Jan. 6, 1953 A. H. HARTMANN 2,624,203

DRIVE FOR WASHING AND WRINGING UNIT

Filed Sept. 4, 1945

3 Sheets-Sheet 1

FIG-1

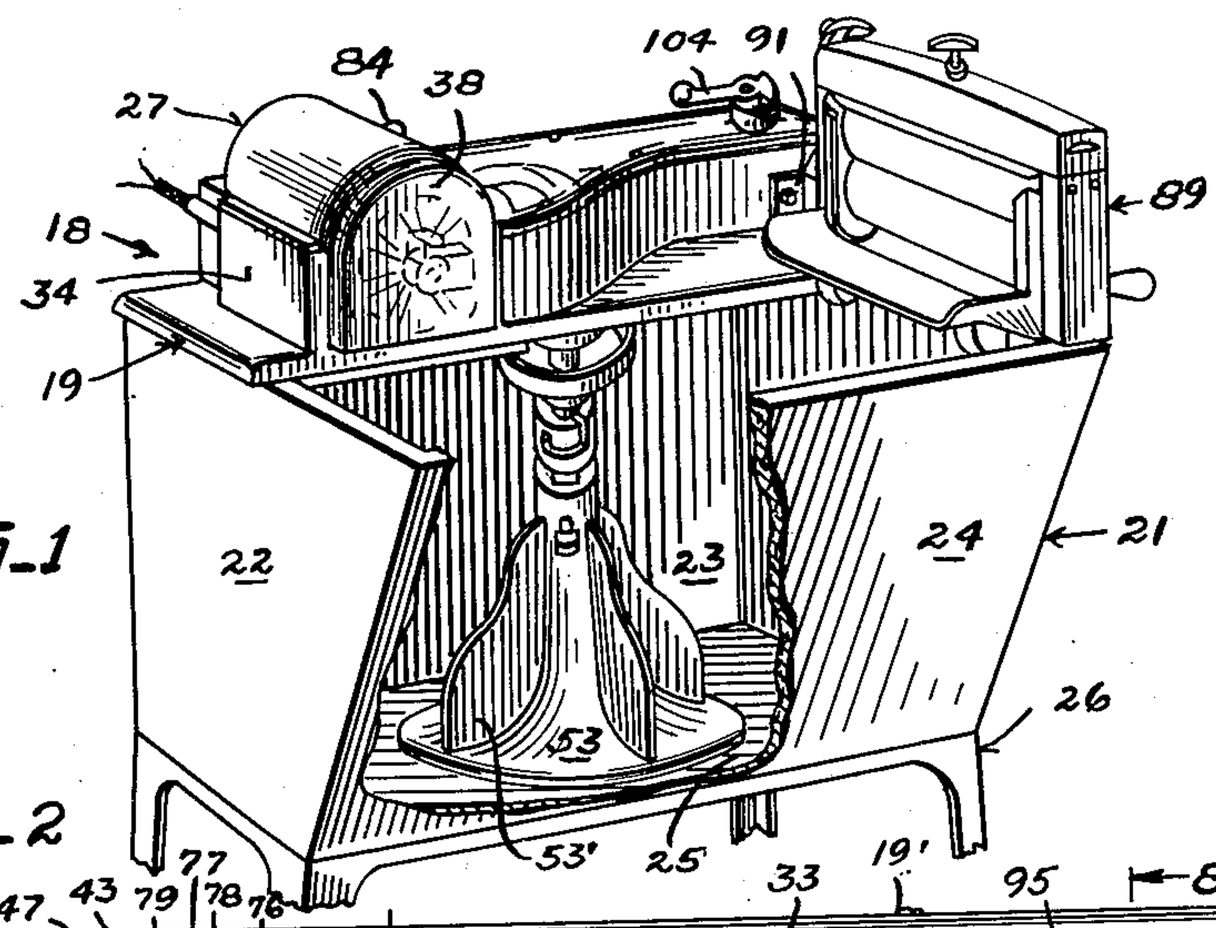

FIG-2

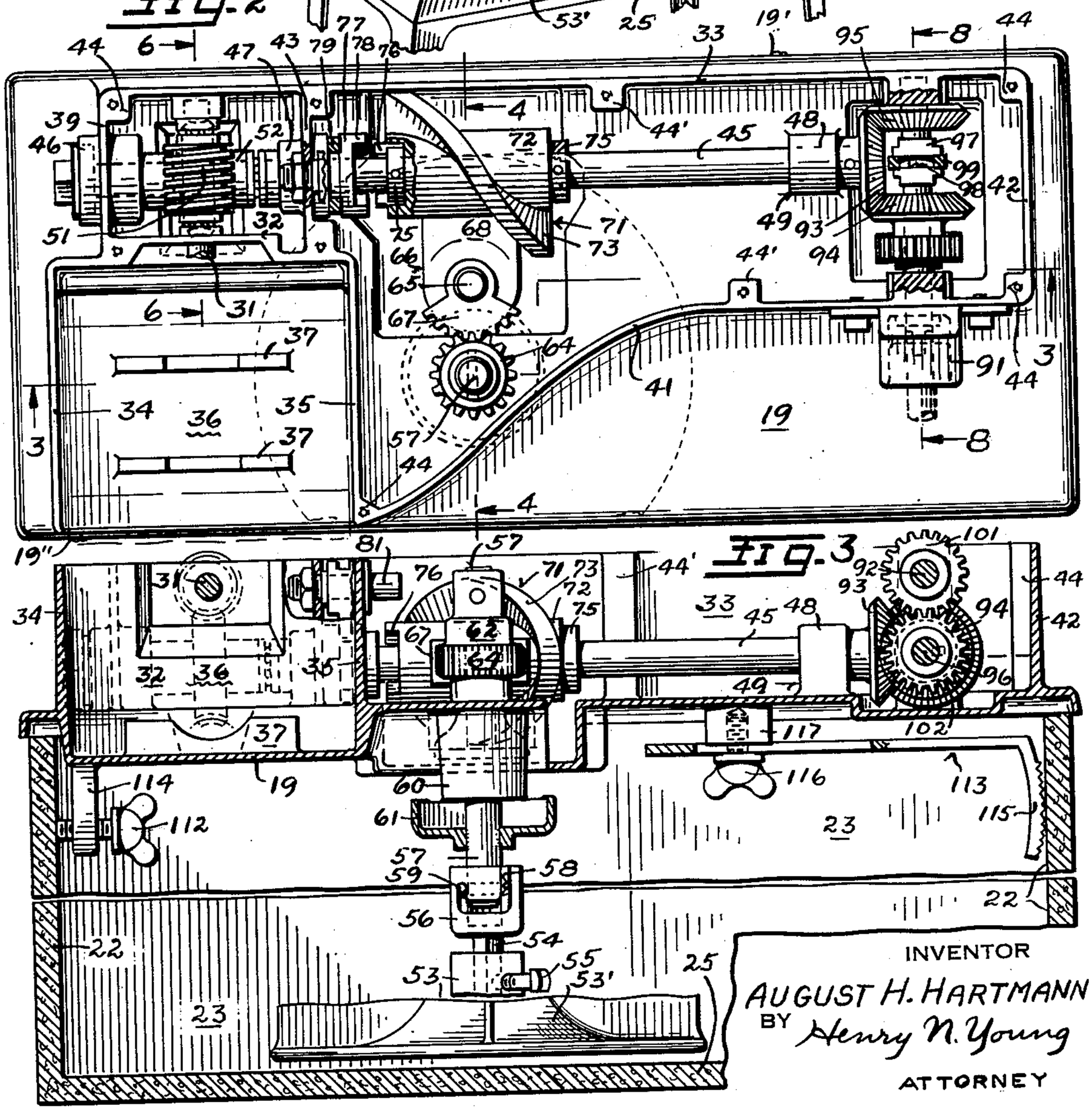

