

J. L. TOMER.
MECHANICAL MOVEMENT.

APPLICATION FILED AUG. 14, 1909.

952,383.

Patented Mar. 15, 1910.

Fig. 1.

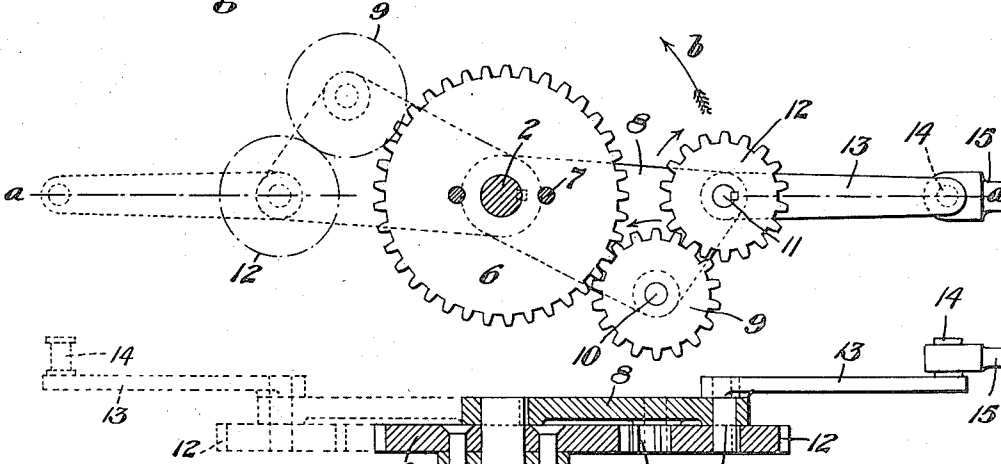


Fig. 2.

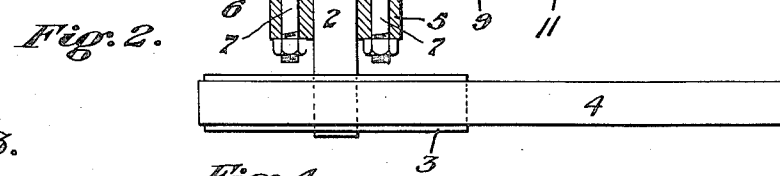


Fig. 3.

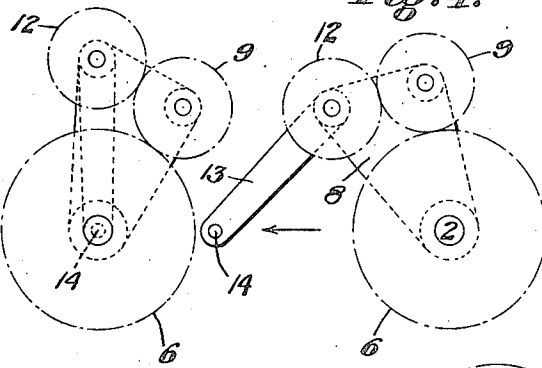


Fig. 4.

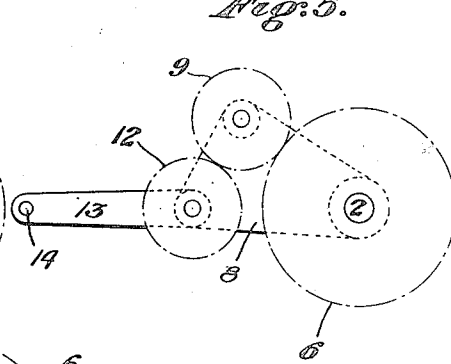


Fig. 5.

