

Aug. 16, 1927.

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F. E. BOWERS

POWER WASHING MACHINE

Filed Sept. 27, 1924

2 Sheets-Sheet 1

Fig. 1.

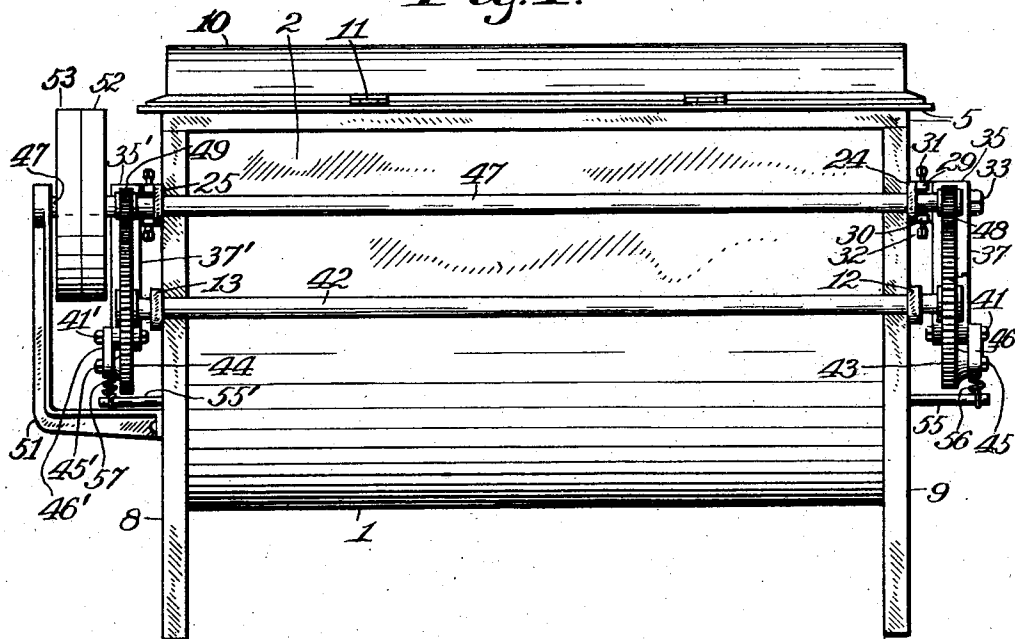
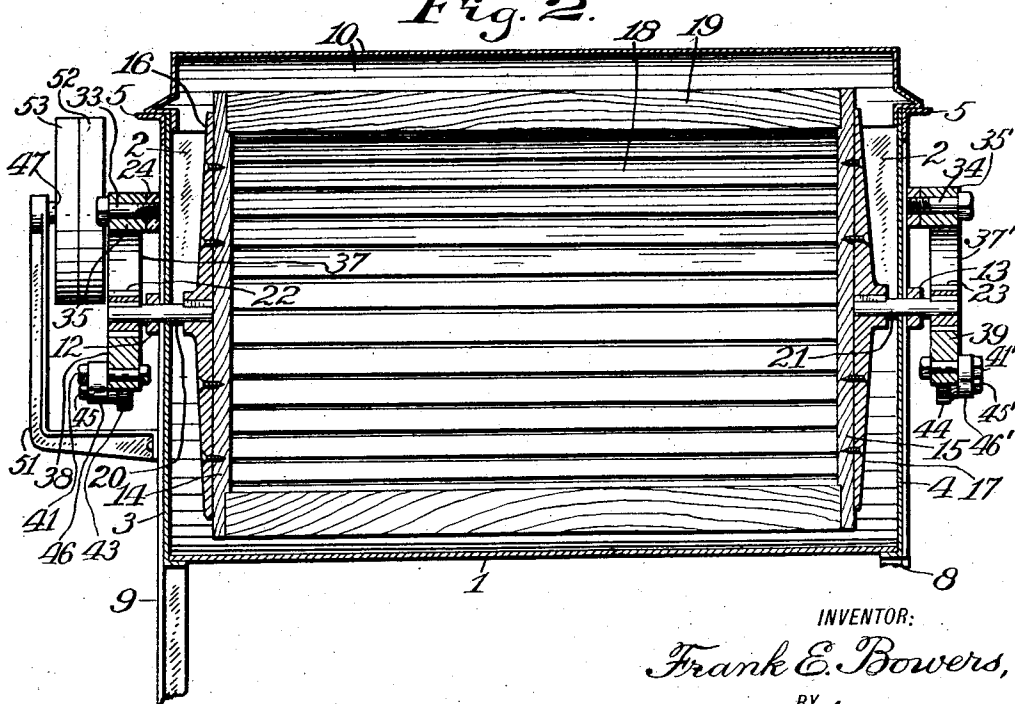