FIG-3

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FIG. 4

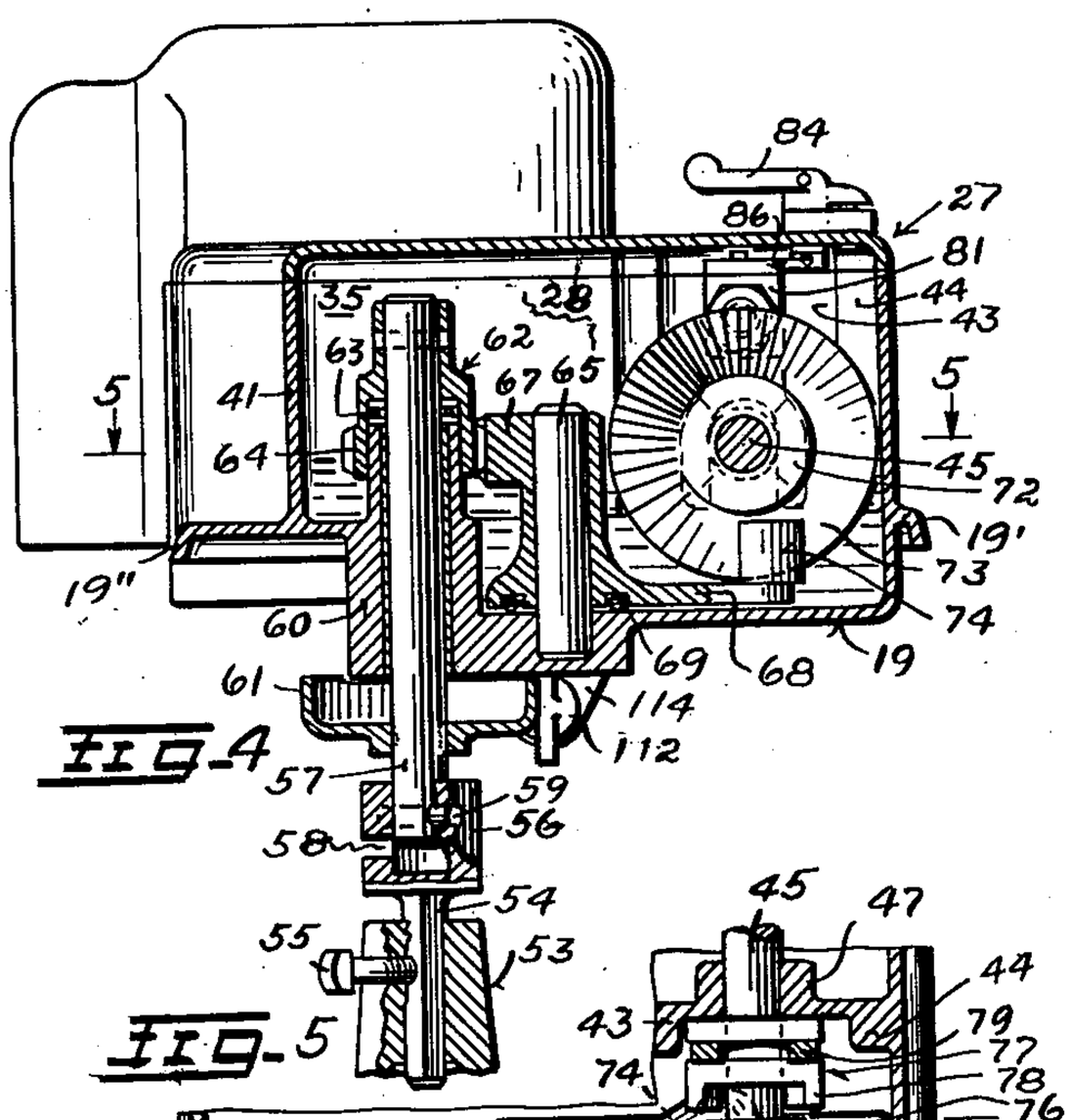


FIG. 5

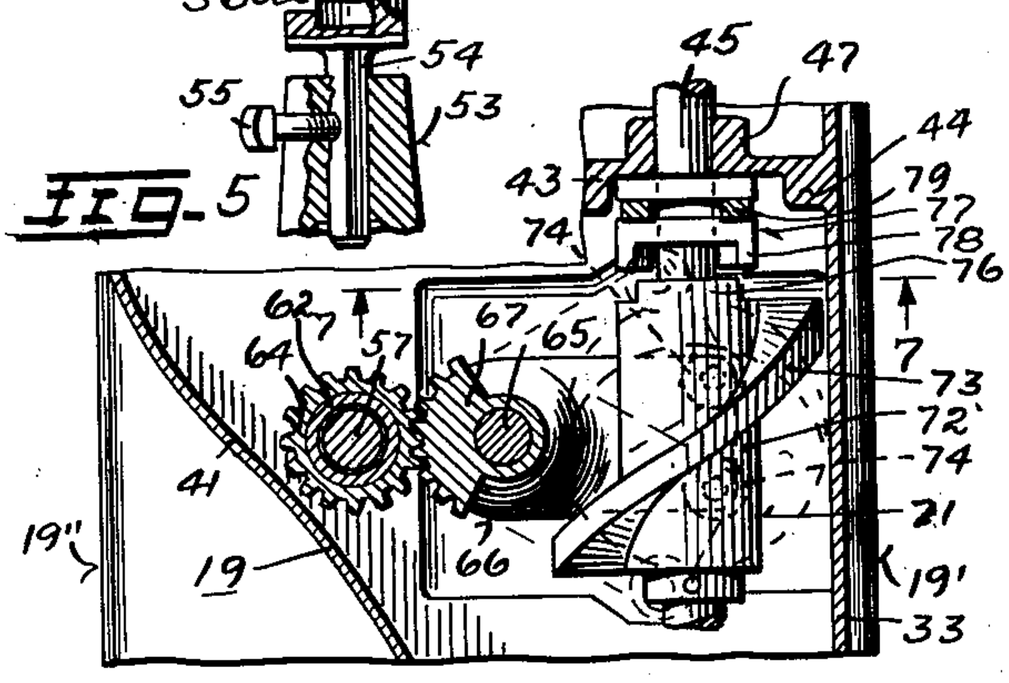


FIG. 6

