H. MURRAY.

MECHANICAL MOVEMENT.

APPLICATION FILED AUG. 9, 1915.

1,199,296. Patented Sept. 26, 1916.

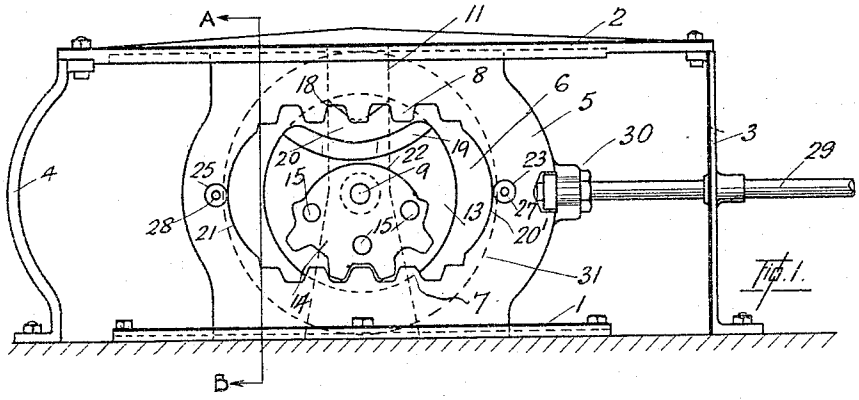


Fig. 1.

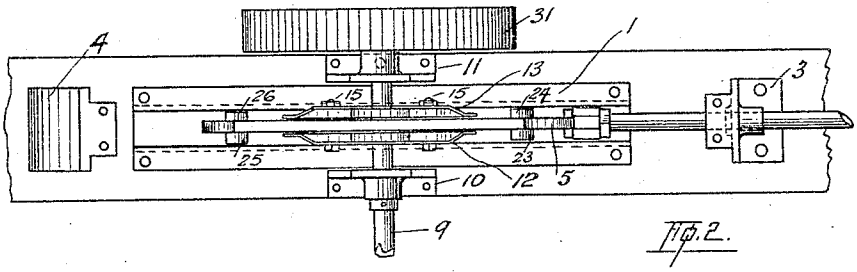


Fig. 2.

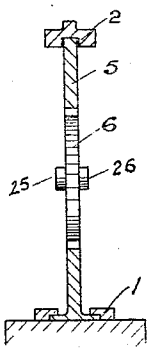


Fig. 3.

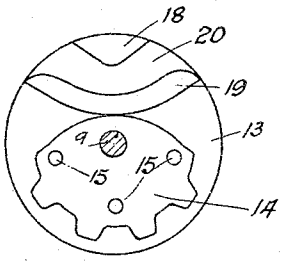


Fig. 4.

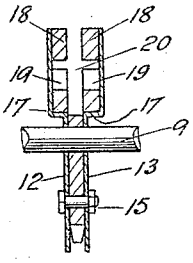


Fig. 5.

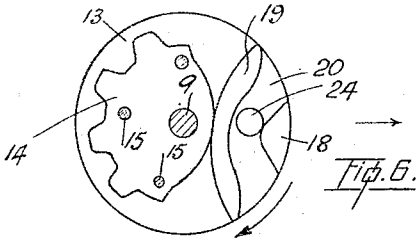


Fig. 6.

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MECHANICAL MOVEMENT.

1,199,296. Specification of Letters Patent. Patented Sept. 26, 1916.

Application filed August 9, 1915. Serial No. 44,527.

To all whom it may concern:

Be it known that I, HUGH MURRAY, a subject of the King of Great Britain, and a resident of the city of Vancouver, in the Province of British Columbia, Canada, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification.

My invention relates to improvements in mechanical movements, and the object of my invention is to devise a means for converting reciprocating motion into rotary motion in a simple efficient manner and with the minimum of working parts. I attain this object by the construction illustrated in the accompanying drawings in which—

Figure 1 is a side elevation of my device, one of the disks being removed. Fig. 2 is a plan view of Fig. 1 with the upper guide plate removed. Fig. 3 is a sectional view taken on the line A—B of Fig. 1. Fig. 4 is a face view of one of the disks and pinion segment. Fig. 5 is a sectional view of the assembled disks and pinion segment. Fig. 6 is a view illustrating the method of carrying the disks over the centers.

Similar figures of reference indicate similar parts throughout the several views.

1 indicates the lower guide, and 2 the upper guide, of my device, the lower guide 1 being mounted on any suitable foundation and the upper guide 2 being carried by any suitable supports such as the brackets 3 and 4, the supports being, however, in accordance with the design of the machine in which the movement may be embodied. A crosshead 5 is slidably mounted between the guides 1 and 2, which crosshead is provided with an opening 6, the longitudinal edges of which are formed as racks 7 and 8. Extending through the opening 6 of crosshead 5 is a shaft 9, rotatably mounted in suitably secured bearings 10 and 11, to which shaft are secured, by any approved mechanical means, the disks 12 and 13, these disks being disposed one on each side of the crosshead. Mounted on and secured to the shaft 9 and fitting between the disks 12 and 13 is a pinion segment 14 provided with a suitable number of teeth for operating in the racks 7 and 8. This segment fits between the disks 12 and 13, and the bolts 15 pass through both of the disks and the segment so that they may be all rigidly secured together.

