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J. H. & J. B. TAYLOR.

MECHANICAL MOVEMENT.

APPLICATION FILED JULY 13, 1906.

Fig. 1.

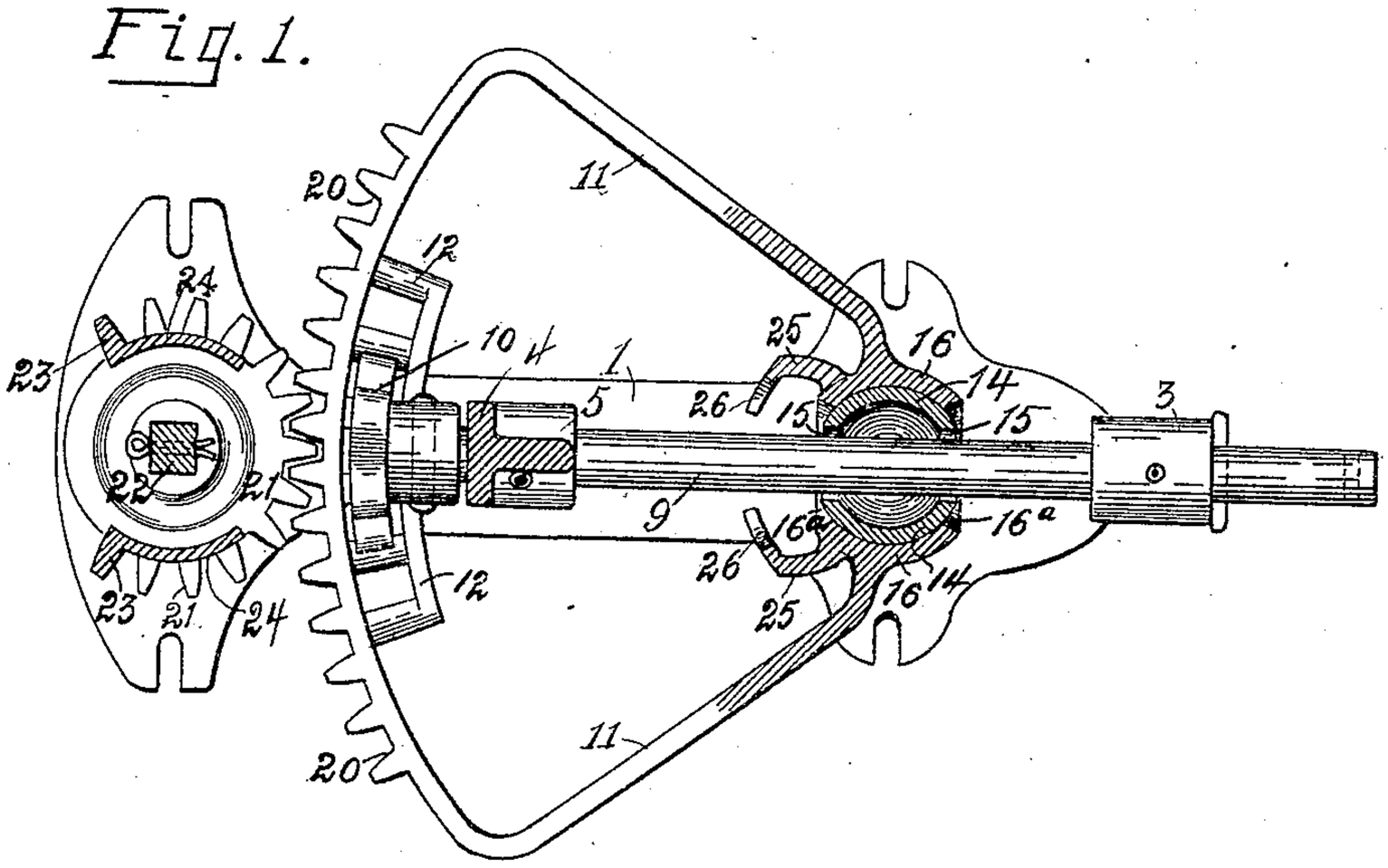


Fig. 2.

