May 28, 1940. G. LIDSEEN 2,202,158

DOMESTIC WASHING MACHINE

Filed Oct. 14, 1938 4 Sheets-Sheet 1

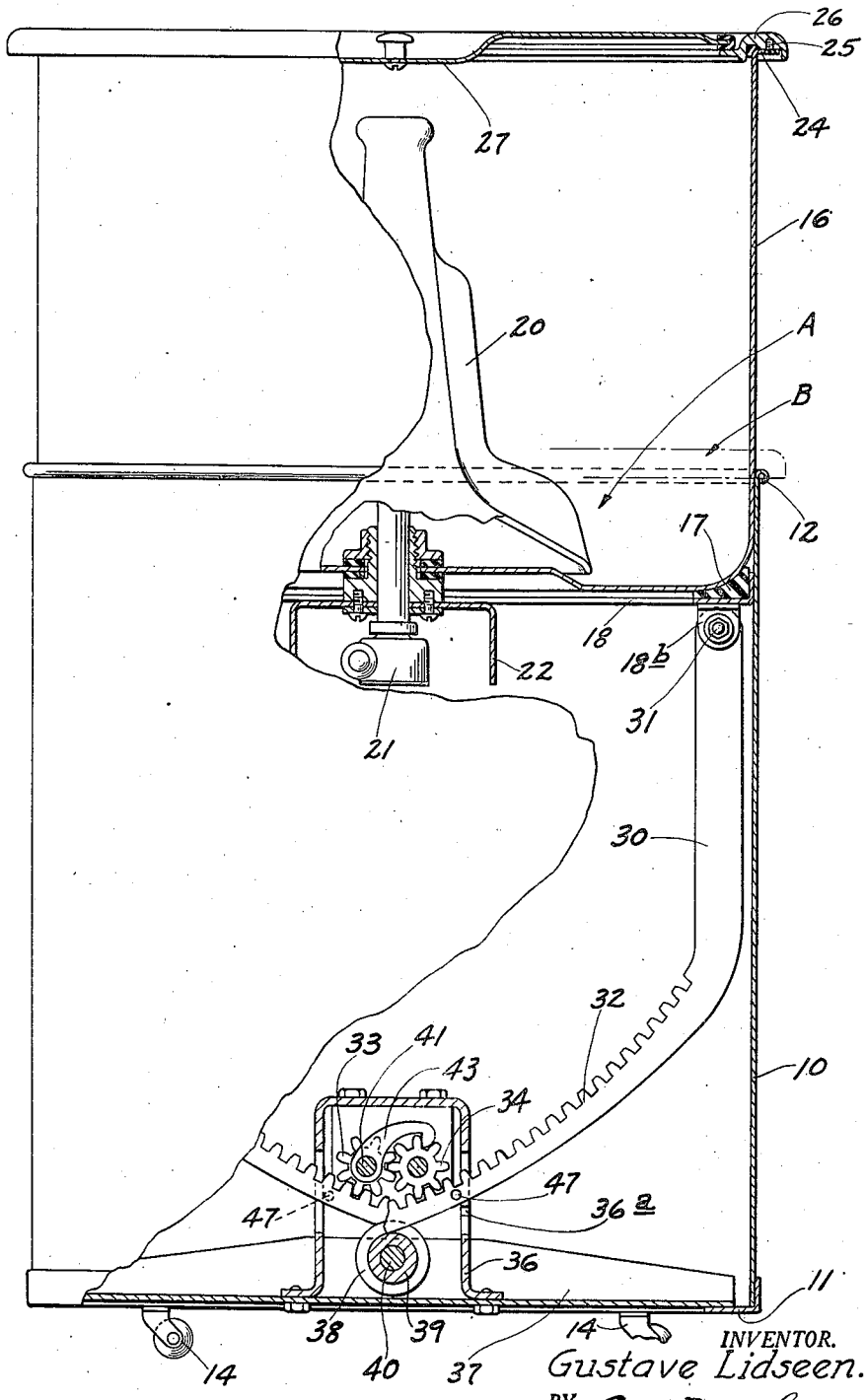

FIG. 1.

