

(No Model.)

E. C. RIDDLE.
MECHANICAL MOVEMENT.

No. 605,015.

Patented May 31, 1898.

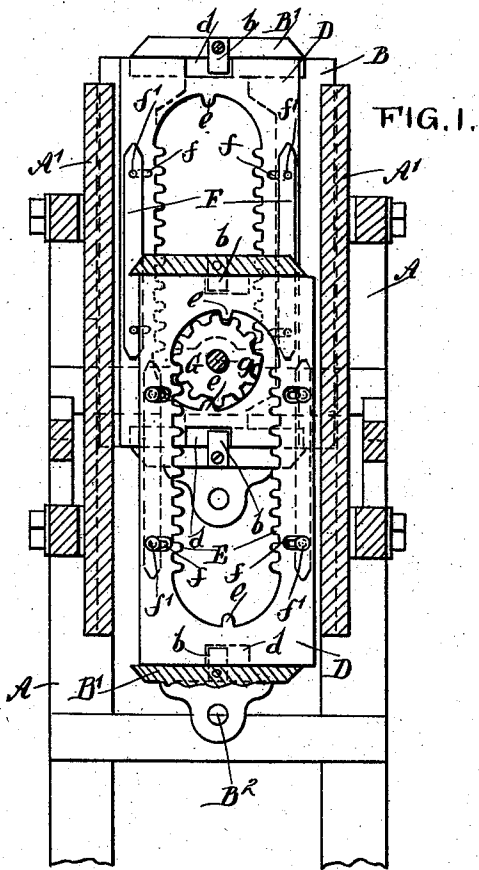


FIG. 1.

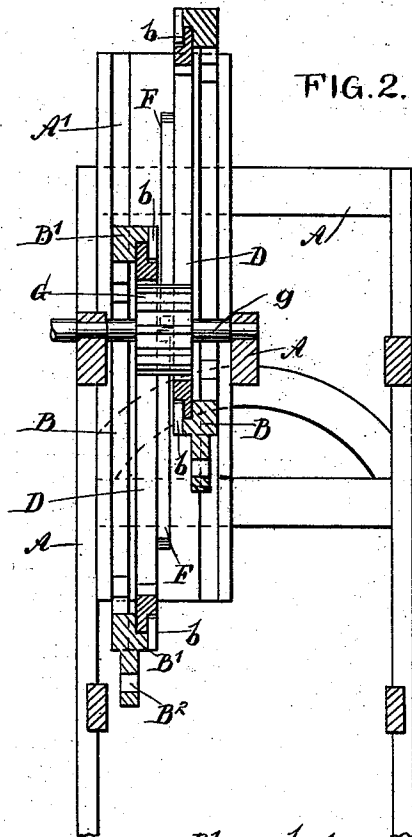


FIG. 2.

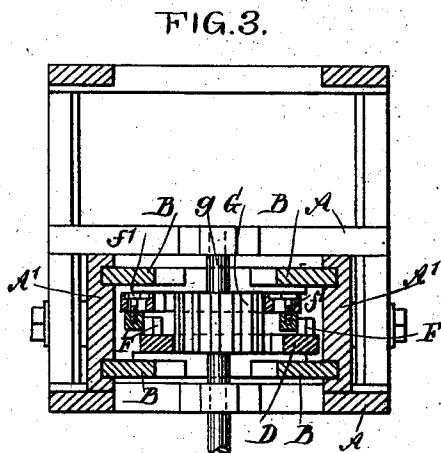


FIG. 3.

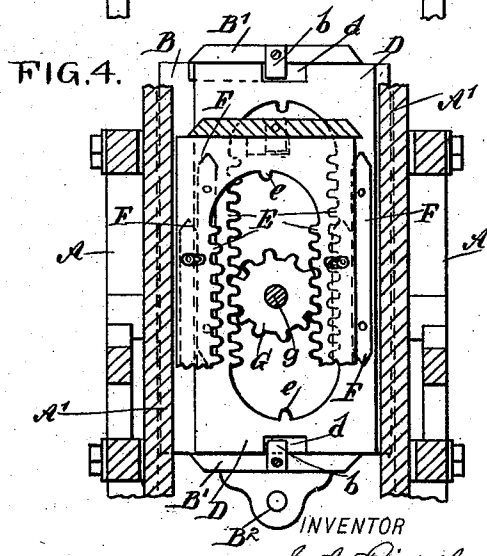


FIG. 4.

WITNESSES:

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EDWARD C. RIDDLE, OF BROWNING, MISSOURI.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 605,015, dated May 31, 1898.

Application filed November 9, 1897. Serial No. 657,937. (No model.)

To all whom it may concern:

Be it known that I, EDWARD C. RIDDLE, of Browning, in the county of Linn and State of Missouri, have invented a new and Improved Mechanical Movement, of which the following is a full, clear, and exact description.

My invention consists of a mechanical movement designed for use in converting reciprocating into rotary motion, and the contrary, and comprises two racks, each consisting of two side bars having their inward or opposed surfaces toothed and at such a distance apart as to permit a pinion to engage the teeth of one side without touching the teeth upon the other side, and of certain constructions in connection therewith by which the racks are caused to reciprocate by the revolution of the pinion or by which the pinion is caused to rotate by opposite reciprocations of the racks.

My invention consists of certain constructions which will be hereinafter described, and particularly pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a longitudinal section through the framework, showing the racks in plan. Fig. 2 is a longitudinal section taken at right angles to that of Fig. 1. Fig. 3 is a cross-section; and Fig. 4 is a section corresponding to that shown in Fig. 1, but with the parts in a different position.

The object of my invention is to produce a device which by means of racks and a pinion may be used to convert reciprocating into rotary motion, or the contrary, and to secure a better operation thereof than by similar previous devices. As shown in the drawings, my invention is not combined with any particular mechanism, but, as will readily be seen, may be used for any purpose where such a result is desired.