Fig. 2.



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Fig. 3.

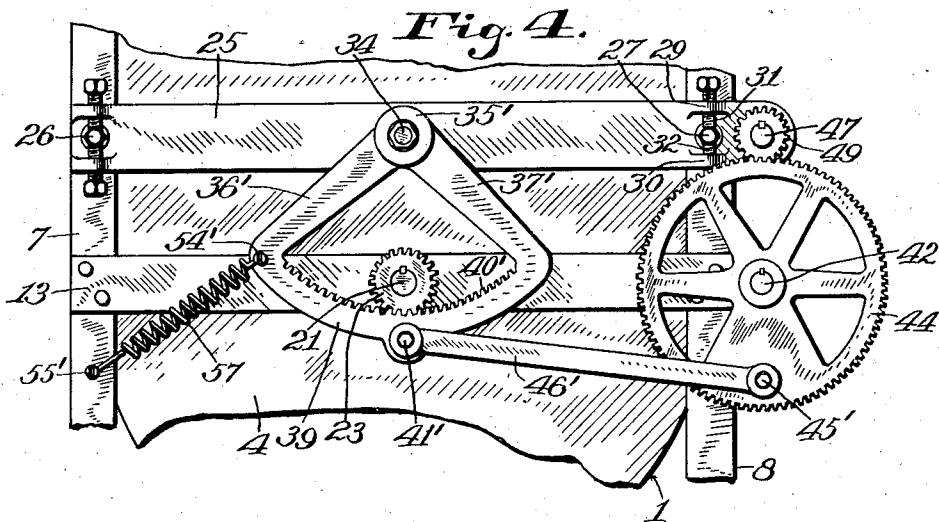
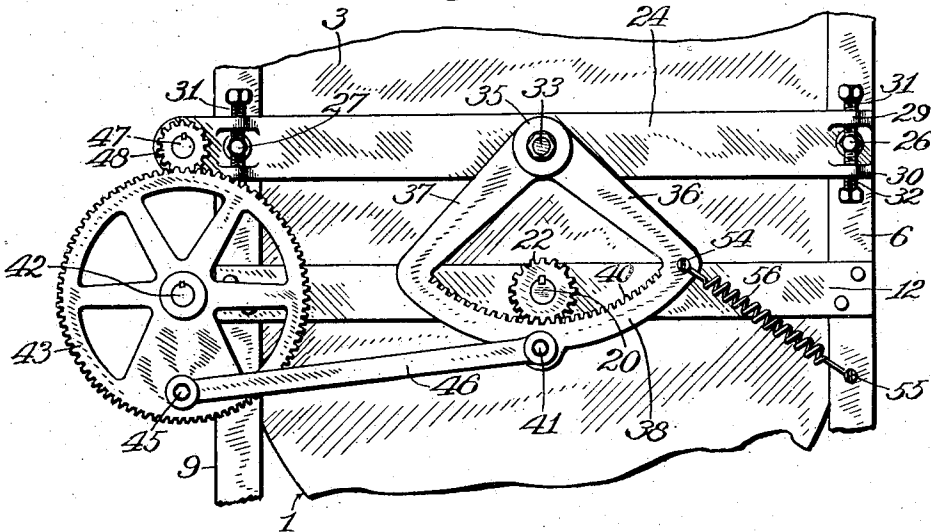
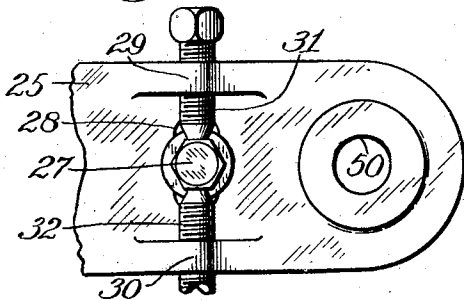


Fig. 5.