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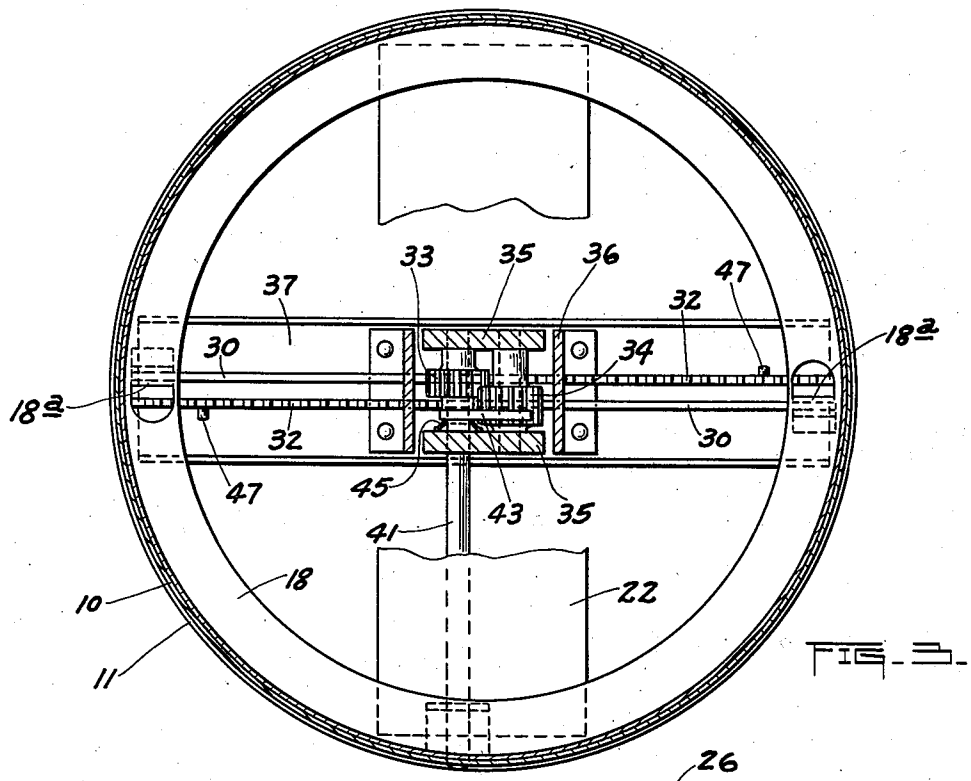

FIG. 3.

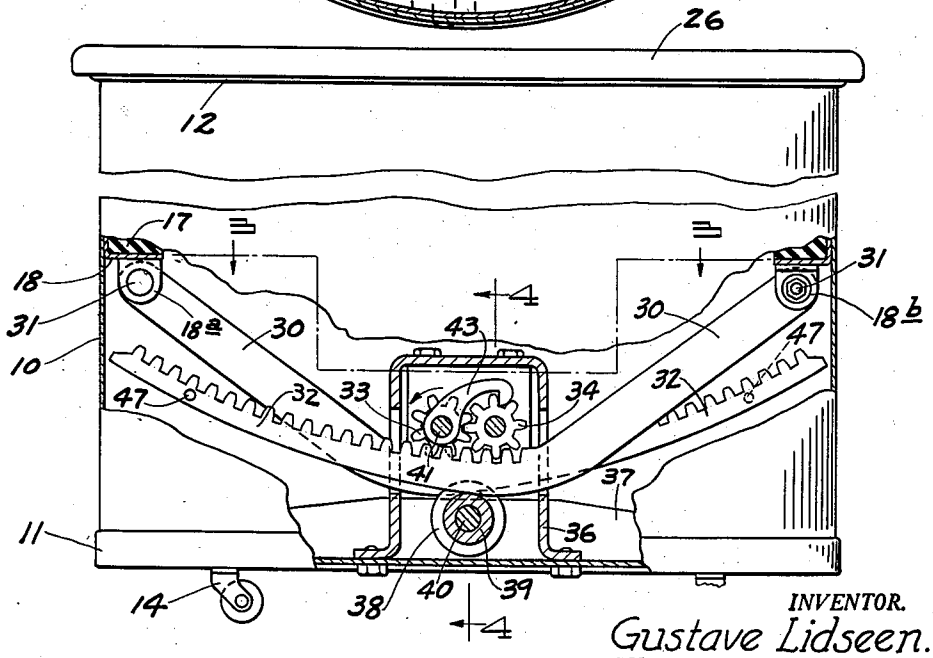

FIG. 2.

