No. 768,138. PATENTED AUG. 23, 1904.

E. C. NORTHRUP.

DEVICE FOR CONVERTING MOTION.

APPLICATION FILED APR. 11, 1904.

NO MODEL.

Fig. 1.

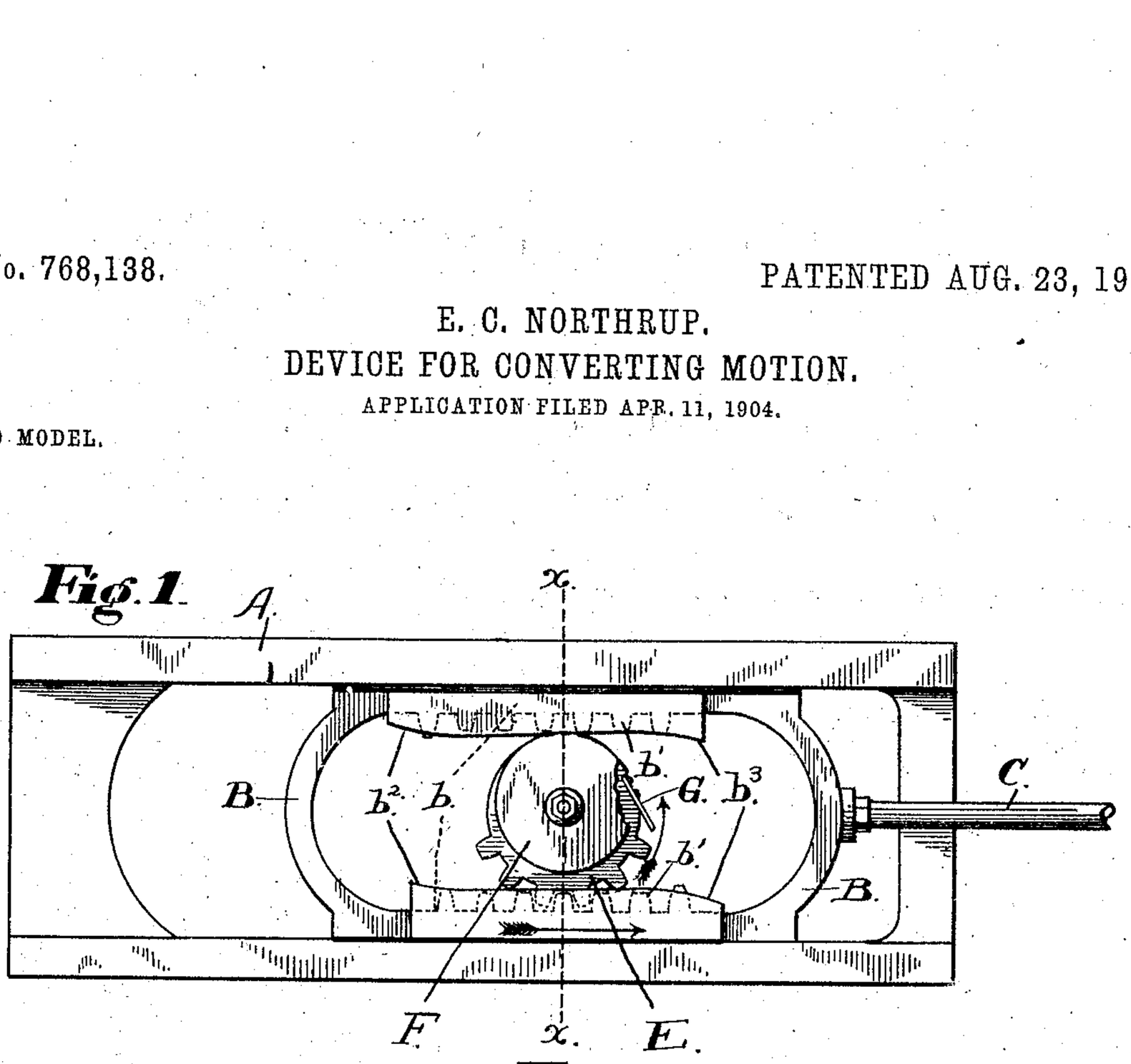


Fig. 2.

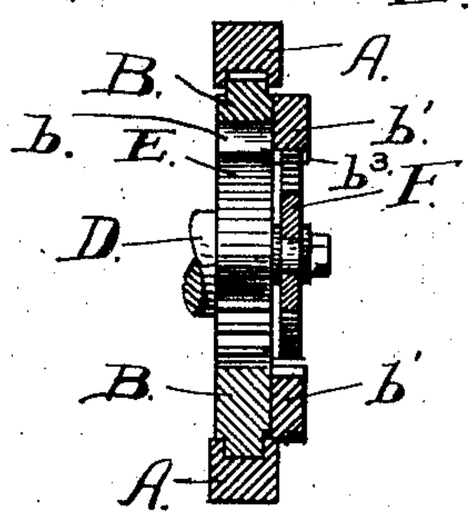


Fig. 3.

