(No Model.)

J. WITT.

MECHANICAL MOVEMENT.

No. 382,785. Patented May 15, 1888.

Fig. 1.

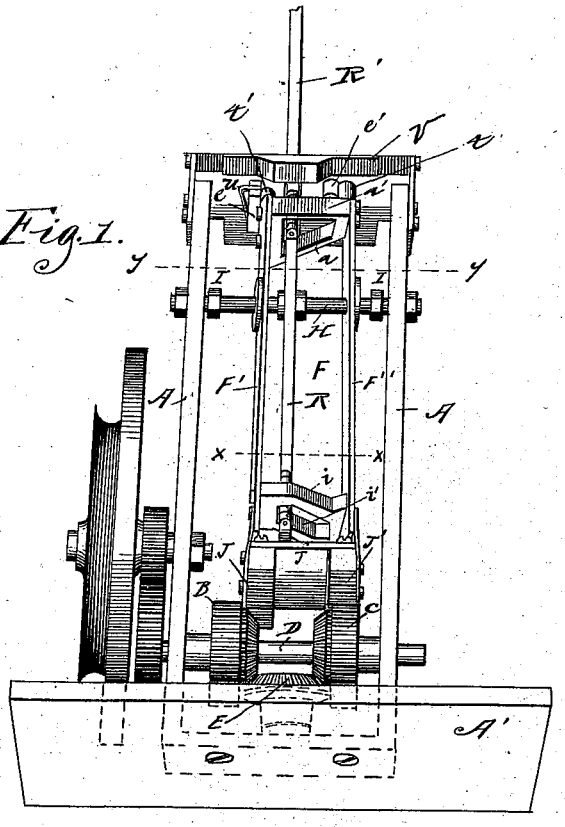


Fig. 2.

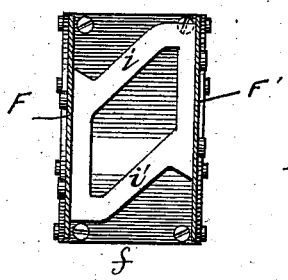


Fig. 4.

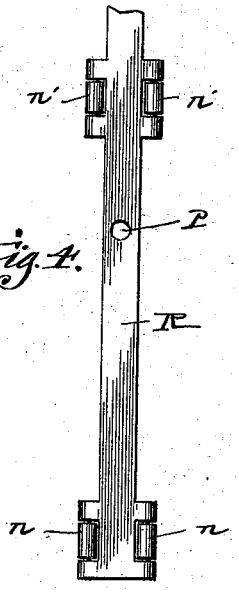
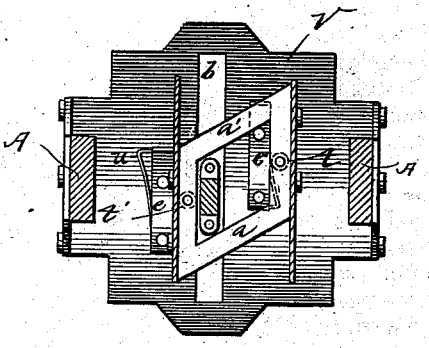


Fig. 3.



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UNITED STATES PATENT OFFICE.

JULIUS WITT, OF CHICAGO, ILLINOIS.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 382,785, dated May 15, 1888.

Application filed December 23, 1887. Serial No. 258,816. (No model.)

To all whom it may concern:

Be it known that I, JULIUS WITT, a subject of the Emperor of Germany, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Mechanical Movements, which I desire to protect by Letters Patent of the United States, and of which the following is a specification.

My present invention has for its object the improvement in mechanism for converting reciprocating into continuous rotary movement upon the general plan for which Letters Patent of the United States were granted me April 19, 1887, No. 361,341, as a motor for velocipedes.

The modification and improvement embraced in this invention are designed to render the shifting mechanism more certain and perfect in its operation.

In the accompanying drawings, making a part of this specification, Figure 1 is a view of the apparatus in isometrical perspective. Fig. 2 is a detail beneath line *x x*, Fig. 1. Fig. 3 is a view of parts inverted, taken on line *y y*, Fig. 1. Fig. 4 represents a portion of a lever.

For the present purpose of illustration, the mechanism is supported by uprights A, which are secured upon the base A′. The shaft and wheels for receiving rotary movement and utilizing it are shown near the bottom of the structure. Of this part of the mechanism two gear-wheels, B and C, are mounted on a shaft, D. These wheels combine both spur and bevel gear, wheel C being loose on the shaft, and the bevel-gear of both B and C engaging with a bevel-gear, E, on a vertical shaft. Thus, in a manner well known, a force applied alternately to the wheels B and C in opposite directions imparts continuous rotary movement to the shaft.

A frame, F, composed of two parallel side bars, F′ F″, joined at their lower ends by a plate, *f*, is supported loosely on a shaft, H. The latter is pivotally supported on its bearings at I I. On plate *f*, secured on the under portion of frame F, are provided toothed segments J J′, adapted to respectively gear with the spur-gear of the wheels B and C.