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DOMESTIC WASHING MACHINE

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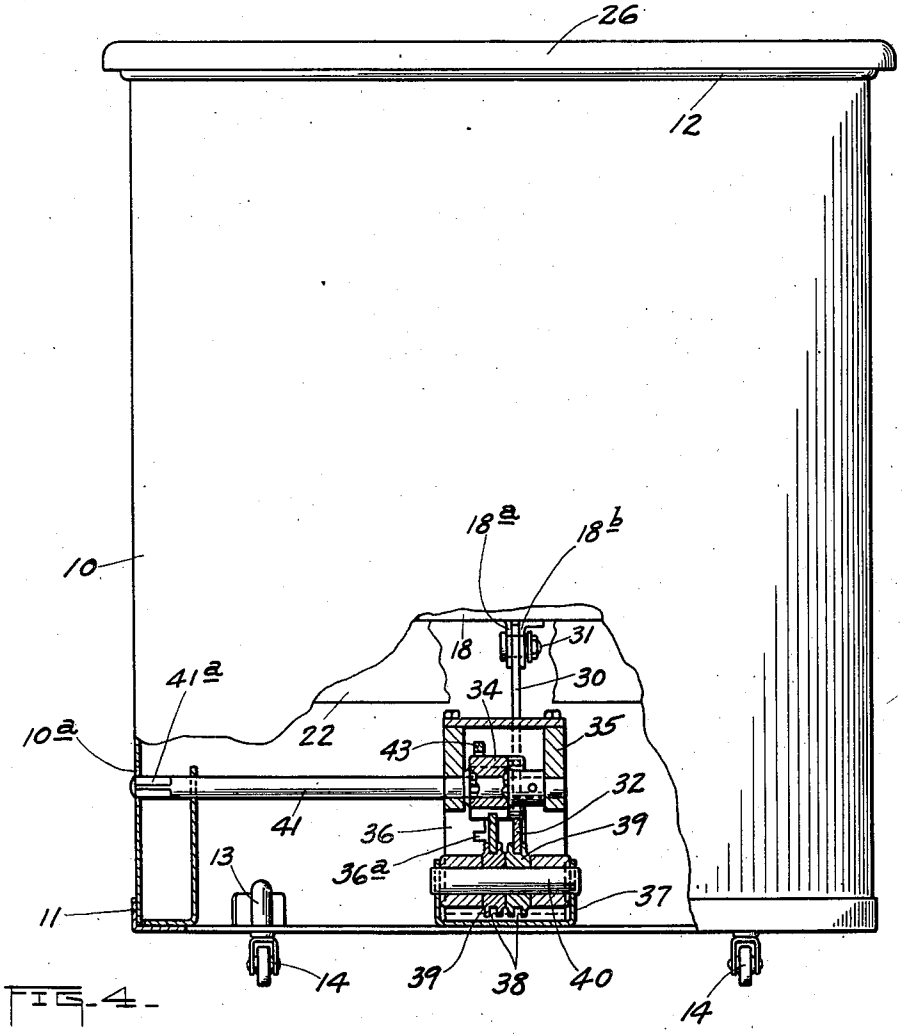

