

No. 759,265.

PATENTED MAY 10, 1904.

C. F. GODDARD, JR.
 DEVICE FOR VARYING RECIPROCATING MOTION.

APPLICATION FILED JUNE 25, 1903.

NO MODEL.

Fig 1

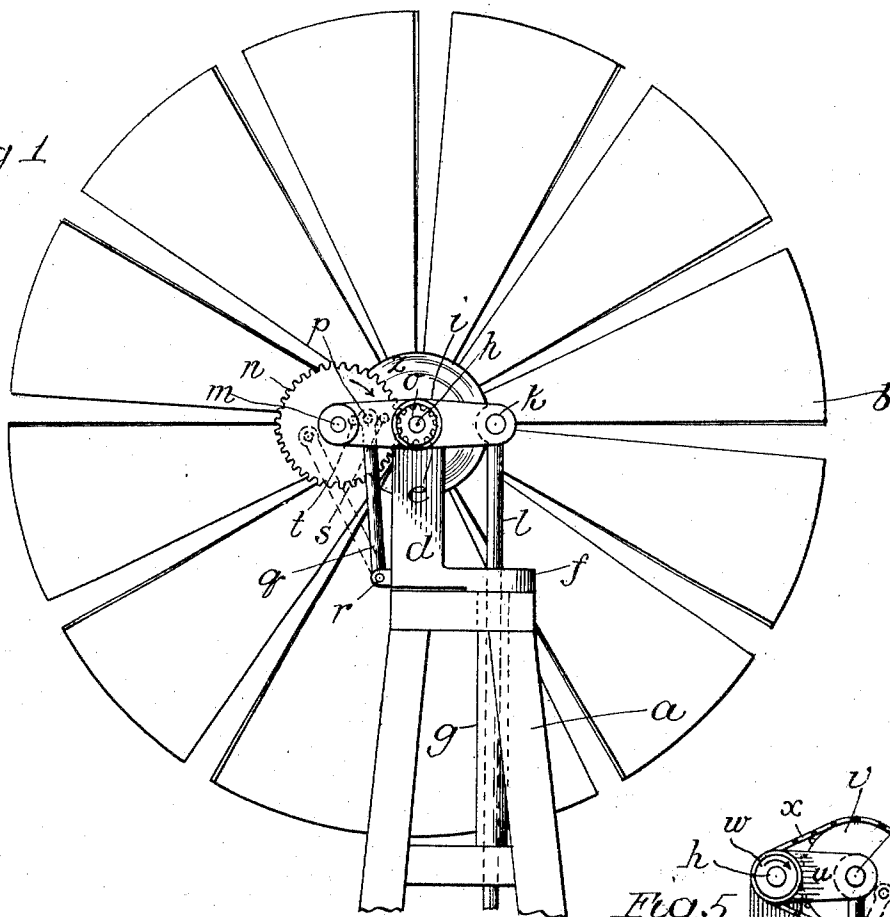


Fig. 5

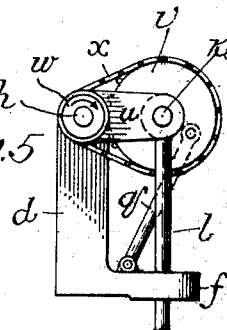


Fig. 2



Fig. 3

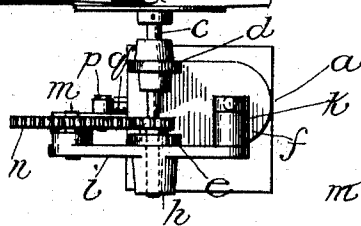
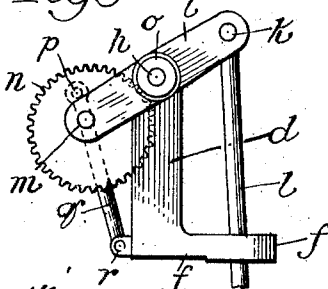
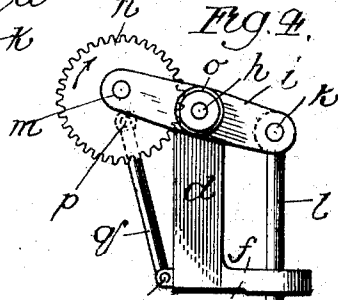


Fig. 4.



Witnesses
 Harold E. Barrett
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Inventor
 Charles F. Goddard, Jr.
 By David H. Fletcher, Atty

UNITED STATES PATENT OFFICE.

CHARLES F. GODDARD, JR., OF ANCHO, TERRITORY OF NEW MEXICO.

DEVICE FOR VARYING RECIPROCATING MOTION.

SPECIFICATION forming part of Letters Patent No. 759,265, dated May 10, 1904.

Application filed June 25, 1903. Serial No. 163,063. (No model.)

To all whom it may concern:

Be it known that I, CHARLES F. GODDARD, Jr., a resident of Ancho, in the county of Lincoln and Territory of New Mexico, have invented a new, useful, and Improved Device for Varying Reciprocating Motion, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings, forming a part of this specification, in which corresponding letters of reference in the different figures indicate like parts.

The object of my invention is to provide simple and efficient means for so modifying or varying reciprocating motion as applied, for example, to the pump-rod of a windmill or to drills, hay-presses, or other analogous devices in which such variation of motion may be desired that the relative speed of the reciprocating movements in opposite directions may be varied in different directions with respect to each other, the ratio of variance being subject to predetermined conditions.

Stated in general terms, said object may be accomplished by means of a crank mounted upon a pivoted arm or lever, the wrist-pin of the crank being connected, by means of a pitman, to a stationary point, means being also provided for operatively connecting said crank with a driving-shaft the axis of which coincides with that of said pivoted arm, all of which is hereinafter more particularly described, and definitely pointed out in the claims.

