constitutes the bottom of the casing 10.

It is to be understood that the wringer post drive shaft 43 terminates at its upper end adjacent the top 12 and is formed to receive a coupling of the drive mechanism associated with the wringer (not shown), which may be understood to be detachably connectible to the shaft 43 in a conventional manner. As may be seen in Fig. 1 of the drawings, the casing 10 extends a substantial distance below the bottom of the tub 14

and has its lower marginal edge formed with an inturned flange to which is secured, as by bolts (not shown), a panel 47 to constitute a bottom for the casing, and, incidentally, to constitute a bottom for a storage compartment formed therein below the tub and the driving mechanism. Preferably, the rear wall of the casing, adjacent the bottom, is formed with an opening 48 to afford access to the compartment, which compartment may serve as a convenient place of storage for the wringer when removed from the machine.

A pump 49 is operably connected to the driving mechanism in a conventional manner and is provided with a flexible hose 49a, which, it may be understood, is connected to the drain outlet of the tub 14. The pump is also provided with a flexible discharge conduit (not shown) connected to the lower end of a stand pipe 49b, secured by brackets to the exterior rear wall of the casing 10. The upper end of the stand pipe is provided with a telescopic swivel neck 49c constituting the discharge nozzle, which may be adjusted as desired for conveniently discharging the washing fluid into the sink or other place of discharge.

The washing machine, as may be seen in Fig. 1, may occupy a position as shown in full lines, or may be elevated to a position indicated by dotted lines, or may be adjusted to any position intermediate the two positions indicated in said Fig. 1 so as to suit the convenience of the user as to the matter of height of the machine. The mechanism for elevating and lowering the machine includes vertically disposed supporting legs 51 slidably mounted in each of the four corners of the casing and, as may be seen in the drawings, said supporting legs are each formed as structural angle members, including a pair of angularly related portions adapted to be positioned in close proximity to the two contiguous walls of the casing forming the corner. The lower end of each of the legs has rigidly attached thereto as by welding, a bracket 52 in which is mounted a caster 53, which casters serve to facilitate the movement and placement of the machine. The supporting legs 51 are confined in their respective corners by the brackets 20 which are spot-welded to the interior of the casing and which are formed with offset portions connected by an intermediate portion bridging the corner so as to accommodate and provide clearance for the leg members 51. Said brackets are formed to provide ways 20a in which the outer marginal portions of the respective angularly related portions of the leg members are slidably movable. Mounted adjacent the lower portion of the casing to also assist in providing guidance and support for the leg members 51 are brackets 55 which, in general are similar to the brackets 20 except that they are not provided with angular extensions 19. Mounted in the ways for the leg members formed in the respective brackets 20 and 55 are bearing liners 56 which are of generally U-shaped cross-section, as seen in Fig. 9, and which liners are adapted to embrace the outer marginal edges of the respective angularly related portions of said legs 51. Said liners are each formed with a pair of tangs 57 projecting outwardly from the web portion connecting the two sides thereof, which tangs are adapted to be extended through openings formed in the ends of the ways of brackets 20 and 55 and crimped thereover, as seen in the drawings, for fixedly attaching said liners in position in said brackets. In order to protect the interior of the metal casing 10 from corrosion, it is preferably coated or painted, and the liners 56 thus space the legs 51 out of sliding contact with the inner surfaces of the casings and thus avoid the possibility of scraping off the coating.

The adjacent marginal edges of the angularly related portions of the legs of each pair are formed with a series of teeth 59 so as to constitute a rack. Extending transversely and disposed in substantially the same horizontal plane, below the driving mechanism for the agitator, are a pair of parallel, spaced-apart, drive shafts 61, to the outer ends of which are rigidly attached gears 62 which are positioned in meshing engagement with the respective racks 59 of said legs 51, as seen in Figs. 4, 5, and 6. These shafts are supported adjacent their outer ends in bracket plates 64 which are of the form as may be seen in the detail of Fig. 8 and which are provided wtih an angularly disposed portion 65 adapted to be rigidly attached to the extensions 19 of the brackets 20. Said bracket plates 64 are attached to the brackets 20 in the corner to which the channel support 17 extends by the bolts 18, which also secure said channel in position, while the bracket plates 64 located in the opposite diagonal corners are secured to the bracket plates 20 by bolts 20b. The bracket plates 64 are formed so as to engage a portion of the lower marginal edge of the brackets 20 in interlocking relationship, as seen in Figs. 4 to 6 inclusive, so as to form a substantial and practical connection to the casing and which, in effect, is equivalent to a direct bearing support on the casing proper.