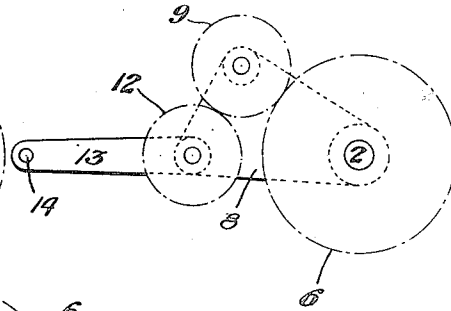
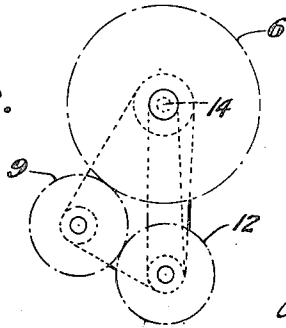


Fig. 6.



Witnesses:

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Inventor:

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UNITED STATES PATENT OFFICE

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MECHANICAL MOVEMENT.

952,383.

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To all whom it may concern:

Be it known that I, JOHN L. TOMER, a citizen of the United States, residing at Export, in the county of Westmoreland and State of Pennsylvania, have invented certain new and useful Improvements in Mechanical Movements, of which the following is a specification, reference being had therein to the accompanying drawing.

My invention refers to an improvement in mechanical movements and has for its objects to provide means for converting rotary motion into reciprocating motion or vice versa, the invention being particularly applicable to the operation of pumping wells, the cutter bar of reapers, etc., or wherever it is desired to utilize the movement.

The invention is illustrated in the accompanying drawings in which:—

Figure 1 is a view in front elevation of the invention. Fig. 2 is a horizontal sectional view on the line *a, a*, of Fig. 1. Figs. 3, 4, 5 and 6 are diagrammatic views illustrating several progressive positions of the parts.

The invention is designed to overcome the objections due to the dead center or centers of crank movements and to utilize the full efficiency of a rotating shaft at all times.

The movement is accomplished by means of a stationary toothed wheel engaging a rotatably carried toothed wheel mounted in a swinging disk or carrier head which also carries the driving wheel intermeshing with said traveling wheel, the driving wheel being mounted by a journal which in turn is provided with a crank provided with a wrist pin and a connection rod or pitman, whereby the wrist pin will constantly travel backwardly and forwardly in a straight line when motion is imparted to it by means of the carrier head and its gears intermeshing with the stationary gear and controlled thereby.

In the drawings, 2 represents the shaft which when used as a driving shaft may be actuated by any suitable means or prime mover for rotation, as a pulley 3 and belt 4. Said shaft 2 is mounted in a stationary bearing 5 of any suitable construction, to the face of which is secured the stationary gear wheel 6 by means of bolts 7 or in any suitable manner. To the end of shaft 2 is secured the disk or carrier head 8 by a key

or otherwise, whereby said head is rotated around with shaft 2 by the belt and pulley.

9 is an idler wheel pivotally mounted at 10 on said carrier head 8 and in intermeshing engagement with wheel 6, while at any other suitable point on carrier head 8 is journaled the shaft 11 provided on the same side of the carrier head with a corresponding driven wheel 12 and at the other side of the carrier head 8 with the crank 13 having the wrist pin 14 to which is secured the pitman 15, to which reciprocating motion is to be imparted along the line *a, a*. In order to accomplish the desired travel of wrist pin 14, wheels 9 and 12 are of the same diameter and of one-half the diameter of stationary wheel 6.

As shown in the position, Fig. 1, the wrist pin 14 is located in the said line of travel *a, a*, passing through the center of shaft 11 and shaft 2 when at the position of extreme throw at one side or the other constituting the limit positions of the stroke. That is to say, assuming the journal 11 and crank pin 14 to be in any position as the initial position, then the shafts 2 and 11 and wrist pin 14 will be in line as shown, and wrist pin 14 will conform to said line *a, a*, at any position throughout its entire travel forwardly or backwardly.

In the position of the apparatus as indicated in Figs. 1 and 2 the line is indicated as shown on the horizontal, but it is obvious that such line of travel may be arbitrarily selected, either for horizontal motion or vertical motion or at any intervening angle. The parts having been once fixed by proper meshing of the teeth of wheel 6 with the teeth of idler wheel 9 and of said wheel with wheel 12 with relation to the proper position of wrist pin 14, the device is ready for operation.