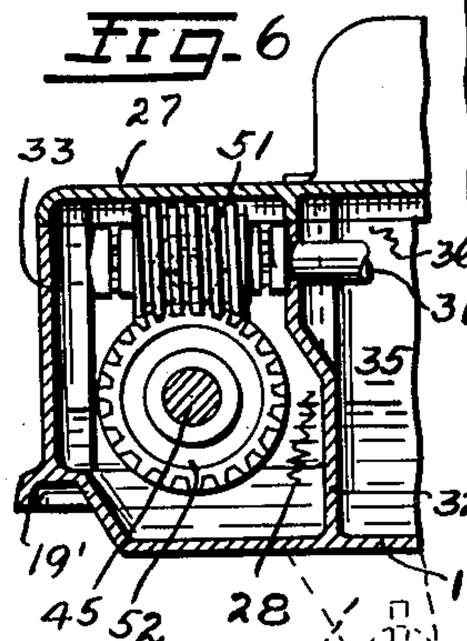


FIG. 7

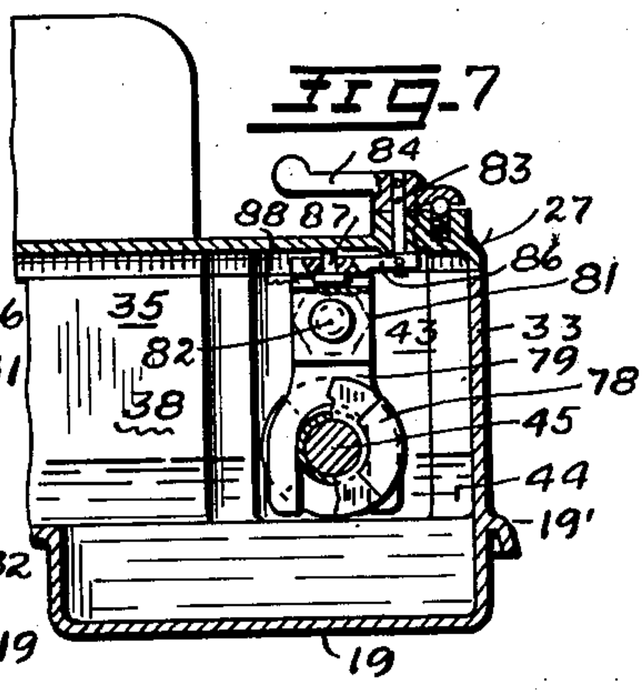


FIG. 8

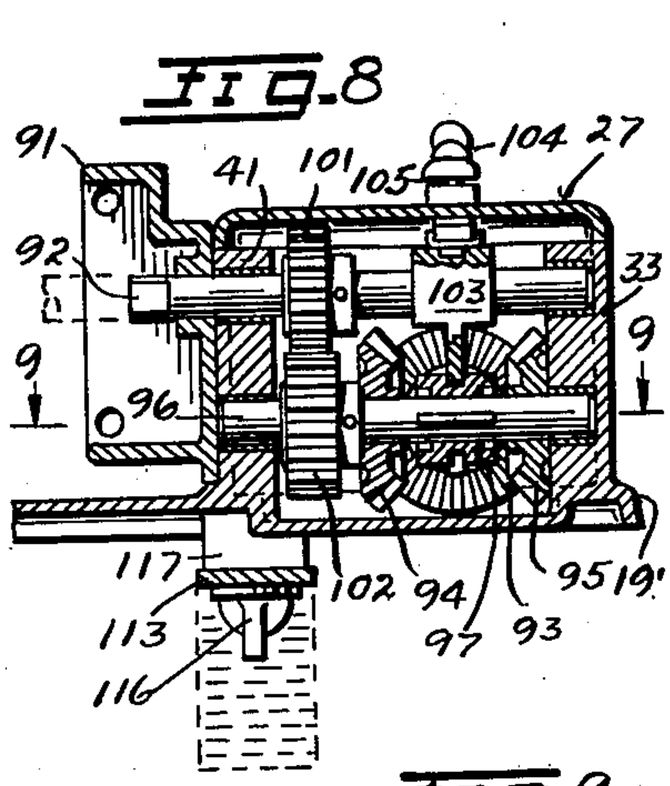


FIG. 9

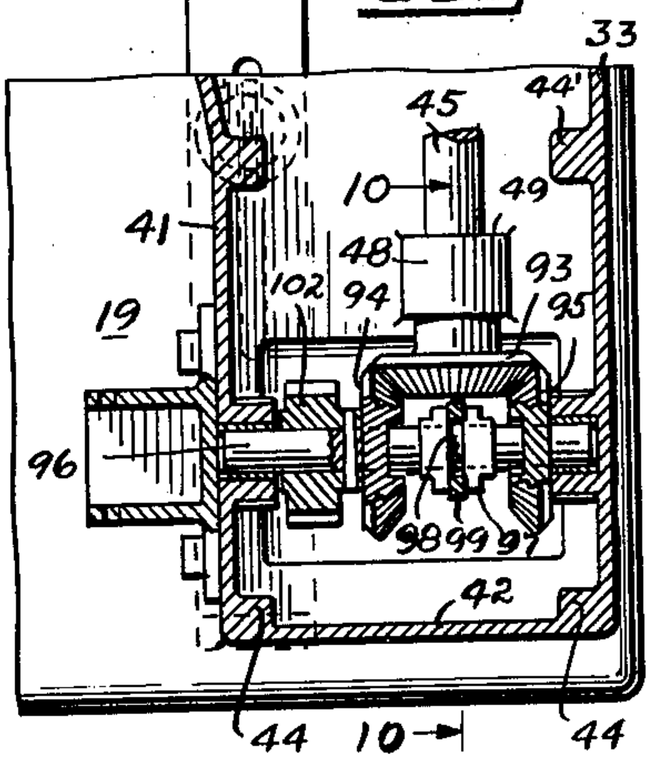


