No. 662,611. Patented Nov. 27, 1900.

J. C. WALKER.

MOTION TRANSMITTER.

(Application filed July 19, 1900.)

(No Model.)

Fig. 1.

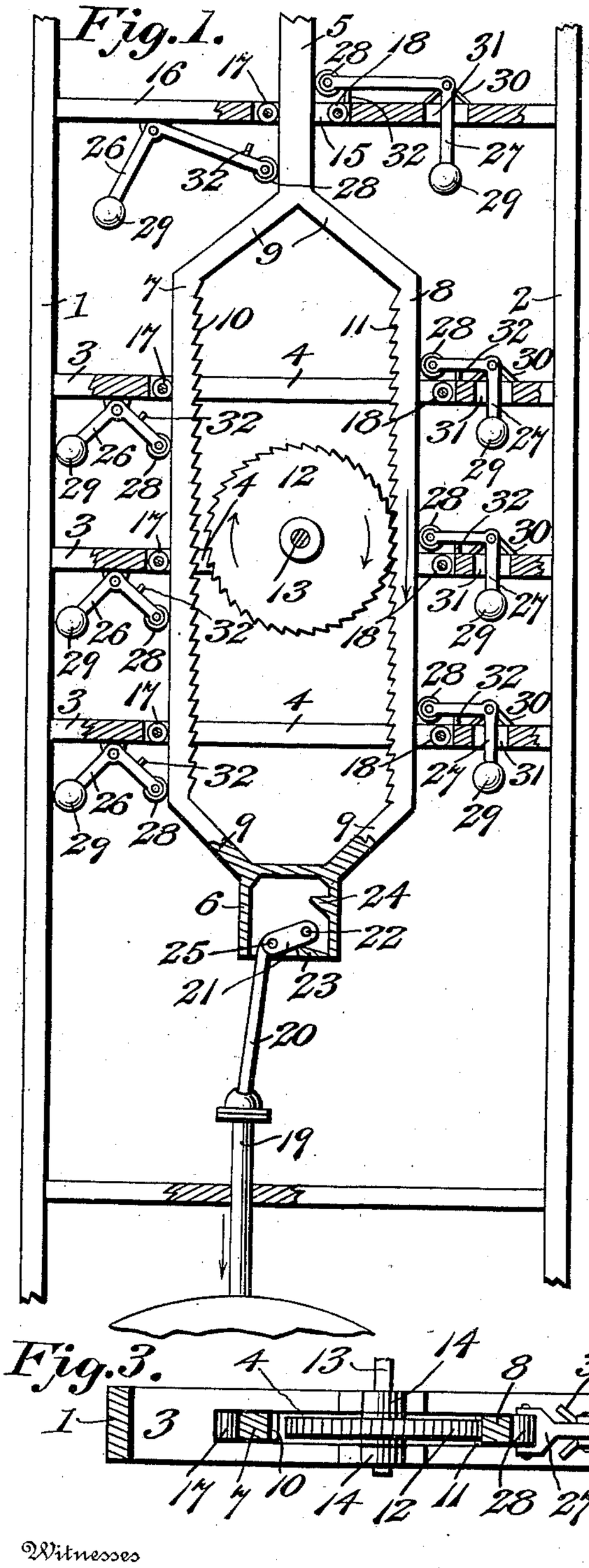

Fig. 2.