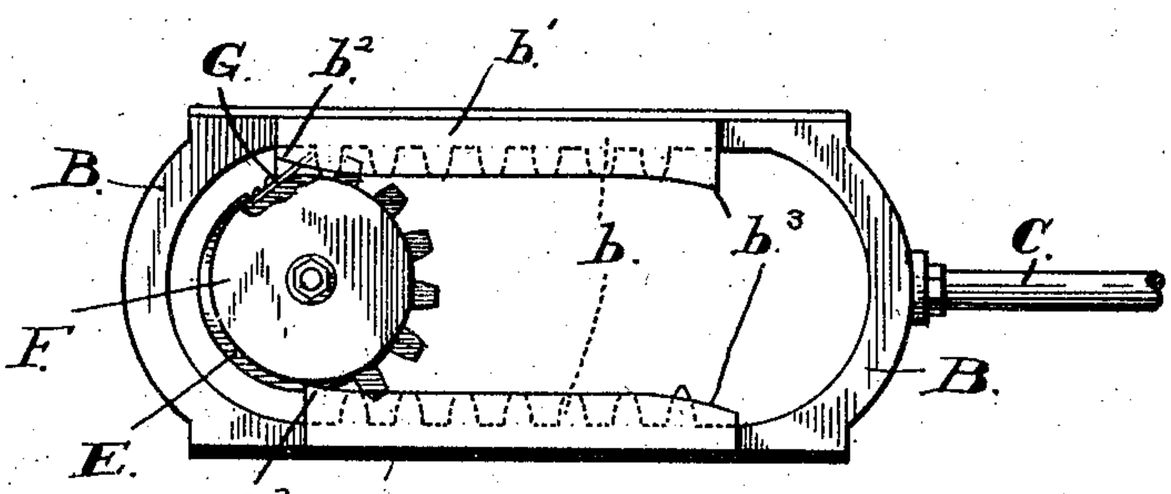
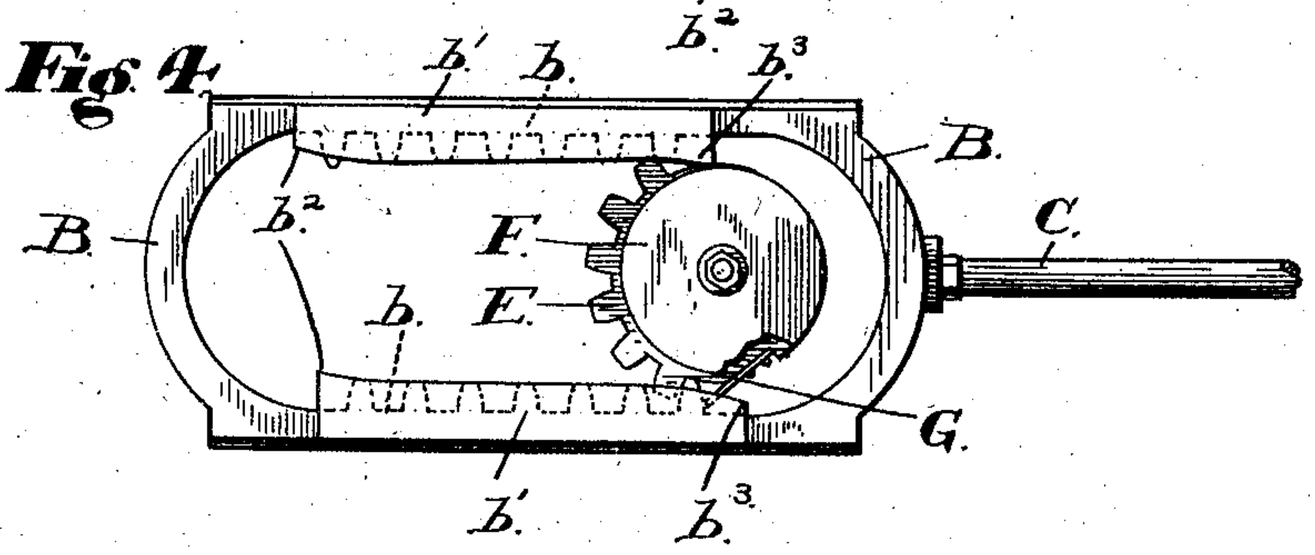


Fig. 4.



Witnesses.
Arthur L. Lee.
Walter H. Lane.

Inventor.
Elmer C. Northrup,
by Wm. F. Booth
his Attorney.

No. 768,138. Patented August 23, 1904.

UNITED STATES PATENT OFFICE.

ELMER C. NORTHRUP, OF RIVERSIDE, CALIFORNIA.

DEVICE FOR CONVERTING MOTION.

SPECIFICATION forming part of Letters Patent No. 768,138, dated August 23, 1904.

Application filed April 11, 1904. Serial No. 202,597. (No model.)

To all whom it may concern:

Be it known that I, ELMER C. NORTHRUP, a citizen of the United States, residing at Riverside, Riverside county, State of California, have invented certain new and useful Improvements in Devices for Converting Motion; and I do hereby declare the following to be a full, clear, and exact description of the same.

My invention relates to that class of devices for converting reciprocating into rotary motion, or vice versa, in which a mutilated pinion is engaged alternately by opposing racks, means being provided for changing the engagement at the end of each stroke and for holding the engagement during the stroke.

