Oct. 27, 1931. H. J. CRINER 1,829,555

DRIVING MECHANISM FOR WASHING MACHINES

Filed Feb. 17, 1930

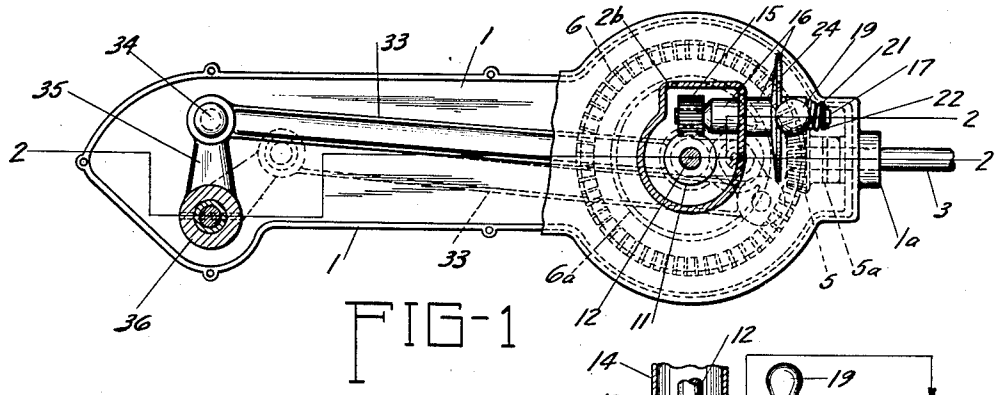


FIG-1

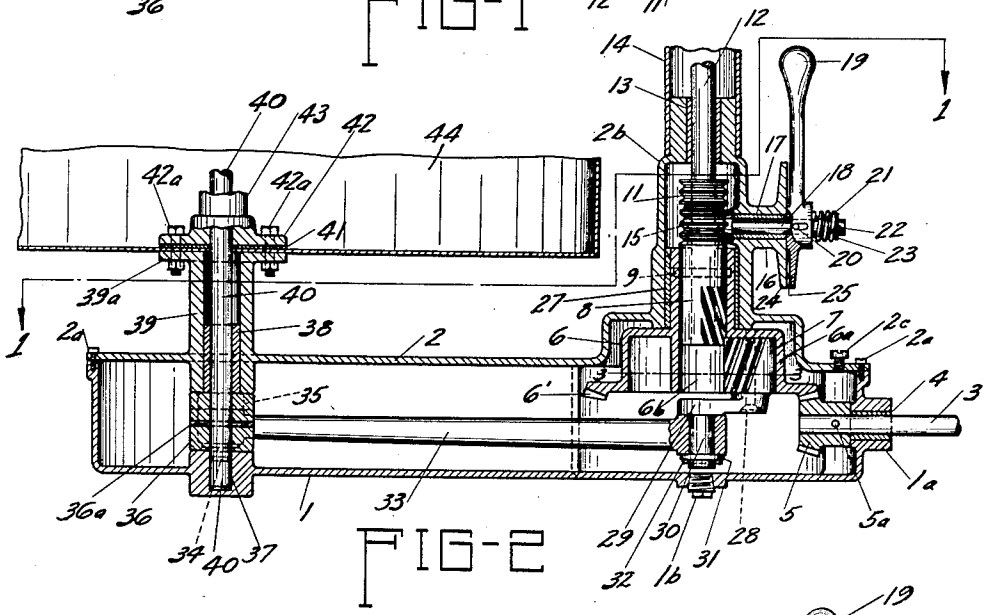


FIG-2

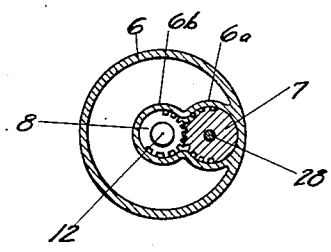


FIG-3

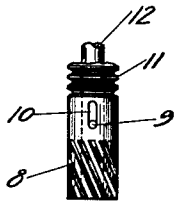


FIG-4

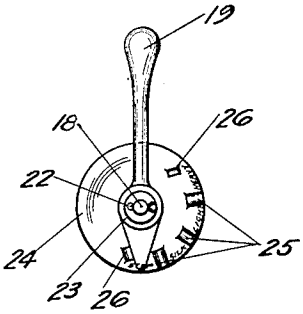


FIG-5

Harry J. Criner INVENTOR.

