

No. 669,379.

Patented Mar. 5, 1901.

A. BAUGHMAN.
MECHANICAL MOVEMENT.
(Application filed Nov. 8, 1900)

(No Model.)

2 Sheets—Sheet 1.

Fig. 1.

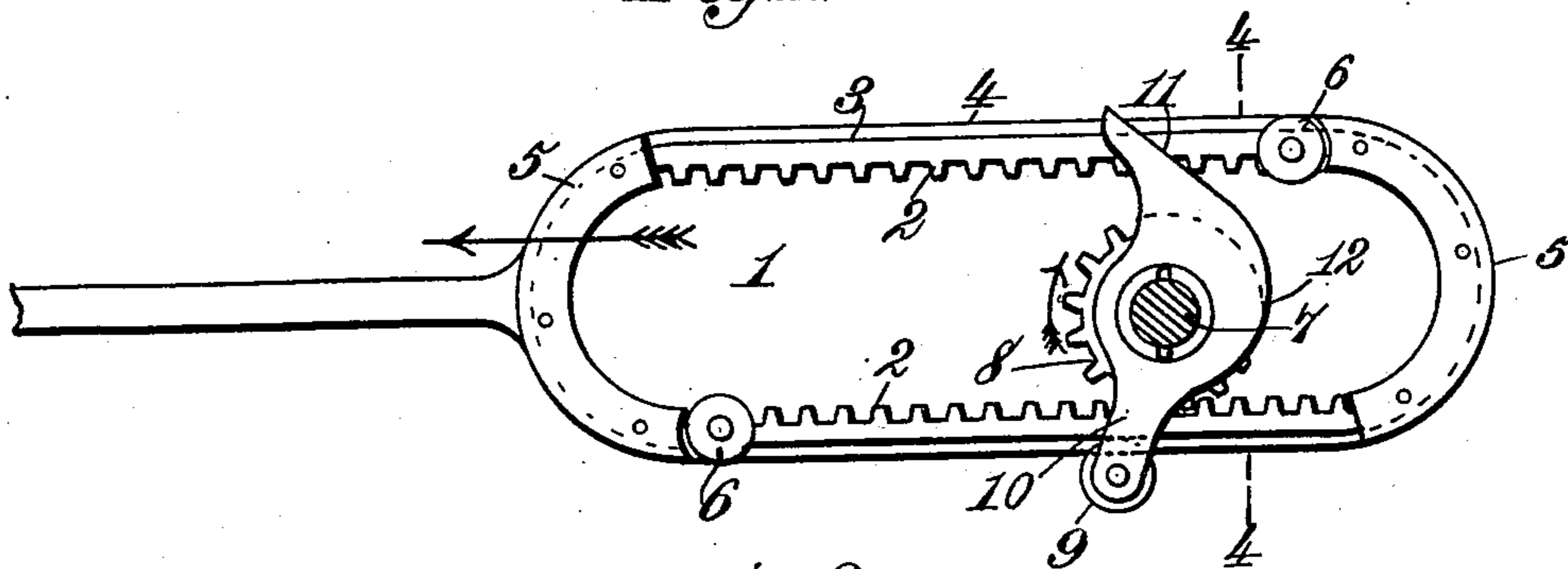


Fig. 2.



Fig. 3.