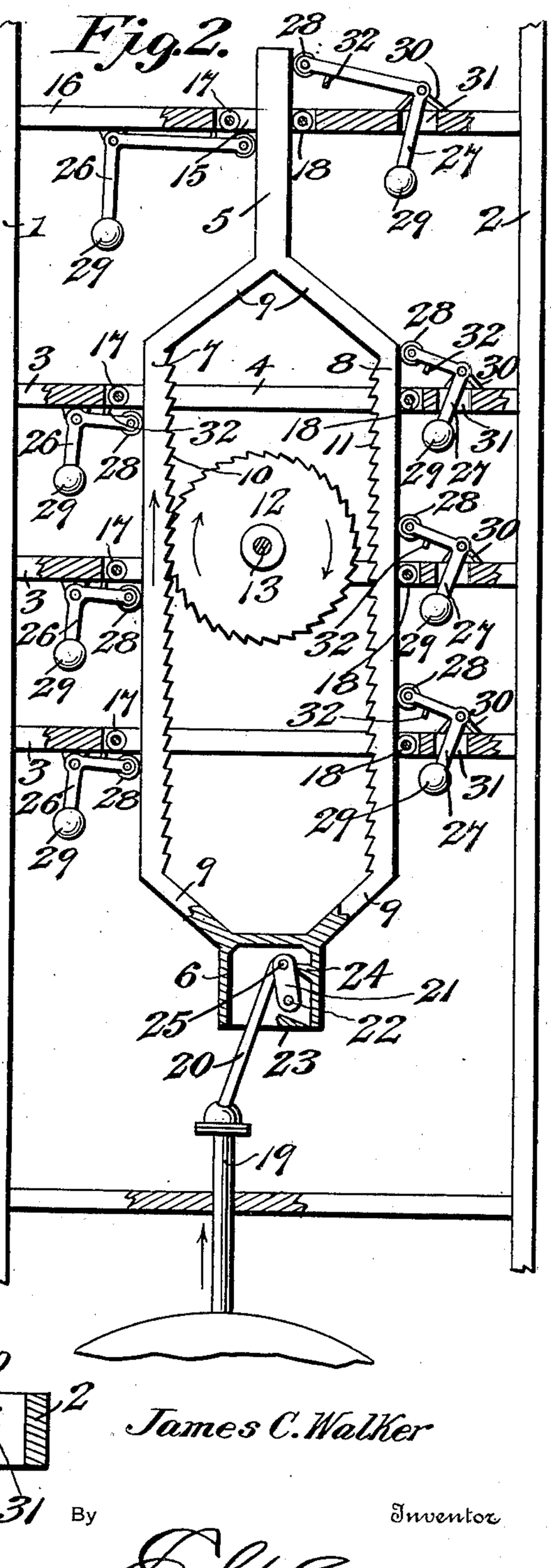

Fig. 3.

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JAMES CONSTANT WALKER, OF WACO, TEXAS.

MOTION-TRANSMITTER.

SPECIFICATION forming part of Letters Patent No. 662,611, dated November 27, 1900.

Application filed July 19, 1900. Serial No. 24,210. (No model.)

To all whom it may concern:

Be it known that I, JAMES CONSTANT WALKER, a citizen of the United States, residing at Waco, in the county of McLennan and State of Texas, have invented a new and useful Motion-Transmitter for Wave-Motors, of which the following is a specification.

My present invention relates to improvements in motion-transmitters, designed with special reference to its use in connection with wave-motors, the primary object of the invention being to produce motion-transmitting mechanism which will effect the conversion or translation of reciprocatory motion into continuous rotary motion in the same direction.

The invention in its preferred embodiment contemplates the employment of a converter reciprocated by the application of power—as, for instance, from a float—and embodying a pair of opposed racks which alternately engage a pinion at opposite sides of the periphery thereof or, more properly speaking, at diametrically opposite points. The alternate engagement of the racks is effected during the alternate reciprocatory movements of the converter to effect the translation of the reciprocatory movement imparted by the float into continuous rotary movement of the pinion in one direction, whereby a power-shaft or other power-transmitting mechanism operated by the pinion may be employed for the transmission of the energy generated by the wave-motor for the operation of various forms of machinery.

In a somewhat more specific aspect the invention contemplates the production of simple and effective mechanism for causing the automatic lateral shifting of the converter for the purpose of effecting the alternate movement being effected by the change of direction of the pitman extending between the converter and the float or other actuator.

A still further object of the invention is to provide means for insuring the smooth antifrictional movement of the converter during the engagement of either rack with the pinion and also while being shifted from one position to the other at the initiation of each reciprocation.

Further objects and advantages will hereinafter more fully appear, as the necessity for their accomplishment is developed, in the subjoined description when taken in connection with the accompanying drawings, in which I have illustrated the preferred embodiment of the invention.

