Feb. 2, 1932. F. R. STEELSMITH 1,843,347

WASHING MACHINE GEAR

Filed Nov. 22, 1928

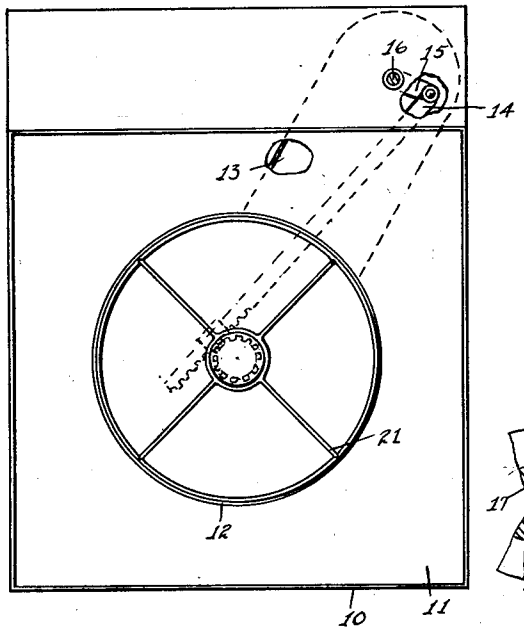

Fig. 1.

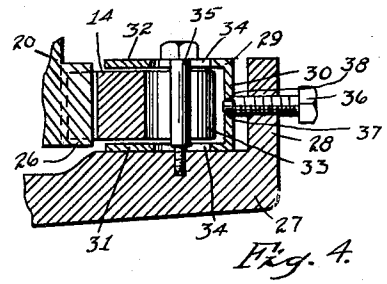

Fig. 4.

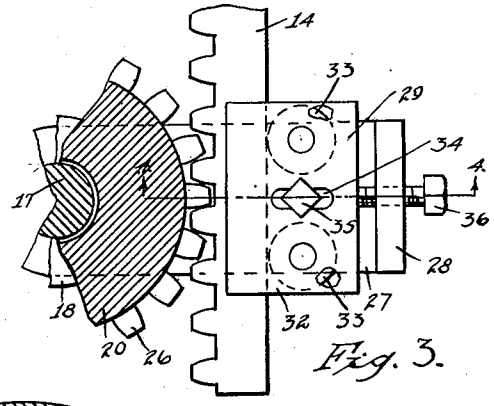

Fig. 3.

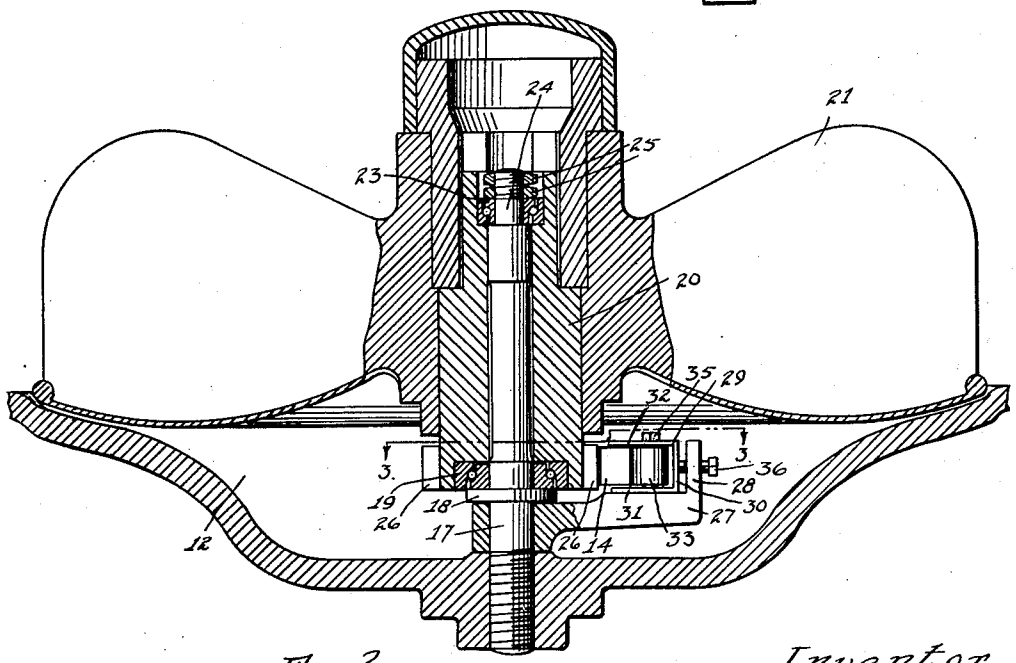

Fig. 2.

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UNITED STATES PATENT OFFICE

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WASHING MACHINE GEAR

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My invention relates to gear mechanisms designed to be used in that type of washing machines having an agitator mounted on an upright shaft, said shaft being supported in the bottom of the tub in such a manner that the agitator is free to oscillate about the upright shaft, and also that type of washing machines employing a pinion gear and a rack bar, the rack being connected directly to and operated by the crank of a vertically arranged shaft.

In this type of washing machines considerable difficulty has been experienced on account of the wear which takes place between the rack and pinion, and also between the agitator and the supporting posts, so that after the machine has been operated for a considerable time knocking and disagreeable noises result.

It is, therefore, the object of my invention to provide a washing machine gear for actuating the agitator, having means whereby wear in the various operating parts may be easily and quickly adjusted and taken up, and to provide the moving members with anti-friction bearings whereby the life of the machine will be greatly prolonged and the amount of power for operating the same materially reduced.

My invention consists in the construction, arrangement and combination of the various parts of the device, whereby the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which:

Figure 1 is a plan view of a washing machine tub of the type to which my gear mechanism is particularly adapted, the agitator being illustrated, and the rack bar and crank for operating the agitator shown in dotted lines.