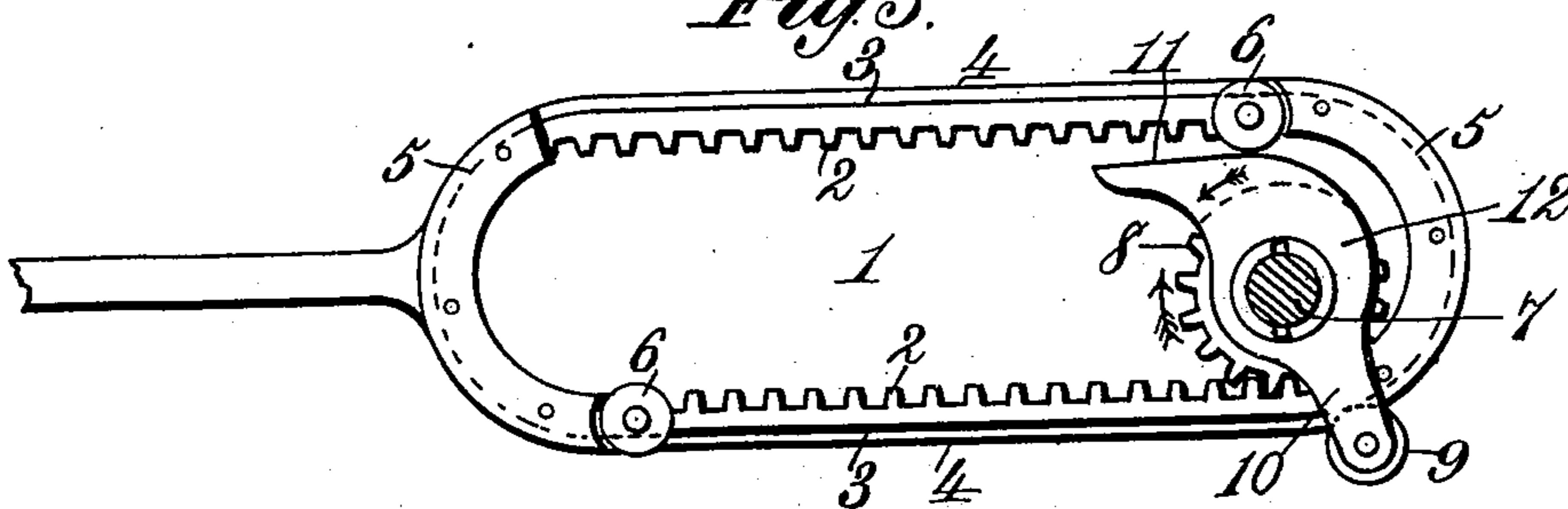
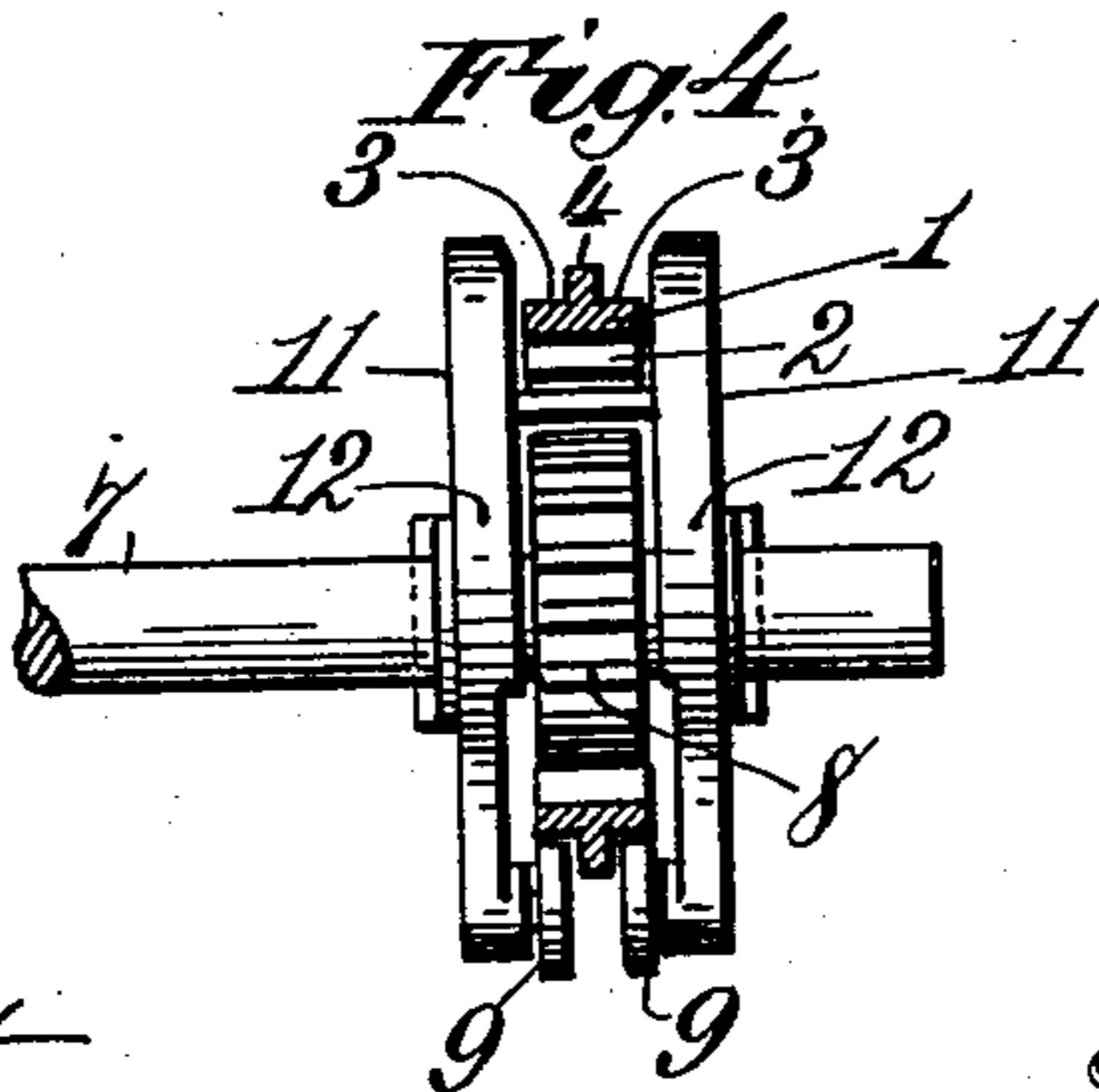


