A. PLAGMAN.

MECHANICAL MOVEMENT.

APPLICATION FILED MAY 2, 1910.

972,236.

Patented Oct. 11, 1910.

2 SHEETS—SHEET 1.

Fig. 1

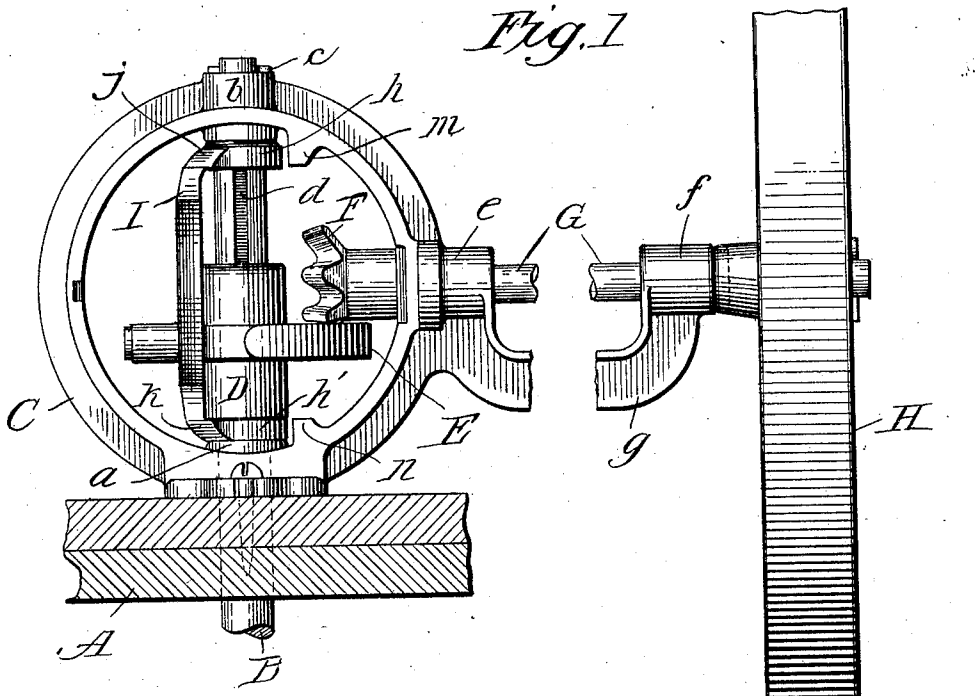

Fig. 2.

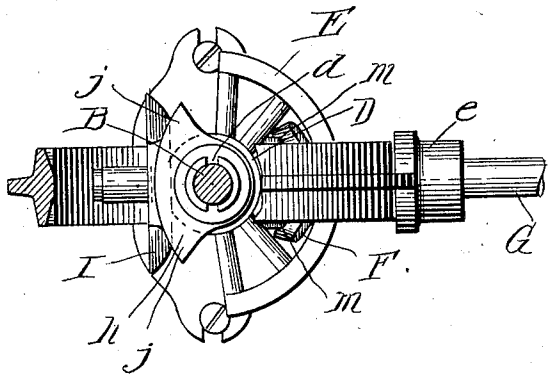

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Fig. 3.

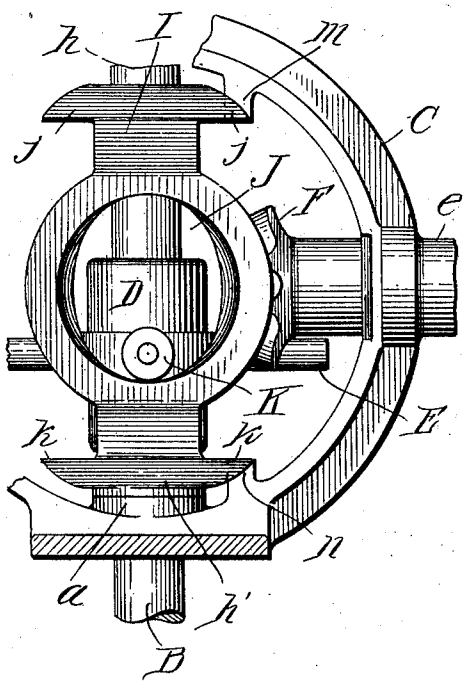


Fig. 4.