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UNITED STATES PATENT OFFICE.

FRANK E. BOWERS, OF INDIANAPOLIS, INDIANA.

POWER WASHING MACHINE.

Application filed September 27, 1924. Serial No. 740,217.

This invention relates to the type of washing-machine that has a hollow rotary-oscillatory cylinder in which garments or fabrics are carried in detergent liquid, the invention having reference more particularly to a machine of the above-mentioned character that is designed to be built inexpensively yet of powerful structure.

An object of the invention is to provide an improved power washing-machine which shall be so constructed as to permit of applying roughly finished operating gearing thereto, such as cast metal gears and other parts with the minimum amount of machine work thereon.

Another object is to provide an improved washing-machine construction which will permit common cast gears to be used therein efficiently and with the minimum amount of rattling and noise which commonly results from the use of gears on which gear teeth have not been accurately cut by machinery.

A further object is to provide an improved washing-machine which may be constructed so as to have large capacity and shall be strong but of light weight, and which shall be efficient, smooth-running, durable and economical in use.

With the above-mentioned and other objects in view, the invention consists in a washing-machine having novel operating gearing, and especially improved application of gearing in washing-machines, and in the parts and combinations and arrangements of parts as hereinafter particularly described and further more definitely claimed.

Referring to the drawings,—Figure 1 is a rear elevation of the improved washing-machine as preferably constructed, a driving pulley being arranged on one end of the machine; Fig. 2 is a vertical longitudinal section of the machine looking rearward, in which the driving pulleys are arranged on the opposite end of the machine as may be desired when locating a machine; Fig. 3 is an enlarged fragmentary elevation of one end of the machine; Fig. 4 is an enlarged fragmentary elevation of the opposite end of the machine; and Fig. 5 is a fragmentary front view of one of the adjustable frame parts of the machine, on a further enlarged scale.

Similar reference characters in the different figures of the drawings indicate corre-

sponding elements or features of construction herein referred to in detail.

As preferably constructed the washing-machine comprises a casing or vessel adapted to contain a detergent liquid, and commonly the casing has a curved bottom 1 and vertical sides 2 in connection with vertical ends 3 and 4, the top of the vessel proper having a strong top frame 5. The vessel has also four vertical corner members 6, 7, 8, 9 that extend downward beyond the bottom of the vessel to constitute supporting legs. A cover 10 is connected by means of hinges 11 to the top frame 5. The washing-machine frame includes two horizontal bars 12 and 13 one being arranged at the outer side of the end 3 and rigidly secured to the adjacent corner members, the other bar being arranged at the outer side of the end 4 and secured to the adjacent corner members, the bars projecting beyond the rear side of the vessel.

A cylinder, as in common practice, is arranged in the casing and comprises two wooden heads 14 and 15 to the outer side of which metallic head members 16 and 17 are secured, and staves or slats 18 and ribs 19 secured to the heads. The heads are provided with stub shafts 20 and 21 respectively that are rotatively supported in the adjacent frame bars 12 and 13 respectively and extend therethrough, pinions 22 and 23 being secured to the shafts respectively adjacent to the outer sides of the frame bars 12 and 13 respectively. A pair of adjustable horizontal frame bars 24 and 25 of improved construction are provided and arranged above the bars 12 and 13 respectively. One of the adjustable bars is secured by means of strong screws 26 and 27 to the corner members 6 and 9, the other bar being likewise secured to the corner members 7 and 8, the bars extending beyond the rearward side of the vessel. The adjustable bars have vertical slots 28 therein, being transverse in the bar, to receive the screws and permit adjustment of the bar upward or downward. The adjustable bars have ears 29 and 30 adjacent to their edges, there being one ear above and one below each screw, and set-screws 31 and 32 are arranged in the opposite ears so as to have contact with the upper and lower sides respectively of the head of the adjacent securing screw, whereby to securely hold the bar when adjusted. The adjustable bars 24 and 25 are provided