Fig. 4.



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2 Sheets—Sheet 2.

Fig. 5.

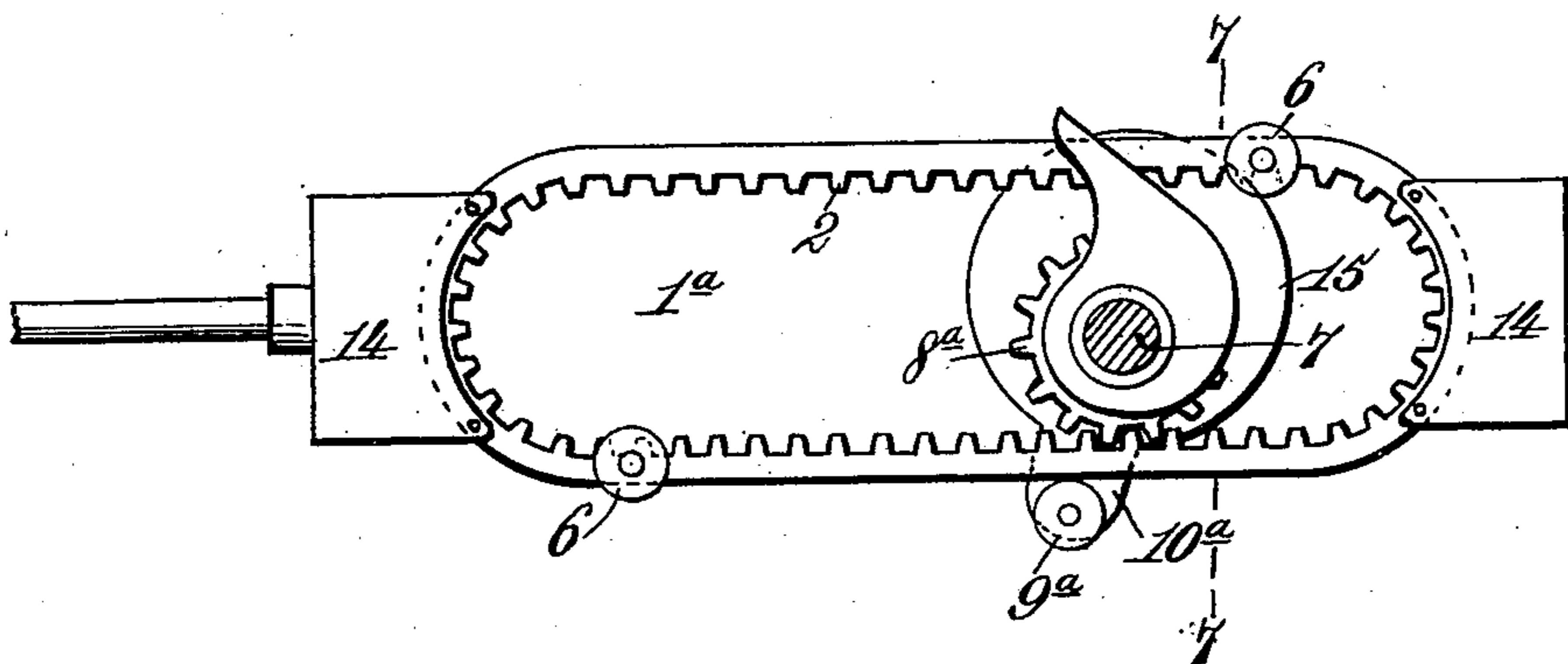