In said drawings, Figure 1 is a sectional elevation of my device complete, showing the converter descending. Fig. 2 is a similar view showing the converter ascending, and Fig. 3 is a sectional view of the device.

Referring to the reference-numerals designating like parts and structural characteristics in each of the views, 1 and 2 indicate the frame uprights or standards connected by a series of cross-beams 3, each provided with a longitudinal slot 4 for the accommodation of the vertically-reciprocatory converter composed of a stem 5 and a link-block 6 at its upper and lower ends, respectively, and a pair of intermediate parallel rack-bars 7 and 8, extended through and guided within the slots 4 and rigidly connected to the stem 5 and block 6 by the converging arms 9. Upon their opposed faces the rack-bars 7 and 8 are provided with toothed racks 10 and 11, the teeth of which are inclined in opposite directions—that is to say, the teeth of the rack 10 are given an upward inclination, while the teeth of the rack 11 are downwardly inclined, the relative angles of inclination being the same in both instances. These toothed racks of the converter are designed for alternate engagement with a pinion 12, mounted upon a power-shaft 13, journaled in suitable bearings 14, carried by the intermediate cross-beam 3. The pinion 12 extends above and below the intermediate beam 3 and is accommodated within the slot 4 in said beam, the diameter of the pinion being such as to prevent simultaneous engagement of both racks 10 and 11 with the teeth of the pinion, which teeth, as clearly shown in the drawings, are given a tangential inclination which will cause the inclinations of the teeth disposed at diametrically opposite points upon the periphery of the pinion to coincide with the inclination of the opposed teeth of the racks. The reason for these relative inclinations of the teeth of the rack and pinion is that the engagement of each rack with the pinion must be positive, and as the racks engage only during the opposite or alternate recipro-

cations of the converter the engaging teeth are given an inclination which will tend to prevent the accidental lateral shifting of the converter which would effect the disengagement of the opposed teeth. The stem 5 of the converter extends through a slot 15 in a head-beam 16, extending between the uprights 1 and 2 a suitable distance above the series of cross-beams 3, and within the opposite ends of each of the slots 4 and the slot 15 are mounted antifrictional rollers 17 and 18, designed to antifrictionally guide the movements of the converter by contact with the rack-bar 7 or 8, as the case may be, when said converter is shifted to its opposite positions for the purpose of engaging the racks with the pinion.

As has been heretofore stated, one of the primary objects of my invention is to provide for the smooth antifrictional movement of the converter as it is being shifted to one side or the other at the beginning of its opposite reciprocatory movements; but before proceeding to a description of the mechanism which I employ to the attainment of this end I will first describe the novel means which I employ for effecting this automatic lateral movement or shifting of the converter and will then proceed with a description of the means for rendering such movement smooth and antifrictional.

The float-stem 19 is connected to the link-block 6 by means a pitman 20, having a pivotal connection with the upper end of the float-stem and extended into the block 6, where its opposite end is pivotally connected to the shifting-link 21, having its opposite end pivotally mounted upon a stationary pintle 22 to one side of the vertical center of the block 6. The function of the pitman 20 and link 21 is to shift the point of application of power to opposite sides of the vertical center of the converter during the opposite reciprocations of the float-stem for the purpose of causing said stem to exert its force in a proper direction to automatically shift the converter for the purpose of presenting the racks 10 and 11 to the pinion alternately. The depression of the link 21 impelled by the downward movement of the float-stem is limited by a stop-lug 23, and its elevation upon the upward movement of said stem is limited by a stop-lug 24, both of said lugs being carried by the link-block and located to dispose the pivotal connection 25 between the pitman 20 and link 21 at opposite sides of the vertical center of the link-block in the opposite positions of the link. It will now appear that when the float-stem 19 is depressed the link 21 will assume the position shown in Fig. 1 of the drawings, throwing the pivotal connection 25, which is the point of application of power, to the left of the vertical center of the converter. The effect of this will be to cause the converter to be shifted to the left to effect the engagement of the rack 11 with the pinion 12. Further downward movement of the stem will obviously effect the rotation of the pinion in the direction of the arrow in Fig. 1 until the converter has reached the limit of its downward movement. The opposite reciprocation or upward movement of the stem 19 before effecting the reciprocation of the converter will first elevate the link 21 to throw the pivotal connection 25 or the point of application of power to the right of the vertical center of the link-block 6, which will now cause the converter to be shifted to the right to present the rack 10 to the pinion 12 for the purpose of continuing the rotary movement of said pinion in the same direction during the upward reciprocation of the converter.

