W. T. BURROWS.

Device for Converting Reciprocating Motion into Rotary.

No. 209,456. **Patented Oct. 29, 1878.**

Fig. 1.

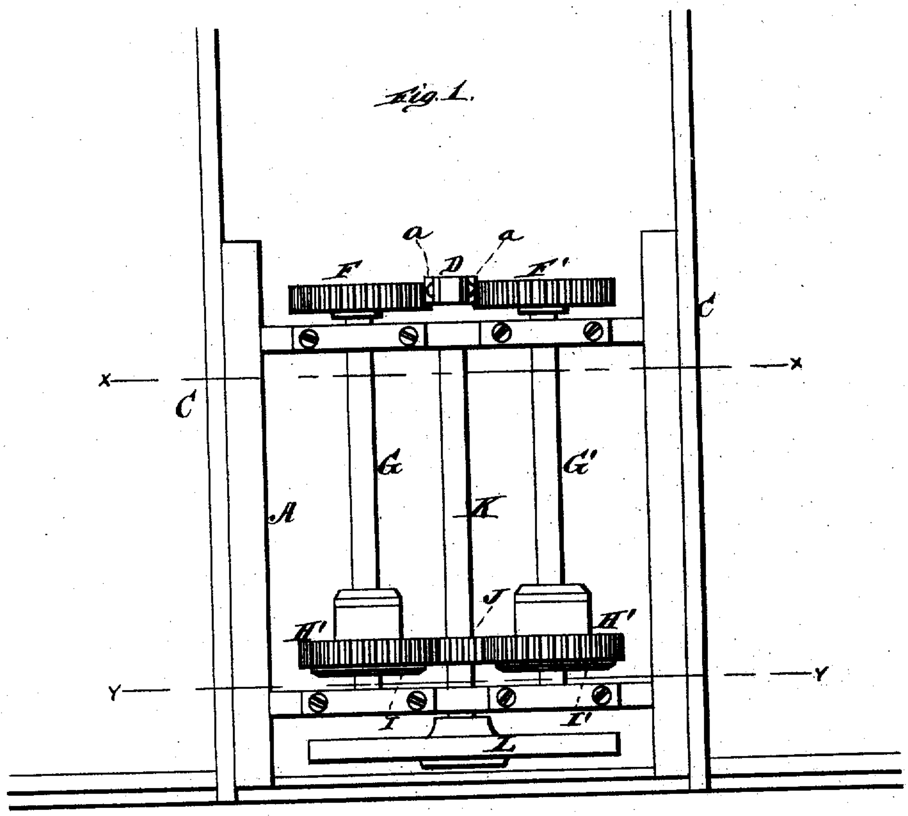


Fig. 2.

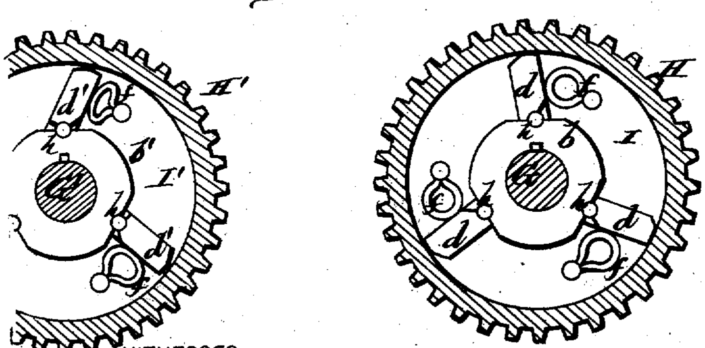


Fig. 3.

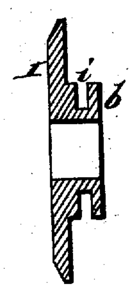
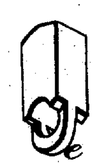


Fig. 4.



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2 Sheets—Sheet 2.

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Fig. 5.