Figure 2 is a vertical central sectional view of the agitator and a portion of the tub bottom, showing the manner in which my improved gear mechanism is applied, and showing the manner in which the agitator is adjustably mounted to the stationary support.

Figure 3 is a detail sectional view taken on the line 3—3 of Figure 2.

Figure 4 is a detail sectional view taken on the line 4—4 of Figure 3.

The numeral 10 indicates the tub of a washing machine having a bottom member 11 provided with a recess 12 near its central portion. Beneath the bottom 11 is a chamber or cavity 13 in which the rack bar 14 is mounted, one end of which is pivotally connected to a crank 15 supported on an upright shaft 16. The shaft 16 is continuously rotated by means of suitable drive mechanism not illustrated.

Supported in the bottom of the recess 12 is an upright post 17, the lower end of which is preferably screw threaded into the bottom member. The post 17 has a collar 18 spaced above the bottom a slight distance and designed to support a ball bearing 19. The bearing 19 is designed to support a hub 20 of the agitator 21. The upper end of the hub 20 has a recess 22 for receiving a second ball bearing 23, which is mounted on a contracted portion 24 in the upper end of the post 17. The upper end of the contracted portion is screw threaded for receiving adjusting nuts 25. The nuts 25 provide means whereby any vertical movement of the hub 20 may be eliminated, and at the same time permits the hub to rotate freely about the post 17. The lower end of the hub 20 is provided with a pinion gear 26 designed to mesh with the teeth of the rack bar 14, and to be actuated by said rack bar.

It will be seen that as the shaft 16 is rotated, the crank 15 will also be rotated and reciprocating movement will be imparted to the rack bar. The crank end of the rack bar will also travel in a circular path about the shaft center, which will cause the toothed end of the rack bar to swing about the center of the pinion gear.

To properly support and retain the rack bar in proper mesh with the pinion, when the rack is in all of its various swinging positions of movement, I have mounted on the lower end of the post 17, below the collar 18, a rock arm 27 having its free end extending transversely below the rack bar and provided with an upwardly extending portion 28 opposite the back face of said rack bar and spaced therefrom a considerable distance.

Mounted on the top face of the arm 27, I have provided what I shall term a rock bar guide 29, which comprises a vertical member 30 having laterally extending portions 31 and 32 spaced apart a distance equal to the height of the rack bar 14, and designed to slidably receive the rack bar between their ends. Rollers 33 are pivotally supported to and between the members 31 and 32, and designed to engage the back face of the rack 14.

The members 31 and 32 are provided with transversely arranged slots 34 designed to receive a stud bolt 35, which provides means for anchoring the rock bar guide to the member 27. The lower end of the bolt 35 is threaded into said arm. The slots 34 provide means whereby the guide may be moved toward and from the pinion 32, and also provide means whereby the rack bar may always be supported in proper mesh with said pinion gear.

A set screw 36 is mounted in the member 28 and has its inner end provided with a contracted portion 37 for entering an opening 38 in the member 30. The set screw 36 provides means for adjusting the rock bar guide toward the pinion gear, and for retaining it in its adjusted position. The set screw 36 also prevents the rack bar guide from rotating about the bolt 35, so that when an adjustment has been made, the guide will be locked in fixed relation with the arm 27. The rollers 33 are spaced apart a considerable distance and are both brought into contact with the outer face of the rack bar, so that any swinging or angular movement of the rack bar will be imparted to the rock arm 27, which will rotate freely about the pivot center of the pinion gear.

Thus means is provided whereby the rack bar will always be maintained in proper mesh with the pinion, regardless of its angular position of movement.

The rollers 33 also reduce the friction between the bars 14 and the guide, as there is considerable tendency when in operation for the rack bar to move outwardly from the center of the pinion, due to the inclined faces of the meshing teeth.

I have also found that there is some tendency toward up and down movement of the rack bar, which is easily and quickly taken care of by the bolt 35, as the members 31 and 32 are yieldably mounted, so that any wear which takes place between the upper and lower face of the rack bar and the inner faces of the members 31 and 32 may be easily and quickly adjusted.

Thus it will be seen that I have provided a gear mechanism for driving an oscillatory agitator, of simple, durable and inexpensive construction, in which any tendency of the agitator to move longitudinally of its pivoted support may be easily and quickly eliminated by adjusting the nuts 25, and any wear or looseness between the rack bar and its pinion may be easily and quickly adjusted, thereby eliminating any disagreeable noises or knocking, as well as reducing the amount of power necessary to operate the mechanism, and reducing the wear between the teeth of the rack bar and the pinion by reducing any knocking between the coacting members.

I claim as my invention:

1. In a device of the class described, a supporting post, a member rotatively mounted on said post having a pinion gear, a rock arm rotatively mounted on said post adjacent to said pinion, a rack bar in mesh with said pinion gear, a rack guide mounted on the free end of said arm comprising a substantially U shaped member having rollers rotatively mounted therein adjacent to the outer surface of the said rack bar, said guide being adjustable relative to said arm and toward and from the center of said pinion, and means for adjusting the free ends of the U shaped member toward each other.

2. In a device of the class described, a supporting post, a member rotatively mounted on said post having a pinion gear, a rock arm rotatively mounted on said post adjacent to said pinion, a rack bar in mesh with said pinion gear, a rack guide mounted on the free end of said arm comprising a substantially U-shaped member having rollers rotatively mounted therein adjacent to the outer surface of the said rack bar, said guide being adjustable relative to said arm and toward and from the center of said pinion to compensate for wear and adapted to be secured in said adjusted position in operative relation with said pinion.

FRANK R. STEELSMITH.