FIG. 10

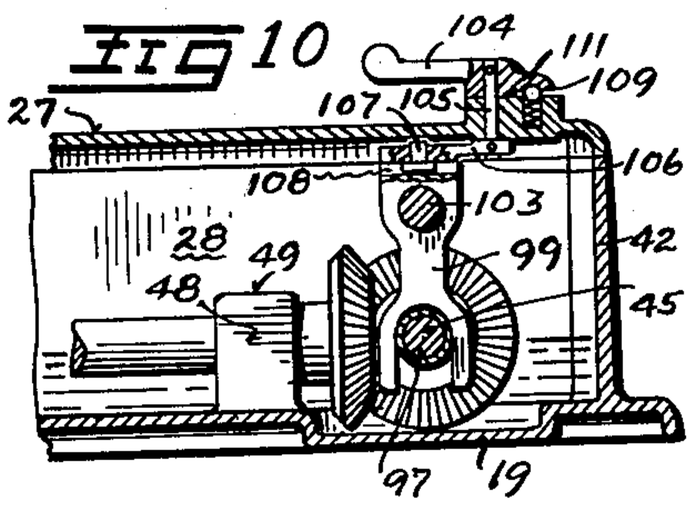
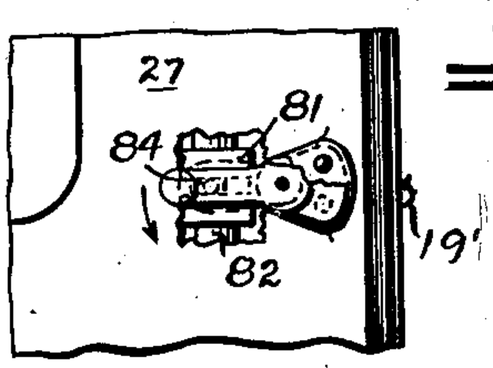


FIG. 11



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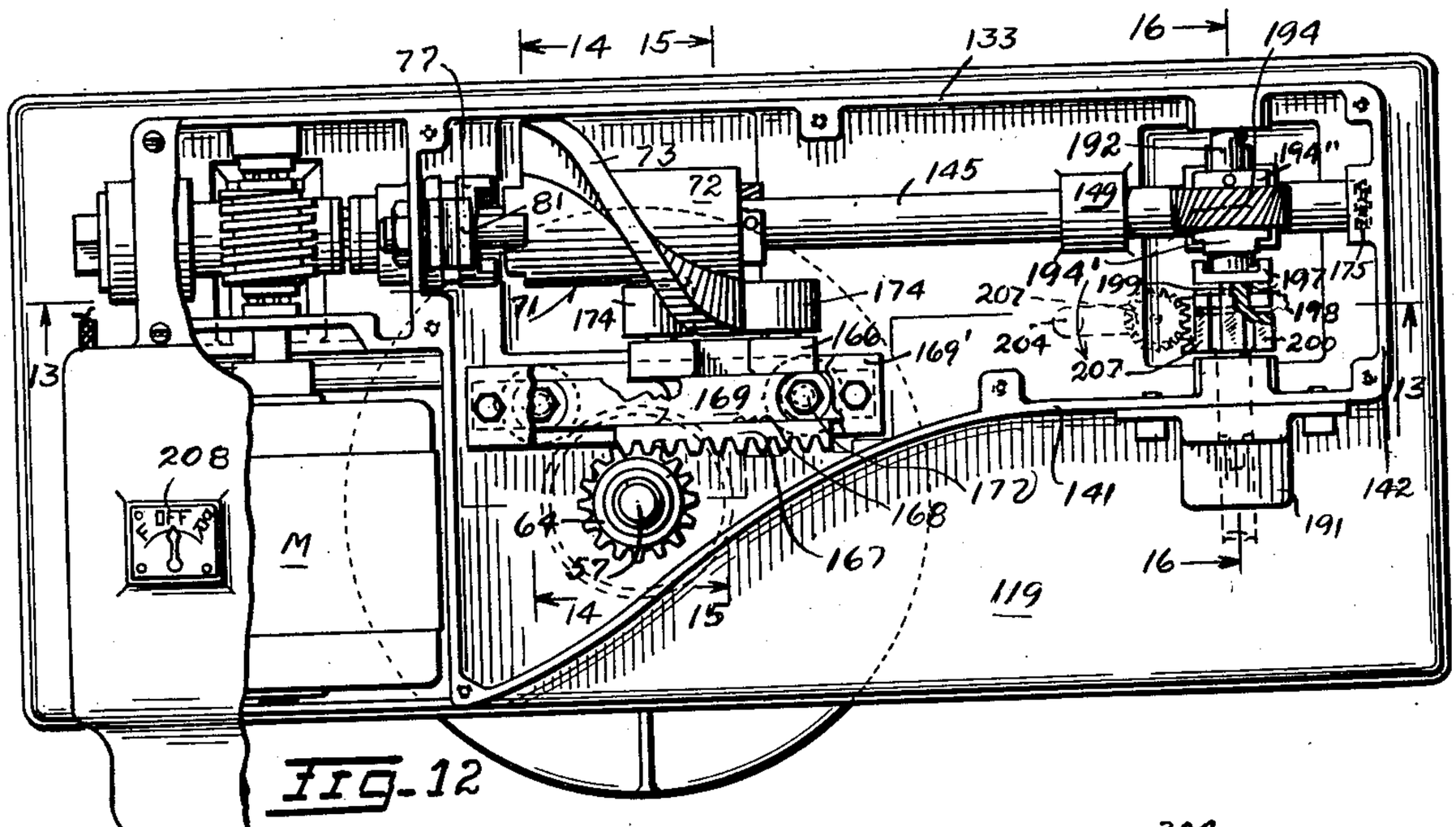

