(No Model.)

E. CARLSON.

POWER CONVERTER.

No. 531,408. Patented Dec. 25, 1894.

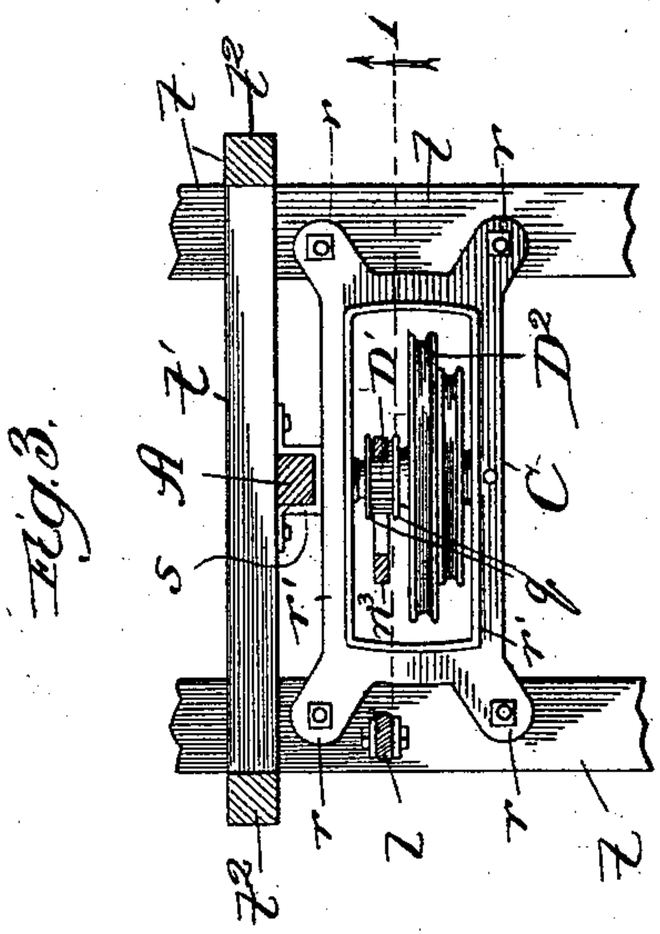

Fig. 3.

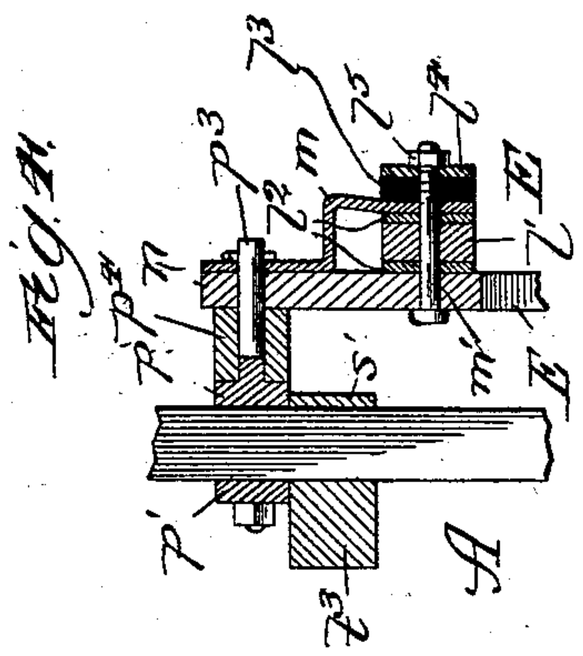

Fig. 4.