Patented Oct. 27, 1931

1,829,555

UNITED STATES PATENT OFFICE

HARRY J. CRINER, OF DAVENPORT, IOWA, ASSIGNOR OF ONE-HALF TO A. G. BUSH, OF DAVENPORT, IOWA

DRIVING MECHANISM FOR WASHING MACHINES

Application filed February 17, 1930. Serial No. 428,948.

My invention relates to improvements in driving mechanisms for washing machines and other machinery.

The objects of my invention are:

1. To provide a simple, efficient means by which the relative position of a crank pin to its crank shaft may be varied so as to increase or decrease the throw of the crank pin and thereby increase or decrease the travel of a link or connecting rod driven by the crank pin;

2. To provide means by which the distance between the axis of a crank pin and its crank shaft may be increased or reduced to zero and the motion of a connecting rod driven by the crank correspondingly increased or reduced;

3. To provide a driving mechanism for washing machines controllable by a single handle by which the throw or stroke of the dolly or agitator in the washing machine may be varied or reduced to zero;

4. To provide a driving mechanism for washing machines controllable by a single handle by which the throw or stroke of the dolly or agitator can be increased or diminished to predetermined lengths or reduced to zero without stopping the motor or the parts geared thereto.

I attain these objects by the means illustrated in the accompanying drawings, in which,—

Figure 1 is a plan view of my driving mechanism, but with the housing broken away over the left portion thereof;

Figure 2 is a vertical section on the lines 2—2 of Figure 1;

Figure 3 is a sectional detail on the line 3—3 of Figure 2;

Figure 4 is a detail of the sliding adjusting member looking at it from the right as shown in Figure 2;

Figure 5 is an elevation of the controller handle and stops.

Similar numerals refer to similar parts throughout the several views.

My invention comprises a housing or gear case, 1, with cover, 2, bolted or otherwise suitably secured thereto. The housing, 1, may be secured to the frame or base of the machine by any suitable means.

For convenience in describing the drawings, I refer to the left end of Figure 1 as the inner end and to the right end of it, as the outer end. The inner end of the housing is located under the center of the tub, 44, of the washing machine and a support or housing, 39, is formed integral with the cover, 2, having a flange, 39*a*, at its upper end which may be secured to the bottom of the tub, 44, by bolts, 42*a*, or other suitable means.

A hollow agitator post, 43, is mounted in the tub having a flange, 42, which is likewise secured to the bottom of the tub by the bolts, 42*a*. A gasket, 41, is preferably inserted between the flange, 42, and the bottom of the tub, 44.

An agitator shaft, 40, is revolvably mounted within the agitator post, 43, and extends downwardly through the housing, 39, and into a boss or bearing, 37, formed integral with the bottom plate of the gear case, 1. An upper bearing, 38, preferably of oilless bearing material, is mounted within the housing, 39, and forms a bearing for the shaft, 40. A rocker-arm, 35, has one end provided with a hub, 36, secured to the lower end of the shaft, 40, by a pin, 34, or other suitable means, and the other end of the rocker-arm is connected by a pin, 34, to one end of a link or connecting rod, 33. The opposite end of the connecting rod, 33, is mounted upon a crank pin, 30, and secured thereon by a washer, 31, and cotter pin, 32, or other suitable means.

The crank pin, 30, is united to or formed integral with one end of the crank arm, 29, the opposite end of which has united thereto or formed integral therewith a spiral or semi-spiral gear, 7. The gear, 7, is secured within a corresponding circular housing, 6*a*, by a pin or set screw, 28. The circular housing, 6*a*, is formed to fit closely upon the gear, 7, so that the housing, 6*a*, forms the main support for the gear, 7, although the pin, 28, may be made heavy enough to aid materially in retaining the gear, 7, in place.

An additional gear housing, 6*b*, is formed integral with the housing, 6*a*, but extends upward a considerable distance above the housing, 6*a*. The housings, 6*a* and 6*b*, are preferably cast integral with a circular gear

housing, 6, which is provided with teeth, 6′, upon its lower edge.

The upper extension of the housing, 6*b*, is revolvably mounted within an oilless bearing, 27, which is seated within an upward extension of the cover, 2, and forms the lower bearing for the wringer shaft, 12, which is mounted within a tubular extension of the cover, 2, in which an upper bearing, 13, is mounted around the shaft, 12.