FIG-12

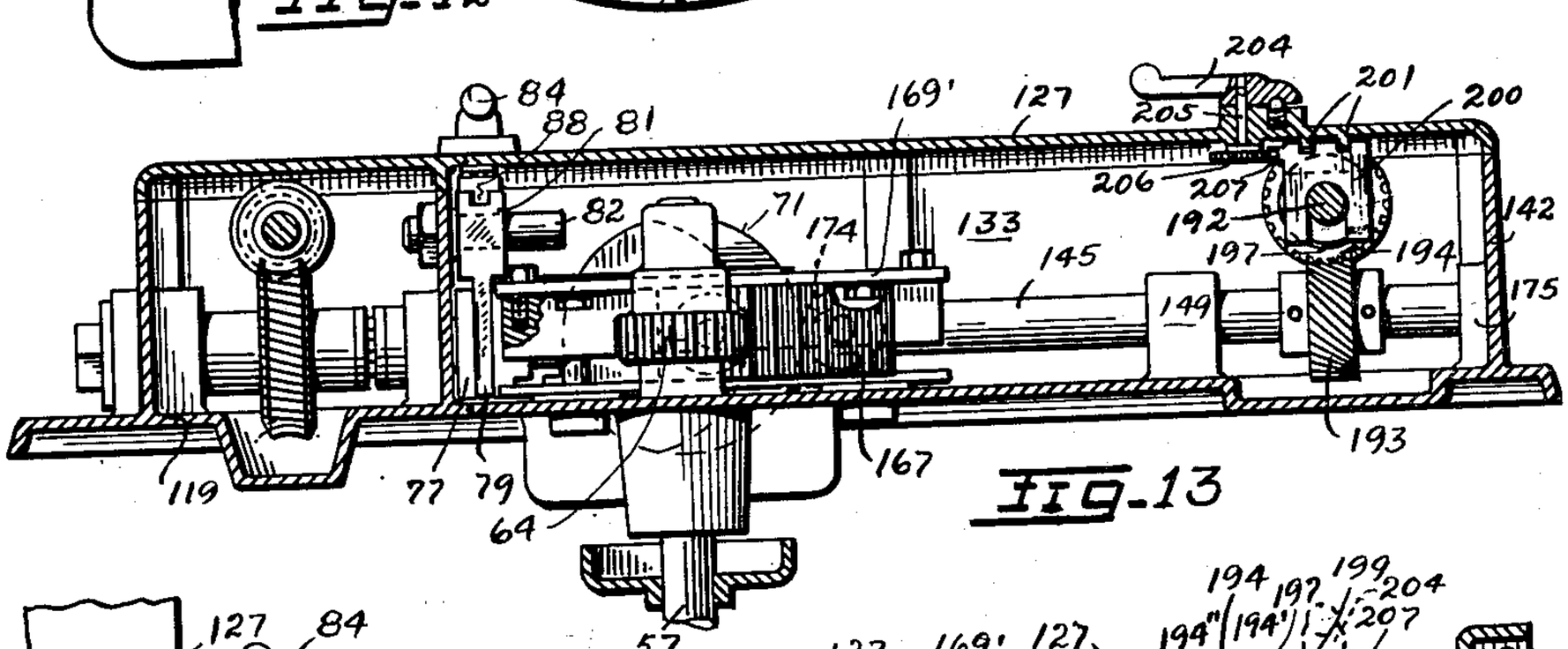

FIG-13

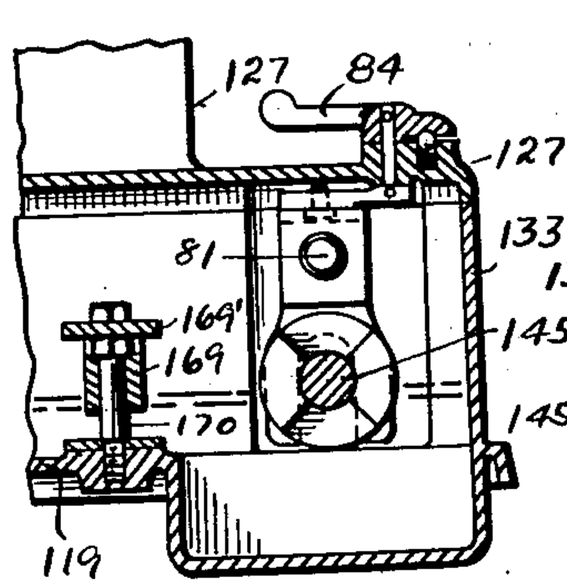

FIG-14

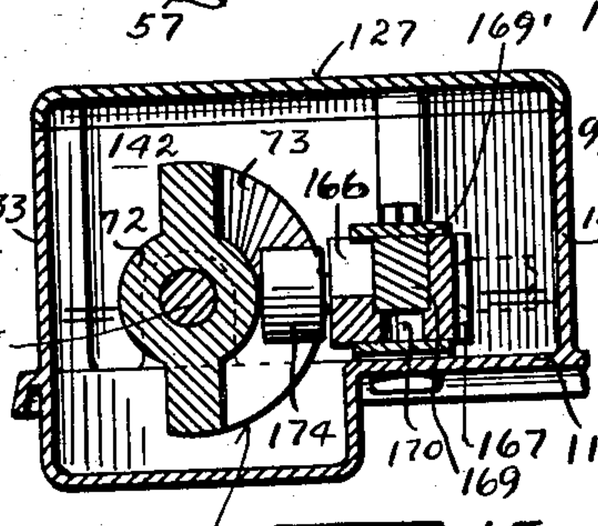

FIG-15

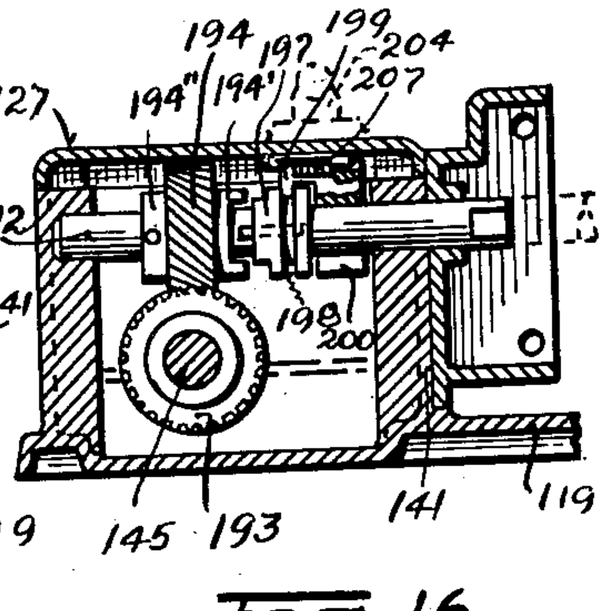

FIG-16

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Patented Jan. 6, 1953

2,624,203

UNITED STATES PATENT OFFICE

2,624,203

DRIVE FOR WASHING AND WRINGING UNIT

August H. Hartmann, Oakland, Calif.

Application September 4, 1945, Serial No. 614,121

5 Claims. (Cl. 74—17)

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The invention relates to a clothes washing and wringing unit arranged for use with a wash tray for performing washing operations upon clothing in the tray and thereafter wringing out the washed clothing.

A general object is to provide an improved and particularly effective drive for an oscillating washing agitator.

Another object is to provide an improved drive for the actuation of a clothes wringer of the unit.

A further object is to provide conveniently located and mutually independent controls for the agitator and wringer of the unit.

Yet another object is to provide for a particularly ready removal and replacement of the washing agitator.

The invention possesses other objects and features of advantage, some of which, with the foregoing, will be set forth or be apparent in the following descriptions of typical embodiments thereof, and in the accompanying drawings, in which,

Figure 1 is a perspective view showing a unit embodying features of the present invention and mounted in use position upon a domestic wash tray fixture, portions of the wash tray being broken away.

Figure 2 is a plan view of the unit, the cover and operating motor and wringer being removed.

Figure 3 is an elevation taken on the broken line 3—3 in Figure 2, portions of the supporting tray and the agitator being omitted.

Figure 4 is a sectional elevation at the line 4—4 in Figure 2, the view including the cover portion of the unit.

Figure 5 is a fragmentary section at the line 5—5 in Figure 4.

Figure 6 is a fragmentary section at the line 6—6 in Figure 2.