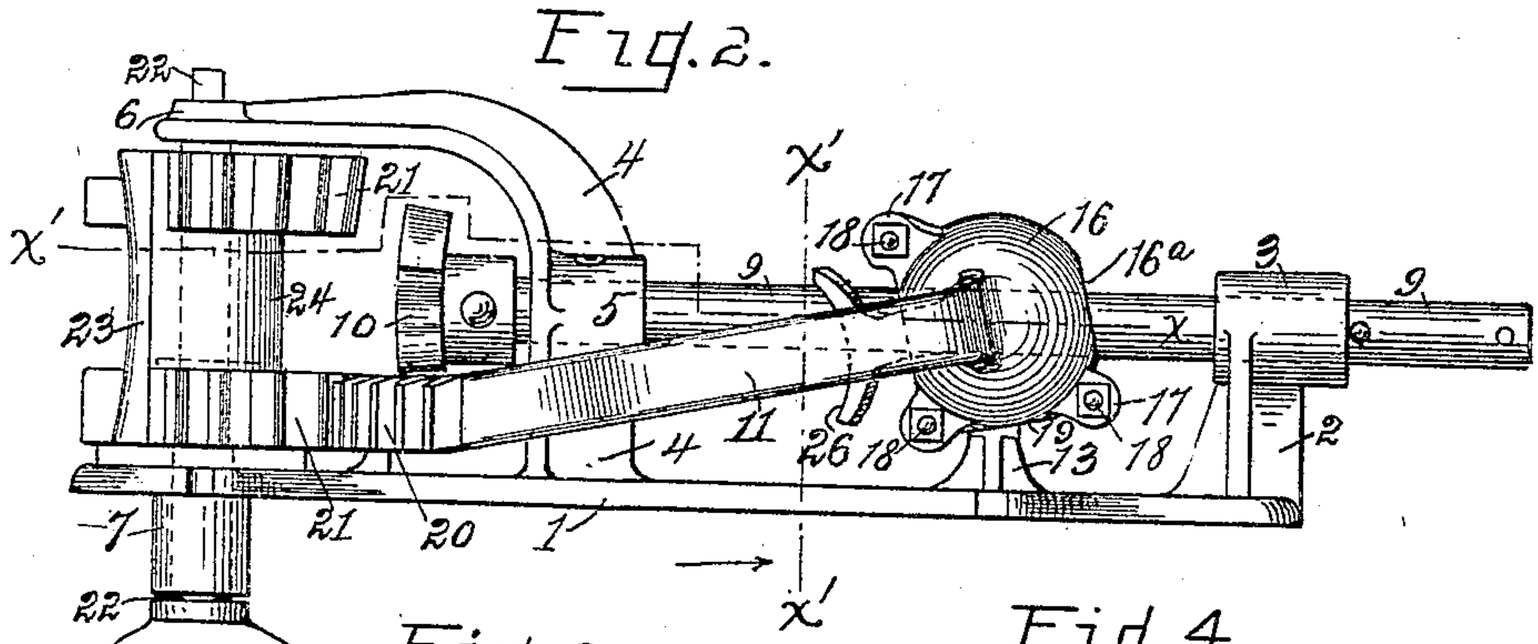


Fig. 3.

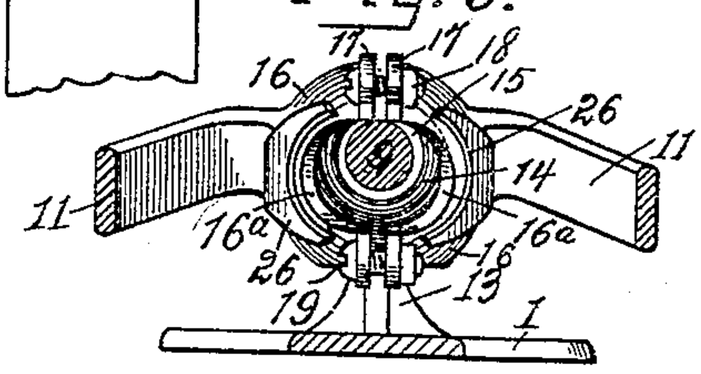
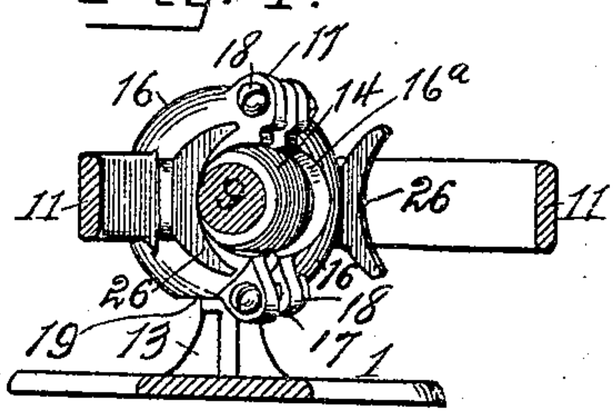


Fig. 4.



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MECHANICAL MOVEMENT.

No. 835,169. Specification of Letters Patent. Patented Nov. 6, 1906.

Application filed July 13, 1906. Serial No. 326,015.

