Aug. 18, 1931. C. F. STAPLES 1,819,208

WASHING MACHINE

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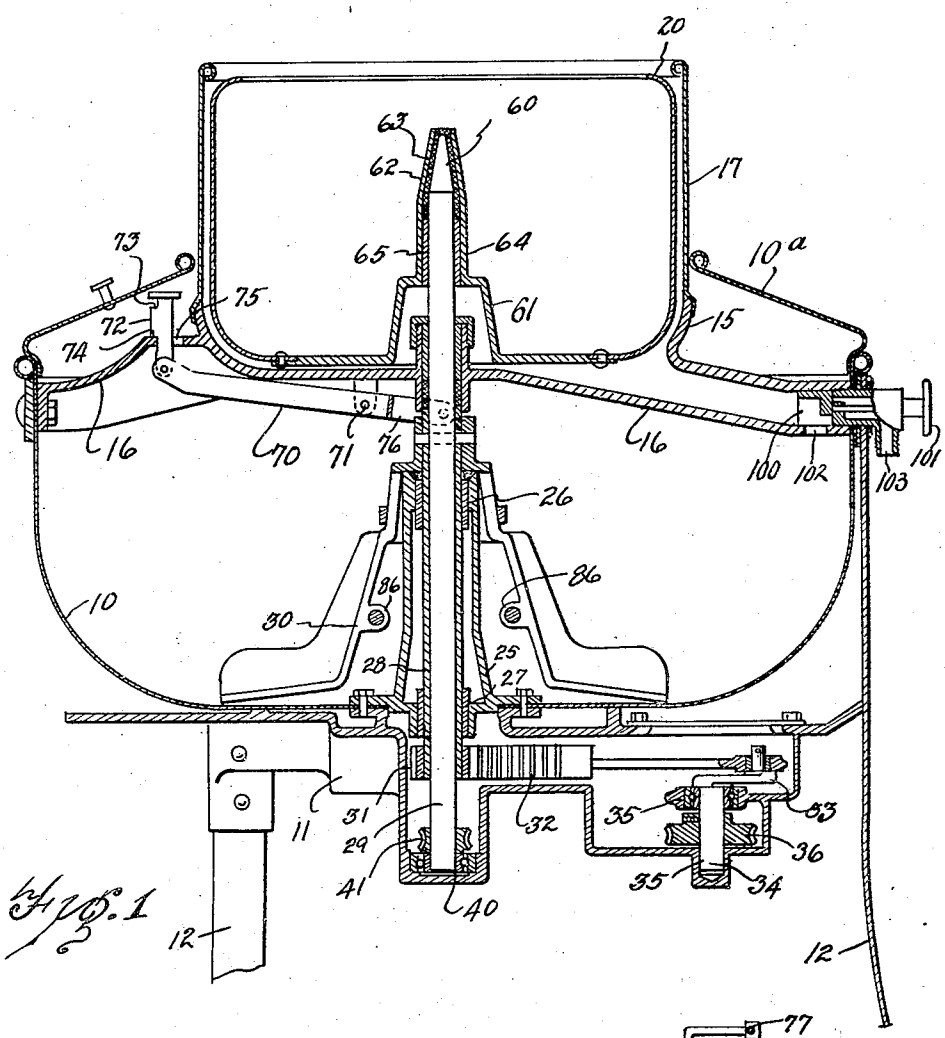


Fig. 1

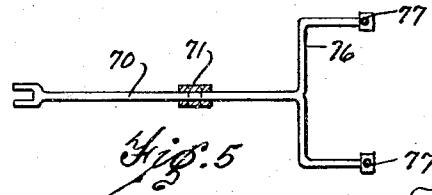


Fig. 5

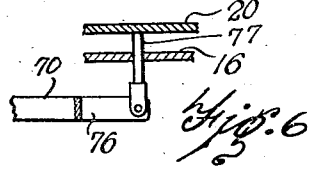


Fig. 6

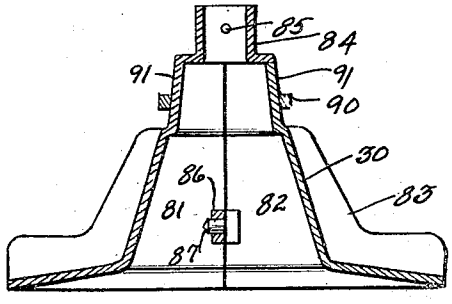


Fig. 4

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Fig. 2.