The object of my invention is to provide a simple and effective device of this class in which friction is reduced to a minimum and the parts are durable and not apt to get out of order.

To this end my invention consists in the novel construction, arrangement, and combination of parts, which I shall now describe by reference to the accompanying drawings, in which—

Figure 1 is an elevation showing the parts midway of a stroke. Fig. 2 is a cross-section on line $x\ x$ of Fig. 1. Fig. 3 is an elevation showing the completion of a stroke to the right and ready to begin a stroke to the left. Fig. 4 is an elevation showing the completion of a stroke to the left and ready to begin a stroke to the right.

A represents a suitable frame in which is mounted and adapted to slide the double-rack yoke B by means of the connecting-rod C. The racks b of the yoke are on opposite sides, and beside them are tracks b', which are formed with or carried by the yoke. These tracks have at one end—say the left—an inclined rise, as shown at b^2, while at the other end they have an inclined fall or depression, as shown at b^3. Between the ends the tracks are best curved, as shown.

D is a shaft on which is a pinion E, having teeth half-way around. Mounted freely beside and eccentric to the pinion is a guide-wheel F, which is adapted to travel on the tracks b', first on one and then on the other. The eccentricity of this wheel relatively to the pinion center is such that it travels on the track opposite to the rack which the pinion is then engaging. Just beyond one of the terminal teeth of the pinion a spring G is secured to the plain face of said pinion, its free extremity projecting far enough to enable it at the proper time to engage the terminal tooth of either rack to initiate the reverse engagement. This spring may be of any suitable character adapting it to press down easily and to rise accurately to place. The terminal tooth of each rack is made slightly longer, so that the pinion will not pass by it at the end of the stroke. Assuming now the yoke to be midway of its stroke and the pinion to be engaging the lower rack while the free guide-wheel F engages the upper track, as shown in Fig. 1, then if the rack be moved to the right, as shown by the arrow, the direction of rotation of the pinion will be, as the other arrow shows, to the left. This will continue until near the end of the stroke, when the rise b^2 of the lower track coming up to the free guide-wheel F will lift said wheel, (the recession of the upper track permitting this,) thereby lifting at the end of the stroke the pinion to engagement with the upper track. At this same time the spring G has passed the last tooth of the upper rack and by the lift has come to engagement behind said tooth. This is the position of the parts shown in Fig. 3. Now the stroke of the yoke being reversed, the first tooth of the upper rack acting on the spring will initiate the engagement of said rack with the pinion, which will thus continue its rotation in the same direction, the free guide-wheel meanwhile traveling on the lower track and holding the pinion up to its engagement with the upper track. This continues until the free guide-wheel, being met by the depression b^3 at the right-hand end of the upper track, is forced down (the depression of the lower track permitting) to carry the pinion and its spring down to engagement with said lower track, as is shown in Fig. 4, which is the position to initiate a repetition of the first stroke.

The free guide-wheel is subject to but little friction and being free can accommodate and automatically adjust itself to serve its function without regard to the rotation of the pin-

ion. The cam-tracks are simple and effective for the purpose of controlling the guide-wheel, and the spring F is advantageously situated to render it effective.

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

1. In a device for converting motion, the combination of a double-rack yoke, having a track beside each rack, said tracks having corresponding inclined rises and depressions at opposite ends, a mutilated pinion engaging the racks alternately, and a guide-wheel eccentric to and carried by the pinion and traveling on the tracks to effect the alternate engagement of the pinion with the opposite rack and to hold it to said engagement.

2. In a device for converting motion, the combination of a double-rack yoke, having a track beside each rack, said tracks having corresponding inclined rises and depressions at opposite ends, a mutilated pinion engaging the racks alternately, and an independently-revoluble guide-wheel eccentric to and carried by the pinion and traveling on the tracks to effect the alternate engagement of the pinion with the opposite rack and to hold it to said engagement.

3. In a device for converting motion, the combination of a double-rack yoke, having a track beside each rack, said tracks having corresponding inclined rises and depressions at opposite ends, a mutilated pinion engaging the racks alternately, a guide-wheel eccentric to and carried by the pinion and traveling on the tracks to effect the alternate engagement of the pinion with the opposite rack and to hold it to said engagement, and a spring on the pinion beyond one of its terminal teeth, adapted to alternately engage the terminal tooth of opposite racks and initiate the engagement of the pinion with said racks alternately.

4. In a device for converting motion, the combination of a double-rack yoke, having a track beside each rack, said tracks having corresponding inclined rises and depressions at opposite ends, a mutilated pinion engaging the racks alternately, an independently-revoluble guide-wheel eccentric to and carried by the pinion and traveling on the tracks to effect the alternate engagement of the pinion with the opposite rack and to hold it to said engagement, and a spring on the pinion beyond one of its terminal teeth, adapted to alternately engage the terminal tooth of opposite racks and initiate the engagement of the pinion with said racks alternately.

In witness whereof I have hereunto set my hand.

ELMER C. NORTHRUP.

Witnesses:
H. C. HIBBARD,
W. H. SULLIVAN.