It is evident from the foregoing that the reversal of the direction of movement of the stem 19 will effect the automatic shifting of the converter to engage the racks 10 and 11 alternately with the pinion 12 at diametrically opposite points upon the pipherery thereof, and it will also appear that after the converter has reached the limit of its lateral movement or shifting it will be guided antifrictionally by the contact of either the rack-bar 7 or 9 with the antifrictional rollers 17 or 18, located in the opposite ends of the several guide-slots. A further development of my invention, however, contemplates the employment of counteracting guide-levers which will maintain an anitfrictional engagement with the opposite sides of the converter at all times for the purpose of insuring the smooth antifrictional shifting of said converter and to prevent violent jarring or vibration of the parts during their reciprocation or shifting. These counteracting guide devices are shown as embodied in bell-crank levers, the levers at the left of the converter being indicated by the numeral 26 and those at the right being indicated by the numeral 27. Each of these levers is provided at its extremity adjacent to the converter with an antifriction-roller 28 and at its opposite end with a counterpoise 29, the levers 26 being fulcrumed below each of the bars 3 and 16 at the left of the converter, and each of the levers 27 being fulcrumed in brackets 30 above said beams to the right thereof. Inasmuch as the roller-carrying arms of the levers 26 are designed to move downwardly from their horizontal positions, and as the bearing-arms of the levers 27 are designed to move upwardly from the horizontal position, the weighted arms of the levers 27 depend below the cross-beams, which are provided with slots 31 for their accommodation. Each of the bearing-arms may be, and preferably is, provided with a stop 32, designed to limit the movement of the arm to prevent its passing a horizontal plane under the impulse of the counterweight.

Assuming the parts to be in the position indicated in Fig. 1 of the drawings—that is to say, assuming the converter to be moving downwardly with the rack 11 in engagement with the pinion 12—the bearing-arms of the several levers 27 will be in their horizontal po-

sitions above the beams 3 and 16 and the rollers 28, carried thereby, will be opposed to the contiguous side of the converter, which will be antifractionally retained between the rollers 28 and 17, the former being located upon the levers 27 and the latter within the opposite ends of the slots 4 and 15. At the same time the bearing-arms of the levers 26 at the left of the converter will have been depressed against the resistance of the counterweights 29, which latter will exert a constant pressure tending to shift the converter in the opposite direction. When the converter has reached the downward limit of its movement and is shifted to the right by the swinging of the link 21 for the purpose of presenting the rack 10 to the pinion 12, the movement of the converter will be assisted by the swinging of the levers 26 under the impulse of their counterweights 29, and the levers 27 will be simultaneously rotated to the position shown in Fig. 2 of the drawings to swing back the bearing-arms of said levers against the resistance of their counterweighted arms, the converter now being retained antifrictionally between the rollers 28 of the levers 29 and the rollers 18 within the opposite ends of the guide-slots. It will thus be seen that the several levers 26 and 27 constitute opposed or counterbalancing guide devices which maintain an antifrictional engagement with the converter at all times to prevent violent vibration of the latter during its shifting and to insure its antifrictional movement both laterally and longitudinally under all conditions.

While the present embodiment of the invention appears at this time to be preferable, I do not desire to be understood as limiting myself to the structural details defined, as I reserve the right to effect such changes, modifications, and variations as may be properly comprehended within the scope of the protection prayed.

What I claim is—

1. In a motion-transmitter, the combination with a reciprocatory converter mounted to have lateral movement, and a rotary element designed to be engaged during the opposite reciprocatory movements thereof, of an actuator, and a connecting device carried by the converter and operatively connected with the actuator, said connecting device being shiftable to the opposite sides of the center of the converter through the movement of the actuator.