A tube, 14, which supports the wringer, is seated upon the upper end of the tubular extension of the cover, 2, and the shaft, 12, will be understood to extend upwardly to the wringer.

Upon the lower end of the shaft, 12, and within the housing, 6*b*, I mount a spiral gear block, 8, with teeth corresponding to the teeth of the spiral gear, 7. The upper end of the spiral gear block, 8, has a series of rack teeth, 11, cut therein which extend all the way around the gear block, 8, and mesh with a pinion, 15, which is mounted upon a jack-shaft, 18, revolvably seated in the upper extension of the cover, 2, at right angles to the shaft, 12. Oilless bushings, 17, are mounted within the hub, 16, and form the bearings for the shaft, 18. The control handle, 19, is mounted upon the outer end of the shaft, 18, and the hub of the handle, 19, is provided with a slot which permits it to slide upon a pin, 20, which extends through the shaft, 18. A spring, 21, is mounted upon the shaft, 18, outside of the handle, 19, with a washer, 23, and pin, 22, to secure it in place, and the spring, 21, bears against the handle, 19, to secure it in normal position. A disc, 24, is formed upon the outer end of the hub, 16, and has stops, 26, and detents, 25, formed integral therewith adapted to engage the lower end of the hub, 19, and to secure it in its various adjusted positions.

The gear, 6, is driven by a pinion, 5, mounted upon a drive shaft, 3, and secured thereto by a pin, 5*a*. The shaft, 3, is mounted in a bushing, 4, secured in a hub, 1*a*, formed at the right end of the housing, 1. An oil plug, 1*b*, is secured in the bottom of the housing, 1, by which it can be drained and an oil plug, 2*c*, is provided in the cover plate for filling the gear housing with oil.

In the operation of my device, the handle, 19, is placed in the vertical position shown in Figures 2 and 5. The motor is then started and as the shaft, 3, turns, it drives the gear, 6. When the crank pin, 30, is in the position shown in Figure 2, it is concentric with the shaft, 12, and hence will not cause any movement of the connecting rod, 33, but when the handle, 19, is thrown to its horizontal position so that the lower end of the handle will be between the upper detent, 25, and stop, 26, of Figure 5, the crank arm, 29, will be thrown into the position shown in dotted lines in Figure 1, and locked there by the gears, 7 and 8. As the shaft, 12, then revolves, the crank pin, 30, will cause the connecting rod, 33, and with it the arm, 35, to reciprocate. The reciprocating movement of the rocker arm will give a reciprocating rotary movement to the shaft, 40, and with it the dolly or agitator mounted thereon.

When the handle is thrown into one of the intermediate positions, it will move the gears, 7 and 8, correspondingly, thus changing the relative position of the crank pin, 30, and the stroke of the connecting rod, 33.

It is obvious that this mechanism is not only applicable to washing machines, but can be applied to any machine to control or vary the longitudinal travel of a cutting head or the reciprocating rotary travel of a desired piece of mechanism.

I claim:

1. An adjustable driving mechanism for a reciprocating element comprising a column, a combined gear and housing having an upwardly extending sleeve revolvably mounted in the column, a gear block slidingly mounted in the sleeve and rotatable therewith, the lower end of said gear block having spiral teeth cut therein and the upper end of the gear block having a rack formed thereon, a rotatable gear mounted in the housing adjacent the gear block and having spiral teeth in mesh with the teeth of the gear block, a crank united to the rotatable gear, and means for shifting the vertical position of the gear block relative to the rotatable gear whereby the rotatable gear may be rotated in its housing and the throw of the crank thereby varied.

2. An adjustable driving mechanism for a reciprocating element comprising a column, a combined gear and housing having an upwardly extending sleeve revolvably mounted in the column, a gear block slidingly mounted in the sleeve and rotatable therewith, the lower end of said gear block having spiral teeth cut therein and the upper end of the gear block having a rack formed thereon, a rotatable gear mounted in the housing adjacent the gear block and having spiral teeth in mesh with the teeth of the gear block, a crank united to the rotatable gear, a transverse shaft mounted in the upper part of the column, a pinion mounted upon the transverse shaft adapted to mesh with the rack, and manually operable means for rotating the transverse shaft.

