

H. L. STALEY.
GEARING.

APPLICATION FILED JUNE 28, 1909.

1,020,226.

Patented Mar. 12, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

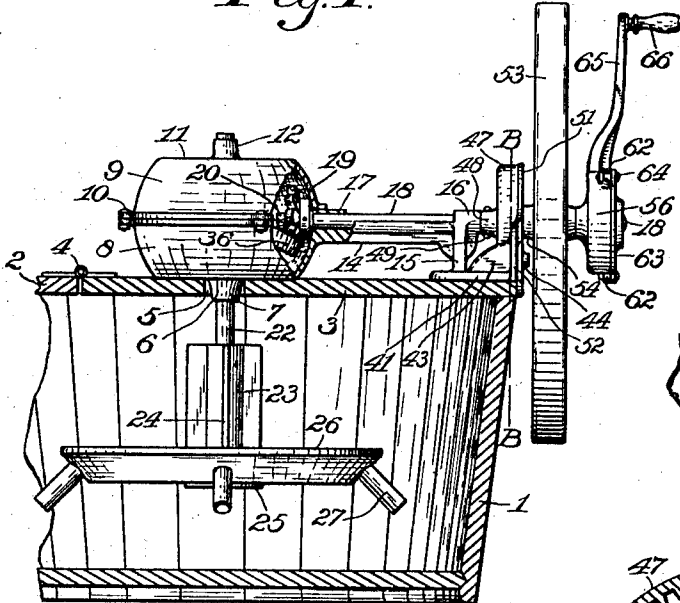


Fig. 2.

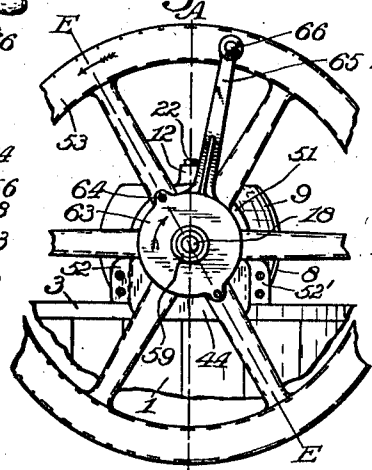


Fig. 4.

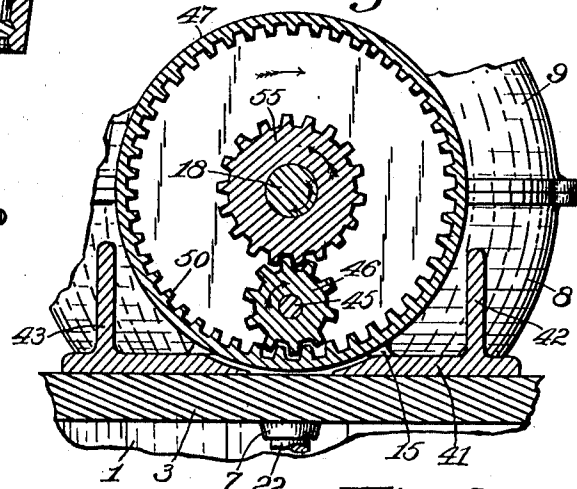


Fig. 3.

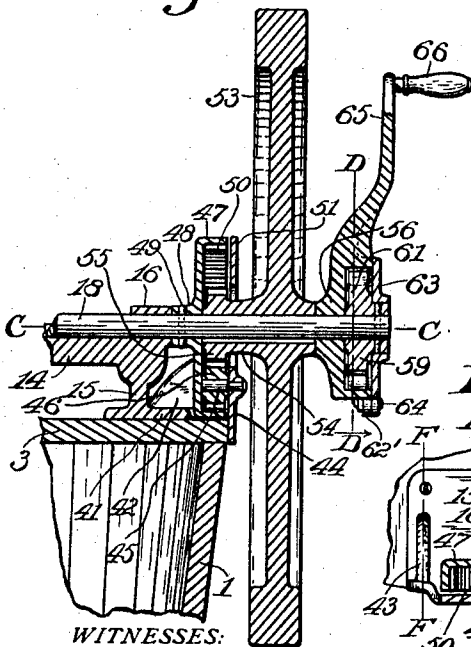


Fig. 5.