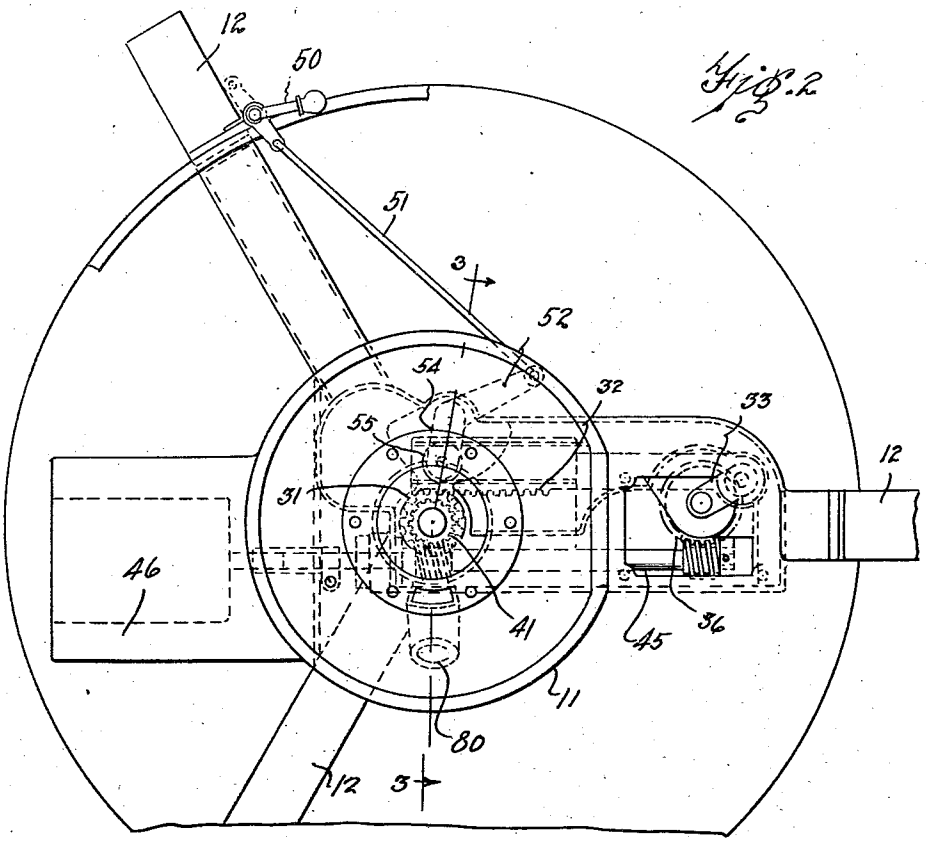
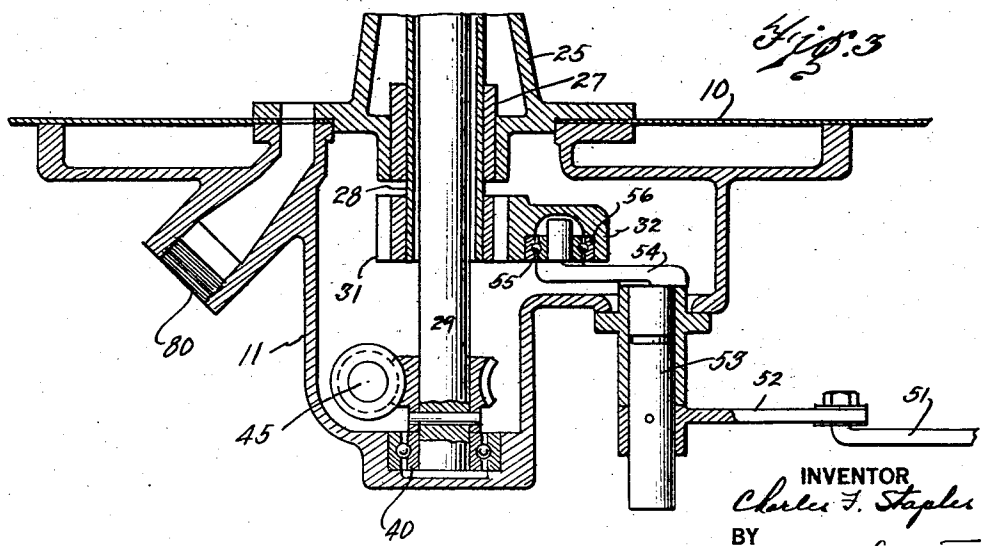


Fig. 3.