The device is herein shown as mounted within a frame A, provided with guideways A', adapted to engage opposite edges of the reciprocating members. These reciprocating members each include a frame B, which I have termed a "gate," and a rack D, which is mounted upon said gate, so as to have a limited lateral reciprocation thereon.

Each gate B is mounted with its edges sliding in grooves formed in the side surfaces of the guides A'. At each end the gate is provided with raised ribs B'. The ends of the rack D fit snugly within these ribs, against which they slide. At each end of the rack D is formed a recess *d*, opening to the outer side thereof and receiving a lug *b*, which is removably secured upon the rib B' of the gate. This lug serves to hold the rack in place and to limit the amount of its side reciprocation.

The rack D is formed of two side bars which are toothed upon their inner or opposed edges and connected at each end by a cross member. This forms an opening which, as shown in the drawings, terminates at each end in a curve. At the center of this curve is placed a single tooth *e*, corresponding in size with the teeth E upon the side bars. These teeth E are made so as to mesh with the teeth of a pinion or gear G, which is mounted upon a shaft *g*, extending in a direction at a right angle to the plane of the rack. This gear has a width of face which enables it to engage the teeth upon both racks at the same time.

Upon the faces of the racks which are adjacent are secured ribs F, which act as sliding pieces to maintain the two racks in proper relation to each other during their reciprocation and to secure certain contact of the rack-teeth with the teeth of the gear G. These ribs are mounted upon the racks by means of lateral slots *f* and bolts *f'*, passing through said slots and engaging the ribs. These ribs are made of such a length that their ends will pass by each other when the racks are moved to the outer limit of their travel.

In the operation of the device each rib F is alternately outside of and then inside of the corresponding rib upon the opposite rack, the side surfaces of the ribs F being in sliding contact while the racks are being reciprocated. By making these ribs movable upon the racks in the manner described they may be adjusted so as to maintain proper contact of the racks with the gear and also proper sliding contact between the ribs upon the two racks.

The operation of the device is as follows: Starting upon the supposition that the power is applied to the racks in order to rotate the shaft *g*, the reciprocation of the racks will

rotate the gear and the shaft. The reciprocation of the racks should be in opposite directions, as the opposite sets of teeth on each rack are in contact with the gear at the same time. When the racks have reached one limit of their travel, the teeth *e*, situated at the end of the openings in said racks, are engaged by the gear *G*, which results in shifting the racks laterally until the teeth upon the opposite racks are engaged by the gear. At this point the power applied to the racks is to be reversed, when, the opposite set of teeth being in contact with the gear, the opposite movement of the racks will cause a continuation of the rotation of the gear and shaft. At the point where the lateral reciprocation of the racks is commenced, being the position shown in Fig. 1 the ribs *F* are so situated in relation to each other that their ends will clear and permit the rib which normally was outside to be transferred to the inner side of the rib upon the other rack. This transfer is accomplished alternately at each end of the reciprocation.

In using my device reversely—that is, to transform rotary motion into reciprocating—the action is substantially the same. In this case, however, the gear is the driver and the racks the driven member. The gates may be provided with eyes *B*², located at one end thereof, and to which connection may be made from the mechanism operating or being operated by the device.

As herein shown and described, this device is superior to similar constructions in being adjustable for wear and so that the parts may be kept in the best working position at all times and also in being constructed so that the reciprocating members move at all times in a perfectly straight line, thus enabling them to be connected directly and rigidly to straight reciprocating devices, such as pump or engine cylinders.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

1. A device for converting reciprocating into rotary motion and the contrary, comprising a frame having two sets of parallel guideways therein, two reciprocating frames or guides sliding longitudinally in said guideways and provided with lateral guides, a rack mounted to slide laterally in said guides, said frame and rack being provided with stops limiting said lateral movement, said racks

consisting of two bars connected at their ends and having the inner or opposed surfaces of the side bars toothed, ribs fixed to each of the side bars upon the side facing the other rack and adapted to slidingly engage each other, a single tooth upon the cross-bars at each end of the racks, and a pinion mounted upon a shaft and engaging opposite sides of each rack, substantially as specified.

2. A device for converting reciprocating into rotary motion and the contrary, comprising a frame having two sets of parallel guideways therein, two reciprocating frames or gates sliding on said guideways and provided with lateral guides, a rack mounted to slide in said lateral guides, said frame and rack being provided with stops limiting said lateral movement, said rack consisting of two bars connected at their ends and having the inner or opposed surfaces of the side bars toothed, ribs fixed to each bar upon the side facing the other rack and adapted to slidingly engage each other, said ribs being secured by bolts passing through laterally-extending slots so as to be laterally adjustable, a single tooth upon the cross-bars at each end of the racks, and a pinion mounted upon the shaft and engaging opposite sides of each rack, substantially as specified.

3. A device for converting reciprocating into rotary motion and the contrary, comprising a frame having two sets of parallel guideways therein, two reciprocating frames or gates sliding in said guideways and provided with lateral guides, a rack mounted to slide in said lateral guides, said frames and racks being provided with stops to limit said lateral movement consisting of a lug upon the gate entering a recess upon the rack, said racks consisting of two bars connected at their ends and having inner or opposed surfaces of the side bars toothed, ribs fixed to each bar upon the side facing the other rack and adapted to slidingly engage each other, and of such length as to pass by each other at the limit of their stroke, means for laterally adjusting said ribs, a single tooth upon the cross-bars at each end of the racks, and a pinion mounted upon the shaft and engaging opposite sides of each rack, substantially as specified.

EDWARD C. RIDDLE.

Witnesses:

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S. L. GIBSON.