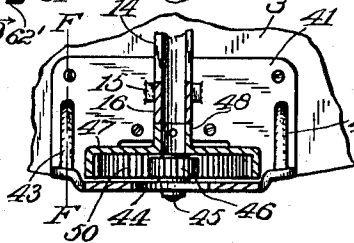
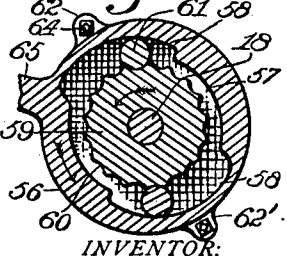


Fig. 6.



WITNESSES:

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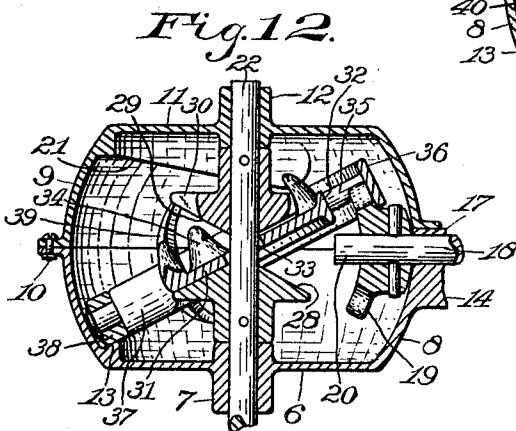
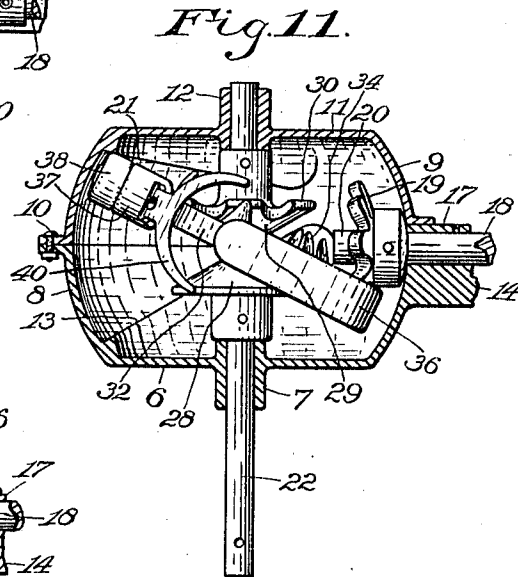
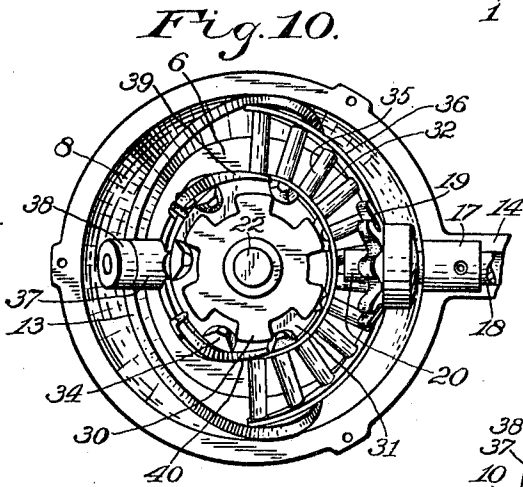
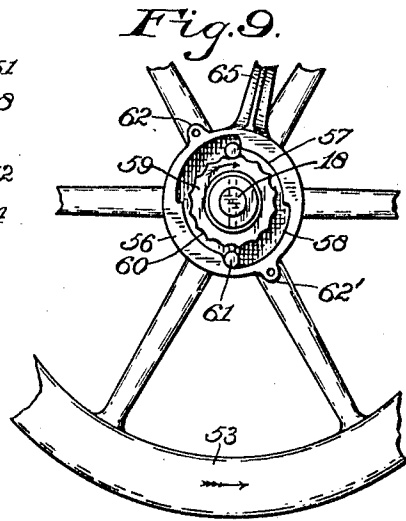
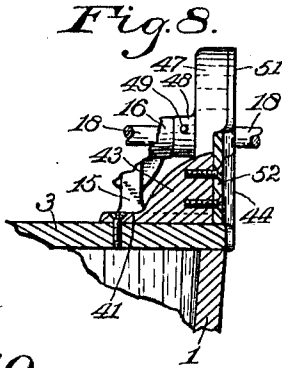
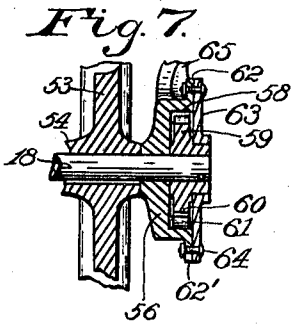
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2 SHEETS—SHEET 2.