3. An adjustable driving mechanism for a reciprocating element comprising a column, a combined gear and housing having an upwardly extending sleeve revolvably mounted in the column, a gear block slidingly mounted in the sleeve and rotatable therewith, the lower end of said gear block having spiral teeth cut therein and the upper end of the gear block having a rack formed thereon, a rotatable gear mounted in the housing adjacent the gear block and having spiral teeth in

mesh with the teeth of the gear block, a crank united to the rotatable gear, a transverse shaft mounted in the upper part of the column, a pinion mounted upon the transverse shaft adapted to mesh with the rack, and manually operable means for rotating the transverse shaft and locking it in various adjusted positions.

4. An adjustable driving mechanism for a reciprocating element comprising a column, a combined gear and housing having an upwardly extending sleeve revolvably mounted in the column, a gear block slidingly mounted in the sleeve and rotatable therewith, the lower end of said gear block having spiral teeth cut therein and the upper end of the gear block having a rack formed thereon, a rotatable gear mounted in the housing adjacent the gear block and having spiral teeth in mesh with the teeth of the gear block, a crank united to the rotatable gear, a transverse shaft mounted in the upper part of the column, a pinion mounted upon the transverse shaft adapted to mesh with the rack, a handle lever united to the outer end of the transverse shaft and movable longitudinally thereon and springheld in its normal position, and a flange united to the column and having detents formed thereon adapted to engage one end of the handle lever in various adjusted positions.

5. An adjustable driving mechanism for a reciprocating element comprising a column, a combined gear and housing having an upwardly extending sleeve revolvably mounted in the column, a gear block slidingly mounted in the sleeve and rotatable therewith, the lower end of said gear block having spiral teeth cut therein and the upper end of the gear block having a rack formed thereon, a rotatable gear mounted in the housing adjacent the gear block and having spiral teeth in mesh with the teeth of the gear block, a crank united to the rotatable gear, a transverse shaft mounted in the upper part of the column, a pinion mounted upon the transverse shaft adapted to mesh with the rack, a handle lever united to the outer end of the transverse shaft, and means for detaining the handle in various positions of adjustment.

6. An adjustable driving mechanism for a reciprocating element comprising a column, a combined gear and housing having an upwardly extending sleeve revolvably mounted in the column, a gear block slidingly mounted in the sleeve and rotatable therewith, the lower end of said gear block having spiral teeth cut therein and the upper end of the gear block having a rack formed thereon, a rotatable gear mounted in the housing adjacent the gear block and having spiral teeth in mesh with the teeth of the gear block, a crank united to the rotatable gear, and means for shifting the vertical position of the gear block relative to the rotatable gear whereby the rotatable gear may be rotated in its housing and the throw of the crank thereby varied.

7. Means for adjusting the distance of a crank pin from the center of rotation of the crank comprising a support, a rotatable housing mounted therein, a spiral gear rotatably mounted in the housing, an additional spiral gear slidingly mounted in said housing rotatable therewith and in mesh with the rotatable gear, a crank having one end united to the rotatable gear and its opposite end provided with a crank pin, a rack united to the sliding gear, a shaft mounted in the support adjacent the rack, a pinion united to the shaft in mesh with the rack, and a manually operable lever united to the shaft.

8. Means for adjusting the distance of a crank pin from the center of rotation of the crank comprising a support, a combined gear and housing rotatably mounted therein, a spiral gear rotatably mounted in the housing, an additional spiral gear slidingly mounted in said housing rotatable therewith and in mesh with the rotatable gear, a crank having one end united to the rotatable gear and its opposite end provided with a crank pin, a rack united to the sliding gear, a shaft mounted in the support adjacent the rack, a pinion united to the shaft in mesh with the rack, a manually operable lever united to the shaft, and means for driving the combined gear and housing.

9. Means for adjusting the distance of a crank pin from the center of rotation of the crank comprising a support, a combined gear and housing rotatably mounted therein, a spiral gear rotatably mounted in said housing, an additional spiral gear slidingly mounted in said housing rotatable therewith and in mesh with the rotatable gear, a crank having one end united to the rotatable gear and its opposite end provided with a crank pin, means for adjusting the sliding gear longitudinally of the rotatable gear, thereby varying the throw of the crank pin, and means for driving the combined gear and housing.

In testimony whereof he affixes his signature.

HARRY J. CRINER.