E. HARDS.

MECHANICAL MOVEMENT.

APPLICATION FILED MAY 19, 1909.

946,671. Patented Jan. 18, 1910.

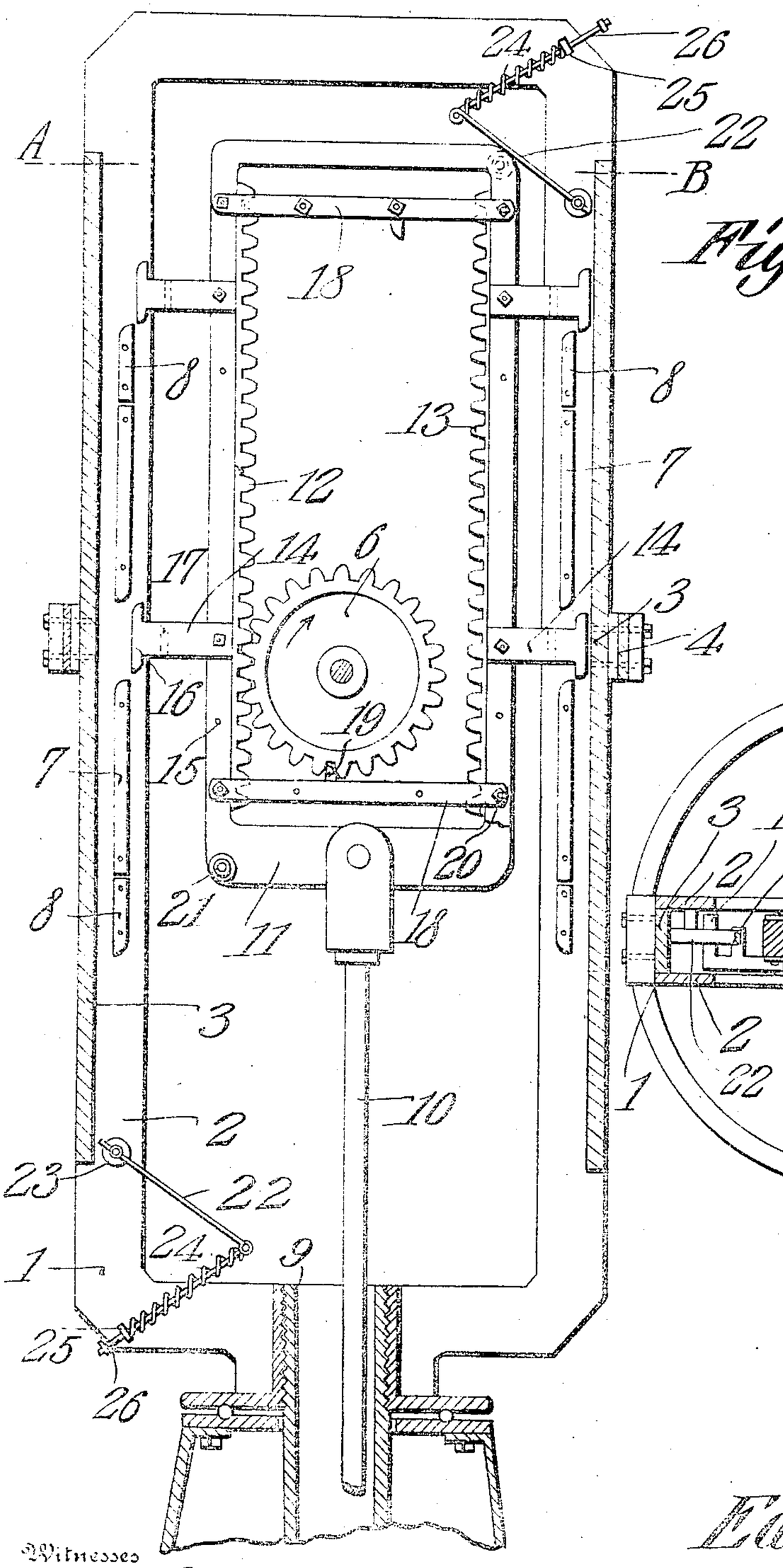

Fig. 1.