1,020,226.



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UNITED STATES PATENT OFFICE.

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GEARING.

1,020,226.

Specification of Letters Patent.

Patented Mar. 12, 1912.

Application filed June 28, 1909. Serial No. 504,682.

To all whom it may concern:

Be it known that I, HARRISON L. STALEY, a citizen of the United States, residing at Martinsville, in the county of Morgan and State of Indiana, have invented certain new and useful Improvements in Gearing; and I do declare the following to be a full, clear, and exact description of the invention, reference being had to the accompanying drawings, and to the letters and figures of reference marked thereon, which form a part of this specification.

This invention relates to gearing that is designed primarily for washing machines, but which may be used for various other purposes, the invention having reference particularly to accelerating gearing for increasing the speed of a balance wheel relatively to the actuating shaft of the wheel, the invention relating also particularly to an improved housing for the gearing.

The object of the invention is to provide improved speed accelerating gearing for balance wheels, a particular object being to provide improvements in oscillatory rotary gearing of the type shown in Letters Patent No. 903,613, granted to me November 10, 1908, which gearing is briefly shown and described herein in order to illustrate and explain the purposes and functions of the present improvements. Said oscillatory rotary gearing comprises a rotative driving shaft, a rotative driven shaft and peculiar vibrating gearing connecting the driving shaft and the driven shaft for causing the driven shaft to oscillate and also to advance forward rotatively at each alternate oscillation, so that when operating the driving shaft by hand the tendency of the gearing is to cause unsteadiness of motion of the operating crank and to retard the motion periodically, and the specific purpose of the present invention is to provide apparatus whereby steady and uniform rotary movement of the driving shaft may be produced; a further object being to provide gearing whereby the balance wheel may be caused to rotate in the direction opposite to the direction of movement of the operating crank, so as to neutralize the tendency to jerk when the balance wheel and crank turn in the same direction in case the wheel is not accurately balanced, as may be the case in cheaply constructed machinery; a still fur-

ther object being to so connect the operating crank to the shaft as to permit the shaft to continue rotation through the force of momentum in the balance wheel after arresting the movement of the operating crank.

With the above-mentioned and other objects in view, the invention consists in the combination with a rotatable driving shaft, of novel speed accelerating gearing, a balance wheel mounted on the shaft and driven by the gearing reversely to that of the shaft, and a crank arm on the shaft for operating the shaft; and the invention consists further in the parts and combinations and arrangements of parts, as hereinafter particularly described and then defined in the accompanying claims.

Referring to the drawings, Figure 1 is a fragmentary vertical central sectional view of a wash tub to which the invention is applied and shown in elevation, parts thereof being broken away; Fig. 2, a fragmentary front elevation; Fig. 3, a fragmentary vertical sectional view on the line A A in Fig. 2; Fig. 4, a fragmentary vertical section on the line B B in Fig. 1; Fig. 5, a fragmentary horizontal section on the line C C in Fig. 3 minus parts thereof; Fig. 6, a fragmentary vertical section on the line D D in Fig. 3; Fig. 7, a fragmentary section on the line E E in Fig. 2; Fig. 8, a fragmentary section on the line F F in Fig. 5; Fig. 9, a fragmentary front elevation showing the construction and connection with the driving shaft of the operating crank with internal parts thereof uncovered; Fig. 10, a top plan showing the principal parts of the oscillatory rotary gearing; Fig. 11, a vertical section of the housing or case and the oscillatory rotary gearing therein in elevation; and Fig. 12, a vertical sectional view of the oscillatory rotary gearing and housing thereof.

Similar reference characters in the different figures of the drawings indicate corresponding elements or features of construction referred to herein.