FIG-4-

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DOMESTIC WASHING MACHINE

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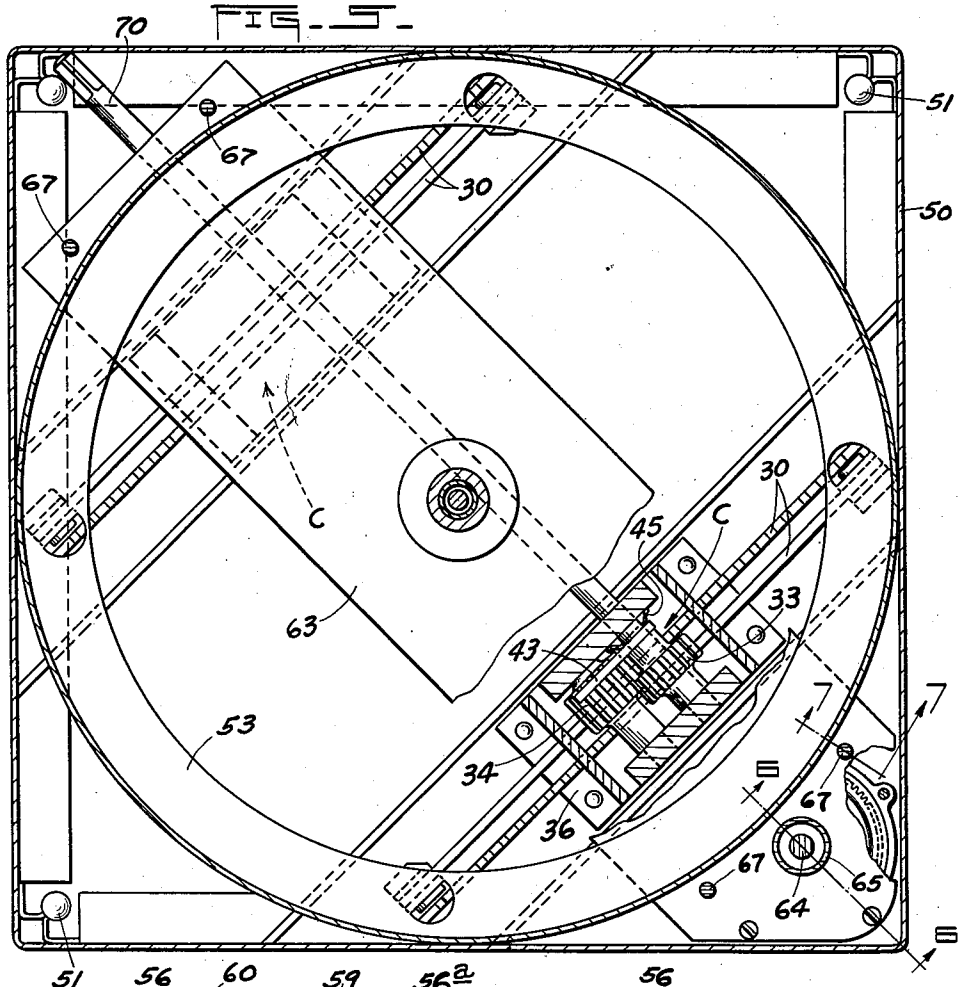
FIG. 5.



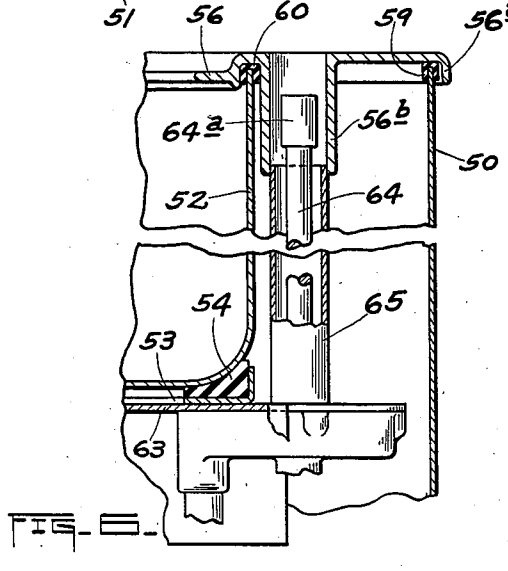


FIG. 6.

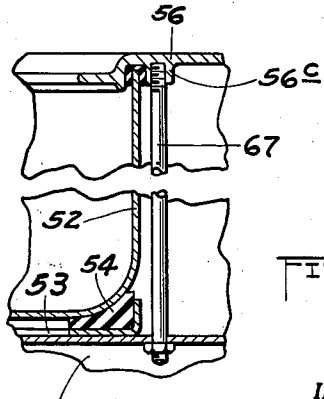


FIG. 7.

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Patented May 28, 1940

2,202,158

UNITED STATES PATENT OFFICE

2,202,158

DOMESTIC WASHING MACHINE

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Application October 14, 1938, Serial No. 234,991

9 Claims. (Cl. 312—22)

The present invention relates to clothes washing apparatus of the type employed in the household.