Extending transversely of the shafts 61 is a manually operable drive shaft 67 disposed below said driven shafts 61 and supported thereby. Said shaft 67 is connected to the respective shafts 61 by bearing brackets 68, each of which in either of two right angle vertical planes is of U-shaped cross-section, and in which brackets a pair of legs 69 have journal support on the drive shaft 67, while the other opposite pair of legs 70 are somewhat longer and are journaled on the shafts 61. Rigidly mounted on the drive shaft 67 and embraced between each pair of legs 69 is a worm 71, which worms are secured to said shaft by means of set screws 72. Disposed in the bottom of the brackets, below the worms, is a body of material, preferably in the form of fabric 73, such as felt, saturated with suitable lubricant for providing adequate lubrication to the threads of the worm. Mounted on the respective shafts 61 by means of pins 62 intermediate respective pairs of legs 70 of said bracket 68 are gears 75 which are in mesh with the respective worms 71. It will now be seen that by virtue of the construction described, the drive shaft 67 together with the worms are supported by the driven shafts 61. One end of the drive shaft 67 is extended as indicated at 67a through the back wall of the casing and bent angularly to a hand crank portion 67b on the outer end of which is mounted a convenient knob 67c for rotating the shaft 67, which in turn imparts rotation in opposite directions to the two driven shafts 61 by virtue of which the gears 62 are caused to rotate and thereby move vertically with respect to the racks 59 and their supporting legs 51, either upwardly or downwardly, depending upon the direction of rotation of the crank arm 67b, for raising or lowering the entire washing machine structure. It is to be understood that the worms 71 are of the self-locking

type so as to serve to support the load and maintain the machine, at any position of vertical adjustment within the range of movement thereof as indicated in the full line and dotted line positions respectively in Fig. 1.

It will now be apparent that by virtue of the construction described the washing machine when in use may be readily elevated to a proper and convenient height for performing a normal washing. When the washing operation is completed, the wringer (not shown) may be removed and placed in the storage compartment 48 in the bottom of the cabinet, and then by operation of the crank arm 67b through the mechanism above described, the machine may be lowered to a height substantially as indicated in full lines in Fig. 1, at which height it is sufficiently low to permit the machine to be conveniently stored under a kitchen sink of average height, or under a table or in any suitable out-of-the-way location. In any event, the machine, when collapsed, will occupy a minimum amount of space while at the same time, it does not present an objectionable or unsightly appearance.

Although we have herein shown and described a preferred embodiment of our invention, manifestly it is capable of modification and rearrangement of parts without departing from the spirit and scope thereof. We do not, therefore, wish to be understood as limiting this invention to the precise embodiment herein disclosed, except as it may be so limited by the appended claims.

We claim:

1. In combination, a casing of polygonal cross-section for supporting and enclosing a washing machine or the like therein, a plurality of supporting legs slidably mounted in the respective corners of the casing, bracket means connected to the interior of each of two contiguous sides of the casing to form guideways for said leg members, and manually actuated means carried by the casing and operably connected to said legs for uniformly moving said casing relatively to the legs, whereby to vary the height of the casing relatively to the floor, said manually actuated means including a plurality of driven shafts, pinions rigidly mounted on said shafts, rack means on each leg member meshed with said pinions, a drive shaft, motion transmitting means interconnecting said drive shaft with the driven shafts, and bearing brackets for said driven shafts rigidly connected to said leg-guideway brackets for supporting said manually actuated means.

2. In combination, a casing of polygonal cross-section for supporting and enclosing a washing machine or the like therein, a plurality of supporting legs slidably mounted in the respective corners of the casing, bracket means connected to the interior of each of two contiguous sides of the casing to form guideways for said leg members, and manually actuated means carried by the casing and operably connected to said legs for uniformly moving said casing relatively to the legs, whereby to vary the height of the casing relatively to the floor, said manually actuated means including a plurality of driven shafts, pinions rigidly mounted on said shafts, rack means on each leg member meshed with said pinions, a drive shaft, motion transmitting means interconnecting said drive shaft with the driven shafts, including means for supporting said drive shaft from said driven shafts, and bearing brackets for said driven shafts rigidly connected to said leg-guideway brackets for supporting said manually actuated means.

3. In combination, a casing of polygonal cross-section for supporting and enclosing a washing machine or the like therein, a leg member slidably mounted in each corner of the casing, each of said leg members being of angular cross-section with the angularly related portions thereof disposed adjacent contiguous sides of the casings, the marginal edge of one of said portions of each leg member being formed as a rack, bracket means connected to the interior of each of two contiguous sides of the casing to form ways for the respective angularly related portions of the leg members, liners of U-shaped cross-sections mounted in said ways of the brackets and serving to embrace and provide guidance for the angularly related portions of the leg members, and manually actuated leg operating means carried by the casing, including pinions meshing with the racks of the respective leg members for uniformly moving the casing relatively to the leg members for varying the height of the casing relatively to the floor.

EDWARD N. HURLEY, JR.
JOSEPH W. JENSEN.