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1,819,208

UNITED STATES PATENT OFFICE

CHARLES F. STAPLES, OF DETROIT, MICHIGAN, ASSIGNOR, BY MESNE ASSIGNMENTS, TO GRAYBAR ELECTRIC COMPANY, INC., OF NEW YORK, N. Y., A CORPORATION OF NEW YORK

WASHING MACHINE

Application filed November 9, 1925. Serial No. 67,801.

The present invention relates to washing machines and more specifically to improvements in that type of machine described and claimed in Patent No. 1,505,674, issued August 19, 1924, to the present applicant.

Among the objects of the present invention is a washing machine in which all of the operations of washing, rinsing, bluing, and wringing and boiling may be carried on without removing or displacing any of the apparatus or replacing the wash water.

Another object is a washing machine having a centrifugal wringer or drier which can be operated during the operation of the washer and without interference therewith.

Still another object includes the improvement of the driving mechanism for the washer and drier and the arrangement of parts to increase efficiency of performance and economy of production and operation.

With these and other objects in view as will readily appear to those skilled in the art upon reference to the following description, the invention consists broadly in a washer provided with an agitator and having superposed a centrifugal drier adapted to be operable independently of the agitator, both, however, being actuated by a single motor through mechanism entirely enclosed in a housing which also supports and protects the motor.

Reference should be made to the accompanying drawings, in which like numerals refer to like parts throughout, and in which:

Fig. 1 is a vertical section through a machine forming the preferred embodiment of the invention;

Fig. 2 is a plan view of the portion below the washing vessel or tub;

Fig. 3 is a part vertical section through the operating mechanism taken on line 3—3 of Fig. 2;

Fig. 4 is a detail view in vertical section of the agitator;

Figs. 5 and 6 are respectively a plan and elevation of the basket brake, with parts in section.

As indicated in the drawings, the preferred form of embodiment of the invention consists of a washing tub or container 10, preferably circular and of the form indicated in the drawing, seated upon a traylike housing 11 containing the operating mechanism. The housing 11 and tub 10 are both secured to legs 12 which extend to the upper edge of the tub. In the upper part of the tub is a preferably circular tray 15 supported centrally by a plurality of legs 16, two being shown in Fig. 1, this tray forming the bottom of the drier container 17. The latter is somewhat smaller in diameter than the tub 10 and encloses a centrifugal basket drier 20. It is preferred to provide the tub 10 with an annular cover or lid 10*a* adapted to extend around container 17 and cover the tub during the washing operation.

As shown, the central part of the bottom of the tub 10 is provided with an opening over which is bolted a tubular upright shaft housing and bearing 25. This member 25 extends upwardly to near the top of tub 10 to approximately the normal water level therein. Member 25 is provided with bearings 26 and 27 for a hollow shaft 28 and this in turn provides bearing for a second shaft 29.

To the upper end of shaft 28 is pinned an agitator 30 which will be described more in detail later. Upon the upper end of shaft 29 is carried the basket 20.

The lower ends of shafts 28 and 29 extend down into the housing 11, as shown in Fig. 1, and co-operate with the driving mechanism therein. The lower end of shaft 28 is provided with a spur gear 31 adapted to be rotated back and forth by a rack 32 oscillatable longitudinally by a crank 33 on a short vertical shaft 34 supported in bearings 35 and provided with a worm gear 36.

The lower end of shaft 29 is supported in a suitable thrust bearing 40 and is provided with a worm gear 41. Gears 36 and 41 are so located as to be driven by a single shaft 45 (see Fig. 2) provided with suitable worms, and shaft 45 is driven by a suitable motor mounted in the motor support 46 forming part of the housing member.

By the mechanism just described, operation of the motor will rotate shaft 29 and with

it the drier basket 20 and will oscillate shaft 28 and with it the agitator in tub 10.

