Feb. 25, 1930. D. G. SMELLIE 1,748,150

CLOTHES WASHER

Filed Oct. 28, 1925 3 Sheets-Sheet 1

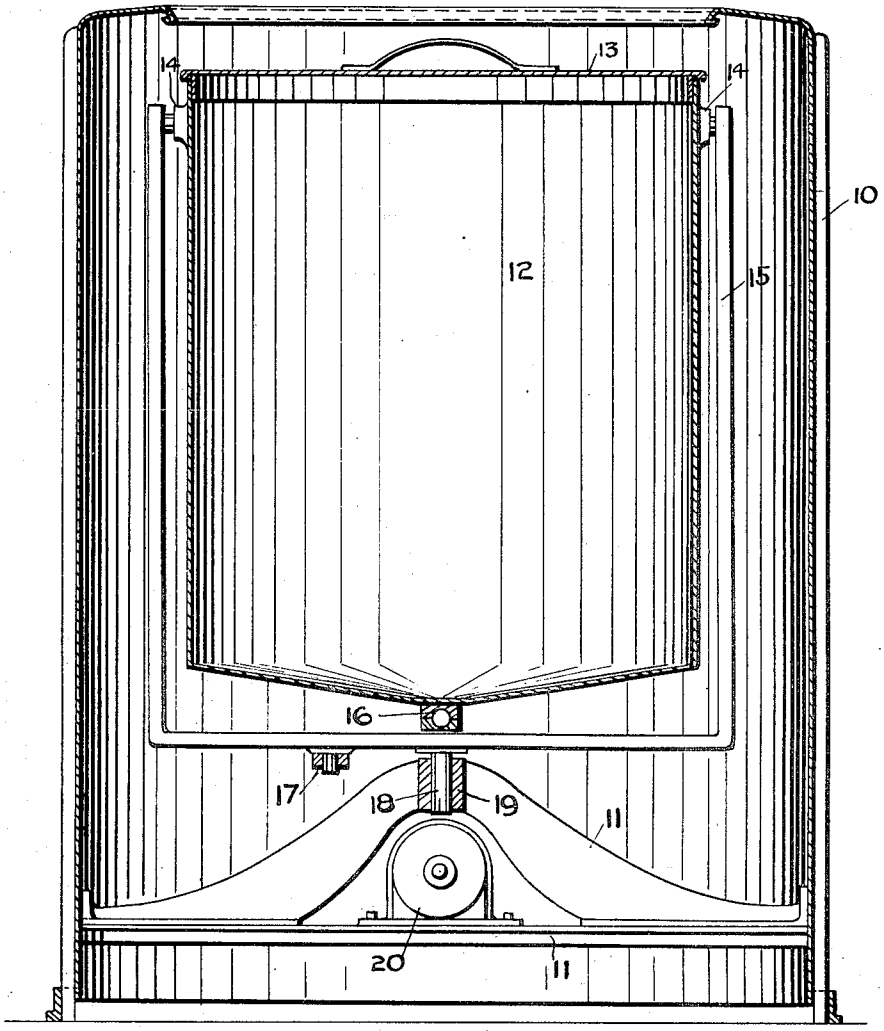


Fig. 1

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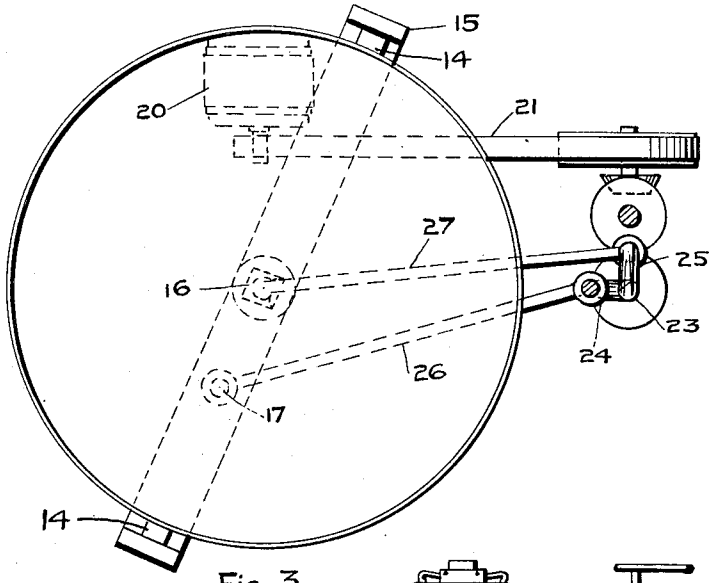


