No. 631,635. Patented Aug. 22, 1899.

G. HALLBERG.

MECHANICAL MOVEMENT.

(Application filed Jan. 28, 1899.)

(No Model.) 2 Sheets—Sheet 1.

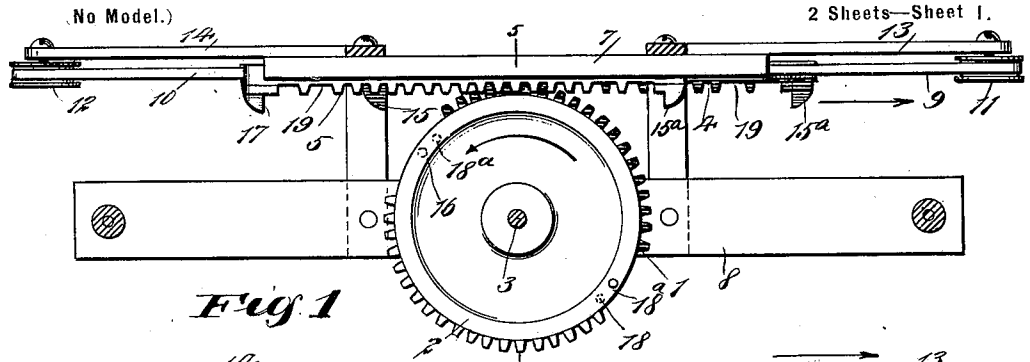


Fig. 1

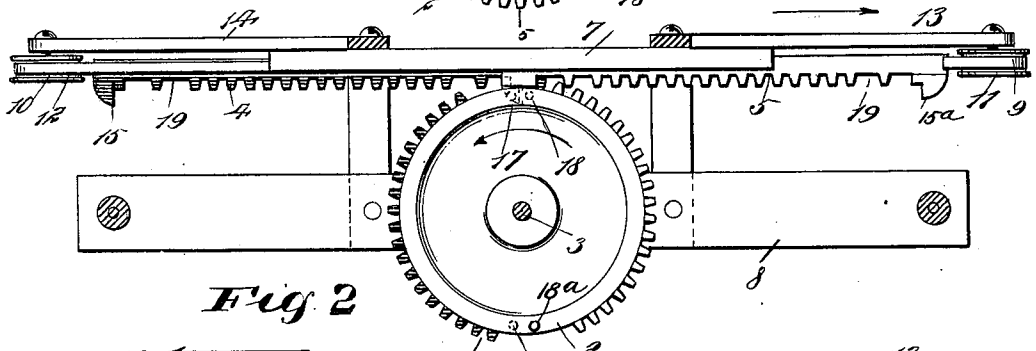


Fig. 2

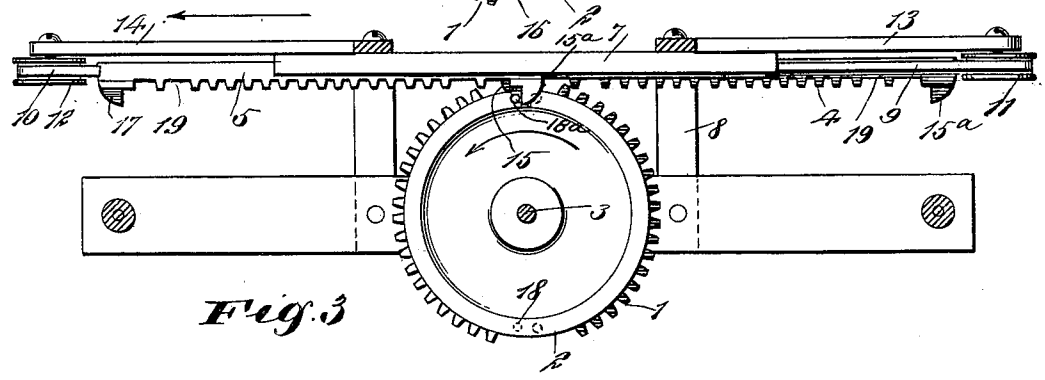


Fig. 3

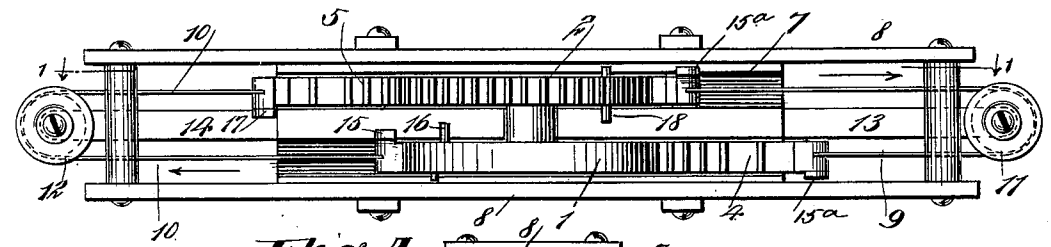


Fig. 4

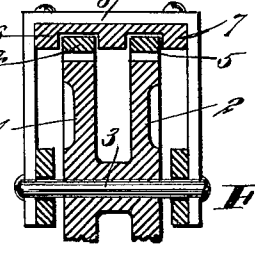


Fig. 5

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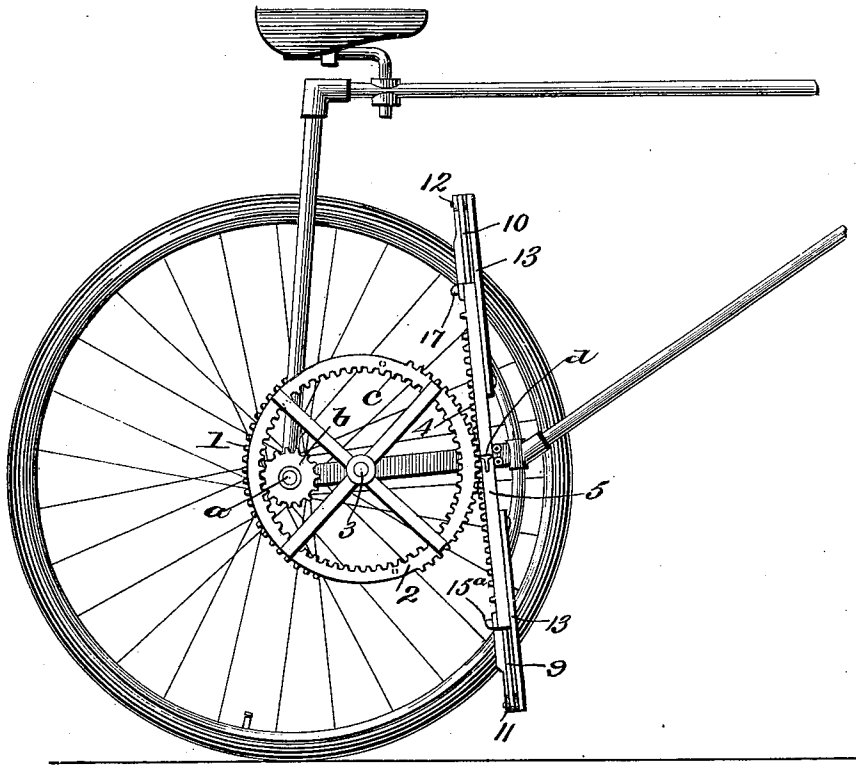
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Fig. 6.



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MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 631,635, dated August 22, 1899.

Application filed January 28, 1899. Serial No. 703,685. (No model.)

To all whom it may concern:

Be it known that I, GUSTAF HALLBERG, of the city of New York, borough of Manhattan, in the county of New York and State of New York, have invented a new and Improved Mechanical Movement, of which the following is a full, clear, and exact description.

This invention relates to improvements in devices for changing reciprocating movement into rotary motion or, vice versa; and the object is to provide a mechanism for this purpose that shall be simple in construction and positive in its operation.

I will describe a mechanical movement embodying my invention and then point out the novel features in the appended 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 figures.

Figure 1 is a partial elevation and partial section on the line 1 1 of Fig. 4 of a mechanical movement embodying my invention. Fig. 2 is a similar view, but showing the parts in another position. Fig. 3 is a similar view, but showing the parts in still another position. Fig. 4 is an inverted plan view. Fig. 5 is a transverse section substantially on the line 5 5 of Fig. 1; and Fig. 6 is a side elevation of a portion of a bicycle, showing my improvement applied thereto.

The device comprises two segmentally-toothed wheels 1 2, both mounted rigidly upon a shaft 3. It will be seen that the teeth of the two wheels are arranged to point in directly opposite directions, and the teeth of each wheel extend nearly one-half of its circumference.