To all whom it may concern:

Be it known that we, JAMES H. TAYLOR and JULIUS BYRON TAYLOR, citizens of the United States, residing at Toledo, in the county of Lucas and State of Ohio, have invented certain new and useful Improvements in Mechanical Movements; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

Our invention relates to a mechanical movement in which rotary is converted into oscillatory motion, and is designed to simplify and reduce the number of parts in that class of these devices in which a segmental toothed rack is caused to oscillate by being thrown alternately into engagement with opposite sides of a pinion having a constant rotary motion.

For illustration we have herein shown our gearing arranged to oscillate the vertical shaft of a washing-machine of the kind in which the rubbing or agitating members are revolved horizontally first in one direction and then in the opposite direction.

Figure 1 of the drawings represents a top plan view of our device, partly in section on line $x\,x$, Fig. 2; Fig. 2, a side elevation of the same; Fig. 3, a sectional end view of the same, taken on line $x'\,x'$, Fig. 2, showing the segmental rack-frame hereinafter referred to in central position; and Fig. 4 the same, showing said member at the limit of its transverse throw.

Like parts are represented by corresponding numerals throughout the drawings.

In the drawings, 1 is a bed-plate adapted to be secured, for instance, upon the top of a washing-machine.

2 is an upright bracket having a horizontal shaft-bearing 3 at its top and disposed at one end of the bed-plate 1. 4 is another upright bracket having a horizontal shaft-bearing 5 in exact alinement with the bearing 3, this bracket being curved upwardly and horizontally in the same plane with the bearings 3 and 5 and having at its extremity a shaft-bearing 6 in exact vertical alinement with a corresponding bearing 7 in the bed-plate. In the bearings 3 and 5 is journaled a shaft 9, the outwardly-projecting end of which next to the bearing 3 is adapted to receive a crank or other driving means. Upon the opposite end of this shaft, which projects beyond the bearing 5, is secured a slightly-beveled pinion 10.

11 is a frame approximately segmental in outline having upon its inner concave side a curved rack 12, the teeth of which are engaged by the teeth of the pinion 10. The short segmental rack 12 is designed to remain in constant engagement with the teeth of the pinion 10 and to swing horizontally to and fro first above the pinion and then below. To accomplish this, it is necessary that the frame 11 be pivoted at its apex in such fashion as to permit it to have both vertical and horizontal motion upon its pivot. This pivot we will now proceed to describe.

13 is a short standard springing upright from the base-plate nearly midway between brackets 2 and 4 and terminating at top in a hollow ball 14. The standard and ball are preferably cast integral with the bed-plate. Through this ball horizontally is an opening 15, through which passes the shaft 9. The converging arms of the segmental frame 11 terminate in equal segments or sections 16 of a spherical shell. At their opposed meeting faces these shell-sections have coincident lugs or ears 17, pierced to receive bolts and nuts 18, by means of which the shell-sections are caused to loosely and adjustably clasp the ball 14. The shell-sections 16 are of such shape that there are formed at opposite sides of the shell openings 16^a large enough to permit the oscillation of the shell without coming in contact with the shaft 9. The under side of the shell 16 16 is slotted, as at 19, in the direction of the length of the shaft 9 to receive the standard 13. This slot permits the vertical and horizontal swing of the segmental rack-frame 11; but the standard 13, passing through the narrow elongated slot, prevents the rack-frame from tilting sidewise. Thus it will be seen that the rack-frame has a vertical swing and a horizontal swing upon a ball-and-socket joint in which, unlike the usual joints of this sort, the ball is stationary and the socket is movable.

Upon its outer convex side the rack-frame 11 is toothed, as at 20.

21 is a pinion secured to shaft 22, journaled in the bearings 6 7 between the arm 4 and the bed-plate. The pinion 21 is engaged by rack 20. The teeth of pinion 21 may be regarded as elongated transversely to permit the teeth of the rack 20 to slide vertically

while in mesh with the teeth of the pinion; but as the rack 20 swings vertically only at the end of its transverse throw the portion between the top and bottom of the pinion-teeth is dispensed with, except as to the last two teeth in the series at opposite sides of the pinion, as shown at 23 23. The separated upper and lower portions of the pinion 21, together with the teeth 23, are formed integral with a sleeve 24, secured upon the shaft 22.

Formed integral with each of the shell-sections 16 is a finger 25, the two fingers being curved toward each other, lying in the same plane with the rack-frame 11, between the converging sides of said frame and at opposite sides of the shaft 9. The fingers 25 terminate in crescent-shaped portions 26, the concave margins of which are arranged to alternately contact with the shaft 9 at its opposite sides.