Figure 7 is a fragmentary section at the line 7—7 in Figure 5.

Figure 8 is a section at the line 8—8 in Figure 2.

Figure 9 is a section at the line 9—9 in Figure 8.

Figure 10 is a section at the line 10—10 in Figure 9.

Figure 11 is a fragmentary top view of a clutch-control means shown in Figure 7.

Figure 12 is a plan view similar to that of Figure 2, and discloses a unit having a drive mechanism embodying certain modifications of the drive mechanism of the first embodiment.

Figures 13 to 16 inclusive are sections taken on the lines 13—13 and 14—14 and 15—15 and 16—16 respectively of Figure 12.

As disclosed in the embodiment of Figures 1 to 11 inclusive, the mechanism of a washing and

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wringing unit 18 is mounted on a base plate 19 which is arranged for supported disposal upon and across the top of a wash tray 21 having upright ends 22, an upright rear wall 23, a sloping front wall 24, and a bottom 25; the tray structure is supported on a suitable base frame 26. Upright walls extend integrally from the plate 19 to provide the major portion of a space in which the drive mechanism of the unit is contained, said walls terminating at a common plane which is parallel to the general plane of the base plate 19. A suitable cover 27 is provided for a fitted mounting upon the rim of the base structure to complete a closed space 28 containing the operating mechanism of the unit.

The mechanism of the present unit 18 is arranged to be operated from an electric motor mounted on the base plate 19 and having its shaft 31 extending into the space 28 through a side wall 32 of said space. The wall 32 is parallel to the rear wall 33 of the space 28 which extends along and adjacent the rear edge 19' of the base plate 19, and is spaced from the front edge 19'' of the plate to provide for the mounting of the motor 29 in front of it. Walls 34 and 35 extend forwardly from the different ends of the wall 32 to the front edge 19'' to provide sides for a motor-receiving space 36 above the plate; in the present structure, the wall 34 is adjacent and parallel to the left end of the base plate. Cradles 37 extend integrally from the base plate within the space 36 for supporting the motor in appropriate position therein, and the cover 27 is provided with a front portion 38 depending below the level of its plane of support on the base walls and to the base plate edge at the front of the space 36 for fully closing the space 36 at its front.

The left-end wall 39 of the space 28 extends forwardly from the left-side end of the rear wall 33 to a juncture with the wall 32, and a front wall 41 extends from the forward end of the wall 35 to a juncture with the forward end of the right-side end wall 42 extending forwardly from the rear wall 33. The bottom portion of the space 28 is thus laterally and jointly defined within the walls 33 and 39 and 32 and 35 and 41 and 42 taken in order. A partition 43 connects the walls 32 and 33 to the right of the shaft 31. At the corners defined at the juncture points of the various walls defining the space 28, fillets 44 are provided for stiffening the structure thereat, said fillets being provided with threaded openings extending downwardly from their top ends for receiving the screws by which the cover 27 is secured upon the wall structure. Upright ribs 44' are provided as needed at intermediate points of

the rear wall 33 and front wall 41 for performing the functions of the fillets 44 thereat.

It will now be noted that a jack-shaft 45 is mounted in the space 28 in parallel relation to the wall 33, said shaft being carried in and between suitable bearings 46 and 47 and 48 provided respectively at the wall 39 and partition 43 and a bearing block 49 spaced from the right-end casing wall 42; as indicated, the bearing 46 includes end-thrust anti-friction bearings for preventing an axial displacement of the shaft 45. Driving of the shaft 45 is effected by the operation of a worm gear 51 carried on the motor shaft 31 and constantly engaging a spur gear 52 fixed on the shaft 45; in this manner, the shaft 45 is arranged to be rotated with the motor shaft.

The present jack-shaft 45 is arranged to actuate an agitator 53 suspended from the base plate 19 for its oscillating operation within the space of a tray. As particularly shown, the agitator 53 has a flat base portion from which its side face tapers conically upwardly to a sleeve end which is arranged to complementarily and slidably receive the bottom end of a stem member 54 which is mounted for oscillation without axial displacement. Radial webs 53' extend from the flat base portion of the agitator to points near its top, and the stem member 54 and the bore of the agitator sleeve portion which complementarily receives the stem are of rectangular cross-section for insuring oscillating movements of the stem and agitator together. While the bottom of the agitator might engage the tray bottom 25 for the support of the agitator thereon, a set screw 55 is preferably provided in the sleeve portion of the agitator for engaging the inserted stem to secure the agitator in adjusted spaced relation to the tray bottom.

At its upper end, the stem member 54 carries a sleeve 56 fixed thereto and extending upwardly of the stem extremity for receiving the lower end of a shaft 57 which depends from the base plate 19 in its bore. A bayonet slot 58 is provided in the side of the sleeve 56 above the top of the stem 54 for receiving a pin 59 extending radially from the shaft 57 at a point near its bottom end; the arrangement is essentially such that the stem-and-agitator assembly is supported upon the pin 59, but may be readily released from its suspended support on the shaft 57 by lifting and rotating it slightly to free the pin from the bayonet slot 58, whereby the agitator may be detached if and when the unit is being placed on or removed from its mounted position on the tray.

The shaft 57 is journalled in an upright bearing sleeve 60 provided by the plate 19 and extending upwardly of the plate to at least the level of the axis of the drive shaft 45, said level determining the maximum depth of the liquid lubricant which is provided and maintained in the casing space 28 for the lubrication of all wearing parts of the mechanism therein; see Figure 4. While the present arrangement permits little, if any, escape of lubricant along the shaft 57, the latter may carry a sealedly encircling member 61 at a point below the sleeve 60 and cooperative with the shaft to provide an annular cup for trapping any lubricant which may escape along the shaft. A cap-like member 62 is pinned or otherwise fixed to the upper end of the shaft 57, encloses the top of the sleeve 60, receives the bearing ring 63 disopsed upon the top of the sleeve 60 for the rotative support of this member thereon and provides a spur gear 64 integral therewith.

A stub shaft 65 extends upwardly from the base

plate 19 at a point between the shaft 57 and the jack-shaft 45 in a plane perpendicular to the jack-shaft axis and rotatably mounts a member 66 providing a segmental gear 67 coaxial with the axis of swinging of the member and in meshing engagement with the gear 64. The member 66 further provides an arm 68 at its bottom, and is supported upon the underlying base plate portion on a bearing ring 69. Means are provided for oscillating the member 66 about the shaft 65 whereby its segmental gear 67 may oscillate the shaft 57 and the agitator. Preferably and as shown, the pitch diameter of the segmental gear 67 is greater than the pitch diameter of the gear 64 whereby the agitator may be oscillated through a greater turn angle than is the gear 67.