Coacting with the wheel 1 is a rack 4, and coacting with the wheel 2 is a rack 5. These racks reciprocate, respectively, in guides 6 7, here shown as supported in a suitable frame 8. The ends of the two racks are connected by straps 9 10, of steel or other suitable material, and which extend, respectively, around rollers 11 12, mounted to rotate on arms 13 14, extended from the frame 8.

A lug 15, projecting downwardly from one end of the rack 4, at one side thereof, is adapted to engage with a pin 16, extended inward from the wheel 1, and a similar lug 17 on the same end of the rack 5 is adapted to engage with a pin 18 on the wheel 2. It will be noted that there is a double space 19 between the last two teeth at each end of each rack. This is to prevent the binding or stopping of the mechanism when a rack shall have reached the end of its operating movement, at which time the other rack is in position to engage with the teeth of its wheel. In operation the two racks are to be reciprocated alternately in opposite directions. In Fig. 1 it will be noted that the rack 4 is in engagement with the teeth of its wheel 1 and that the rack 5 is moving in the direction of the arrow. (Shown in Fig. 1.) At this time motion is being imparted to the two wheels in the direction indicated by the arrow. When the rack 4 shall have reached the end of its movement in this direction, the stop-lug 17 on the rack 5 will engage with the stop-pin 18 on the wheel 2, preventing the wheels from being thrown too far forward and also serving to move the rack into engagement with the wheels by the impetus of said wheels. At this time the first tooth of the rack 5 will be in position to engage the first tooth of its wheel 2, so that when the rack 5 is moved in the reverse direction to the arrow the two wheels will be rotated with it, and at the end of the motion the stop-lug 15 will engage with the stop-pin 16 on the wheel 1 for the purpose before described, and obviously the motion will be kept up as long as the racks are reciprocated.

The above description applies when motion is imparted to the wheels and the shaft 3 from the racks. It is obvious, however, that reciprocating motion may be imparted to the racks by a rotary motion imparted to the wheel by any suitable means—such, for instance, as by a crank.

This device will be found useful in a great number of mechanical movements.

In Fig. 6 of the drawings I have shown the improvement applied to a bicycle. In said figure the frame of the device is mounted upon the frame of the bicycle so as to straddle the drive-wheel, and in the said frame upon each side of the bicycle is mounted one of the segmental gear-wheels and a rack, the racks being connected at each end by straps, as shown in the other figures of the drawings. Each of the gear-wheels is formed with in-

ternal teeth *c*, and upon the shaft *a* of the drive-wheel, at each end, is mounted a pinion *b*, (only one of which is shown,) with which the internal teeth of said wheels mesh. For operating the racks they are provided with foot-rests or pedals *d*. Now it is obvious that when the racks are reciprocated by the operator the wheels 1 and 2 will be rotated and the motion of said wheels will be transmitted to the driving-wheel through the medium of the pinions *b* and internal teeth of the said wheels 1 and 2.

It is evident that reverse motion may be made and that for a complete or continuous reverse motion lugs 15ª, similar to the lugs 15 and 17, may be placed on the opposite ends of the racks on the outer side, so as to engage with pins 18ª, extended outward from the wheels. It will be noted that the power applied to the racks is at a right angle to the shaft.

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

1. A mechanical movement comprising two segmentally-toothed wheels, a shaft on which said wheels are mounted, the teeth of one wheel being arranged oppositely to the teeth of the other wheel, reciprocating racks for the respective wheels, a stop-lug on the end of each rack, and stop-pins on the wheels for engaging the said lugs, substantially as specified.

2. In a mechanical movement, two wheels each having a segmental row of teeth, reciprocating racks for engaging with the teeth of the wheel, strap connections between the ends of said racks, rollers around which said straps engage, a stop-lug on the end of each rack, and a stop-pin extended inward from each wheel for engagement with the lug, substantially as specified.

3. A mechanical movement, comprising two segmentally-toothed wheels, the teeth of one projecting in an opposite direction from the teeth of the other wheel, a shaft on which both of the wheels are mounted, a reciprocating rack for each wheel, there being a double space between the two end teeth of each rack, a stop-lug on the end of each rack, and projections on the wheels for engaging with said lugs, substantially as specified.

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