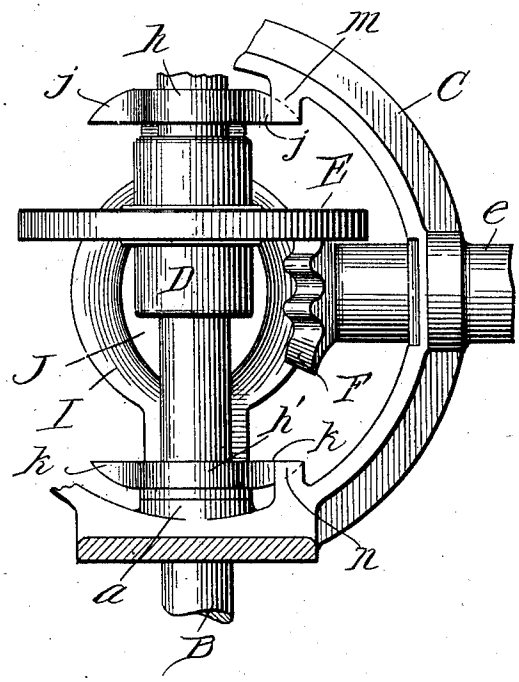
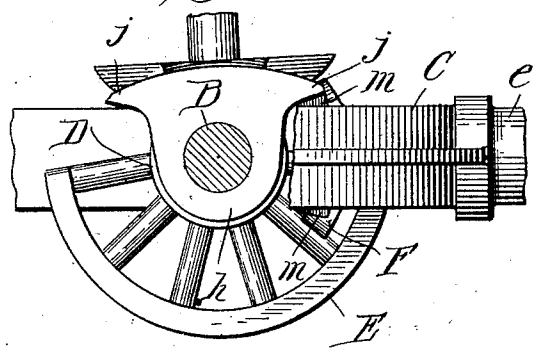


Fig. 5.



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UNITED STATES PATENT OFFICE.

ADOLPH PLAGMAN, OF DAVENPORT, IOWA, ASSIGNOR TO WHITE LILY MANUFACTURING COMPANY, OF DAVENPORT, IOWA, A CORPORATION OF IOWA.

MECHANICAL MOVEMENT.

972,236. Specification of Letters Patent. **Patented Oct. 11, 1910.**

Application filed May 2, 1910. Serial No. 558,943.

To all whom it may concern:

Be it known that I, ADOLPH PLAGMAN, a citizen of the United States, residing at Davenport, in the county of Scott and State of Iowa, have invented new and useful Improvements in Mechanical Movements, of which the following is a full, clear, and exact description.

The object of my invention is to provide a simple mechanical movement for converting a continuous rotary motion into a rotary reciprocal motion by means, the reversing action of which is accomplished in a novel manner that makes it less abrupt and with less friction than has heretofore been accomplished, substantially as hereinafter fully described and as particularly pointed out in the claims.

In the drawings:—Figure 1 is a side elevation of my invention having a portion broken away. Fig. 2 is a plan view with part of the supporting-frame broken away. Fig. 3 is a diagrammatical view showing a side elevation of the converting mechanism in one extreme position. Fig. 4 is a corresponding view showing said mechanism in the opposite extreme position. Fig. 5 is a plan view showing the connecting mechanism at one extreme position.

In the drawings A represents the support for my improved mechanical movement, and B the rotary reciprocal or driven shaft. This shaft, B, extends up through a suitable bearing *a* made integral with the lower segment of a ring-shaped annular supporting-frame C, and up through a diametrically opposite bearing *b*, made in the uppermost segment of said annular frame and has a cotter *c* through its upper end to secure the same in place. Between these bearings, shaft B is provided with a longitudinal groove *d*, and has mounted thereon a longitudinally reciprocal sleeve D, that is provided with a suitable feather or spline that enters said groove *d;* thus permitting the longitudinal movement of said sleeve, but preventing its rotating independently of said shaft. About midway its length, sleeve D is provided with a segmental rack E projecting at right angles from its circumference. This rack consists of a number of equi-distant spokes or arms that are connected by a suitable rim, substantially as shown, and it is engaged by a spur-gear or pinion F on the adjacent end of drive-shaft G; which latter extends at right angles to shaft B, out through a suitable bearing *e* made in the annular frame C midway between the bearings of shaft B, and through bearing *f* in the end of an extension *g* of frame C, and has on its outer end a drive-wheel H, that may be driven by hand or otherwise.

