

No. 670,011.

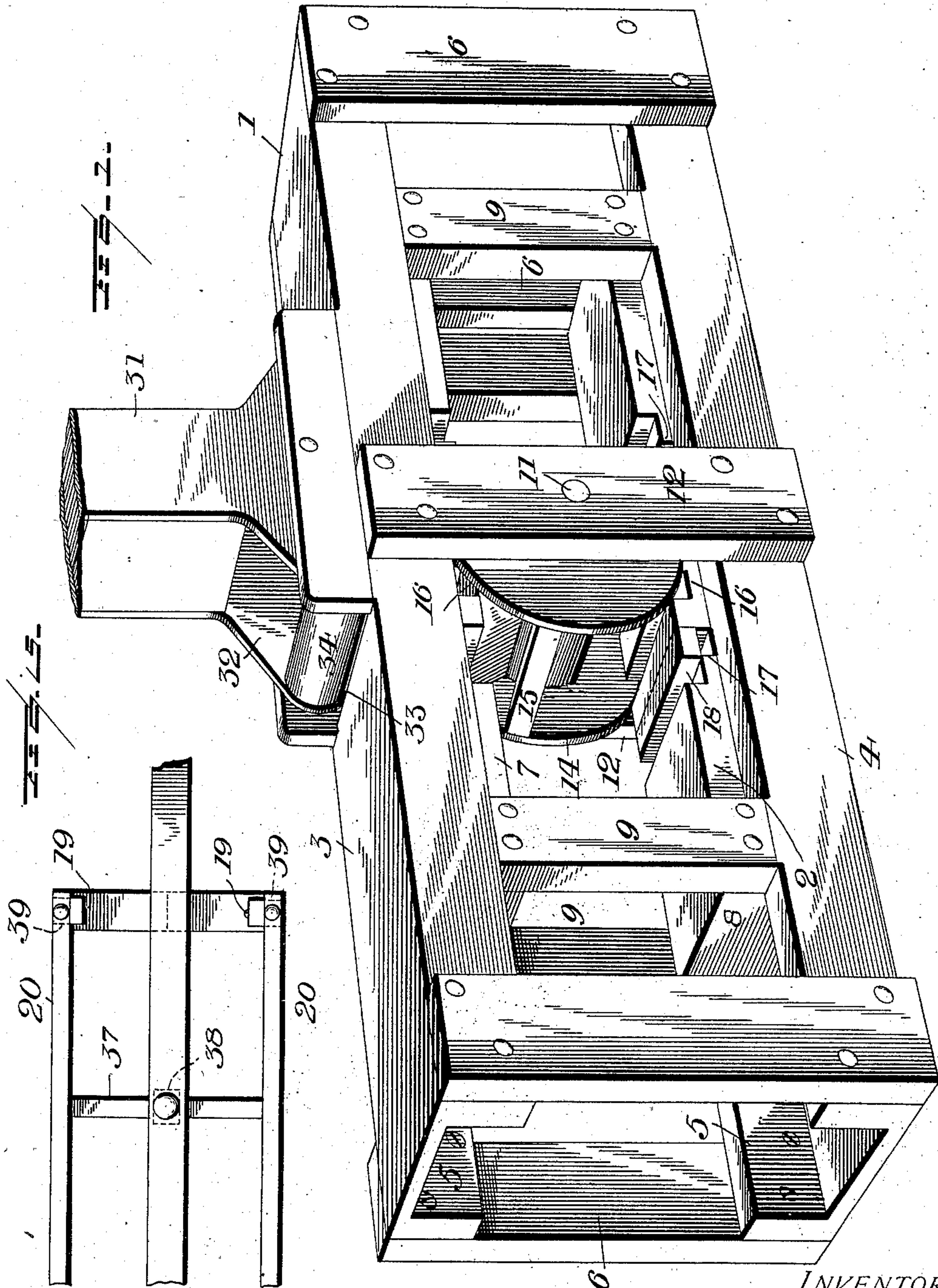
Patented Mar. 19, 1901.