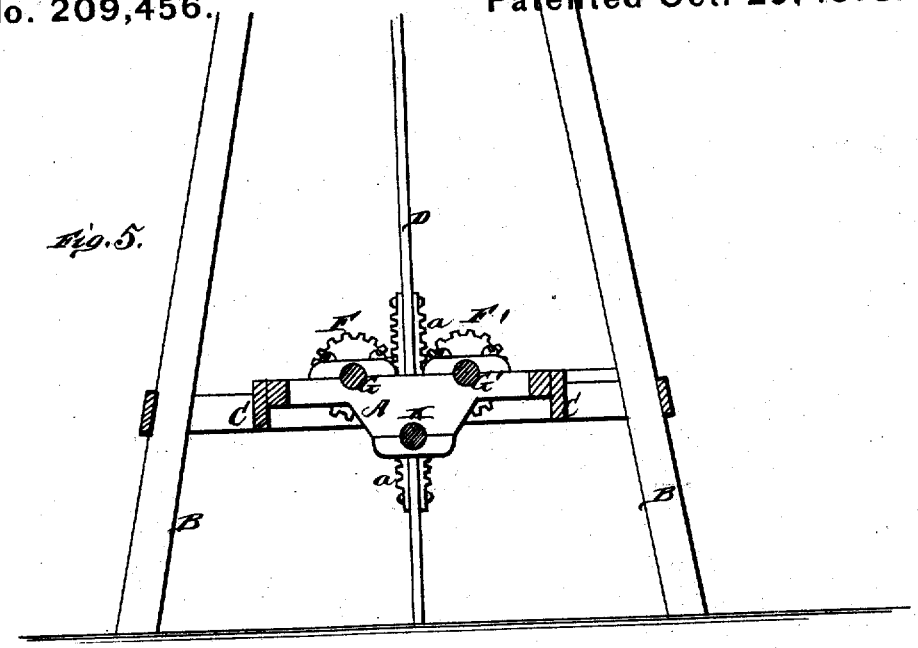
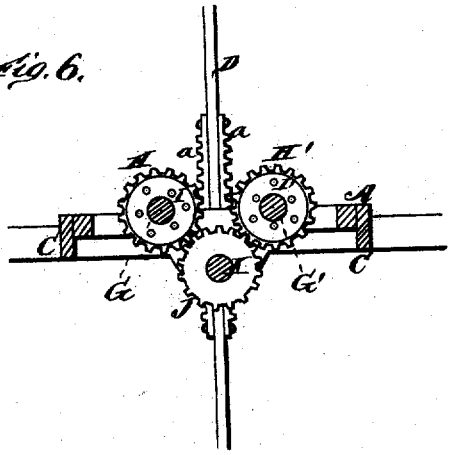


Fig. 6.



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UNITED STATES PATENT OFFICE.

WILLIAM T. BURROWS, OF NASHUA, IOWA.

IMPROVEMENT IN DEVICES FOR CONVERTING RECIPROCATING MOTION INTO ROTARY.

Specification forming part of Letters Patent No. **209,456**, dated October 29, 1878; application filed March 30, 1878.

To all whom it may concern:

Be it known that I, WILLIAM T. BURROWS, of Nashua, in the county of Chickasaw and State of Iowa, have invented a new and valuable Improvement in Devices for Converting Reciprocating into Rotary Motion; and I do hereby declare that the following is a full, clear, and exact description of the construction and operation of the same, reference being had to the annexed drawings, making a part of this specification, and to the letters and figures of reference marked thereon.

Figure 1 of the drawings is a representation of a plan view of my device for converting reciprocating into rotary motion. Figs. 2 and and 3 are sectional detail views. Fig. 4 is a perspective detail, and Figs. 5 and 6 are part-sectional side views thereof, taken through the lines *x x* and *y y*.

The nature of my invention consists in the construction and arrangement of a machine for converting a reciprocating into a revolving motion, which is applicable to steam-engines of various descriptions, windmills, treadles, and anywhere that it may be necessary to convert a reciprocating into a revolving motion, as will be hereinafter more fully set forth.