Shaft G is revolved continuously in one direction, and the pinion F which engages the rack E rotates the latter, together with shaft B, until it reaches the end of the rack, whereupon, by virtue of the assistance received from other mechanism, supposing the rack to have been moving in a plane below it, it will lift said rack and sleeve until said rack will be in a plane above the pinion. The continued rotation will then move the rack in the opposite direction until its opposite end reaches the pinion where it will engage the mechanism hereinbefore mentioned, and will gravitate to its lower position again. The reverse of this operation is the same when the drive-shaft G is revolved in the opposite direction.

In order to limit the movement of the rack, I provide a reversing-frame I, or yoke, the body of which is parallel to the axis of shaft, B, and located on the side thereof opposite the rack. The ends of this reversing-frame are bent at right angles to its length to form pivotal lugs *h*, *h'* which are loosely journaled on shaft B next its bearings. Midway between its pivotal lugs this reversing-frame is made annular in construction to provide a circular or other suitably shaped opening or eye, J, out through which a stud K, projecting diametrically opposite rack E, extends. The upper and lower ends of the reversing-frame, I, are provided with oppositely projecting wings *j*, *j*, and *k*, *k*, respectively, which are adapted to engage first one side and then the other of stop-lugs, *m*, and *n*, projecting toward the axis of the drive-shaft G from the annular-frame, C, near the bearings of shaft, B, in a vertical transverse plane just beyond the face of the pinion F opposing sleeve D. The vertical dimensions of the opening, J, of the reversing-frame, I, correspond to the throw of the reciprocal sleeve D plus the diameter of the stud K, and for convenience of construction I prefer to make it substantially circular.

In operation, as the point of engagement of pinion F approaches the ends of the rack, the stud K moves in the eye of the reversing frame, J, in the same direction with it, until the wings *j*, *k*, projecting from the ends of the reversing-frame, in the direction in which the stud is moving, engage the stops, *m*, and *n*, whereupon said stud is compelled to roll up the side of the circumference of the eye by the engagement of the pinion with the end cog or spoke of the rack. When the rack reaches the plane above the pinion, and begins to move in the opposite direction, it will momentarily, and while it is moving in the upper quadrant of the eye, let the reversing-frame remain stationary. When the stud reaches the limit of its upward movement it again engages the reversing-frame and moves the same in the opposite direction until the wings *j*, projecting opposite from those last mentioned, engage the opposite sides of the stops *m* and *n*, whereupon the stud moves downward with the rack E, and holds the same and pinion F, in engagement while the former is moving downward. The reversing-frame, J, remains stationary while the stud is in engagement with the lower quadrant of the eye while describing its downward movement. Thus the reversing-frame J has an intermittent rotary reciprocal motion, the extent of which is less than that of the rack, and reduces the friction of the mechanism during the reversing movement or operation of the converting mechanism and makes it much easier to operate.

What I claim as new is:—

1. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven-shaft disposed at an angle thereto, a pinion on one end of said drive-shaft, a segmental rack engaged by said pinion for transmitting the motion of the drive-shaft to the driven-shaft, and a member having a limited movement and engaged by said rack during the reversal movement of said rack.

2. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven-shaft disposed at an angle thereto, a pinion on one end of said drive-shaft, a segmental rack engaged by said pinion for transmitting the motion of the drive-shaft to the driven-shaft, and an intermittently movable member having a limited movement and engaged by said rack during the reversal movement of said rack.

3. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven-shaft disposed at an angle thereto, a pinion on one end of said drive-shaft, a segmental rack engaged by said pinion for transmitting the motion of the drive-shaft to the driven-shaft, and a member adapted to have a movement concentric to the axis of said rack, and having a limited movement and engaged by said rack during the reversal movement of said rack.

4. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven-shaft disposed at an angle thereto, a pinion on one end of said drive-shaft, a sleeve slidable longitudinally upon but rotatable with said driven-shaft, and having a segmental rack engaged by said pinion for transmitting the motion of the drive-shaft to the driven-shaft, and a member having a limited movement and engaged by said rack during the reversal movement of said rack.

5. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven-shaft disposed at an angle thereto, a pinion on one end of said drive-shaft, a sleeve slidable longitudinally upon but rotatable with said driven-shaft, and having a segmental rack engaged by said pinion for transmitting the motion of the drive-shaft to the driven-shaft, and a member having a limited movement and engaged by said rack during the reversal movement of said rack.

6. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven-shaft disposed at an angle thereto, a pinion on one end of said drive-shaft, a sleeve slidable longitudinally upon but rotatable with said driven-shaft, and having a segmental rack engaged by said pinion for transmitting the motion of the drive-shaft to the driven-shaft, and an intermittently movable member having a limited movement and engaged by said rack during the reversal movement of said rack.

7. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven-shaft disposed at an angle thereto, a pinion on one end of said drive-shaft, a sleeve slidable longitudinally upon but rotatable with said driven-shaft, and having a segmental rack engaged by said pinion for transmitting the motion of the drive-shaft to the driven-shaft, and a member adapted to have a movement concentric to the axis of said rack and having a limited movement and engaged by said rack during the reversal movement of said rack.

8. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven-shaft disposed at an angle thereto, a pinion on said drive-shaft, a sleeve having a longitudinal sliding motion on said driven-shaft that is provided with a segmental rack engaged by said pinion, and has a stud projecting radially therefrom, and a reversing frame having a limited movement and engaged by said stud during the reversal movement of said rack.

9. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary

reciprocal driven-shaft disposed at an angle thereto, a pinion on said drive-shaft, a sleeve having a longitudinal sliding motion on said driven-shaft that is provided with a segmental rack engaged by said pinion, and has a stud projecting radially therefrom, and a reversing frame arranged parallel to said driven-shaft having a limited movement and engaged by said stud during the reversal movement of said rack.

10. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven-shaft disposed at an angle thereto, a pinion on said drive-shaft, a sleeve having a longitudinal sliding motion on said driven shaft, that is provided with a segmental rack engaged by said pinion, and has a stud projecting radially therefrom and a reversing-frame arranged parallel with said driven-shaft, and having its ends provided with transverse pivotal lugs that are journaled on said shaft, and adapted to be engaged by said stud during the reversal movement of the rack.

11. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven-shaft disposed at an angle thereto, a pinion on said drive-shaft, a sleeve having a longitudinal sliding motion on said driven shaft that is provided with a segmental rack engaged by said pinion, and has a stud projecting radially therefrom, and a reversing frame arranged parallel with said driven shaft, having pivotal lugs at its ends that are journaled on said shaft and having an eye or opening therein through which said stud projects.

12. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven shaft disposed at an angle thereto, a pinion on said drive-shaft, a sleeve having a longitudinal sliding motion on said driven shaft that is provided with a segmental rack engaged by said pinion, and has a stud projecting radially therefrom, and a reversing frame arranged parallel with said driven shaft and having an opening or eye therein through which said stud projects.

13. A mechanical movement comprising a continuously revoluble drive-shaft, a rotary reciprocal driven shaft disposed at an angle thereto, a pinion on said drive-shaft, a sleeve having longitudinal sliding motion on said driven shaft that is provided with a segmental rack engaged by said pinion, and has a stud projecting radially therefrom, and an intermittently operated reversing frame having a limited movement and engaged by said stud during the reversal movement of said rack.

14. A mechanical movement comprising a continuously revoluble drive-shaft, a pinion on one end of the same, a rotary reciprocal driven-shaft, a sleeve having a longitudinal sliding movement on said driven shaft and having a rack engaged by said pinion, a reversing frame adapted to be engaged by means connected with said sleeve, and having its ends journaled on said driven-shaft and provided with lateral wings, and a supporting frame having suitable stops adapted to be engaged by said wings to limit the movement of said reversing-frame.

In witness whereof I have hereunto set my hand this 26th day of April 1910.

ADOLPH PLAGMAN.

Witnesses:
CHAS. H. TAPPERT,
O. R. MECKELNBURG.