2. In a motion-transmitting device, the combination with a reciprocatory converter provided with a pair of racks and a pinion mounted for alternate engagement with said racks, of a reciprocatory actuator, and a connecting device carried by the converter and operatively connected with the actuator, said connecting device being shiftable to opposite sides of the longitudinal center of the converter through the movement of the actuator.

3. In a motion-transmitting device, the combination with a converter having a pair of opposed racks, and an intermediate pinion, of a swinging link carried by the converter, means for connecting said link to a reciprocatory actuator, and means for limiting the movement of the link to position its swinging end in positions at opposite sides of the center of the converter during the opposite movements of the latter.

4. In a motion-transmitting device, the combination with a converter having a pair of opposed racks, and an intermediate pinion, of a link-block movable with the converter, a swinging link mounted upon the block, a reciprocatory actuator, a pitman pivotally connected to said actuator and link, respectively, and a pair of stops located to limit the movements of the link in opposite directions to position the swinging end of said link at opposite sides of the center of the converter for the purpose of shifting the point of application of power during the opposite movements of the converter.

5. In a motion-transmitting device, the combination with a reciprocatory converter, means for shifting the converter laterally and a rotary element arranged for engagement with said converter, of antifrictional guide devices engaging the opposite sides of the converter, and means for maintaining the engagement of said devices with the converter during the shifting thereof.

6. In a motion-transmitting device, the combination with a reciprocatory converter, means for shifting the converter laterally and a rotary element arranged for engagement with said converter, of pivoted guide devices engaging the opposite sides of the converter, and means for urging said devices in the direction of the converter to maintain an operative connection therewith during the shifting thereof.

7. In a motion-transmitting device, the combination with a reciprocatory converter, means for shifting the converter laterally and a rotary element arranged for engagement with said converter, of counterbalanced guide devices operatively engaging the opposite sides of the converter.

8. In a motion-transmitting device, the combination with a reciprocatory converter, means for shifting the converter laterally and a rotary element arranged for engagement with said converter, of counterweighted levers located beyond the opposite sides of the converter and provided with terminal antifrictional devices engaging the opposite sides of the converter.

9. In a motion-transmitting device, the combination with a reciprocatory converter, means for shifting the converter laterally and a rotary element arranged for engagement with said converter, of counterweighted bell-crank levers located at opposite sides of the converter and provided with antifrictional rollers in contact therewith.

10. In a motion-transmitting device, the combination with a reciprocatory converter,

means for shifting the converter laterally and a rotary element arranged for engagement with said converter, of slotted guide-beams for said converter, oppositely active counterweighted bell-crank levers having bearing-arms located above and below the bearing-beams and in engagement, respectively, with the opposite sides of the converter.

11. In a motion-transmitting device, the combination with a reciprocatory converter, means for shifting the converter laterally and a rotary element arranged for engagement with said converter, of slotted guide-beams for the reception of the converter, antifriction-rollers carried by said beams within the opposite ends of the slots, and counterweighted bell-crank levers having antifriction-rollers opposed to the opposite sides of the converter, and means for limiting the movement of said levers.

12. In a motion-transmitting device, the combination with a converter comprising a pair of opposed racks, and a link-block, of a swinging link carried by the block, means for applying power to the link for the actuation of the converter, means for limiting the movement of the link to locate its free end at one side of the center of the converter to effect the shifting of the latter, and counterweighted guide devices maintaining an engagement with the converter during the shifting of the latter to prevent vibration thereof.

13. In a motion-transmitting device, the combination with a frame comprising uprights and slotted cross-beams provided with antifrictional rollers in the ends of the slots, of a converter comprising a pair of racks passed through said slots, a link-block located at one end of the converter, a shifting element carried by the link-block for the application of power, and counterweighted bell-crank levers carrying antifrictional rollers in contact with the opposite sides of the converter for the purpose of guiding the latter during its lateral movement.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in the presence of two witnesses.

JAMES CONSTANT WALKER.

Witnesses:

JOHN H. ROGERS,

J. B. WILSON.