It is recognized that the present trend in building construction of modern homes is toward designs wherein no basement is provided, and which, therefore, necessitates carrying on the laundering operations either in the kitchen or on the back porch. It is also recognized that due to necessity and circumstances, occupants of apartments, especially in larger cities, are at times obliged, for convenience, to do at least a portion of their washing and ironing in the kitchen of the apartment. It is also recognized that domestic washing machines as heretofore constructed for handling substantial capacity are of such size that they require a substantial amount of space, so that they do not lend themselves practically for use in such homes and apartments, due to the fact that they are of such dimensions as to be in the way when not in use, and further, results in unduly crowding of a room or other locality where the machine is stored, as well as presenting an unsightly appearance. I am aware of the fact that there are available at this time small types of washing machines, sometimes termed "midget" machines, which, while occupying a small amount of floor space, are, as a rule, wholly impractical for expeditiously washing an appreciable volume of clothes. Moreover, such small machines are generally not provided with power driven wringers and, hence, the water must be removed from the clothing by hand.

One of the primary objects of the present invention is to provide a novel form of clothes washing apparatus for use in the household, which is of substantial capacity and which is so constructed as to permit quick and easy adjustment thereof to a desirable 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 apparatus in small quarters in an out-of-the-way location when not in use, such as under a kitchen sink, or under a table, or in a wall cabinet, etc.

Another object resides in the provision of a novel construction of clothes washing apparatus which includes an external casing of tubular cross-section, and a washing machine of substantial capacity adapted to be telescoped into and out of the upper end of the casing.

A further object of the invention is to provide a novel form of raising and lowering mechanism for controlling the telescopic movement of a washing machine within a tubular casing.

Still another object is to provide an improved clothes washing apparatus 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, taken in connection with the accompanying drawings in which:

Fig. 1 is a view in side elevation with parts in section to show the details of construction of the novel clothes washing apparatus embodying the present invention, shown in elevated position.

Fig. 2 is a view in side elevation, with parts broken away showing the clothes washing apparatus in lowered or collapsed position.

Fig. 3 is a horizontal, staggered, sectional view taken substantially at line 3—3 on Fig. 2.

Fig. 4 is a view in side elevation, at right angles to the view shown in Fig. 2, with the raising and lowering apparatus shown in section, and taken substantially as indicated at line 4—4 on Fig. 2.

Fig. 5 is a top plan view of a modified construction, shown with the tub, top, and cover removed; and with certain parts shown in section to illustrate details of construction.

Fig. 6 is a vertical section through a portion of the wringer post drive mechanism, taken as indicated at line 6—6 on Fig. 5.

Fig. 7 is a vertical section taken at line 7—7 on Fig. 5, showing mode of securement of the tub and top to the chassis of the washing machine.

The clothes washing apparatus constituting the present invention includes a casing 10 formed of sheet metal in tubular cross-section and, as specifically shown, of circular outline, having its lower end supported and secured in a reinforcing base member 11 of angular cross-section, while its upper end terminates in an exteriorally rolled bead 12. The lower end of the casing has secured thereto a plurality of sockets 13, for caster wheels 14, by means of which the unit may be conveniently moved about from place to place.

The upper end of the casing 11 is open and is adapted to receive telescopically a washing machine indicated generally at A. Said machine includes a cylindrical tub 16 seated on an annular ring 17 of resilient material, such as rubber, which is seated on an annular frame member 18,

which is desirably formed of angular cross-section, for stability and reinforcement. Mounted within the tub 16 is an oscillatable agitator 20, of conventional design, adapted to be actuated by a rack and pinion drive, which may be understood to be enclosed within housing 21. The rack and pinion drive is connected to a suitable source of power, such as electric motor (not shown). The drive mechanism is supported by an inverted structural channel member 22, the ends of which are securely attached to the underside of the annular frame member 18, while the intermediate portion of the channel provides journal support for the agitator element 20, in a conventional manner, as shown in Fig. 1 of the drawings.

It is to be understood that the tub 16, together with the flanged annular frame member 18, are of such dimensions as to provide adequate clearance for telescopic movement of the frame and tub and associated mechanism of the washing machine into and out of the upper end of the casing 10. The upper marginal edge of the tub 16 is provided with an outwardly extending flange 24 to which is secured by means of screws 25, a top 26 which extends over the upper edge of the tub 16, and inwardly of the wall of said tub, and formed to provide a recessed seat for a cover element 27 for closing the tub.