Fig. 6.

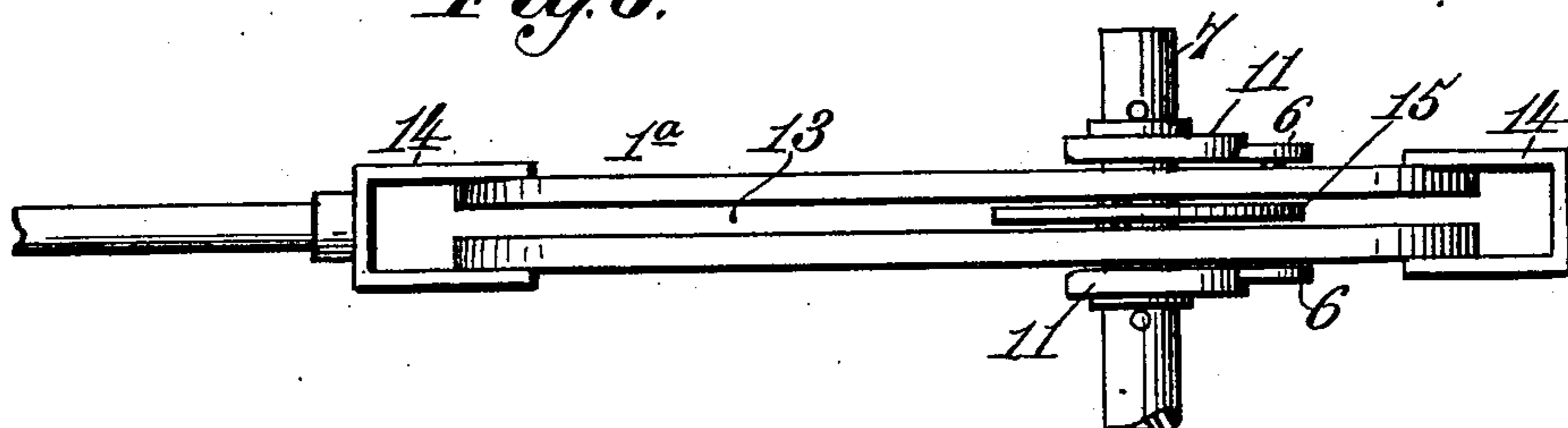
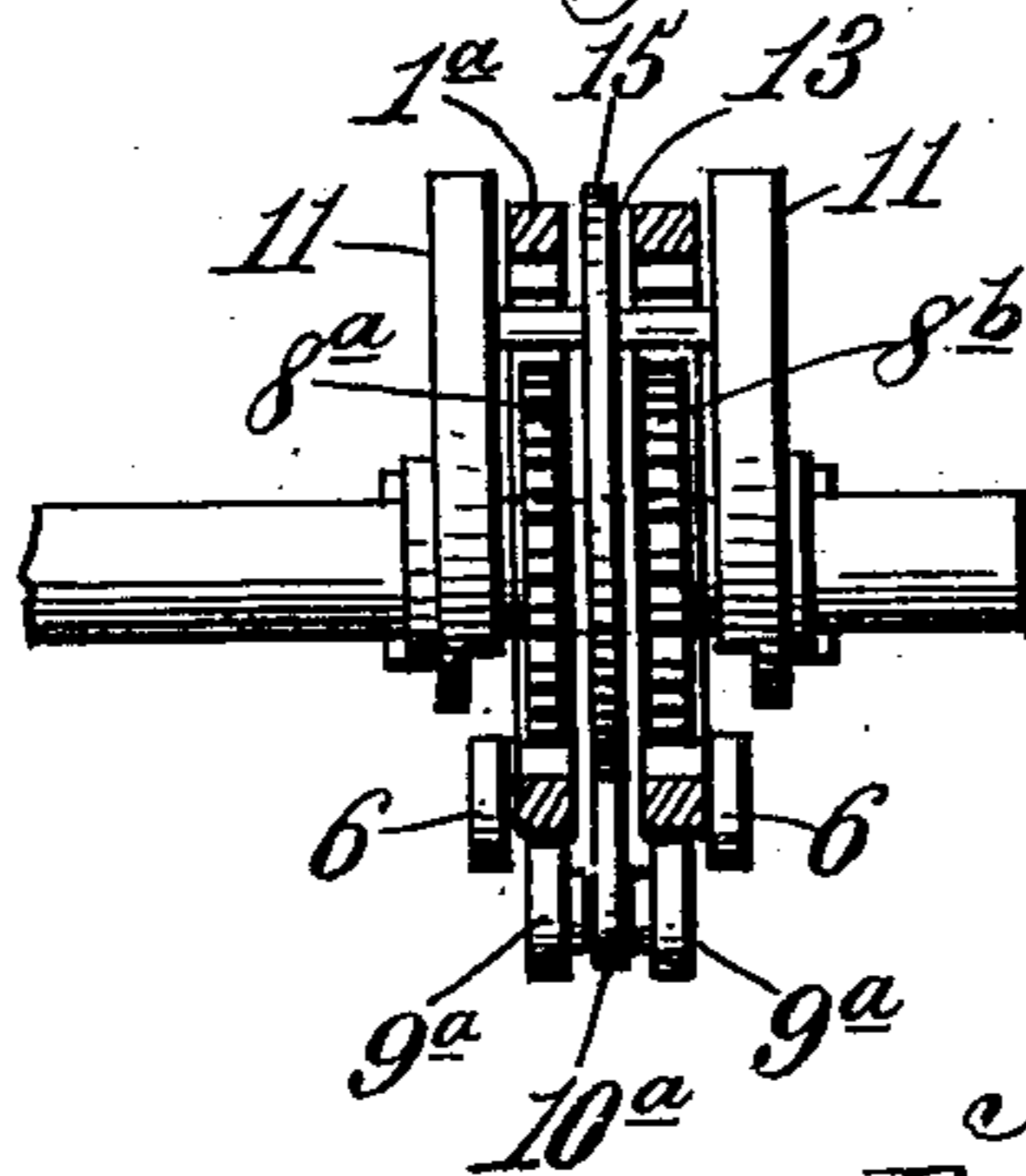