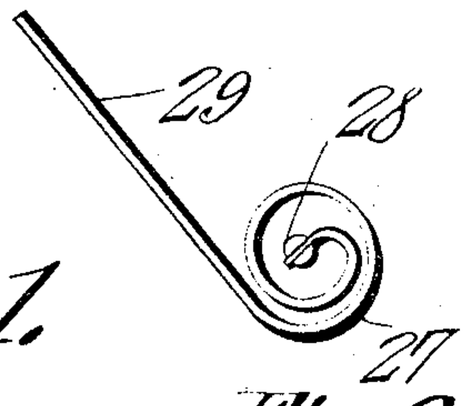

Fig. 3.

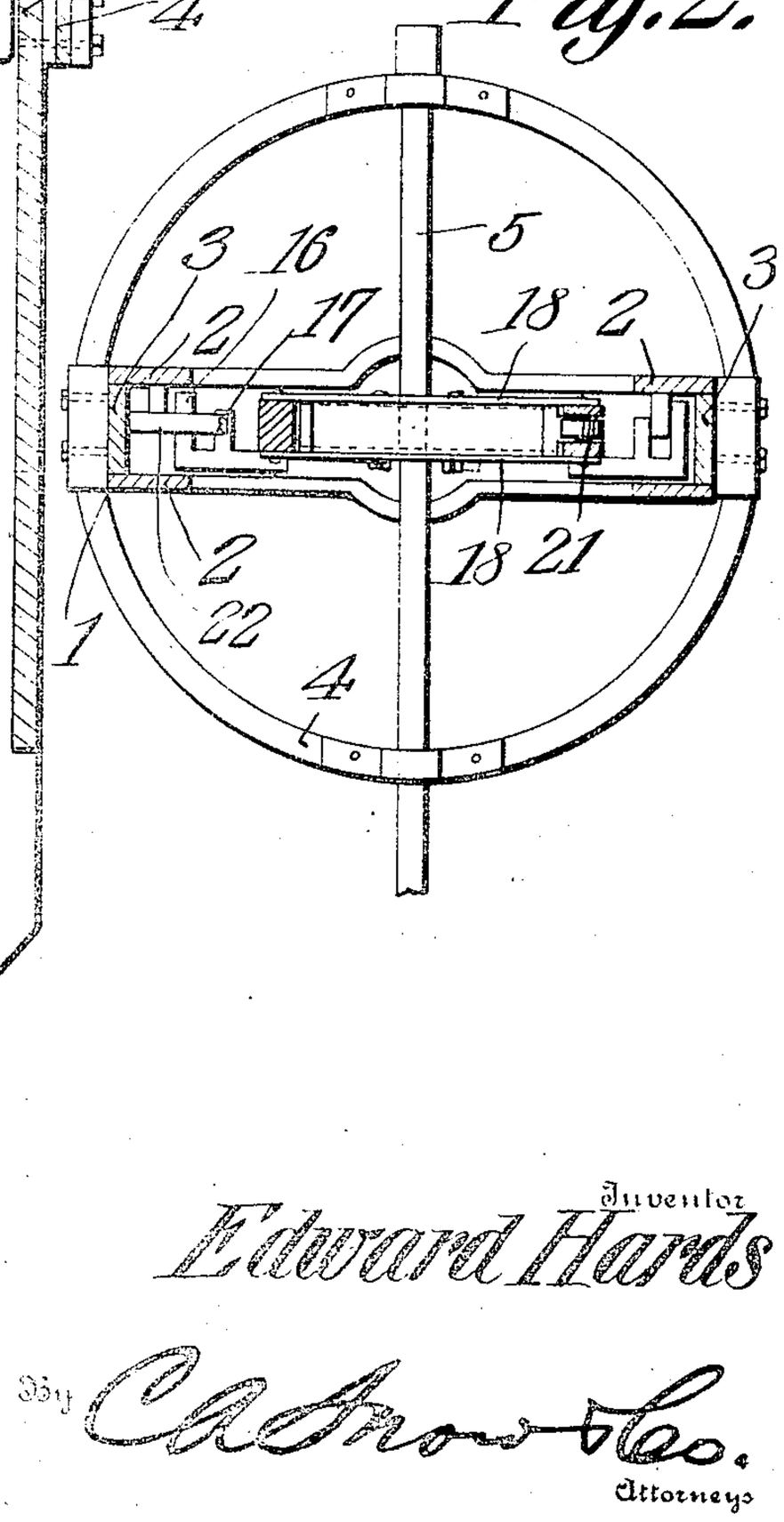

Fig. 2.

Witnesses

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MECHANICAL MOVEMENT.

946,671. Specification of Letters Patent. Patented Jan. 18, 1910.