The construction and arrangement of the invention shown in Patent No. 903,613 above referred to will be first briefly described in order that a clear understanding may be had of the purposes and functions of the present improvements, said patent showing

a wash-tub 1 on which is a stationary cover-part 2 and a movable cover-part 3 connected to the stationary cover-part by hinges 4 and having an aperture 5 therein. The oscillatory rotary gearing is inclosed in a housing comprising two similar parts arranged one upon the other, the lower part comprising a bottom 6 mounted on the cover part 3 and having a journal-box 7 that extends into the aperture 5, a bowl-shaped wall 8 extending upward from the bottom. The upper part of the housing comprises a wall 9 that is secured by bolts 10 to the lower part and has a top 11 on the wall that is provided with a journal-box 12 in alignment with the journal-box 7. The lower part of the housing has a guide-rail 13 that is formed on the inner side of the wall 8 in inclined position, and said lower part has an arm 14 thereon that is provided with a foot 15 which is suitably secured to the cover-part 3, the arm being provided with two journal-boxes 16 and 17 in which a rotative driving shaft 18 is journaled and extending suitable distances beyond the journal boxes, the inner end of the shaft having a dished long toothed pinion 19 thereon, the shaft extending through the pinion and forming a guide-pin 20 at the inner side of the pinion. The upper part of the housing has a guide-rail 21 formed on the inner side of the wall 9 and opposite to the guide rail 13, the two guide-rails being farthest apart at their middle portions at the side of the housing opposite the end of the pin 20, and extending each toward the other along the inner sides of the housing. A shaft 22 is mounted in the journal-boxes 7 and 12 to rotate therein and extends into the tub, the shaft having a relatively long hub 23 thereon that is provided with the ribs 24 and a collar 25 at the lower end of the hub, there being a rubbing plate 26 mounted on the hub, so as to move vertically thereon and having suitable slots to receive the ribs 24 whereby to rotate the rubbing plate, the latter having a suitable number of projections 27 thereon to turn the articles that are to be washed in the tub. A conical guide 28 is attached to the shaft 22 upon the journal-box 7, and a combined conical-guide and gear wheel 29 is secured also to the shaft 22 above the guide 28, and has peripheral notches so that relatively thick gear-teeth 30 are provided for actuating the driven shaft 22. A rolling gear segment comprises a circular plate 31 having a rim 32 thereon and a central guide opening 33 that is slightly greater in diameter than the shaft 22 which extends through the opening, there being a suitable number of gear teeth 34 projecting upward from the rim 32, the teeth being arranged in a circle of greater diameter than the pitch line of the teeth 30. A suitable number of pin-teeth

35 extend radially from the rim of the plate 31 and the outer ends of the teeth having a guide rail 36 connected thereto. The plate 31 is arranged between the conical guides 28 and 29 and may roll thereon while the teeth 35 are in engagement with the pinion 19. An arm 37 extends from the plate 31 at the opposite side thereof from the pin-teeth and has a guide-roller 38 on its end that is adapted to roll on the guide-rails 13 or 21 to guide the gear segment and assist in maintaining the connection between the teeth of the gear segment and the driving pinion during reversing movements especially. A pair of crescent shaped reversing guides 39 and 40 are suitably secured to the plate 31 opposite the terminal pin teeth 35 of the group, the guides being adapted to engage the guide pin 20 when the gear segment is being reversed in motion. Figs. 10 and 11 show the plate 31 tilted in one direction, and Fig. 12 shows it tilted in the opposite direction. In the operation of said oscillatory rotary gearing increased power and balancing is desired to act on the driving shaft during the reversing operations of the driven shaft at which periods the plate 31 is caused to tilt.

The improvements as preferably constructed consist in providing the foot 15 with a supporting base-plate 41 that extends over a suitable extent of area of the top 3 and has two vertical braces 42 and 43 thereon and also an upward extending frame plate 44 that extends also from one brace to the other one and has a stud axle 45 mounted thereon on which a pinion 46 is rotatably mounted. An internal gear wheel 47 has a laterally extending hub 48 whereby the wheel is supported on the shaft 18 and secured thereto by a pin 49, the wheel having gear-teeth 50 on the inner side of its rim and extending inward toward the shaft. The construction and arrangement is such that the gear-wheel 47 is situated approximately above the wall of the tub or near the edge of the top part 3, and the rim of the wheel passes below the pinion 46 with the teeth 50 of the gear wheel in engagement with the pinion below the axis thereof. A guard-plate 51 is arranged opposite the front or open side of the gear wheel 47 and is suitably supported, the plate preferably having two projections 52 and 52' that extend down at opposite ends of the frame member 44 and are secured to the braces 42 and 43. A balance wheel 53 is mounted rotatably on the shaft 18 and has a relatively long hub 54 on one end of which is a pinion 55 that is in engagement with the pinion 46 above its axis, the inner side of the pinion 55 being guided against the inner side of the gear wheel 47 and the outer end of the hub 54 being guided by a hub 56 of a crank-arm that is mounted rotatably on the shaft 18 at the outer side of the hub of the balance wheel. The outer side of the hub