Fig. 7.



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UNITED STATES PATENT OFFICE.

ALVIN BAUGHMAN, OF GRISWOLD, IOWA, ASSIGNOR OF ONE-FOURTH TO
GEORGE PLUMMER BAUGHMAN, OF WHATCHEER, IOWA.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 669,379, dated March 5, 1901.

Application filed November 8, 1900. Serial No. 35,863. (No model.)

To all whom it may concern:

Be it known that I, ALVIN BAUGHMAN, a citizen of the United States, residing at Griswold, in the county of Cass and State of Iowa, have invented new and useful Improvements in Mechanical Movements, of which the following is a specification.

My invention relates to mechanical movements, the object of the same being to provide novel means for converting rotary into reciprocating motion, or vice versa, the same being adapted for use in connection with windmills, engines, bicycles, and the like.

The invention consists of a hollow substantially elliptical frame having internal rack-teeth thereon, a rotary shaft, a pinion thereon meshing with said rack-teeth, a traveler adapted to move upon a track on the outer surface of said frame loosely connected with said shaft and having a cam thereon adapted to engage a roller on said frame for automatically shifting said traveler from one side of the frame to the other at opposite ends of the stroke.

The invention also consists in certain features and details of construction and combinations of parts, which will be hereinafter more fully described and claimed.

In the drawings forming a part of this specification, Figure 1 is a side elevation illustrative of my invention. Fig. 2 is a top or edge view of the same. Fig. 3 is a view similar to Fig. 1, showing the reciprocating member near the end of its stroke in one direction; and Fig. 4 is an end view, partly in section. Fig. 5 is a side elevation illustrating a modified construction. Fig. 6 is a top or edge view of the same. Fig. 7 is a cross-section on the line 7 7 of Fig. 5.