Application filed May 19, 1909. Serial No. 496,994.

To all whom it may concern:

Be it known that I, EDWARD HARDS, a citizen of the United States, residing at Phoenix, in the county of Maricopa and Territory of Arizona, have invented a new and useful Mechanical Movement, of which the following is a specification.

This invention relates to mechanical movements, its object being to provide means for converting rotary motion into reciprocatory motion, the mechanism being especially designed for actuating pump rods and the like, although it can be used for various other purposes and may be driven by an engine, a wind wheel, or any other suitable motor.

With these and other objects in view the invention consists of certain novel details of construction and combinations of parts hereinafter more fully described and pointed out in the claims.

In the accompanying drawings the preferred form of the invention has been shown.

In said drawings:—Figure 1 is a view, partly in section and partly in elevation, of the mechanism constituting the present invention. Fig. 2 is a section on line A—B Fig. 1. Fig. 3 is a detail view of one of the deflecting devices.

Referring to the figures by characters of reference 1 designates a substantially rectangular guide body consisting of spaced similar frames 2 connected at their outer longitudinal edges by webs 3. These webs are bolted or otherwise secured at their centers to diametrically opposed portions of a ring 4, which may, if preferred, be mounted on any suitable support (not shown). This ring 4 also constitutes a bearing for a shaft 5, which may be driven in any suitable manner and which is provided with a gear 6 arranged at the center of the ring and between the webs 3.

Secured upon one face of one of the frames 2 and adjacent each longitudinal edge thereof are alining guide rails 7 spaced apart as indicated in Fig. 1, the upper and lower ends of the respective rails being provided with removable extensions 8, bolted or otherwise secured in place.

The frames 2 are preferably connected at one end by means of a guide sleeve 9 within which is loosely mounted a pump-rod 10 or the like, said rod being attached at one end to a preferably rectangular frame 11, constituting a head, there being parallel longitudinally extending racks 12 and 13 within the head and designed to alternately mesh with the gear 6 heretofore referred to, the distance between the two racks being slightly greater than the diameter of the gear. Arms 14 are arranged in pairs at the sides of the head 11, said arms being detachably secured to the head by means of bolts or in any other preferred manner, the securing means being insertible into any one of the series of openings 15 formed within the head. Each arm 14 projects laterally from the head and is provided with spaced parallel ears 16 and 17, the distance between these two ears being slightly greater than the width of the rail 7 and both ears being designed to work between the frames 2.

Interposed between the ends of the racks 12 and 13 are cross-bars 18, each of which has a tooth 19 projecting therefrom and in the direction of the center of the head 11. The ends of each bar 18 engage certain teeth of the racks 12 and 13 and are held in place by means of holding strips 20, which are bolted or otherwise secured to opposite sides of the bar and have their ends secured to the sides of the frame or body 11.

Mounted upon the body 11 at diametrically opposed corners thereof are rollers 21, and secured to the end portions of the guide frame 1 and in the paths of these rollers are deflecting strips 22. Each strip is pivotally mounted as shown at 23 and has one end yieldingly supported by a spring 24, which bears against an ear 25 extending from the frame 1. A rod 26 is slidably mounted within the ear and extends through the spring 24, said rod being pivotally attached to the strip 22.

As heretofore stated the shaft 5 may be actuated in any desired manner. The gear 6 rotates therewith and when rotating in the direction of the arrow in Fig. 1 will force the rack 12 downwardly and thus cause the ears 16 and 17 at the right side of the head 11 to travel along the rails 7 adjacent thereto, said rails assuming positions between the ears, as shown in Fig. 2. This operation will continue until the lower arm 14 assumes a position below the lower rail 7 and the upper arm 14 assumes a position between the two rails. During the completion of this downward movement the lower roller 21 comes into contact with the deflecting strip 22 in

the path thereof, and at the same time the gear 6 moves into mesh with the tooth 19 on the upper bar 18. Both ends of the head 11 are thus shifted laterally and simultaneously, so as to shift the ears 16 and 17 at the left of the head into position to engage the adjoining rail 7. This lateral movement of the head will cease as soon as the tooth 19 moves out of mesh with the gear 6, and immediately subsequent thereto the head 11 will be shifted upwardly by the rotating gear, the rails 7 serving to guide the ears 16 and 17 during such movement. As soon as the head reaches the upper limit of its movement the foregoing operation will be reversed and obviously the constant rotation of gear 6 will thus produce a constant reciprocation of the head and of the rod 10 attached to it. Should it be desired to shorten the stroke of the rod 10 the bars 18 can be detached and then secured to the head 11 at points closer together. The arms 14 can also be brought closer together and the extensions 8 of the rails can be removed.