As particularly illustrated, the means for oscillating the member 66 comprises a cam member 71 consisting of a tubular hub 72 rotatably mounted upon the shaft 45 and provided with a continuous encircling flange 73 of uniform thickness axially of its hub, of uniform height radially of the hub, having its radial surface elements perpendicular to the shaft axis, and having the general plane of its periphery oblique to said axis. Mutually spaced and upstanding rollers 74 are provided at the free end of the arm 68 of the member 66 for constantly receiving the cam flange 73 in contacting engagement between them, the arrangement being such that a rotation of the cam is operative by reason of the progressive engagement of different portions of the cam flange 73 between the rollers to rock the member 66 about its axis and so oscillate the agitator through the co-action of the segmental gear 67 with the gear 64 on the shaft 57. As particularly shown, the base plate 19 is provided with a depressed portion beneath the member 66 as required for its installation and the operation of its arm 68 beneath the cam member 71.

In the present structure, the cam member 71 has its hub 72 held against axial movement along the shaft 45 between collars 75 fixed on the shaft. The hub end nearest the drive gear 52 is cylindrically recessed to receive the collar 75 thereat, and said hub end is provided with clutch teeth 76 extending axially therefrom toward a clutch collar 77 slidable on and splined to the drive shaft 45 for movement to selectively dispose teeth 78 thereof between or axially spaced from the clutch teeth 76 of the hub 71; in this manner the cam member 71 is arranged to be driven from the shaft 45. As particularly shown, the collar 77 is provided with an annular peripheral groove in which the arms of a shift fork 79 are arranged to be constantly engaged. The fork 79 extends from a hub 81 which is slidably mounted upon a stub-shaft 82 which extends from the casing partition 43 in a line parallel to and above the shaft 45.

Adjustments of the fork 79 along the stub-shaft 82 are arranged to be effected by a means provided on the cover 27. As particularly illustrated (Figures 4 and 7 and 11), an upright stem 83 is journalled in a boss provided on the cover and mounts an adjustment lever 84 for movement over the boss face between limiting positions in which it is releasably held by a spring detent 85 mounted in the boss and selectively operative in sockets provided in the opposed face of a fan-shaped lever extension. An arm 86 extends from the stem 83 beneath the cover and is provided with a depending pin 87 which constantly engages in a slot 88 provided across the top of the fork hub 81. The arrangement is such that a lever

84 may be optionally set for the engagement or disengagement of the described clutch which controls the operation of the cam member 71 from the shaft 45.

It will now be noted that the jack-shaft 45 is also used for actuating a clothes wringer 89, said wringer being mounted on the front wall 41 at a bracket 91 fixed to the wall to extend over a tray portion not covered by the unit. A shaft 92 is journalled in and between the casing walls 33 and 41, and extends through the latter at the bracket 91 for operative engagement with the drive shaft of the mounted wringer, as indicated in Figures 2 and 8. Means are preferably provided for reversedly actuating the wringer from the drive shaft 45 independently of the use of the latter shaft to actuate the washing agitator 53, said means generally comprising a gear connection through a suitable clutch device.

As particularly shown, the end of the shaft 45 beyond the bearing block 49 mounts a bevel gear 93 which is in constant engagement at opposite sides thereof with bevel gears 94 and 95 rotatable on a shaft 96 which is journalled in and between the walls 33 and 41 opposite the end of the shaft 45 and coplanar therewith. The gears 94 and 95, while rotatable with respect to the shaft 96, are retained in engagement with the gear 93, and their mutually opposed hub ends are provided with clutch teeth for cooperative engagement respectively with clutch teeth provided at opposite ends of a clutch sleeve 97 which is slidably mounted on the shaft 96 and is splined thereto for rotation therewith. The sleeve 97 is provided with a peripheral annular groove 98 in which the arms of a shift fork 99 are operative in a usual manner. In the present structure, the wringer-operating shaft 92 is disposed vertically above the shaft 96 and carries a spur gear 101 which constantly meshes with a spur gear 102 fixed on the shaft 96; as shown, the gear 101 is smaller than the gear 102 whereby the shaft 92 may be driven at a faster rate than is the shaft 96. The shift fork 99 depends from a sleeve member 103 slidably mounted upon the shaft 92 and functioning as a support and guide means for the fork.

Control of the positioning of the shift fork 99 is arranged to be effected by means of a hand lever 104 mounted on and operative above the cover 27 in an arrangement generally similar to that of the clutch control lever 84 for the agitator drive connections. The lever 104 is mounted on a stem 105 which carries a radial arm 106 beneath the cover from which a pin 107 slidably engages in a slot 108 provided across the top of the fork sleeve 103. A spring detent 109 is operative beneath a radial extension 111 of the lever 104 for selective disposal in any one of three sockets provided in the under face of the extension, whereby the lever may be selectively set for inoperatively or operatively disposing the clutch sleeve with respect to the bevel gears. It will be understood that with the drive arrangements now described for the agitator and wringer, either or both may be actuated from the common drive shaft 45.

Since the present unit 18 is arranged for its removable mounting upon a wash tray 21, means are preferably provided for releasably fixing the unit in place upon the tray. Figure 3 discloses a securing arrangement in which members 112 and 113 mounted on the under side of the base plate 19 and simultaneously reactive with the mutually opposed inner faces of the tray ends 22 for securing the unit 18 in set position upon the top

of the tray. The member 112 comprises a thumb screw which is engaged through a lug 114 depending from the plate 19 near one side thereof, while the member 113 comprises a thrust bar providing a laterally offset wall-engaging foot 115 at one end and having a longitudinal slot for receiving a thumb screw 116 which is operative to clamp the set bar against the under side of a lug 117 depending from the base plate. The lug 117 is appreciably spaced from the wringer side of the base plate whereby the member 113 is adjustable for fitting the securing means to trays of different widths. When a unit has been positioned upon a tray with the point of the screw 112 engaging a tray end 22, the member 113 is set with its foot 115 engaging the other tray end, the screw 116 is tightened, and the screw 112 is then finally tightened to provide forcible securing reactions of it and the foot 115 with the opposite tray ends.

The embodiment of Figures 12 to 16 inclusive discloses certain modifications in the driving of an agitator shaft 57 and a wringer from a common shaft 145. The shaft 145 carries a cam 71 as in the first embodiment for actuation with the shaft through the clutch collar 77 which is controlled by the fork 79 from the hand lever 84. In the present structure, a member 166 is mounted for reciprocation upon the base 119 in a line parallel to the axis of the shaft 145 and provides a longitudinal rack bar 167 having its teeth constantly meshing with the gear 64 of the agitator shaft 57. The present member 166 is provided with a longitudinal groove 168 of uniform cross-sections in its top, and a fixedly mounted bar 169 which is engaged in the groove as a guide means for the member and is carried on posts 170 extending from the base plate 119. A plate member 169' is mounted on the member 169 and extends laterally therefrom over the member 166 to retain the member against an upward movement from its operative position; the member 169' might be integral with the member 169 if desired.