My invention is designed as an improvement upon the devices shown in the patents to E. Bates, of July 27, 1833, and A. Provancha, No. 146,780, January 27, 1874, in which either pawls and ratchets are used or the friction ends of the dogs bear upon the sleeves or shafts, and the said dogs are not firmly secured. The small diameter of such sleeve renders such friction-bearing of the dogs unreliable and inefficient. In my device the friction end is turned outward, the other extreme being secured by pins, and the bearing of the friction-surface increased, because of the greater area upon which the dogs operate. In this construction and arrangement lies the gist of my invention.

The annexed drawing, to which reference is made, fully illustrates my invention as applied to a windmill; but it may equally as well be used for other purposes wherever the same may be applicable.

A represents the frame proper of my machine. B B are the corner-posts of a lower section of a windmill-tower. C C are pieces of timber put into the tower to receive the frame A. D is the lower section of a pump-rod or pitman as generally used in windmills for pumping purposes. *a a* are toothed metal plates or rack-bars, bolted to the rod D, and having their teeth engaging with those of a pair of gear-wheels, F F′, rigidly connected to shafts G G′. These shafts have near their opposite ends gear-wheels H H′, placed loosely thereon, one side of each wheel being bored out or provided with a circular recess concentric with the wheel, and into said recesses project respectively the hubs *b b′* of two disks, I and I′, which are keyed or otherwise secured on the shafts.

The hubs *b b′* are grooved, as shown, to admit one or more steel dogs, *d d′*, respectively, the length of which between the shoulders and the friction ends is a little more than the distance between the outside of the hub and the walls of the recesses in the wheels, and each having a position at equal distances apart around the hub, and all inclining in the same direction.

The dogs *d d′* are connected in the following manner to their respective hubs and plates: Each dog is at its inner end formed or provided with an ear, *e*, which lies in the groove in the hub, and through the same is passed a pin, which projects into a hole in the disk. Each dog is actuated by means of a spring, *f*, which may be made of rubber, wire, metal, or other suitable material. The disks are first cast of nearly the desired shape and bored for the shaft. Three holes are then drilled in each disk for the steel pins *h*, on which the dogs hinge parallel to the shaft and just below the surface of the hub. The metal is then turned off the outside of the hub until that part of the holes passing through the hub is a little more than half cut away. There is then a narrow groove, *i*, cut around the hub about midway of its length and in depth about equal to one-fourth its diameter.

To form the connecting end of the dog the hole must first be drilled, and then the metal cut away so as to form an ear, *e*, which will work easily in the groove, and uncovering a little more than half of the hole at the shoulder in such a manner that the dog will move freely on its hinge and have a bearing the full

width on the pin *h*, the pin being held in place by a tight fit where it passes through the disk. The spring *f* acts upon the dog in such a manner as to hold it in such a position that it will take hold without loss of motion, and yet not cause friction when in its backward movement.

The two gear-wheels H H′ gear with a similar wheel, J, upon a counter-shaft, K, upon which is secured the fly-wheel L.

By moving the rod D up and down the fly-wheel L is made to revolve continually in one direction. When the rod moves down the dogs of the disk I lay hold of its gear-wheel H, its motion being thereby transmitted to the intermediate gear, shaft, and fly-wheel; and when the rod moves up the dogs of the disk I′ operate in the same manner, and by the alternate action of the two sets of dogs upon the intermediate gear the continued revolving motion is produced.

I am aware that the combination of a reciprocating bar having teeth on two sides with gear-wheels upon parallel shafts, and meshing into said bar and a clutch mechanism, are not broadly new with me, and therefore I lay no claim to such invention, which differs in construction from that above set forth.

What I claim as new, and desire to secure by Letters Patent, is—

The reciprocating bar D and connecting mechanism, in combination with the alternately-acting recessed wheels I I′, provided with the grooved hubs *b i* on the shafts G G′, the pivoted dogs *d*, having their friction ends adapted to operate upon the outer surface of the recesses in the wheels, and the direct-acting springs *f*, holding the dogs in quick contact, arranged and constructed to serve as and for the purpose set forth.

In testimony that I claim the above I have hereunto subscribed my name in the presence of two witnesses.

WILLIAM T. BURROWS.

Witnesses:
E. E. LUCE,
J. W. HATCH.