Like reference-numerals indicate like parts in the different views.

The hollow frame 1 is substantially elliptical in shape having straight parallel sides and rounded ends. The inner surface of the frame 1 is provided with rack-teeth 2, and the periphery of said frame is formed with a track 3 extending entirely around the same. This track 3 is double, the two parts thereof being separated from each other by a projecting rib 4. At the curved ends of the frame 1 the two parts of the track are provided with

guards 5 5, which, as shown, consist of curved plates secured to the opposite sides of the frame 1 and projecting beyond the periphery thereof. The trackway 3 is by this construction closed on opposite sides at the ends of the frame. Adjacent to one end of each of the curved guards 5 are rollers 6 6, arranged in pairs upon opposite sides of the frame 1 and serving as engaging portions for cams, as will hereinafter appear. The rotary shaft 7 lies at right angles to the plane of the frame 1, extends into or through said frame, and has a pinion 8 thereon which meshes with the rack-teeth 2. In order that the pinion 8 may travel from the rack-teeth 2 on one side of the frame 1 to those on the other side, some means must be provided for guiding the frame 1 and for holding the pinion 8 in engagement with the teeth 2 on one side or the other. The means provided by me consists of track-travelers 9 in the form of anti-friction rollers mounted in the ends of arms 10, loosely mounted on the shaft 7 on opposite sides of the pinion 8. These rollers 9 are adapted to move in the two parts of the trackway 3, and as they are mounted on the shaft 7 they will serve to maintain the pinion 8 in engagement with the rack-teeth 2 of the frame 1 no matter what the relative position of the shaft 7 and said frame may be. The ends of the arms 10 opposite those in which the rollers 9 are mounted are in the form of cams, the same being provided with cam-surfaces 11, which are adapted to engage the rollers 6 on the frame 1. Said cam-surfaces 11 gradually increase in distance from the shaft 7 from the points 12 to the extreme ends of the arms 10 opposite the rollers 9. By this construction it will be seen that if the shaft 7 be the driving member and the frame 1 the driven member when the pinion 8 is in mesh with the teeth 2 on the lower side of the frame 1 the rollers 9, which constitute the track-travelers, will lie beneath the shaft 7 and be in engagement with that portion of the track 3 which is on the under side of the frame 1. Now then when the frame 1 has been moved to a point near the end of its stroke to the left the cam-surfaces 11 on the arms 10 will be brought into engagement with the rollers 6 at the upper right-hand end of

the frame 1. The result of this action will be to throw the lower ends of the arms 10, carrying the rollers or track-travelers 9, to the right, and thence upwardly around the curved end of the track 3 between the guards 5 until they assume a position in the track 3 on the upper side of the frame 1. The continuous rotation of the shaft 7 will move the frame 1 to the right, the pinion 8 being held in mesh with the rack-teeth 2 of the frame 1 by the engagement of the rollers 9 with the upper part of the track 3. When the frame 1 reaches the end of its stroke to the right, the cam-surfaces 11 are brought into engagement with the rollers 6 at the lower left-hand end of the frame 1, and the arms 10, carrying the rollers or track-travelers 9, are turned first to the left and then downwardly into their original position beneath the shaft 7 and in engagement with the lower part of the track 3. It will thus be seen that the pinion 8 and rack-teeth 2 are held in mesh with each other at all positions. Furthermore, it is then impossible for any clogging or binding between the different parts of the device by reason of the engagement of the pinion 8 with more than one portion of the rack-teeth.