Stub shafts extend laterally from the member 166 toward the axis of the shaft 145 and carry rollers 174 receiving the flange 173 of the cam member 71 between them, whereby, as the member 71 is rotated, the member 166 is reciprocated to oscillate the shaft 57 through the coaction of the rack and gear. It will be noted that the horizontal axes of the rollers 174 are perpendicular to and coplanar with the axis of the shaft 145, whereas, in the first embodiment, the axes of the rollers 74 are upright and parallel and have their common plane in different angular relations to the shaft axis in different positions thereof.

In the present structure, the shaft 145 is extended beyond a bearing 149 into a bearing 175 in the right-end wall 142 of the base 119 corresponding to the base 19 of the first embodiment, and the shaft portion between the bearings 149 and 175 carries a helical gear 193 which meshes with a complementary helical gear 194 mounted on a wringer-actuating shaft 192 journalled in and between the front and rear casing walls 133 and 141, with the shaft 192 extending forwardly through and from the wall 133 at a wringer-supporting bracket 191 for driving connection with a wringer (not shown) mounted on the bracket. The worm gear 194 is rotatably mounted upon the shaft 192, and one end of its hub 194' is provided with clutch teeth for complementary engagement with clutch teeth provided at the opposed end of a shift sleeve 197 splined to the shaft and shiftable to engage or disengage its

teeth with those of the hub 194'; a collar 194'' is fixed to the shaft 192 at the opposite side of the gear 194 from the clutch means to maintain the gear in contact with the gear 193.

The shift sleeve 197 is provided with an annular groove 198 slidably receiving a shift finger 199 provided by a member 200 which is slidably supported on the shaft 192 at the opposite end of the sleeve from its clutch face. As particularly shown, the member 200 is longitudinally grooved from below to slidably and rotatably receive the shaft, and the upper end of this member is engaged by guide tracks 201 depending from the casing cover 127 into complementary grooves in the top of the member for securing the member in upright position upon the shaft 192. A hand lever 204 is mounted on the top of the cover 127 on a stem 205 which carries a gear 206 beneath the cover for operative engagement with a rack 207 provided at the top of the member 200, whereby the lever is operative to shift the member between a pair of limiting positions in which the clutch is respectively disengaged or engaged. In general reference to this clutch control and those provided for the first embodiment, it is noted that the lifting away of the cover carrying the clutch control levers is all that is necessary for disengaging the lever assemblies from the shift forks, ready access to the unit mechanism thus being provided for.

Since the present drive of the wringer-actuating shaft 192 from the shaft 45 is not reversible, the drive motor M is preferably of the reversible type, as is indicated by the showing of a two-way switch 208 in Figure 12, it being understood that it may be desired or necessary to reverse the wringer and that the direction of the rotation of the shaft 145 is unimportant as far as the operative oscillating actuation of the agitator is concerned.

From the foregoing description taken in connection with the accompanying drawings, the advantages of the construction and operation of the present washing and wringing units will be readily understood by those skilled in the art to which the present inventions appertain. While I have described the features and principles of operation of assemblies which I now consider to comprise preferred embodiments of my invention, I desire to have it understood that the showings are primarily illustrative, and that such changes and developments may be made, when desired, as fall within the scope of the following claims.

I claim:

1. In a washer unit arranged for mounting on the rim of a wash tray, a support base providing a basin for a lubricant and having a laterally closed tubular boss extending upwardly from the basin bottom to a level above the lubricant in the basin and having its bore extend through the basin bottom, an agitator shaft depending from the base and journalled in the bore of the boss and directly supported upon the top of the boss, a horizontal drive shaft mounted on the base and extending within the basin space, means coactive between the shafts and entirely within the lubricant in the basin for oscillating said agitator shaft, and thrust members adjustably mounted on and beneath the basin bottom for their cooperative projection against opposite points of the side of the mounting tray for fixing the unit in laterally adjusted position on the tray rim.

2. In a washer unit arranged for its fixed mounting upon the top of a wash tray, a support base providing a basin for lubricant and having a

laterally closed tubular boss extending upwardly from the basin bottom to a level above the lubricant in the basin and having its bore extend through the basin bottom, an upright agitator shaft depending from the base and journalled in the bore of the boss, a drive gear provided on the agitator shaft and supporting the shaft on the boss and extending into the lubricant in the basin, a horizontal drive shaft mounted on the base and extending within the lubricant space, a drive cam carried by the drive shaft for rotation therewith and comprising a cam flange oblique to the shaft axis, and a unitary element movably mounted on said base within the lubricant in the basin and having mutually fixed parts directly connecting said cam flange and gear for an oscillative driving of the latter from the former as the drive shaft is rotated.

3. In a washer unit for clothing and the like, a base arranged for support in fixed position upon the rim of a wash tray, an upright agitator shaft depending through the base and mounting a drive gear above the base, a drive shaft carried by the base in overlying relation to it and in the plane of the gear, a drive cam carried by the drive shaft and providing a continuous and uniform one-turn radial cam flange oblique to the shaft axis, an element movable on said base for movement between limiting positions thereof and providing a fork means fixedly related thereto and constantly engaging the cam flange for effecting an actuation of the element between its limiting positions as the cam is rotated, and a direct gear connection between the element and the gear of the agitator shaft disposed solely on the cam side of the shaft gear.

4. In a washer unit for clothng and the like, a base for fixed support upon and above a wash tray and providing an upwardly-open basin space for a lubricant, an upright agitator shaft sealedly depending through the base bottom and mounting a drive gear in said space, a drive shaft carried by the base in said space and in the plane of said gear, a drive cam carried by the drive shaft and comprising a tubular hub rotatively receiving the drive shaft and mounting a continuous cam flange oblique to the shaft axis, a clutch means directly operative to releasably connect the cam hub with the drive shaft for rotation therewith, an element movable on said base in a horizontal plane and between limiting positions thereof and engaging the cam flange for an actuation of the element between its limiting positions as the cam is rotated, a direct gear connection in said space between the element and the gear of the agitator shaft, a removable cover for said space, and a manually-settable control member for the clutch carried by said cover.

5. In a washing and wringing unit of the character described, a base arranged for its removable and fixedly positioned support upon the rim of a wash tray and providing a continuous side wall extending upwardly from a bottom wall to provide a basin space for receiving a lubricant, means on the base mounting a jack-shaft in said space in horizontal disposition, an upright agitator-operating shaft supportedly depending through the base bottom from within said space, a wringer-operating shaft supportedly extending through the basin side wall from within said space, a motor means mounted on the base for effecting a continuous rotation of the jack-shaft, mutually independent drive connections between the jack-shaft and the agitator and wringer shafts, a clo-

sure cover for said basin space removably supported on said wall, and control members for the different drive connections carried by the cover and extending upwardly from the connections through the cover to provide for manual settings thereof from above the cover.

AUGUST H. HARTMANN.

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