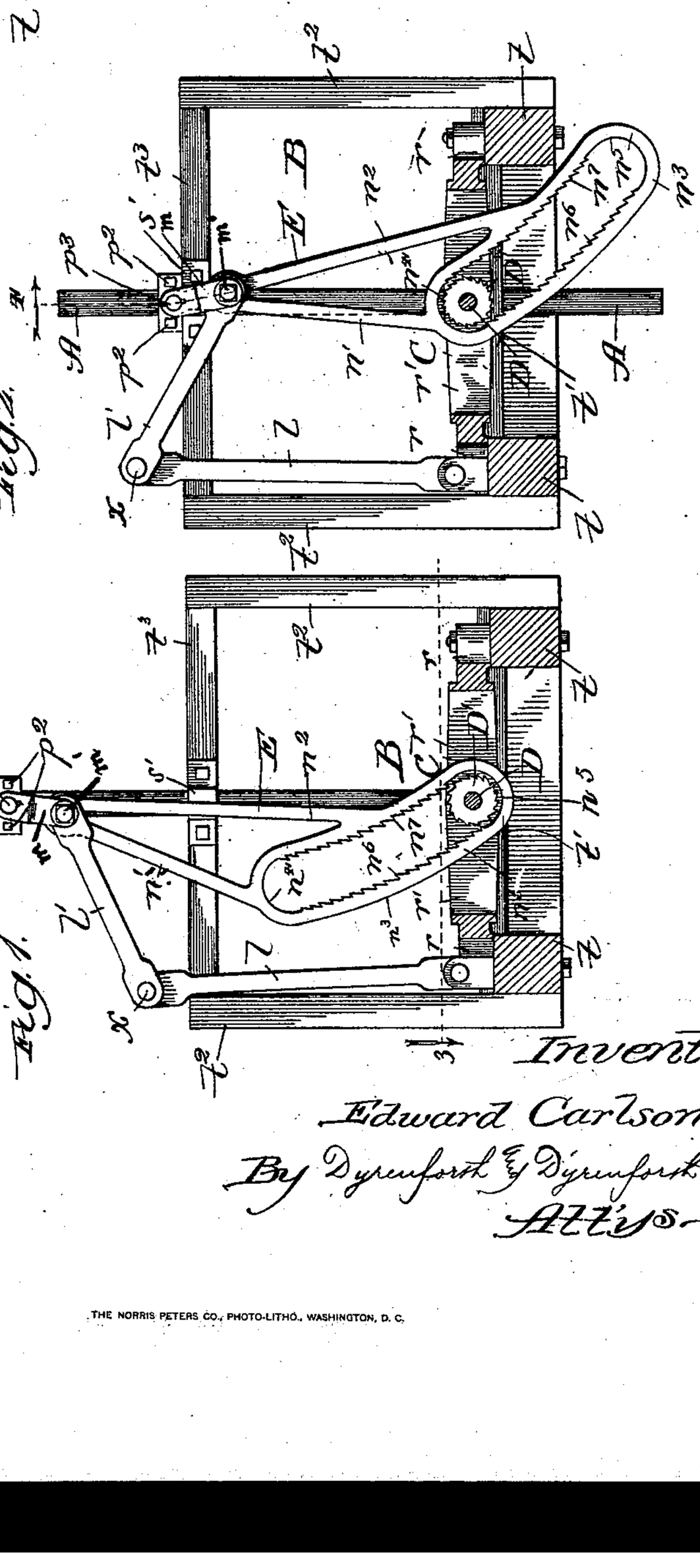

Fig. 2.

Fig. 1.

Witnesses:
Chas. E. Gaylord.
Leite & Alter

Inventor.
Edward Carlson
By Dyrenforth & Dyrenforth
Attys

UNITED STATES PATENT OFFICE.

EDWARD CARLSON, OF CHICAGO, ILLINOIS.

POWER-CONVERTER.

SPECIFICATION forming part of Letters Patent No. 531,408, dated December 25, 1894.

Application filed August 11, 1894. Serial No. 520,005. (No model.)

To all whom it may concern:

Be it known, that I, EDWARD CARLSON, a citizen of the United States, residing at Chicago, in the county of Cook and State of Illinois, have invented a new and useful Improvement in Power-Converters, of which the following is a specification.

My invention relates to improvements in mechanism for converting reciprocal into rotary motion, and more especially to such a mechanism applied to the pump-rods of windmills, whereby the power of the mill may be utilized for turning grindstones, grinding-mills, churns, or to impart rotary motion for any other desired purpose.

My object is to provide a simple, durable and effective mechanism of the above class which is especially adapted to farm use.

In the drawings—Figure 1 is a broken sectional elevation of my improved power-converter, the section being taken on line 1 of Fig. 3, and the view showing the mechanism at the limit of its movement in the upward direction; Fig. 2, a view the same as Fig. 1, but showing the mechanism at the limit of its movement in the downward direction; Fig. 3, a plan section taken on line 3 of Fig. 1; and Fig. 4, an enlarged broken section taken on line 4 of Fig. 2 and viewed in the direction of the arrow.

A is a reciprocal power transmitter, which may be the pump-rod of a windmill.

B is a frame, which may be constructed with platform-sills $t\ t$ provided with a cross-bar t', and uprights $t^2\ t^2$ joined at the top by a cross-bar t^3. The pump-rod A works through a loop-iron guide s on the cross-bar t', and a similar guide s' on the cross-bar t^3. Fastened upon the sills $t\ t$ is a frame C, which may be cast-iron, having perforated corner projections r which rest upon the sills and are secured thereto by bolts, as indicated.

The frame C is formed with side-bars $r'\ r'$, and journaled at opposite ends in the said side-bars is a shaft D carrying a pinion D′, and one or more pulleys D^2. The pinion D′ is between disks q which are of slightly greater diameter than the pinion. Adjustably secured to the pump-rod A is a clamp comprising a front plate p and rear plate p' secured together at opposite ends by bolts $p^2\ p^2$ which extend across opposite sides of the rod A. The tightening of the bolts p^2 clamps the plates rigidly against opposite sides of the pump-rod. Projecting forward from the front plate p' is a short shaft p^3 integral with the said plate; and on the shaft p^3 at the plate p is a spacing washer p^4.

E is a swinging frame comprising a hub-portion n pivoted at its upper end upon the shaft p^3, spokes or arms $n'\ n^2$ extending from the hub, and a loop n^3 presenting plain surfaced ends $n^4\ n^5$ and parallel segmental sides formed into racks $n^6\ n^7$, the teeth of which point in contrary directions. The part n^3 of the swinging frame E fits over the pinion D′ between the disks q and the latter operate to hold the part n^3 of the frame in position with relation to the pinion D′. The diameter of the pinion is slightly less than the distance between the racks.