with pivot studs 33 and 34 respectively that are arranged so as to be above the shafts 20 and 21 respectively, and two oscillators are pivoted to swing to and fro, one comprising a hub 35 supported on the stud 33 and having divergent arms 36 and 37 to the ends of which the ends of a curved rack-bar 38 are integrally connected, the rack-bar being arranged to operate beneath the pinion 22. The other oscillator is similar but arranged at the opposite end of the vessel and has a hub 35' supported on the pivot stud 34, arms 36' and 37' extending from the hub and a rack-bar 39 integral with the arms and arranged to operate beneath the pinion 23. The rack-bars have gear teeth 40 and 40' meshing with the pinions 22 and 23 respectively. Thus each shaft that supports the cylinder heads is provided with means for directly rotating and controlling the shaft which is important in large machines to prevent straining of the cylinder structure with probable loosening of the several parts thereof. The rack-bars have wrist pins 41 and 41' respectively for operation and control thereof.

A crank shaft 42 is rotatively mounted in the projecting portions of the frame bars 12 and 13 and extends horizontally across the back of the vessel, gear wheels 43 and 44 being secured to the shaft adjacent to the outer side of the frame bars, and having crank pins 45 and 45' thereon respectively, to which connecting rods 46 and 46' are respectively connected, the rods being connected also to the wrist pins 41 and 41' respectively, so that the rack-bars shall be synchronously operated. A driving shaft 47 is rotatively supported in the projecting portions of the adjustable frame bars 24 and 25 and it has two pinions 48 and 49 secured thereto in mesh with the gear wheels 43 and 44 respectively, to insure steady driving without requiring all the driving strength to be incorporated in the crank shaft, in the construction of very large machines. The projecting portions of the frame bars are substantially as shown in Fig. 5, each having a shaft bearing 50.

Usually one end of the vessel has a bearing bracket 51 secured thereto that assists in supporting the driving shaft 47 which is sufficiently long to extend to the bracket, and the shaft has tight and loose pulleys 52 and 53 thereon adjacent to the bracket, in such case the machine being driven by a belt. The forward end portions of the rack-bars are provided with wrist pins 54 and 54' respectively, the forward corner posts are provided with suitable brackets 55 and 55' respectively, and coil springs 56 and 57 are connected at one end with the wrist pins respectively and have their opposite ends suitably connected with the brackets respectively, the springs being slightly tensioned so as to slightly resist the movements of the rack-

bars as they are swung alternately in opposite directions to the end of their travel and while being reversed in movement. The spring is adopted as the preferable means that is simple and inexpensive for aiding in attaining quiet and smooth operation of the machine gearing.

It is to be understood that there are a variety of sizes of the washing-machines, the smaller and less costly being provided with gearing at only one end of the machine to be actuated by a suitable hand crank. Various minor features of the machine not necessary to an understanding of the invention are omitted from the drawings.

In practical use the vessel is supplied with a suitable liquid and the articles to be cleansed are placed in the cylinder as customarily. When the gearing is put into operation the crank wheels 43 and 44 rotate in unison and the connecting rods operated thereby cause swinging movements of the oscillators alternately in opposite directions and as they rotate the pinions 22 and 23 alternately in opposite directions the actuating power is applied equally to both heads of the cylinder, preventing twisting strains to which the cylinder would be subjected if driven at one end only, the cylinder being of large proportions and heavily loaded. The springs connected to the oscillators operate as anti-rattling devices while contributing to effect smooth running of the gearing. To compensate for wear of the rough teeth of the pinions 48 and the gear wheels connected therewith, the frame bars 24 and 25 are to be adjusted, being moved slightly downward, and the opposite ends of the bars are moved slightly upward to bring the rack-bars closely up to the pinions 22 and 23 to compensate for wear and conduce to smooth running.