The washer A may be collapsed or telescoped into the casing 10 so that the top 26 is disposed in a position as indicated at B, in dot-dash outline in Fig. 1, or may be elevated to a position as seen in full lines in Fig. 1 or to any intermediate height at which it is most convenient for use by the operator, or for adjustment to proper height of a kitchen sink. The means for raising and lowering the washing machine A includes a pair of oppositely disposed depending arms 30 pivotally connected at their upper ends at 31 to a lug 18[a] struck out of the horizontal flange of the frame member 18, and a bracket 18[b] secured to said frame. When the washing machine is in the elevated position, as seen in Fig. 1, the upper portions of the arms are disposed in substantially vertical position, while the lower portions are of arcuate formation, having their upper edges formed as racks 32. Said arms are mounted in diametrically opposite relation in a position for movement in parallel planes relatively close to each other and with their rack portions 32 meshing with intermeshed pinion gears 33 and 34, journaled in bearings 35 in a bracket 36, which is rigidly secured to a transversely disposed structural channel member 37, the ends of which are rigidly attached to the horizontal flanges of the base member 11 of the casing 10, as seen in Fig. 1. The under edge of the lower portions of the respective arms 30, opposite the racks 32, are adapted to move in annular guideways 38 formed in rollers 39, which are loosely mounted on a pin 40, supported in the bracket 36 and the flanges of the channel member 37, as seen in Fig. 4. Said rollers 39 serve as trunnions for taking the load and thrust imparted to the arms 30 from the load of the washing machine proper. The pinion gears 33 and 34 are disposed in transaxially offset relation, as seen in Fig. 3, it being understood that pinion gear 33 is rigidly mounted on an operating shaft 41 which extends laterally through an opening 10[a] in the side wall of the casing 10, as seen in Fig. 4, with the extreme end portion thereof formed with flattened surfaces as indicated at 41[a] for receiving a suitable crank for rotating the shaft 41, by virtue of which the elevating and lowering mechanism is actuated for telescoping the washing machine into or out of the casing 10.

Loosely mounted on the shaft 41 adjacent the gear 33 is a check pawl 43 having its outer end formed for engagement in the teeth of the pinion gear 34. Interposed between the check pawl 43 and the adjacent bearing block 35 is an annular spring element 45 which is adapted to exert sufficient frictional pressure against the pawl so that upon rotation of the shaft 41 in a clockwise direction, the pawl swings in a direction so that its outer end tends to engage in the teeth of the pinion gear 34. However, due to the fact that the pinion gear 34 at that time rotates in counter-clockwise direction, the pawl is continuously cammed out of engagement with the teeth of said pinion gear. It will be apparent that when the washing machine A is arrested at an elevated position, the pawl will be disposed in locking engagement with the teeth of the pinion gear 34 so as to prevent reverse rotation of the pinion gears, and thus maintain the washing machine at the desired position of elevated adjustment. When it is desired to lower the washing machine within the casing 10, the operating shaft 41 is rotated in counter-clockwise direction, which swings the pawl 43 out of engagement with the pinion gear 34 so as to permit the pinion gears 33 and 34 to rotate and engage with the rack portions 32 for gradually collapsing the arms 30 and simultaneously lowering the washing machine within the casing 10.

The washing machine is limited in its telescopic movement into and out of the casing; first, in its lowered position by the top 26, associated with the tub 16, engaging the bead 12 of the casing 10, and its elevated position is limited by the provision of stop pins 47 on the rack portions 32 of the arms, as seen in Fig. 1 of the drawings. These pins project laterally from the arms and are adapted to engage the inner surface of the wall of the bracket 36 for limiting further upward movement of the arms 30, and likewise the washing machine A. The opposite walls of the bracket 36, with respect to the pins and arms as shown in Fig. 1, are formed with slots 36[a] through which said pins on the arms 30 may pass, permitting free collapsing movement of the arms during the process of telescoping the washing machine into the casing 10.

While I have herein shown a raising and lowering mechanism including a single pair of arms 30, it will be manifest that, if desired, any number of said arms may be employed for obtaining more exact control of true directional movement of the washing machine into and out of the casing 10.