In the drawings, Figure 1 is an elevation of a windmill, showing my improvement applied thereto. Fig. 2 is a plan view thereof. Fig. 3 is a detailed view of my improved device, showing the parts as they would appear when in one extreme position. Fig. 4 is a like view of the same, showing the parts in reversed position, respectively; and Fig. 5 is a view of said device, showing a modified construction.

Referring to the drawings, *a* represents the mast or frame of an ordinary windmill. The wind-wheel *b* is mounted in any well-known way upon a driving-shaft *c*, which is in turn journaled in suitable bearings in uprights *d e*, which are rigidly attached to a base or turn-table *f*, having a hollow pivotal support *g*, stepped in the usual way in the frame, so as

to permit of the rotation of the turn-table upon a vertical axis. Pivotaly mounted upon a stud or pin *h*, which coincides with the shaft *c*, is a lever or walking-beam *i*, to a wrist-pin *k* upon one end of which is connected the usual pump-rod *l*. Upon a similar wrist-pin *m*, at or near the opposite end of the beam, is mounted a gear-wheel *n*, which meshes with and is driven by a pinion *o*, keyed to the driving-shaft *c*. A wrist-pin *p* upon the gear-wheel *n* is connected, by means of a pitman *q*, to a lug *r*, formed upon the turn-table *f*.

The operation of said device is as follows: Assuming the parts to be in the relative positions shown in Fig. 1, the pinion *o* tends to rotate the gear *n*, while the points *p m* tend to oppose said rotation, the point *p* forming a fulcrum, while the distance between that point and the pinion *o* constitutes what would be the short end of a lever. It follows, therefore, that when said gears are in the relation stated the beam *i* will move at a maximum rate of speed, which will gradually be diminished until the pitman *q* stands in the position indicated in dotted lines in Fig. 1, when the beam will be moving at a minimum rate of speed. The gears *o p* are so adjusted with reference to each other that when the parts are in the respective positions shown in Fig. 1 the pump-rod is upon the downstroke, at which time the greatest speed with the minimum of power would be required. When, however, the pitman attains the position shown in Fig. 4, the upward stroke will have commenced and the maximum power and minimum speed of the device will have been exercised until the pump-rod is fully raised, as shown in Fig. 3. It will of course be understood that the speed of the arm will be alternately accelerated and decreased from minimum to maximum and from maximum to minimum.

The factor of speed variation of the part *i* depends upon the eccentricity of the crank-pin *p*. If placed near to the periphery, it is manifest that the reciprocating speed variation would be very great, while if correspondingly close to the center it would be proportionately small. In Fig. 1, *s t* respectively in-

dicating bores in which the wrist-pin may be placed to produce maximum and minimum variations in reciprocal speed.

In Fig. 5 I have shown a modification of said invention in which a pivoted arm *u* is substituted for the walking-beam *i*, and a sprocket-wheel *v*, which is the equivalent of the gear *n*, is mounted upon a wrist-pin, to which the pump-rod *l* is secured and connected with a driving sprocket-wheel *w* by a chain *x*, the location of the pitman *q* being changed to conform to that of the crank mechanism.

While I have shown my improved device applied to a windmill, it is obvious that its use may be varied indefinitely and that it may be applied without material change to any device in which it is desired to vary the speed in opposite strokes of elements to which a reciprocating movement is desired to be imparted.

I do not confine myself to the exact construction shown, as it is obvious that it may be varied without departing from the principle involved, in which is embodied an anchored pitman connected with the bend or wrist-pin of a crank the shaft of which is journaled upon a vibratory arm driven in any approved manner by means of a revoluble element journaled upon the axis of said driving-arm.

It is obvious that a pump-rod or its equivalent in pitman form may be dispensed with and the connection of the driven element in whatever form made directly with said vibratory arm or lever.

Having thus described my invention, I claim—

1. In a device of the class described, the combination with a revoluble driving element, an arm pivoted upon the axis of said driving element, a wheel, the axis of which is journaled in the free end of said arm, said wheel being in operative connection with said driving element, and a pitman for connecting said wheel to a stationary point.

2. The combination with a reciprocating

driven element, of a vibratory arm, a revoluble driving element journaled upon the axis of said arm, a wheel journaled in the movable portion of said arm, means for operatively connecting said wheel with said driving element, and a pitman for connecting said wheel to a stationary point, whereby said vibratory arm may be driven directly by said wheel modified by the restraining influence and movement of said anchored pitman.

3. The combination of a revoluble driving element, a vibratory arm pivotally mounted upon the axis thereof, a wheel journaled upon the movable portion of said arm, means for connecting said wheel to said driving element and a pitman anchored to a stationary point and connected to said wheel between its axis and periphery.

4. The combination of a revoluble driving element, a vibratory arm pivotally mounted upon the axis thereof, a wheel journaled upon the movable portion of said arm, means for connecting said wheel with said driving element, a crank-pin upon said wheel, a pitman anchored to a stationary point and connected to said crank-pin, and means for adjusting said crank-pin, whereby its relative position between the axis and periphery of said wheel may be varied.

5. In a device of the class described, the combination with a driving-pin, a vibratory arm pivoted upon the axis thereof, a gear-wheel in mesh with said pinion, journaled upon the movable portion of said arm, a crank-pin upon said gear-wheel, and a pitman connected with said crank-pin and to a stationary point respectively.

In testimony whereof I have signed this specification, in the presence of two subscribing witnesses, this 23d day of June, 1903.

CHARLES F. GODDARD, JR.

Witnesses:

D. H. FLETCHER,

CARRIE E. JORDAN.