What is claimed as new is:

1. A power gearing including a main frame bar to be horizontally secured in place, an adjustable frame bar to be horizontally secured above the main frame bar having two vertical slots in proximity to the opposite ends respectively of the bar, the bar having also an ear above and an ear below each of the slots, two securing screws to be arranged in the slots respectively, two set-screws arranged in the upper ears to engage the securing screws respectively, two set-screws arranged in the lower ears to engage the securing screws respectively, a curved rack-bar having arms pivoted to the adjustable frame bar intermediately of said slots, a shaft rotatively supported by said main bar intermediately of its ends, a pinion secured to the shaft and being in engagement with the rack-bar, a gear wheel rotatably supported by said main bar adjacent to one end thereof and having a crank pin, and a rod connected to said crank pin and pivoted to said rack-bar.

2. A power gearing including a main frame vertically arranged, a main frame bar horizontally secured rigidly to the main frame, an adjustable frame bar arranged
 5 above the main frame bar, means to adjustably secure the adjustable bar to the main frame to be vertically shifted, a shaft rotatively supported by the main frame bar adjacent to the middle thereof, a pinion secured
 10 to said shaft, a rack-bar having arms pivotally supported by said adjustable bar above said pinion and carrying the rack-bar beneath the pinion in contact therewith, a gear wheel rotatably supported by said main bar
 15 adjacent to one end thereof and having a crank pin, a rod connected to said crank pin and pivoted to said rack-bar, a driving shaft rotatably supported by said adjustable bar adjacent to one end thereof, a pinion
 20 secured to said driving shaft in mesh with said gear wheel, and a coil spring connected to said rack-bar and also to the main frame.

3. A power gearing comprising in combination a casing, two front and two rear
 25 corner members secured to the casing, two frame bars rigidly secured each to a front and a rear corner member, the bars being at opposite ends respectively of the casing and extending beyond the rear corner mem-
 30 bers, a crank shaft rotatably supported by the rearward extending portions of the frame bars and having two gear wheels secured thereto adjacent to the outer sides of said bars respectively, each gear wheel hav-
 35 ing a crank-pin thereon, two brackets secured to the front corner members respectively and below said frame bars respectively, two stub shafts rotatably mounted in said frame bars respectively, two pinions secured
 40 to said stub shafts respectively, two horizontal adjustable bars arranged above said rigid bars respectively and secured for ver-

tical adjustment each to a front and a rear corner member, said adjustable bars extend-
 45 ing beyond said rear members, a driving shaft rotatably supported by the rearward extending portions of said adjustable bars and having two pinions secured thereto in mesh with said gear wheels respectively, two
 50 curved rack-bars having supporting members pivoted to said adjustable bars respectively and being in connection with the pinions respectively on said stub shafts, each rack-
 55 bar having two wrist-pins thereon, two rods connected to said crank-pins respectively and also to one of the wrist-pins on the rack-bars respectively, two coil springs connected
 60 to said brackets respectively and also to the remaining one of the wrist-pins on the rack-bars respectively, and a device secured to the driving shaft to rotate it.

4. In a power washing-machine gearing comprising a frame, a shaft rotatably supported by the frame, and a pinion secured
 65 to the shaft, the combination of a frame bar horizontally arranged on the frame above the pinion and having two vertical slots in proximity to the opposite ends respectively
 70 of the bar, the bar having also an ear above and an ear below each of the slots, two securing screws arranged in the slots respectively and connected to the frame, two set-
 75 screws arranged in the upper ears and engaging the securing screws respectively, two set-screws arranged in the lower ears and engaging the securing screws respectively, a
 80 curved rack-bar having carrying arms pivoted to said frame bar intermediately of said securing screws, said rack-bar being in engagement with said pinion, and a device pivoted to the rack-bar to swing it.

In testimony whereof, I affix my signature on the 22nd day of September, 1924.

FRANK E. BOWERS.