N. A. BAKER.
DEVICE FOR CONVERTING MOTION.

(Application filed Sept. 15, 1900.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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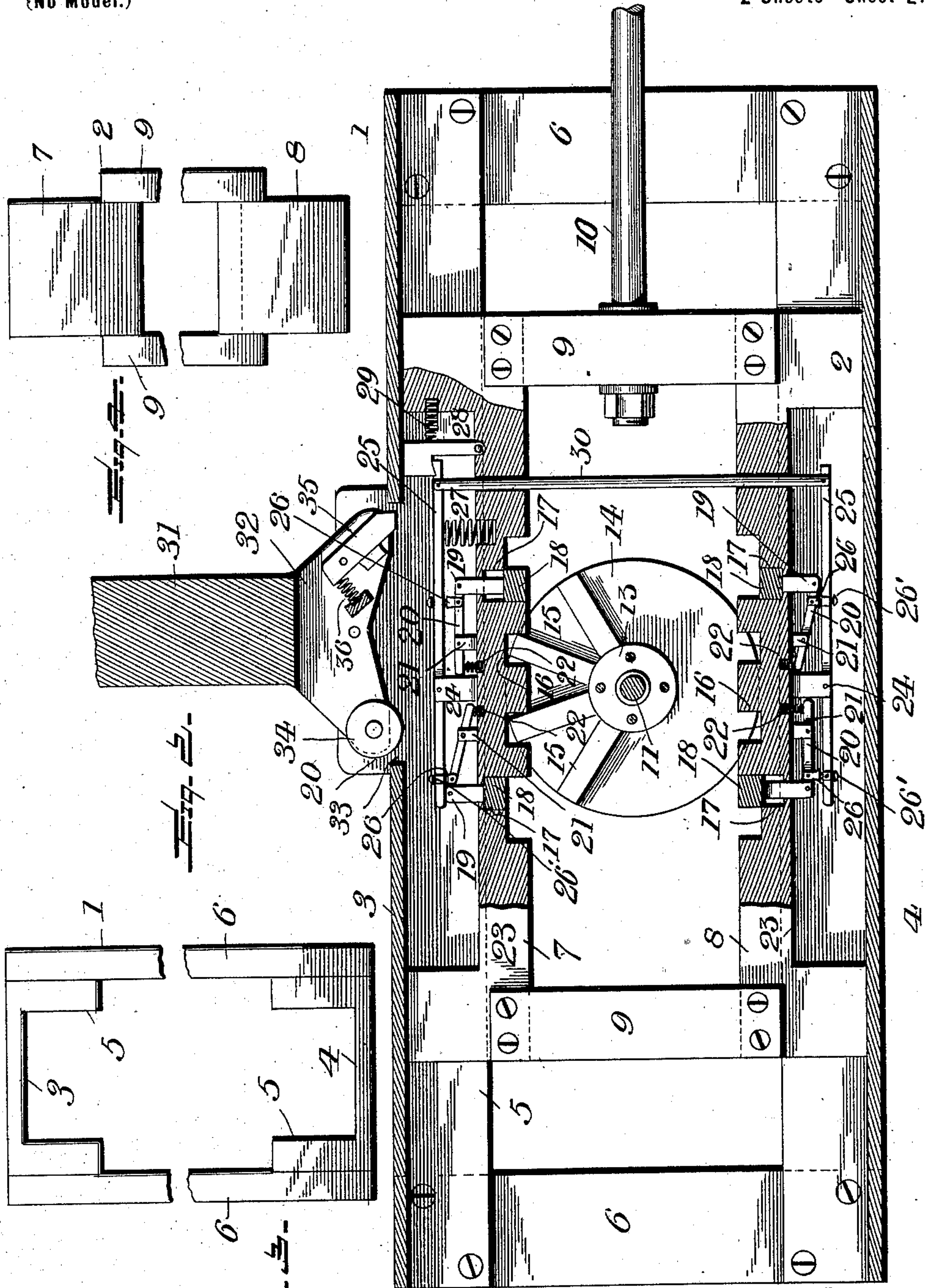
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UNITED STATES PATENT OFFICE.

NELSON A. BAKER, OF OTTUMWA, IOWA.

DEVICE FOR CONVERTING MOTION.

SPECIFICATION forming part of Letters Patent No. 670,011, dated March 19, 1901.

Application filed September 15, 1900. Serial No. 30,157. (No model.)

To all, whom it may concern:

Be it known that I, NELSON A. BAKER, a citizen of the United States, residing at Ottumwa, in the county of Wapello and State of Iowa, have invented a new and useful Device for Converting Motion, of which the following is a specification.

My invention relates to mechanical movements, and has for one object to produce a device of this kind by means of which lineal movement can be converted into rotary or rotary into lineal movement without the use of pawls or ratchets and without the possibility of a dead-center, the device being applicable to lineal engines, although not limited to this class of machinery.

Another object of the invention is to render it reversible and to have the means for reversing the motion contained within the converting mechanism.