Means is also provided to free the agitator to allow it to come to rest or to permit it to be turned by hand for cleaning, etc. This means is shown in Figs. 2 and 3. Carried upon one of the legs 12 is a short lever 50 which through link 51 actuates an arm 52 secured to the lower end of a short shaft 53 mounted in the lower wall of housing 11. The upper end of shaft 53 carries a crank arm 54 having at its outer end a roller 55 lying in a longitudinal channel in rack 32. When the lever 50 is moved to the dotted line position, the crank arm 54 will operate to lift rack 32 away from gear 31 and the rack will thereupon merely continue to oscillate freely. The roller 55 on arm 54 not only serves to move the rack 32 but, when the latter is in operating position, serves as a guide therefor.

It will be noted that the upper end of shaft 29 is provided with a tapered portion 60 and that the bottom of basket 20 is provided with an upstanding central hub member 61 having in its upper end a tapered part 62 corresponding to taper 60 of the shaft. This part 62 is lined with friction material 63 so as to form a friction clutch between basket 20 and shaft 29. In order to maintain the concentric relation of shaft 29 and member 61, it is preferred to insert in the cylindrical portion 64 thereof a sleeve 65 adapted to fit snugly between the shaft and member and maintain their relation.

Means is also provided for releasing the clutch just referred to and bringing to rest the basket 20 though the shaft 29 may continue to rotate. This means consists of a lever 70 pivoted at 71 to the bottom of tray 15 and operable by a handle 72 pivoted to one end thereof and furnished with two oppositely disposed shoulders 73 and 74. When the lever is in its upper position, the shoulder 74 rests on the edge of the guide slots 75 in leg 16 and prevents dropping of the lever and consequent drag on basket 20 as will be seen. When the lever is depressed to release the basket, shoulder 73 will catch under the edge of the slot and retain the lever in its lower position.

The other end of lever 70 will be provided with a fork 76 having pivoted to its arms normally upright pins 77 which pass up through tray 15 and, when the lever is depressed, contact with the flat portion of the bottom of basket 20, lifting the latter and releasing the clutch between the basket and shaft 29, at the same time braking the speed of the basket.

Referring now to Figs. 2 and 3, it will be seen that the housing 11 includes as a part the drain sump and pipe 80. This drain has its inlet near the center of the bottom of the tub and under the area covered by the agitator 30, this being the lowest point of the tub. The agitator is therefore preferably made as is indicated in Fig. 4. In this figure the agitator 30 is indicated as generally bell-shaped and of two parts 81 and 82 provided on the outer surface with blades 83 which extend from the lower edge to near the top of the bell. Part 81 comprises one-half of the bell and all of the sleeve 84 at the top of the agitator by means of which the agitator is pinned through holes 85 to shaft 28. This part is also provided with lugs 86 having holes therethrough. The other part 82 comprises the other half of the bell but extends only up to the lower end of sleeve 84. This part 82 is provided with pins 87 adapted to enter the lugs 86 and thereby be supported by part 81. The two parts are preferably held together by means of a ring 90 fitted over the sloping upper portions 91 of the bell, which portions are above the ends of blades 83.

In using agitators of the type just described it is not uncommon for the articles being washed to be caught under the outer edge thereof and means is always used to prevent this. Heretofore, such means has always been a guard flange or rib or the like. In the present device, no such rib or guard is necessary as the agitator coacting with the bottom of the tub, which curves upwardly from about the lower edge of the agitator to merge into the side walls thereof, causes the articles to be swept away from the lower edge of the agitator by the water currents produced by centrifugal action and guided by the curved wall of the tub. In flat bottom tubs using similar agitators, centrifugal currents are produced but the straight side walls interfere with the sweeping action and permit the clothes or other articles to get caught as mentioned.

The operation of the device would appear to be obvious to those skilled in the art, but one or two points particularly should be noted. The first of these is that either the washer or the drier may be used independently of the other and without operating the other. Another point is that both may be operated simultaneously, each without interfering with the other. A third point is that all of the operations of washing, including washing, rinsing, bluing and wringing can be carried out without removing or displacing any of the parts. The step of boiling may even be included as this form of tub and its arrangement permits the placing beneath it of a suitable burner or burners.