Instead of utilizing a pivoted strip 22 and a spring 24 for holding the strip normally in a predetermined position, a spring helix such as indicated at 27 in Fig. 3, may be utilized, one end of the helix being secured to a stud 28 while the other end thereof is extended along a straight line to constitute a deflecting arm 29 having the same function as the strip 22 heretofore referred to.

Obviously various changes may be made in the construction and arrangement of the parts without sacrificing any of the advantages of or departing from the spirit of the invention.

What is claimed is:—

1. The combination with a revoluble gear, of connected oppositely disposed racks, opposed parallel guides, means movable with the racks for alternately engaging the guides, said means being adjustable toward or away from each other, and means movable with the racks for alternately engaging the rotating gear to bring the racks successively into mesh with the gear.

2. A device of the class described comprising parallel connected racks, a revoluble gear interposed therebetween, means movable with the racks for engaging the gear upon the completion of the strokes of the racks, to shift the said racks successively into engagement with the gear, said means being adjustable toward or away from each other, relatively fixed parallel guides, and means movable with the racks for successively engaging said guides.

3. Mechanism of the class described comprising parallel connected racks, a revoluble gear interposed therebetween, the distance between the racks being greater than the diameter of the gear, adjustable means movable with the racks for successively engaging the gear during the completions of the strokes of the racks to successively move the racks into mesh with the gear, and means for maintaining each rack in mesh with the gear during the stroke of the rack, and resilient deflecting means in the paths of the racks.

4. In mechanism of the class described a movable head having opposed parallel racks, a revoluble gear interposed between the racks, the distance between the racks being greater than the diameter of the gear, resilient deflecting means in the path of the head, means upon the head for engaging the gear to shift said head upon the completion of the stroke of the head to bring the racks successively into mesh with the gear, said means coöperating with the deflecting means and being adjustable toward or away from each other, and means for guiding the head during each stroke thereof.

5. In mechanism of the class described a guide body, opposed adjustable rails therein, a head mounted to reciprocate within the body, means outstanding from the head for successively engaging the rails to guide the head during the strokes thereof, a gear revolubly mounted within the head, racks carried by the head, means movable with the racks for successively engaging the gear during the completion of the strokes of the head to shift the racks successively into mesh with the gear, said means being adjustable toward or away from each other, and resilient deflecting means carried by the body and coöperating with said gear engaging means to shift the head.

6. The combination with a guide body, of a laterally shiftable head, racks carried thereby, a revoluble gear interposed between the racks, means upon the head coöperating with the gear to successively shift the racks into mesh with the gear, said means being adjustable toward or away from each other, spring-controlled deflecting means within the body, anti-friction devices carried by the head and movable against said deflecting means.

7. In mechanism of the class described a laterally shiftable head, said head being mounted to reciprocate longitudinally, cooperating movable and fixed means for guiding the head during the longitudinal movement thereof, opposed parallel racks movable with the head, a gear mounted for rotation between the racks, toothed bars interposed between and engaging the racks, and means for detachably securing the bars between the racks, said bars constituting adjustable means for successive engagement by the gear for successively shifting the racks into mesh with the gear.

8. In mechanism of the class described a laterally shiftable head, said head being mounted to reciprocate longitudinally, co-

operating movable and fixed means for guiding the head during the longitudinal movement thereof, opposed parallel racks movable with the head, a gear mounted for rotation between the racks, and adjustable means successively engaged by the gear for successively shifting the racks into mesh with the gear, and spring-controlled deflecting means in the path of the head for facilitating the lateral shifting thereof.

9. Mechanism of the class described comprising a laterally and longitudinally movable head, coöperating fixed and movable means for guiding the head during the longitudinal movement thereof, opposed parallel racks movable with the head, a gear revolubly mounted between the racks, means actuated by the gear at the completion of each longitudinal movement of the head for shifting the head laterally to bring the racks successively into mesh with the gear, cushioned deflecting devices in the path of the head and coöperating with said lateral shifting means, and anti-friction devices carried by the head and coöperating with the cushioned deflecting devices.

In testimony that I claim the foregoing as my own, I have hereto affixed my signature in the presence of two witnesses.

EDWARD HARDS.

Witnesses:
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A. M. Pecka.