Fig. 3

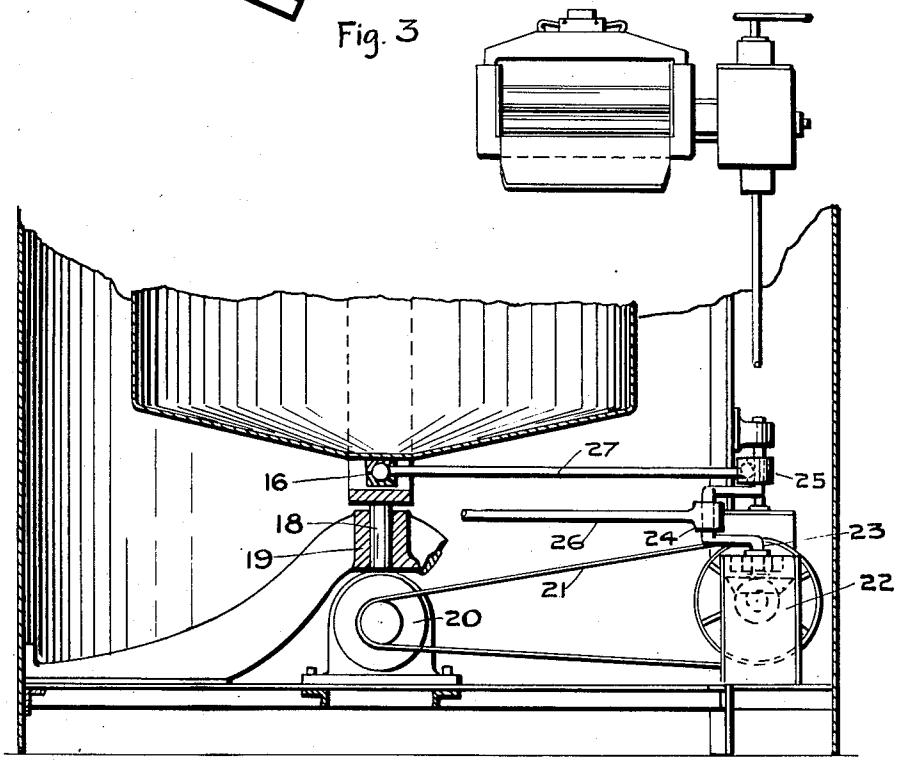


Fig. 2

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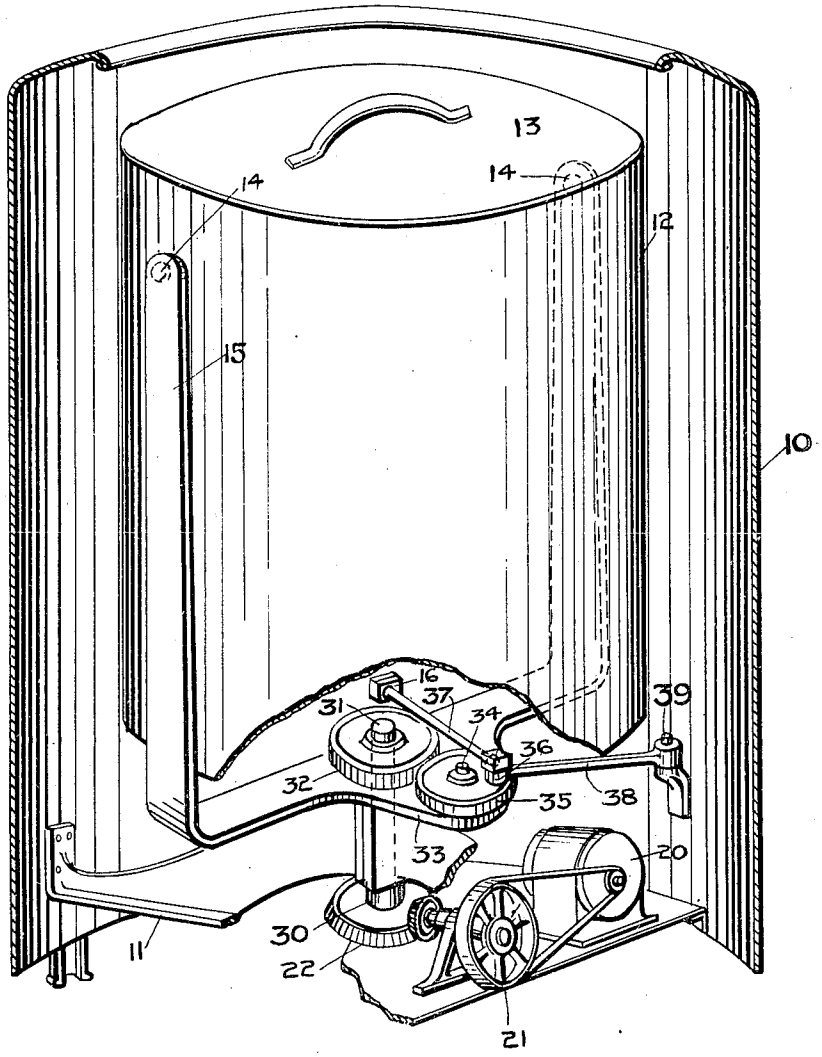


Fig. 4

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UNITED STATES PATENT OFFICE

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CLOTHES WASHER

Application filed October 28, 1925. Serial No. 65,279.