On the end-portion of the shaft p^3 against the swinging frame E is a downward extending bracket m, of the shape in cross-section indicated in Fig. 4; and, extending through the lower end-portion of the bracket m and the adjacent part of the frame E is a bolt or shaft m'. Pivotally mounted at its lower end upon one of the sills t is an upward extending rod l to the upper end of which, at x, is pivoted a swinging arm l'. At its free end the arm l' fits loosely over the shaft m' between the bracket m and side of the swinging frame E. Interposed between the frame E, bracket m and opposite sides of the arm l' are washers l^2. On the shaft or bolt m' at the outer side of the bracket m is a preferably soft-rubber washer l^3 held in place by a metal washer l^4, which in turn is held in place by a nut l^5 on the outer threaded end of the shaft or bolt m'. Tightening of the nut l^5 presses the washer l^4, rubber washer l^3 and bracket m in the direction of the frame E, clamping the arm l' more or less tightly in place, while the rubber washer l^3 tends to render the clamping effect yielding.

The operation of the windmill causes the pump-rod A to reciprocate in its guides $s\ s'$, and plunge the frame E up and down. When in the position shown in Fig. 1 the pump-rod is at the upper limit of its plunge and about to start in the downward direction. In the initial movement of the rod in the downward

direction the frictional engagement of the swinging frame E with the arm l' causes the lower end portion of the frame to be swung in the direction toward the left in Fig. 1, whereby the rack n^7 engages the pinion. In the downward plunge of the pump-rod and frame E, the rack n^7 turns the pinion, shaft D and pulleys D^2. When the parts arrive at the position shown in Fig. 2, the pump-rod is at the lowest limit of its plunge about to start in the upward direction. In the initial upward movement the frictional engagement of the arm l' with the frame E causes the latter to be swung at its lower end in the direction to the right in Fig. 2, whereby the rack n^6 engages the pinion D', so that in the upward movement of the frame the pinion, shaft D and pulleys are rotated.

The engagement of the rack n^7 with the pinion D' in the downward plunge of the frame, and the engagement of the rack n^6 with the pinion in the upward plunge of the frame turn the pinion in the same direction, so that the continued reciprocation of the pump-rod produces continuous rotation of the shaft D and pulley D^2 in one direction. For convenience in use I prefer to provide a pair of pulleys of different diameters, as shown, so that the machine or device to be driven may, according to its resistance or the speed desired, be belted to either pulley, at will.

The frictional engagement of the arm l' with the rack frame E, causes a resistance to relative turning of the parts at the bolt l^3, so that in the initial movement of the pump-rod in either direction the parts l' and E remain in fixed relation and swing upon the pivots p^3 x until the respective rack engages the pinion. The segmental shape of the part n^3 and the way it extends with relation to the pump-rod, causes the frame E, as it is reciprocated up and down, to vibrate like a pendulum with a smooth and even motion, which prevents rattling and renders the operation comparatively noiseless. The friction-shift mechanism for the vibrating frame, should produce only sufficient resistance against turning of the parts on each other at the bolt m', to insure immediate engagement of the respective rack with the pinion, when the motion of the pump rod changes; and the frictional engagement need not be sufficient to cause any material resistance to the operation, or material wear upon the parts. In case the friction-shift mechanism becomes loose through wear, it may be tightened by turning the nut l^5.

Although I prefer to construct my improvements as shown and described they may be modified in the matter of details without departing from the spirit of my invention as defined by the claims.

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

1. The combination with the vertically reciprocating power-transmitter, of a vibrating frame pivoted at its upper end-portion to the transmitter and provided at its lower end portion with parallel racks, a pinion between the racks, and means for shifting the racks alternately into engagement with the pinion with the changes of motion of the transmitter, said means comprising a swinging arm pivotally and frictionally connected with the vibrating frame to operate, substantially as and for the purpose set forth.

2. The combination of a frame B, vertically reciprocating power-transmitter movable in guides on the frame B, vibrating frame pivoted at its upper end-portion to the transmitter and provided at its lower end-portion with parallel racks, a pinion journaled in the frame B between the racks, and shifting means for the vibrating frame, said means comprising an arm l pivoted to the frame B, and an arm l' pivoted at one end to the arm l and at its opposite end pivotally and frictionally connected with the vibrating frame to operate, substantially as and for the purpose set forth.

3. The combination with the frame B, and rod A reciprocating in guides on said frame, of a frame C, shaft D journaled in the frame C and carrying a pulley and pinion D', vibrating frame E pivotally connected at its upper end-portion to the rod A, and having a loop n^3 presenting parallel racks on opposite sides of the said pinion, and friction-shift mechanism for the vibrating frame, substantially as and for the purpose set forth.

EDWARD CARLSON.

In presence of—
M. J. FROST,
W. Y. WILLIAMS.