In the modified construction disclosed in Figs. 5 to 7, inclusive, the casing designated at 50 is of rectangular form, and the lower corners thereof are formed with sockets 51 for receiving suitable caster wheels (not shown). It may be understood that the washing machine which is to be telescoped into and out of the casing 50, if desired, may be similar to that disclosed in the construction represented in Fig. 1 of the drawings, wherein a cylindrical tub, such as indicated at 52, is supported by an annular frame member, such as indicated at 53, with a resilient annular ring 54 interposed therebetween. Supported on the marginal edge of the tub is a top 56 which is of rectangular outline, corresponding generally to the outline of the casing 50. The outer edge of said top is formed with a down-turned flange 56[a]

for telescoping over the upper marginal edge of the casing **50** when the washing machine is collapsed or telescoped therein, such as seen in Fig. 6. For reducing noise and to avoid impairment of finish, the upper marginal edge of the wall of the casing **50** is provided with a resilient band **59** of inverted U-shaped cross-section; and to form a more perfect water seal between the tub **52** and the top **56**, the upper marginal edge of the tub **52** is provided with a similar resilient band **60**.

The annular frame member **53** is supported on a structural channel member **63** which, as in the construction above described, supports the driving mechanism for the agitator element in the tub of the washing machine. In the construction disclosed in Figs. 5 to 7, inclusive, there is also shown driving mechanism for a vertically disposed wringer post drive shaft, indicated at **64**, for operation of a detachable power driven wringer (not shown). It is to be understood that the drive mechanism for the wringer post drive shaft is of conventional design, and said shaft is enclosed within an upstanding tube **65**, which is telescoped at its upper end in the lower end of a depending tubular socket **56b** of the top **56**. The upper end of the shaft **64** is provided with a coupler **64a** adapted to be engaged by the drive connection of the wringer, in a conventional manner. The tub **52** and frame member **53**, together with the top **56** are rigidly secured to the channel **63**, to form a unitary construction, by means of a plurality of tie rods **67**, the upper ends of which are threaded into bosses **56c** formed on the underside of the top **56**, as seen in the drawings.

In the construction represented in Figs. 5 to 7, I employ a dual set of mechanisms for raising and lowering the washing machine within the casing **50**. It is to be understood that said mechanisms, which are indicated generally at C, are duplicates of the single mechanism shown in Figs. 1 to 4, inclusive, and a detailed description thereof is believed unnecessary aside from mentioning the fact that the pinion gears **33** of both mechanisms are rigidly attached to a single operating shaft **70**, the end of which terminates adjacent the wall of the casing **50**, in registration with an opening (not shown) to afford connection with a suitable crank for rotating the shaft in a manner as above described, for raising or lowering the washing machine relatively to said casing.

Although I have herein shown and described certain preferred embodiments of my invention, manifestly it is capable of modification and rearrangement of parts without departing from the spirit and scope thereof. I 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.

I claim:

1. In combination, an upright casing of tubular cross-section, a washing machine mounted for telescopic movement into and out of the upper end of the casing, said washing machine including a frame, and a tub mounted on the frame, and manually operated means for moving the washing machine into and out of the casing for varying the height of said washing machine relatively to the floor, said means including a pair of oppositely extending depending arms, pivotally connected at their upper ends to said frame, the lower portions of said arms being formed as racks, and cooperating, axially aligned pinion gears supported in the lower end of the casing and meshing with the rack portions of said arms.

2. In combination, an upright casing of tubular cross-section, a washing machine mounted for telescopic movement into and out of the upper end of the casing, said washing machine including a frame, and a tub mounted on the frame, and manually operated means for moving the washing machine into and out of the casing for varying the height of said washing machine relatively to the floor, said means including a pair of oppositely extending depending arms, pivotally connected at their upper ends to said frame, the lower portions of said arms being formed as racks, cooperating, axially aligned pinion gears supported in the lower end of the casing and meshing with the rack portions of said arms, and means disposed in alignment with said gears for guiding and supporting said racks in mesh with said pinion gears.