An object of my invention is to provide a washing machine wherein the container holding the objects to be washed and the liquid in which such objects are washed is subjected to a motion compounded from several primary motions which results in a number of reversals in the path of movement during each cycle. The purpose of imparting these reversals of movement to the container is to avoid the entangling of the clothes such as is usually encountered in machines in which the container has only a simple unidirectional motion.

Another object of my invention is to produce a simple and efficient washing machine in which the container is subjected to a compound oscillatory movement.

My invention discloses a clothes container primarily mounted for oscillation about its vertical axis and supported pivotally near its top for a secondary oscillation at right angles to that of the primary oscillation and includes other details of construction and combinations of parts all of which are shown in the drawings hereinafter more particularly described in the specification and defined in the claims.

In the drawings;

Figure 1 is a side view of a washing machine;

Fig. 2 is a fragmentary side elevation of the washing machine taken at substantially right angles to Fig. 1; and

Fig. 3 is a top plan view with certain portions left out for clearness of illustration.

Fig. 4 is a perspective view of a modified embodiment of my invention.

My invention as disclosed in Figures 1, 2 and 3 comprises an outer housing 10 which carries a base support member 11 on which the container and the operating mechanism are mounted.

The clothes container 12, is shown in the form of a substantially cylindrical tub member having a removable cover 13 and is provided near its top with diametrically opposed trunnions 14 by means of which the container is oscillably supported in a substantially U-shaped frame 15, which in turn is provided with a depending pin 18 adapted to be mounted in a bearing sleeve 19 provided in the upper portion of and centrally of base support 11. The bottom of container 12 is provided centrally with a depending socket member 16 and the bottom side of the U-frame is provided with a downwardly projecting pin member 17 offset from the center thereof.

An electric motor 20 or other prime mover is mounted on the base portion of housing 10 and is provided with means 21 for transmitting power to a suitable gear box indicated at 22.

Extending upwardly from gear box 22 is a shaft 23 mounted in suitable bearings and having cranks 24 and 25. Mounted on crank 24 is a connecting rod 26 having an eye member at its outer end to fit over and be carried on pin 17, while on crank 25 there is carried a connecting rod 27 having universal mounting on crank 25 and having on its other end a ball to co-act with socket 16.

In the operation of this washing machine suitable power applied by the prime mover and transmitted thru appropriate gearing to rotate shaft 23, will cause operation of cranks 24 and 25 which in turn cause reciprocation of connecting rods 26 and 27.

Reciprocation of connecting rod 26 will, thru its co-action with pin 17 on U-frame 15, cause this frame to be oscillated bodily about its pivot pin 18 and since the clothes container 12 is carried in the upper portion of the U-frame, the container will be caused to oscillate about the vertical axis of the machine. Reciprocation of connecting rod 27 will, because of its connection to socket 16 depending centrally from the bottom of container 12, cause the container to be rocked on trunnions 14 in U-frame 15. It is to be understood that the amount of oscillation of the U-frame will vary with the length of crank arm 24 and that the excursion of the rocking movements of container 12 is dependent upon the angularity of crank 25 with respect to crank 24 as well as upon the length of crank 25, all of which may be varied at will.

From the above description it may readily be seen that a washing machine constructed as described will impart to the materials and

cleansing fluid contained in the container 12, a plurality of motions, compounded from the oscillation of the U-frame about the vertical axis and the rocking of the container on trunnions 14 pivoted on a horizontal axis.

Since the rocking movement tends to reach its maximum at the point where the oscillating movement is reaching its minimum, there will be a plurality of independent forms of motion including sharp reversals of direction imparted to the materials in the container, which greatly enhances the washing effect as well as prevents entangling of the clothes.

In the modified form shown in Fig. 4, there may be provided an outer housing 10, a base support 11 and a container 12 substantially like those shown in Fig. 1.

In this embodiment of the invention, U-frame 15 is provided with a hollow downwardly extending stem portion 30 which is mounted on and supported in base support 11, and is freely oscillable thereon about its vertical axis. There is provided a prime mover 20 which transmits thru appropriate means 21 and 22 a movement of rotation to a shaft 31 which extends thru the hollow central opening in member 30, and on the upper end of which is carried a gear 32 secured thereto but free to revolve with respect to U-frame 15.