It should be noted that one of the legs 16 (shown in Fig. 1) supporting the tray 15 for the drier is hollow and forms a drain therefor. The end of this leg 16 is provided with a two-way valve 100 which, being operable through handle or hand wheel 101, permits drainage of the drier through passage 102

into the washer or through passage 103 to the outside thereof.

Although the washing of clothes in water by means of this machine has been particularly described, the machine may also be used for cleaning clothes by the so-called "dry cleaning" process. In employing the machine for carrying on this process, the clothes are placed in the tub or container 10, in which gasoline or other dry cleaning fluid is placed. Then the agitator 30 is set into oscillation, and the dry cleaning fluid is circulated through the clothes to clean them. After being thus cleaned, the clothes are removed from the container 10 and placed in the dryer 20, whose rapid rotation causes the surplus cleaning fluid to be expressed from the clothes by centrifugal force.

Further, a lid (not shown) may be provided for the drier if such should be considered desirable or necessary to comply with local legal restrictions, especially where the machine is used for dry cleaning purposes.

Having now described the invention and the preferred form of embodiment thereof, it is to be understood that changes may be made in the specific details without departing from the scope of the claims which follow, in which the terms "crank" and "rack" comprehend any mechanical equivalents procuring the same or similar action.

Claims:

1. A washing machine having a container provided with washing mechanism, a drier superposed thereover, separate shafts connected with the washing mechanism and the drier, a single drive shaft, separate connections between said drive shaft and said separate shafts adapted to oscillate the said mechanism and to rotate the drier, and means for disconnecting the drive of either the washing mechanism or drier at will.

2. In a washing machine, in combination, a washing container, an agitator therein, a drier above said agitator and of smaller diameter than said container, a motor, separate driving connections from said motor to said agitator and drier, and a cover for said container surrounding said drier.

3. In a washing machine, in combination, a washing container and a drier superposed over said container, a separate container for said drier, one of said containers being mounted within the other and substantially concentric therewith, and means for discharging the washing fluid from said drier container either into said first container or outside thereof.

4. In a washing machine, having an agitator, a rack and pinion drive therefor, said rack being provided with a longitudinal channel, a crank member having upon one arm a roller adapted to lie in said channel to guide said rack, and means to move said crank and to thereby cause said roller arm to disengage said rack and pinion.

5. In a washing machine, a container, a housing, a motor, a washing agitator in said container, a drier supported above said washing agitator, a shaft extending up through the bottom of said washing container and connected to said agitator therein, a second shaft extending up through said washing container and connected to said drier, means in said housing for oscillating said first shaft, means in said housing for rotating said second shaft, and means whereby said motor actuates both said other means.

6. In a washing machine, an agitator comprising an upright conical portion having a horizontally disposed flanged lower edge, said portion and said flange being provided with radially extending blades, and a drain for said machine having its inlet disposed beneath said agitator, said agitator having a portion removable whereby access may be had to said drain inlet.

7. In a washing machine, an agitator comprising an upright conical portion having a horizontally disposed flanged lower edge, said portion and said flange being provided with radially extending blades, and a drain for said machine having its inlet disposed beneath said agitator, said agitator having a portion removable whereby access may be had to said drain inlet, said removable portion being supported and actuated by the other portion.

8. In a washing machine having a washer and a superposed concentric rotatable drier, concentric shafts for operating said washer and drier, and a shaft housing and bearing support for said shafts extending up through the bottom of said washer to above the normal water level therein.

9. In a washing machine, an oscillatable agitator, a rotatable drier superposed over said agitator, separate drive shafts for said agitator and drier, one of said shafts being provided with a spur gear and the other with a worm gear, a rack for actuating said spur gear, a crank shaft for actuating said rack, said crank shaft being provided with a worm gear, a drive shaft provided with separate worms co-operating with said worm gears, and means for driving said drive shaft.

10. In a washing machine, an oscillatable agitator, a rotatable drier, separate drive shafts for said agitator and drier, one of said shafts being provided with a spur gear and the other with a worm gear, a rack for actuating said spur gear, means for separating said rack and spur gear at will, a crank shaft for actuating said rack, said crank shaft being provided with a worm gear, a drive shaft provided with separate worms co-operating with said worm gears, and means for driving said drive shaft.