At the top and also near the bottom of the frame F are respectively secured on the inner surfaces, or between the parallel bars of said frame, cam-plates *a a′* and *i i′*. On shaft H is secured a lever, R, (preferably rigidly attached.) The lever R extends up between the cam-plates *a* and *a′* sufficiently to form a handle, R′, for manipulating the movement. The portion of lever R above shaft H extends between cam-plates *a* and *a′*, and through slot *b* in a plate, V, the latter being secured upon the uprights A, and in the present instance is curved in form to correspond to an arc of a circle, of which shaft H is the center. This shape, however, is important only in producing symmetry and for the better adaptation to its under surface of guide-plates. The guide plates or bars (designated *e* and *e′*) are secured to the under surface of said plate. The cam-plates *a a′* and the under surfaces of said guide-plates are preferably curved also, corresponding to an arc of which shaft H would represent the center of a circle, thus better adapting them to the movement of the frame F, as hereinafter described. The obliquity of plates *a* and *a′*, and also the corresponding obliquity of plates *i* and *i′*, serve in giving the shifting action required. These oblique bars, as seen in Figs. 2 and 3, correspond in position, due to the fact that in the latter the parts are inverted. When in position for use, however, they incline in different directions. The bar R in Fig. 4 is shown in side view—that is, at right angles to its position in Fig. 1. Its center of motion or fulcrum-point, at which it has its connection with shaft H, is shown at P. Below this, and at a position within the cam-plates *i* and *i′*, when the parts are in position for use, the lever is provided with anti-friction rollers *n n*.

Above the fulcrum-point are provided anti-friction rollers *n′ n′*, corresponding in position to the upper cam-plates. The machine is operated by giving the handle end of the lever a to-and-fro movement, and, as a result, imparting a reverse stroke to said lever below its fulcrum. By this rocking movement of the lever a corresponding movement is given to the frame, and a segment is thus brought in contact with the gear. The shifting is effected, to cause the segments to be alternately operated, by the oblique positions of the cam-plates with relation to the movement of the lever. The contact of the lower, or rather the rollers supplied to reduce friction, with the oblique bars in both directions, causes the frame to slide on the shaft, and thus so shifts the segments that

they alternately become operative. In this action the lever precedes the frame to the extent of its movement against the cam-plates. This shifting operation is made to take place when the lever is in one extreme or the other of its stroke, so that the segments may not be engaged with the wheels at such time. To effect this, rollers *t* and *t'* are provided on top of the frame, adapted to bear against the guide-bars *e* and *e'*, one against an outer and one against an inner surface of said guide-bars, respectively.

On the sides and at the ends of each guide-bar, and in opposite directions, is a detent-spring, *u*, whereby when the frame has reached a point in that direction in which the roller has passed the end of the guide bar and spring, the reaction of the latter throws it behind the roller and thus prevents the frame from repeating the stroke in the same path. The action of the lever at this time against the cam-plates produces the lateral movement of the frame, and the rollers *t* and *t'* are made to change their positions with relation to the guide-bars, so that the one on the inside is thrown to the outside of its guide-bar and the other roller is brought within the guide-bar ready for the opposite stroke. This shifting of the frame throws the segment last engaged out of gear with its co-operating wheel and brings the other segment into gear with its co-operating wheel.

Having thus fully described my said invention, what I claim, and desire to secure by Letters Patent, is—

1. In mechanism for converting reciprocating into rotary movement, the combination, with a series of co-operating wheels, substantially as described, to receive alternating movement and change it to continuous rotary movement, of a frame provided at one end with a toothed segment or segments, and carrying at its opposite end anti-friction rollers, said frame being mounted loosely on a supporting-shaft and provided with oblique cam-plates, a lever having its fulcrum coincident with the pivotal support of the frame and adapted to engage with the cam-plates of the frame, and guide-bars provided with detents that prevent a return-stroke of the frame until the latter is shifted.

2. In a mechanical movement, the combination, with the series of wheels B, C, and E, of the frame F, mounted loosely and adapted to slide upon a fulcrum-support and provided toward its ends, respectively, with cam-plates, substantially as described, also with segments J J' at its lower end and anti-friction rollers *t t'* at its upper end, a shaft, H, on which frame F is supported, lever R, mounted on said shaft, and guide bars *e e'*, having detents *u u*, substantially as described.

3. In a mechanical movement, the combination, with a series of wheels, B, C, and E, of the frame F, pivotally mounted and laterally movable, and provided with cam-plates *a* and *a'* and *i* and *i'*, a shaft, H, a pivotal lever, R, mounted on said shaft, anti-friction rollers *n n* and *n' n'*, guide-bars *e* and *e'*, detent-springs *u u*, and rollers *t t'*, substantially as set forth.

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