56 has a recess 57 to receive a drive wheel and a suitable number of recesses 58 extend into the wall of the hub from the recess 57, the walls of the recesses 58 that
 5 face toward the shaft 18 extending partially about the shaft eccentrically thereto, and a driving-wheel 59 is secured fixedly to the shaft 18 in the recess 57, and preferably the wheel 59 has shallow notches 60 in its pe-
 10 riphery to receive rollers 61 that are arranged loosely in the recesses 58 for locking the hub 56 to the driving wheel when the hub is turned in one direction, so as to draw the rollers into contact with the driv-
 15 ing wheel. The hub 56 preferably has a pair of ears 62 and 62' thereon whereby a cap plate 63 is secured to the outer side of the hub by means of bolts 64, the hub 56 having an operating crank-arm 65 there-
 20 on that is provided with a handle 66. The hub 56, as will be seen, is guided on the shaft by the driving wheel 63 and assists in guiding the balance wheel. As will be seen, it is designed that the crank-arm 65
 25 shall be turned to the right, or as indicated by the arrow on the cap plate in Fig. 2, but it is obvious that the eccentricity of the walls of the recesses 58 may be inclined in the re-
 30 verse order if desired to operate in the op-
 30 posite direction.

In practical use the crank-arm 65 is moved by hand either to and fro as a rock arm or continuously about the shaft 18 at the de-
 35 sired speed, and while the shaft 18 is driving the vibrating gearing and moving the articles being washed in the tub back and forth under varying conditions that require varying force for operation, the wheel 47
 40 rotates the pinion 46 which in turn rotates the pinion 55, and consequently turns the balance wheel 53 in the direction opposite to that in which the shaft 18 and crank arm are moving, and at relatively higher speed, thus absorbing or neutralizing unsteadiness
 45 of motion due partly to the unbalanced crank-arm and the oscillating parts of the gearing, the principal objections to oscillatory or vibratory gearing being thus elimi-
 50 nated. When the crank-arm 65 is moved backward or is at rest, while momentum of the balance wheel continues to rotate the

shaft 18, the hub 56 is unlocked from the driving wheel 59, as illustrated in Fig. 9.

Having thus described the invention, what I claim as new, is—

1. Gearing including a support, an arm 55 having a foot secured to the support and provided with a supporting base-plate that extends upon the support and has an up-
 60 ward-extending frame-plate thereon, a stud-axle secured horizontally to the upward-
 60 extending frame-plate, a pinion rotatable on the stud-axle, a shaft mounted rotatably on the arm and extending over the pinion, an internal gear-wheel secured to the shaft and
 65 comprising a rim extending entirely about the pinion and adjacent to the upward-
 70 extending frame-plate, there being gear-teeth on the inner side of said rim engaging the
 70 lowermost side of the pinion, and a balance-
 70 wheel supported rotatably adjacent to the support and having a spur-toothed wheel thereon meshing with the pinion and encir-
 70 cled by the said rim.

2. Gearing including a support, a driving 75 shaft and a driven shaft mounted rotatably on the support, a frame member mounted fixedly upon the support below the driving shaft, a stud-axle supported on the frame
 80 member below and parallel to the driving shaft, a spur-tooth pinion rotatable on the stud-axle at one side of the frame member, a balance-wheel rotatable on the driving
 85 shaft and having a spur-tooth wheel thereon meshing with the teeth of the said pinion, an internal gear-wheel secured to the driv-
 90 ing shaft and comprising a rim extending about the pinion and the spur-tooth wheel and adjacent to the frame member, the rim having spur-teeth on the inner side thereof
 90 meshing with the spur-tooth wheel, a shield secured to said frame member and extending opposite and adjacent to said rim, and gear-
 95 ing connecting the driven shaft with the driving shaft.

In testimony whereof, I affix my signature in presence of two witnesses.

HARRISON L. STALEY.

Witnesses:

CLARENCE N. SCHWARTZ,
 CHARLES A. HUBBARD.