The disks 12 and 13 are formed as shown in section in Fig. 5, that is, they are offset as at 17 and to the inner face of the offset portion are secured the members 18 and 19, these members being arranged so that a groove or channel 20 is formed between them, all as shown more particularly in Figs. 4 and 5. It will, of course, be understood that the disks 12 and 13 and the members 18 and 19 need not necessarily be separate elements, as each disk may be cast in one piece, in which case the groove 20 will be formed in the casting. The upper edge of the groove, that is, the upper edge when the disks are in the position shown in Fig. 5, is formed as two sides of a triangle, the apex being slightly rounded, while the lower edge is curved and the mouth of the groove at each end is wider than it is at the center.

The object in forming the upper edge of groove 20 triangular in shape is to enable the segment 14 to be rotated in either direction with equal facility, as it will be seen, on referring to Fig. 6, that the segment will be carried over the center in either direction, as required, according to whichever side of the triangle the roller bears upon; that is to say, if the crosshead be started to reciprocate with the roller 24 bearing on the side of the triangle, as shown in Fig. 6, the segment will turn in the direction indicated by the arrow. If, however, before starting, the disk be moved so that the roller bears on the other side of the triangle, then the segment will be turned in the opposite direction when the crosshead is reciprocated. Thus the reversing of the direction of rotation is provided for in a simple manner.

The ends of the opening 6 of crosshead 5 are rounded as at 20′ and 21 in Fig. 1, to allow for the rolling thereon of the plain rounded edge 22 of the pinion segment 14 when the same is being carried over the centers, and mounted on the crosshead 5 on each side close to each rounded end of the opening 6 and on the longitudinal center line are rollers 23—24 and 25—26, these rollers being rotatably carried on pins 27 and 28 respectively, secured in the crosshead. The diame-

ter of the respective rollers is slightly less than the width of the groove 20 at the narrowest part thereof, while the length of the rollers is slightly less than the depth of the groove.

29 indicates the reciprocating rod, secured to the crosshead 5 in any suitable manner, such as is indicated at 30 in Fig. 1, and which rod may derive its motion from any suitable source of power. The rod 29, therefore, may represent the piston rod of a steam, oil or air cylinder, or it may be connected to a suitable fulcrumed lever or to any means capable of imparting reciprocating movement to it.

31 indicates a flywheel carried by shaft 9.

The manner in which my device operates is as follows:—Referring to Fig. 1, in which the crosshead is shown at half-stroke it will be seen that if the rod 29 be moved to the left hand the pinion segment 14 will be rotated by means of the teeth rack 7 until it can go no farther. This movement carries the segment and the disks 12 and 13 partly over the center, but not sufficiently far enough for the segment to engage the upper rack 8. In this position, however, the rollers 23 and 24 are engaged in the grooves 20 of the disks, as indicated in Fig. 6, from which it will be clear that if the rod 29 be now moved to the right, the rollers 23 and 24, bearing on the angled side of the grooves, will carry the segment still farther over the center until it engages the rack 8 which will then rotate it still farther until the grooves 20 engage the rollers 25 and 26 at the other end of the stroke, when these rollers come into action in the same manner as already described with reference to rollers 23 and 24. It will thus be seen that, by means of the racks 7 and 8 the segment 14 is rotated through the greater part of a revolution, and that the completion of the full revolution is accomplished by the action of the rollers 23—24 and 25—26 in the grooves 20 of the disks at each end of the stroke. The segment 14 being secured to shaft 9, the shaft rotates with the segment, so that the reciprocating motion of rod 29 is converted to rotary motion in shaft 9, or vice versa; if the power be applied to shaft 9 by belt, chain or gearing, the rotary motion of shaft 9 will be converted into reciprocating motion of rod 29.

What I claim as my invention is:—

1. For use in a device of the class described, a pinion segment, and an offset extension portion on each side of said segment whereby a space is formed between said extensions.

2. For use in a device of the class described, a pinion segment, and a U-shaped extension portion carried by said segment, the legs of said extension being interiorly grooved.

3. A mechanical movement, comprising a cross head mounted to reciprocate, such cross head being provided with a pair of oppositely disposed toothed racks, a rotatably mounted pinion segment adapted for alternate engagement with said racks so as to be rotated thereby through part of a revolution as the crosshead reciprocates, said segment having a curved passageway therethrough, and means on said cross head adapted to be engaged alternately by said passageway whereby complete rotation of the segment is effected, said means and passageway being adapted to effect the partial rotation of the segment from one rack to the other in either direction.

4. For use in a device of the class described, a pinion segment, and a U-shaped extension portion carried by said segment, the legs of said extension being interiorly grooved one of the walls of the groove being V shaped and the other being curved.

5. For use in a device of the class described, a pinion segment, an offset extension portion carried by said segment, and a V-shaped lug carried by the extremity of said portion.

6. For use in a device of the class described, a pinion segment, a U-shaped extension portion carried by said segment, and a V-shaped lug carried by the extremity of each leg of the U.

Dated at Vancouver, B. C., this 14th day of July, 1915.

HUGH MURRAY.

Witnesses:
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Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."