The invention consists in the improved construction and novel arrangement of parts of a device for converting motion, as will be hereinafter more fully set forth.

In the accompanying drawings, in which the same reference-numerals indicate corresponding parts in each of the views in which they occur, Figure 1 is a broken perspective of a machine embodying my invention. Fig. 2 is a longitudinal sectional view. Figs. 3 and 4 are end views of the frames, and Fig. 5 is a top plan view of a slightly different form.

Referring more particularly to the drawings, 1 indicates a stationary rectangular frame, within which a similar frame or carriage 2 is arranged to be reciprocated longitudinally. The frame 1 is preferably formed of top and bottom pieces 3 and 4, each grooved longitudinally, as shown at 5, and supported parallel with each other at a suitable distance apart by posts or uprights 6, with their grooved sides facing each other. The frame 2 is shorter and narrower than the frame 1 and comprises two longitudinal pieces 7 and 8, which are spaced apart by the end pieces 9, so as to fit within the frame 1 and be moved freely back and forth in the grooves 5. A pitman 10 or other means of reciprocating it may be secured at one end between the end pieces.

A shaft 11 is journaled inside of two pieces 12, which are secured to the central portion of frame 1. A mutilated gear-wheel, prefer-

ably formed from a hub 13 and disks 14, is rigidly secured to the shaft between the side pieces, with the edges of the disks extending upon the opposite sides of the top and bottom pieces of the frame 2. A series of spokes or receiving-levers 15 are arranged between the disks, preferably within grooves therein, to project out from the hub and be engaged by shoulders formed by cutting transverse grooves or recesses 16 in the inner faces of the pieces 7 and 8.

The end recesses are each double the width of the others, and the bottom of the inner portion of each end recess is recessed to a still greater depth, as shown at 17. A depressible section or bar 18 is yieldingly held in each of the end recesses and is adapted to be held out even with the face of the rack or grooved portion of the pieces 7 and 8 or to be withdrawn or forced into its depression. The section is supported on one end of a pin 19, which projects through an opening in the frame 2 and is pivotally secured to one end of a lever 20, which is pivotally mounted on a standard 21, the opposite end of the lever engaging with a spring 22 for normally forcing the section 18 out even with the rack. The outer face of each of the pieces 7 and 8 is cut away nearly its entire length, as shown at 23, to afford room for the standards and levers, as above described, and also for the reception of the means for controlling or actuating them for reversing the direction of the motion.

A standard 24 is arranged within each of the cut-away portions 23 between the standards 21, in which is fulcrumed a lever 25. Said lever is connected with the levers 20 by means of a rod 26, whereby when the lever 25 is moved in one direction one of the sections 18 is even with the face of the rack and the other one will be depressed. A spring 27 is arranged between one of the levers 25 and the portion of the frame on which it is mounted to normally hold that end and the sections in one position. A catch or detent 28 is pivotally secured adjacent to said end in position to engage with the lever and hold it against the action of the spring 27. A spring 29 engages with the detent and normally forces its free end into the path of the end of the lever 25, so as to automatically engage therewith and hold it in its depressed posi-

tion. A link 30 connects the ends of the levers 25 with each other to cause them to be moved in unison, whereby when the sections at diagonally opposite ends of the two racks are elevated those at the other ends will be depressed, and vice versa. The pins 19 are preferably connected with the levers 20 by means of a tenon which fits within a mortise in the lever, the connection being loose enough to permit the pin to move longitudinally in a straight line, while the lever moves in the arc of a circle, and the rod 26 is preferably provided with a shoulder and has its outer end projecting through an opening in the lever 25. A cap or nut 26' fits on the rod above the lever. An operating or controlling lever 31 is journaled between plates 32 on top of the stationary frame above an opening 33. The lower end of the lever is virtually bifurcated and is provided with a roller 34 in one arm of the bifurcation or on one side of the pivotal point of the lever and with a spring-actuated trip or latch 35 upon the other arm. The roller and latch are adapted to be moved down through the opening 33 in position to engage with the lever 25 or detent 28, respectively, according to the movement of the lever 31. The latch 35 is arranged to stand at an angle, so as to slide over the detent in one direction; but a spring 36 engages with its opposite end to normally hold it in the path of the detent. In using my improved device for converting motion the pitman and shaft are connected, respectively, with the source of power and the machinery to be driven thereby and the operating-lever on top of the stationary frame turned in the proper direction to secure the desired result. In the drawings the machine is shown as being set for running backward—that is, with the shaft and wheel turning from right to left at the top, with the piston on the instroke. When it reaches the end of its stroke, the end receiving-lever of the wheel will have entered the outer portion of the recess next the pitman beyond the depressible section, which is held out even with the face of the rack by the position of the controlling mechanism. At the same time the wheel will have been rotated far enough to cause the end lever upon the opposite side of the series to be moved down into the end space on the opposite side of the frame in position to be engaged by the shoulder formed by that recess, the depressible section being held depressed, so as not to engage with said lever. On the outstroke of the piston the levers of the wheel will engage with the lower rack, and by the time the limit of the stroke is reached the end lever will be projecting into the end space of the upper rack in position to be acted upon thereby on the instroke of the piston. If it be desired to run the machine forward or in the opposite direction, the lever 31 would be moved to the right to cause the latch to engage with the detent and force it back out of engagement with the lever 25. The spring 27 would instantly rock the levers 25 on their