The operation is as follows: Upon rotation being imparted to shaft 2 and its carrier head 8 in journal bearing 5, for instance in the direction of the arrow *b* Fig. 1, wheel 9 will be carried around stationary wheel 6 as will also wheel 12, both of said wheels rotating at an equal speed in the direction of their indicating arrows, wheel 12 of shaft 11 actuating crank 13. It will be observed that in the construction shown, the length of crank 13 is co-extensive with the distance between shaft 2 and shaft 11, so that when

the carrier head has been thrown around for one quarter revolution, wrist pin 14 will correspond in its position with the center of shaft 2 as shown in Fig. 3. Fig. 4 shows the position of the crank 13 and its wrist pin after an additional one-eighth throw of the carrier head 8, Fig. 5 showing the position at the completion of an entire one-half revolution of the carrier head, and Fig. 6 showing the position of the crank and wrist pin on their backward travel when the carrier head has completed three-quarters of the revolution. Throughout the entire travel of the carrier head forwardly and backwardly the wrist pin will accurately follow the straight line of travel *a, a*, imparting corresponding travel to the connecting rod or pitman 15. The stroke of the wrist pin is controlled by the length of the crank 13 and by the distance, corresponding to its length, between shafts 2 and 11. This distance may be accurately regulated in designing the apparatus for the desired work, locating the gear 12 toward or from the center of stationary gear 6 with the idler wheel 9 at a suitable corresponding position to insure proper meshing of the teeth, or if the change in stroke desired is beyond the range of adjustment inwardly or outwardly of wheel 12, then the proportions of the several wheels may be changed to suit the conditions and requirements.

It is obvious that the shaft 2 may be continuously rotated for complete reciprocations of the wrist pin 14 and its connecting pitman for the full throw, or that any less throw with the same mechanism may also be accomplished by alternate back and forward partial rotations of shaft 2, less than a one-half revolution thereof, for which purpose a crank handle may be substituted for the pulley 3.

The invention may be variously utilized or adapted to a great variety of functions or uses; it overcomes the objections of the usual reciprocating connecting rods, developing the highest percentage of power uniformly throughout its operation, with a slight allowance for friction due to the interengaging gears. It may be variously changed or modified in construction, care being taken to adhere to the relative pro-

portions of the parts as herein set forth, and may be modified or varied by the skilled mechanic to suit different conditions of application, but all such changes are to be considered as within the scope of the following claims:

What I claim is:—

1. Means for converting rotary motion into reciprocating motion consisting of a power driven actuating shaft, a bearing therefor, a series of stationary teeth annularly arranged around the center of said shaft, a carrier head secured to the shaft and provided with a rotatable journal, a crank having a wrist pin secured to said journal, a rotatable toothed wheel on said journal, and toothed gearing connecting said wheel with said stationary annular teeth, substantially as set forth.

2. Means for converting rotary motion into reciprocating motion consisting of a power driven actuating shaft, a bearing therefor, a series of stationary teeth annularly arranged around the center of said shaft, a carrier head secured to the shaft and provided with a rotatable journal, a crank having a wrist pin secured to said journal, a rotatable toothed wheel on said journal, and an idler wheel mounted in the carrier head and meshing with said wheel and with the annular stationary teeth, substantially as set forth.

3. Means for converting rotary motion into reciprocating motion consisting of a power driven actuating shaft, a bearing therefor, a series of stationary teeth annularly arranged around the center of said shaft, a carrier head secured to the shaft and provided with a rotatable journal, a crank having a wrist pin secured to said journal, a rotatable toothed wheel on said journal, toothed gearing connecting said wheel with said stationary annular teeth, and means for actuating the first named shaft in its bearing, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JOHN L. TOMER.

Witnesses:

C. M. CLARKE,
CHAS. S. LEPLEY.