3. In combination, an upright casing of tubular cross-section, a washing machine mounted for telescopic movement into and out of the upper end of the casing, said washing machine including a frame, and a tub mounted on the frame, and manually operated means for moving the washing machine into and out of the casing for varying the height of said washing machine relatively to the floor, said means including a pair of oppositely extending depending arms, pivotally connected at their upper ends to said frame, the lower portions of said arms being formed with upwardly facing arcuate racks, and cooperating pinion gears supported in the lower end of the casing and meshing with the rack portions of said arms.

4. In combination, an upright casing of tubular cross-section, a washing machine mounted for telescopic movement into and out of the upper end of the casing, said washing machine including a frame, and a tub mounted on the frame, and manually operated means for moving the washing machine into and out of the casing for varying the height of said washing machine relatively to the floor, said means including a pair of oppositely extending depending arms, pivotally connected at their upper ends to said frame, the lower portions of said arms being formed with upwardly facing arcuate racks, cooperating pinion gears supported in the lower end of the casing and meshing with the rack portions of said arms, and means engaging the underside of the rack portions of said arms for guiding and supporting same in mesh with said pinion gears.

5. In combination, an upright casing of tubular cross-section, a washing machine mounted for telescopic movement into and out of the upper end of the casing, said washing machine including a frame, and a tub mounted on the frame, and manually operated means for moving the washing machine into and out of the casing for varying the height of said washing machine relatively to the floor, said means including a pair of oppositely extending depending arms, pivotally connected at their upper ends to said frame, the lower portions of said arms being formed as racks, cooperating pinion gears supported in the lower end of the casing and meshing with the rack portions of said arms, and means for guiding and supporting said racks in mesh with said pinion gears, said guiding and supporting means including a separate grooved roller for each arm.

6. In combination, an upright casing of tubular cross-section, a washing machine mounted

for telescopic movement into and out of the upper end of the casing, said washing machine including a frame, and a tub mounted on the frame, and manually operated means for moving the washing machine into and out of the casing for varying the height of said washing machine relatively to the floor, said means including a pair of oppositely extending depending arms, pivotally connected at their upper ends to said frame, the lower portions of said arms being formed with upwardly facing arcuate racks, cooperating pinion gears supported in the lower end of the casing and meshing with the rack portions of said arms, and means engaging the underside of the rack portions of said arms for guiding and supporting same in mesh with said pinion gears, said guiding and supporting means including a separate grooved roller for each arm.

7. In combination, an upright casing of tubular cross-section, a washing machine mounted for telescopic movement into and out of the upper end of the casing, said washing machine including a frame, and a tub mounted on the frame, and manually operated means for moving the washing machine into and out of the casing for varying the height of said washing machine relatively to the floor, said means including a pair of oppositely extending depending arms, pivotally connected at their upper ends to said frame, the lower portions of said arms being formed as racks, cooperating pinion gears supported in the lower end of the casing and meshing with the rack portions of said arms, bracket means providing journal support for said pinion gears, and cooperating stop features on said arms and said bracket means for limiting upward movement of said arms, thereby limiting upward movement of the washing machine relatively to said casing.

8. In combination, an upright casing of tubular cross-section, a washing machine mounted for telescopic movement into and out of the upper end of the casing, said washing machine including a frame, and a tub mounted on the frame, and manually operated means for moving the washing machine into and out of the casing for varying the height of said washing machine relatively to the floor, said means including a pair of oppositely extending depending arms, pivotally connected at their upper ends to said frame, the lower portions of said arms being formed as racks, cooperating pinion gears supported in the lower end of the casing and meshing with the rack portions of said arms, and a check pawl mounted co-axially with one of the pinion gears and adapted to engage the teeth of the other gear.

9. In combination, an upright casing of tubular cross-section, a washing machine mounted for telescopic movement into and out of the upper end of the casing, said washing machine including a frame, and a tub mounted on the frame, and manually operated means for moving the washing machine into and out of the casing for varying the height of said washing machine relatively to the floor, said means including a pair of oppositely extending depending arms, pivotally connected at their upper ends to said frame, the lower portions of said arms being formed as racks, cooperating pinion gears supported in the lower end of the casing and meshing with the rack portions of said arms, a check pawl loosely pivoted co-axially with one of the pinion gears and adapted to engage the teeth of the other gear, and spring means interposed between the first mentioned pinion gear and said pawl, adapted for frictionally urging the pawl into engagement with the teeth of said other pinion gear, during one direction of rotation of said first mentioned pinion gear.

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