fulcrums, which would rock the levers 20, and thereby change the relative positions of the depressible sections. This would cause the wheel and pitman to move in the opposite directions from that heretofore described. To again change the direction, the lever 31 would be moved to the left to cause the roller to engage with the lever 25 and force it down until it would be engaged by the detent and held in the position first described.

In the drawings I have shown the wheel provided with four spokes or receiving-levers and each of the racks provided with four recesses, which will form three teeth or driving-bars, the middle bar being wider than the others, each of the end bars being virtually formed of a rigid and depressible section. By making the levers half as wide as the spaces between them the depressible section is just as wide as the rigid section or half the width of the middle bar or section; but the number of levers and of the teeth or bars in the racks, as well as the relative proportions to each other, may be varied to suit circumstances. The sections may be in the form of blocks, rollers, or cogs, as well as of the bars heretofore mentioned. Instead of using a single rod for each depressible section I prefer to use two, one at each end of the section, when the machine is to be used for heavier work and requires a wider rack—as, for instance, when the length of the sections exceeds about six inches. With such a construction there are two levers 20, as shown in Fig. 5, which are connected by a cross-bar 37, which is connected at its center with the lever 25 by a rod 38. The upper end of the rod is shouldered and capped and passes loosely through the lever in the same manner as heretofore described for the single construction. If desired, the ends of the cross-bars may be connected with the levers 20 by means of rods 39, the upper ends of which may be similar to the rods 39; but in that case the upper ends of the rods 39 need not be passed through the lever 25, but be pivotally secured thereto. By making the connection between the levers 20 and the lever 25 in this manner the depressible sections may be forced inward by the engagement therewith of one of the receiving-levers when reversing the machine, and the lever 25 is locked to run the machine backward without breaking the connection.

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

1. In a mechanical movement, the combination, with a stationary frame, of a reciprocating rack-frame therein, the ends of the racks being provided with depressible sections, means for alternately holding two of the diagonally opposite sections extended and the other two retracted, and a wheel journaled in the frame provided with a mutilated gear for engaging with said racks, substantially as described.

2. In a mechanical movement, the combi-

5 nation, with a stationary frame, of a reciprocatory rack-frame therein, a depressible section yieldingly held at each end of each rack, levers for alternately holding two of the diagonally opposite sections extended and the other two retracted, an operating-lever for engaging with a portion of said levers to cause the machine to run in either direction, and a wheel in the stationary frame provided with a mutilated gear for engaging with said racks, substantially as described.

10 3. In a mechanical movement, the combination, with a stationary frame, of a reciprocatory rack-frame therein, the ends of which are provided with depressible sections, a lever connected at one end to each of the sections, a spring in engagement with the other end of the lever, a lever connected with the levers of each side of the frame, a link for connecting the two levers upon the opposite sides of the frame, means for moving said two levers into either of two positions and holding them there, and a wheel journaled in the stationary frame

provided with a mutilated gear for engaging with the racks, substantially as described. 25

4. In a mechanical movement, the combination, with a stationary frame, of a reciprocatory rack-frame therein, depressible sections at the ends of the racks, a spring-actuated lever connected with each section, two connected levers connected with said first-mentioned levers, a spring for one of them, a spring-actuated detent in position to automatically engage with one of said two levers, a bifurcated lever on the stationary frame, one arm of which is provided with a roller and the other arm is provided with a spring-actuated latch, and a wheel in the stationary frame provided with a mutilated gear for engaging with said racks, substantially as described. 30 35 40

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Witnesses:

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