U-frame 15 is provided with an extension on one side indicated at 33 and on which is carried an upwardly projecting pin 34. On upwardly projecting pin 34 there is rotatably mounted a gear wheel 35 which meshes with gear wheel 32 and is rotated on rotation of shaft 31.

Gear wheel 35 is provided with an upwardly extending pin 36 on which is mounted by means of a ball joint a connecting rod 37 having a ball formed at the outer end thereof to be mounted on a downwardly projecting socket secured substantially centrally of the bottom of container 12 similar to socket 16 in Fig. 1. Pin 36 also carries a connecting link 38 the outer end of which is provided with an eye member to co-act with a pin 39 mounted on a stationary portion of the outer housing 10.

From the description of the modified form it may readily be seen that on application of power from the prime mover and thru the transmission means, the gear wheel 32 will be caused to revolve, causing gear wheel 35 also to revolve which in turn thru connecting link 38 will cause oscillation of the U-frame while thru connecting rod 37 the container 12 will be caused to swing on trunnion 14. From the description of this construction it will be seen that the movement imparted to the container is quite similar to that furnished by the first described mechanism. Due to the fact that the crank by which the container is swung is mounted on the U-frame and oscillates therewith, the effective angularity of the connecting rod which causes such swinging will not be so great as in the modification previously described since there is only the angularity of the rod itself to be considered while in the first form this effective angularity is increased by the angularity of the U-frame because of its oscillation.

Having fully described my invention, what I claim is:—

1. The method of washing articles by immersion in a body of detergent fluid in a container, comprising the excitation of the body of detergent fluid by component oscillatory forces whose points of maximum intensity occur at different times.

2. The method of washing articles by immersion in a body of detergent fluid in a container, comprising the excitation of the body of detergent fluid by component oscillatory forces whose points of maximum intensity are displaced 90 degrees in time-phase relation.

3. A washing machine having in combination a container, a support pivotally supporting the container, a mounting for the support in which the support is oscillably mounted and means to oscillate the container relative to the mounting so that the points of reversal of the two oscillations are separated by time intervals.

4. In a washing machine a container adapted to receive articles to be cleaned, an oscillably mounted support pivotally supporting said container above its center of gravity and means to oscillate said container at maximum speed about its pivot point when said support is reversing its direction of travel.

5. In a washing machine a container mounted for oscillation about a horizontal and a vertical axis, means to impart oscillatory movements about both horizontal and vertical axes so that the maximum rates of angular displacement are displaced in time-phase relation.

6. In a washing machine a container mounted for oscillation about a horizontal and a vertical axis, means to impart oscillatory movements about both horizontal and vertical axes so that the maximum rates of angular displacement are displaced 90 degrees in time-phase relation.

7. The method of washing articles by immersion in a body of detergent fluid in a container, comprising the excitation of the body of detergent fluid by component oscillatory forces about vertical and horizontal axes whose points of maximum intensity occur at different times.

8. The method of washing articles by immersion in a body of detergent fluid in a container, comprising the excitation of the body of detergent fluid by component oscillatory forces about vertical and horizontal axes

whose points of maximum intensity are displaced 90 degrees in time-phase relation.

9. A washing machine having in combination a container, a support in a horizontal plane pivotally supporting the container, a mounting for the support in which the support is oscillable about a vertical axis and means to oscillate the container relative to the mounting so that the points of reversal of the two oscillations are separated by time intervals.

10. In a washing machine a container adapted to receive articles to be cleaned, said container being oscillable about a horizontal axis, a support carrying said container above its center of gravity, said support being oscillably mounted about a vertical axis, and means to oscillate said container and said support so that said container is moving at maximum speed about its pivot point when said support is reversing its direction of travel.

11. In a washing machine a supporting base, a support carried by said base and adapted to be rotated through an arc, a container carried by said support and adapted to be pivoted about a horizontal axis and means to actuate said support and said container about their respective axes of rotation comprising a rotatable shaft having cranks formed thereon, connecting rods connecting said support and said containers to said cranks and means to rotate said shaft.

12. In a washing machine a supporting base, a support carried by said base and adapted to be rotated through an arc, a container carried by said support and adapted to be pivoted about a horizontal axis and means to actuate said support and said container about their respective axes of rotation so that their respective points of maximum angular velocity are spaced 90 degrees in time-phase relation, comprising a rotatable shaft having cranks spaced 90 degrees circumferentially formed thereon, connecting rods connecting said support and said container to said cranks and means to rotate said shaft.

Signed at Chicago, in the county of Cook and State of Illinois, this 26th day of October, A. D. 1925.

DONALD G. SMELLIE.