In the modified form of my invention illustrated in Figs. 5, 6, and 7 of the drawings the elliptical frame 1^a is made in two parts parallel to each other and slightly separated, so as to form a continuous guideway 13 between them. The two parts of said frame are held in this position by means of U-shaped connecting-plates 14 14, secured to the ends of the two parts of said frame. The cams 11 are, as before, loosely mounted on the shaft 7; but two pinions 8^a 8^b are secured to said shaft which mesh with the rack-teeth on the two parts of the frame 1^a. A single arm 10^a, in which the rollers or track-travelers 12^a are mounted, is employed instead of the twin arms 10 and rollers 9. The end of the arm 10^a adjacent to the rollers 9^a projects through the guideway 13 between the two parts of the frame, and the opposite end of said arm 10^a is formed with a circular enlargement 15, whose edge projects into the guideway 13. The arm 10^a is loosely mounted on the shaft 7 and is secured to the cams 11 by means of bolts, screws, or other analogous securing devices extending through said cams and said circular enlargement 15. By constructing the device in the manner just described a single track-traveler-supporting arm 10^a instead of a plurality of the same may be employed, and the arm 10^a and its circular enlargement moving in the guideway 13 serve as guides or guards to prevent the lateral displacement of the frame 1^a and the cams 11 and pinions 8^a and 8^b, connected with the shaft 7. The operation of this form of my invention is similar to that described with reference to the construction shown in Figs. 1, 2, 3, and 4 of the drawings.

Having now described my invention, what

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

1. The combination with a hollow, substantially elliptical frame having internal rack-teeth thereon, a rotary shaft and a pinion thereon adapted to mesh with the rack-teeth on said frame, of a track-traveler adapted to engage the periphery of said frame for holding said pinion in engagement with said rack-teeth, and means for automatically shifting said traveler from one side of the frame to the other at the ends of the strokes of said frame.

2. The combination with a hollow, substantially elliptical frame having internal rack-teeth thereon, a rotary shaft and a pinion thereon adapted to mesh with the rack-teeth on said frame, of a track-traveler loosely connected to said shaft and adapted to engage the periphery of said frame for holding said pinion in mesh with said rack-teeth, and means for shifting the position of said traveler from one side of said frame to the other at the ends of the strokes of said frame.

3. The combination with a hollow, substantially elliptical frame having internal rack-teeth thereon, a rotary shaft and a pinion thereon adapted to mesh with the rack-teeth on said frame, of an arm loosely connected with said shaft, an antifriction-roller mounted in said arm constituting a track-traveler, and adapted to move on a track on the periphery of said frame for holding said pinion in mesh with said rack-teeth, and means for automatically shifting the position of said rollers from one side of said frame to the other at the ends of the strokes of said frame.

4. The combination with a hollow, substantially elliptical frame having internal rack-teeth thereon and having engaging portions on opposite sides near its opposite ends a rotary shaft and a pinion on said shaft adapted to mesh with said rack-teeth, of a track-traveler adapted to move in a track on the periphery of said frame for holding said pinion in mesh with said rack-teeth, and a cam connected with said traveler and adapted to be acted upon by said engaging portions for shifting said traveler from one side of said frame to the other.

5. The combination with a hollow, substantially elliptical frame having internal rack-teeth thereon, a rotary shaft and a pinion thereon adapted to mesh with the rack-teeth on said frame, of a track-traveler adapted to engage the periphery of said frame for holding said pinion in engagement with said rack-teeth, means for automatically shifting said traveler from one side of the frame to the other at the ends of the strokes of said frame, and a guide or guard for holding said frame and said pinion in proper relation to each other.

6. The combination with a hollow, substantially elliptical frame having internal rack-teeth thereon and having engaging portions

on opposite sides near its opposite ends, a rotary shaft, and a pinion on said shaft adapted to mesh with said rack-teeth, of a track-traveler adapted to move on the periphery of said frame for holding said pinion in mesh with said rack-teeth, a cam connected with said traveler and adapted to be acted upon by said engaging portions for shifting said traveler from one side of the frame to the other, and a guide or guard for preventing lateral displacement of said frame and said pinion and cam with respect to each other.

7. The combination with a hollow, substantially elliptical frame having internal rack-teeth thereon and having engaging portions on opposite sides near its opposite ends, the said frame being made in two parts forming a continuous guideway between said parts, a rotary shaft, and pinions on said shaft adapt-

ed to mesh with the rack-teeth on the two parts of said frame, of an arm loosely mounted on said shaft and projecting through said guideway, one end of said arm having a circular enlargement thereon which projects into said guideway, a roller on the opposite end of said arm adapted to engage the periphery of said frame, and cams loosely mounted on said shaft, connected with said arm, and adapted to be acted upon by said engaging portions for shifting said roller from one side of said frame to the other.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

ALVIN BAUGHMAN.

Witnesses:

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DAVID W. LEONARD.