The operation of our device is as follows: The parts being assembled, as described, the shaft 9 with its pinion 10 is caused to revolve, carrying the rack-frame 11 horizontally, causing the pinion 21 and its shaft 22 to revolve until one of the crescent-shaped stops 26 comes in contact with the shaft 9. Now the end tooth in the rack 12 is held in engagement with the teeth of the revolving pinion 10 and the rack-frame is carried and swung upon its ball-and-socket pivot to the opposite side of the pinion. The swing of the rack-frame coincides with the curve of the crescent-shaped piece 26, which is now in contact with the shaft, forming a stop and a guide. During the vertical swing of the rack-frame the last teeth of the rack 20 are in engagement with one of the elongated teeth 23 of the pinion 21. The rack 12 having thus been carried to the opposite side of the pinion 10, the rack-frame is now caused to travel in the opposite direction, thus giving a reverse motion to the rack 20, pinion 21, and shaft 22. At the end of the reverse movement of the rack 12 the other finger 26 comes in contact with the shaft 9, again causing the rack-frame to swing upon its pivotal support, as above described, again carrying the rack-frame to the opposite side of the pinion 10, so that the motion of the rack-frame and the parts driven by it are again reversed. Thus the constant rotary motion of the shaft 9 and its pinion 10 imparts to the rack-frame and the parts driven by the rack-frame a motion which is at regular intervals reversed.

We prefer to cast the rack-frame with its fingers 25 of malleable or ductile metal which permits the fingers to be slightly bent, as may be desired, thus furnishing means of adjustment to compensate for inequalities in the castings.

Having described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In a device of the described character, a shaft, a pinion thereon, an oscillating frame having a toothed rack engaged with said pinion, and a pivotal support for said frame comprising a stationary ball having an opening through which said shaft passes, and a shell loosely engaged with said ball and connected with said frame.

2. In a device of the described character, a shaft, a pinion thereon, a frame, a curved rack on said frame in engagement with said pinion, another pinion, another rack on said frame engaged with said latter pinion, and a pivotal support for the frame arranged to permit the vertical and horizontal swing of said frame, said pivotal support being concentric with said shaft.

3. In a device of the described character, a driven pinion having transversely-elongated teeth, a curved rack engaged with said pinion and adapted to traverse said elongated teeth, a pivotal support for said rack consisting of a stationary ball and a socket member loose upon the ball and connected with the rack, combined with a shaft passing through the ball and socket, a pinion on the shaft, and another curved rack concentric with the rack first mentioned and in engagement with the pinion last mentioned.

4. In a device of the described character, a bed-plate, a standard springing therefrom, a ball on the standard having an axial opening therethrough, a pair of shell-sections adapted to loosely fit the exterior of the ball as a socket, a frame connected with said shell-sections, a segmental rack upon said frame, a shaft passing through the opening in the ball, and means operated by said shaft for swinging said frame both vertically and horizontally upon the pivot formed by said ball and socket.

5. In a device of the described character, a shaft, a pinion thereon, a rack-frame having a curved rack adapted to be driven in opposite directions by alternating engagement with opposite sides of the pinion, converging arms for the rack-frame, shell-sections at the meeting ends of the converging arms, means for adjustably clamping the meeting faces of said shell-sections together, and a stationary ball loosely clamped by said shell-sections and having an opening through which said shaft passes, the ball and shell-sections forming a pivot upon which the rack-frame may be swung vertically and horizontally.

6. In a device of the described character, a rack-frame having an external curved rack and an internal curved rack, having also a pivotal support whereby the frame may be swung vertically and horizontally, said support comprising a stationary ball, a supporting-standard therefor, a pair of shell-segments adapted to embrace the ball as a socket, said socket member having an elongated slot for the passage of the standard, and means for clamping the shell-sections upon the ball.

7. A device of the described character

comprising a bed-plate, a pair of brackets springing from the bed-plate, a horizontal shaft journaled in said brackets, an arm on one of said brackets, a vertical shaft journaled in said arm and the bed-plate and in the same plane with the shaft first mentioned, on the vertical shaft a pinion having transversely-elongated teeth, a rack-frame having converging arms, a curved rack on the frame adapted to slidably engage said elongated teeth, another curved rack on said frame, a pinion on the horizontal shaft engaged with said latter curved rack, shell-sections upon the converging arms at their meeting points, a ball loosely engaged by said shell-sections and rigidly supported upon the base-plate, and fingers carried by the rack-frame and adapted to contact with the horizontal shaft to form stops and guides which limit and direct the swing of the rack-frame.

In testimony whereof we affix our signatures in presence of two witnesses.

JAMES H. TAYLOR.
JULIUS BYRON TAYLOR.

Witnesses:
A. J. BARSCH,
E. H. PRICE.