11. A washing machine comprising a con-

tainer, a washing element disposed therein, a rotary drying container superposed above said washing element, and means for driving said washing element and drying container separately or simultaneously.

12. A washing machine comprising a container, a washing element disposed therein, a rotary drying element disposed above said washing element, a pair of shafts extending upwardly through the bottom of said container for severally driving said washing and drying elements, and a housing for said shafts extending upwardly from the bottom of said container to a point above the normal liquid level in said container.

13. A washing machine comprising a container, a washing element disposed therein, a rotary drying element superposed over said washing element, a pair of shafts severally connected to said washing and drying elements, and means for simultaneously oscillating said washing element shaft and rotating said drying element shaft.

14. A washing machine comprising a container, a washing element disposed therein, a rotary drying element superposed over said washing element, a pair of shafts severally connected to said washing and drying elements, a power means, connections between said power means and said shafts, and oscillating means in the connections between said power means and said washing element shaft whereby the latter is oscillated.

15. A washing machine comprising a container, a washing element disposed therein, a rotary drying element disposed above said washing element, a pair of separate shafts in said container, means for rotating one of said shafts and oscillating the other shaft, driving connections between the oscillating shaft and said washing element, and separable driving connections between said rotating shaft and said rotary drying element, whereby the latter may be removed from and replaced on said rotating shaft at will without disturbing said washing element.

16. In a washing machine, the combination of a container, a washing element therein, a drying element above the washing element, separate shafts surrounded by the washing element and connected to said elements, and means for driving said shafts.

17. In a washing machine, the combination of a container, an agitator therein, a rotatable drier above said agitator, separate shafts for said agitator and drier, an oscillating element connected to said agitator shaft, a motor connected to said element and said drier shaft, and means for rendering said element inoperative to actuate said agitator shaft.

18. In a washing machine, the combination of a container, an agitator therein, a rotatable drier above said agitator, separate shafts for said agitator and drier an oscillating element connected to said agitator shaft, a drive shaft connected to said element and said drier shaft, means for rendering said element inoperative to actuate said agitator shaft, and independent means for disconnecting said drier from said drive shaft.

19. In a washing machine, the combination of a container, an agitator therein, a rotatable drier above said agitator, shafts for said agitator and drier, a pinion on said agitator shaft, a toothed element engaging the pinion on said agitator shaft, means to shift said element to disengage it from said pinion, a member for oscillating said element, and a motor connected to said member and drier shaft.

20. In a washing machine, the combination of a container, an agitator therein, a rotatable drier above said agitator, shafts for said agitator and drier, a spur gear on the agitator shaft, a worm gear on the drier shaft, a gear element meshing with said spur gear, a member for oscillating said gear element, a worm gear for driving said member, and a driven shaft having worms meshing with said worm gears for driving the same.

21. A washing machine comprising a container, a washing element therein, a second container disposed above said washing element, a drier therein, a shaft extending through the bottom of said first container and connected to said agitator, a second shaft projecting through the bottom of the second container and connected to said drier, means for oscillating said agitator shaft, and means for rotating said drier shaft.

22. In a washing machine, the combination of two separate containers, one of said containers being supported in the other container, an agitator in one of said containers, a drier in the other container and superposed over said agitator and discharging only into its container, separate shafts connected to said agitator and drier, means for oscillating said agitator shaft, and means for rotating said drier shaft.

CHARLES F. STAPLES.

DISCLAIMER

1,819,208.—*Charles F. Staples*, Detroit, Mich. WASHING MACHINE. Patent dated August 18, 1931. Disclaimer filed October 20, 1933, by the assignee, *Graybar Electric Company, Inc.*

Hereby enters this disclaimer to that claim in the specification, which is in the following words, to wit:

"In a washing machine, an oscillatable agitator, a rotatable drier, separate drive shafts for said agitator and drier, one of said shafts being provided with a spur gear and the other with a worm gear, a rack for actuating said spur gear, means for separating said rack and spur gear at will, a crank shaft for actuating said rack, said crank shaft being provided with a worm gear, a drive shaft provided with separate worms cooperating with said worm gears, and means for driving said drive shaft."

[*Official Gazette November 14, 1933.*]