(No Model.) 2 Sheets—Sheet 1.

C. H. BRANDT.

MACHINE FOR CONVERTING MOTION.

No. 455,961. Patented July 14, 1891.

Fig. 1.

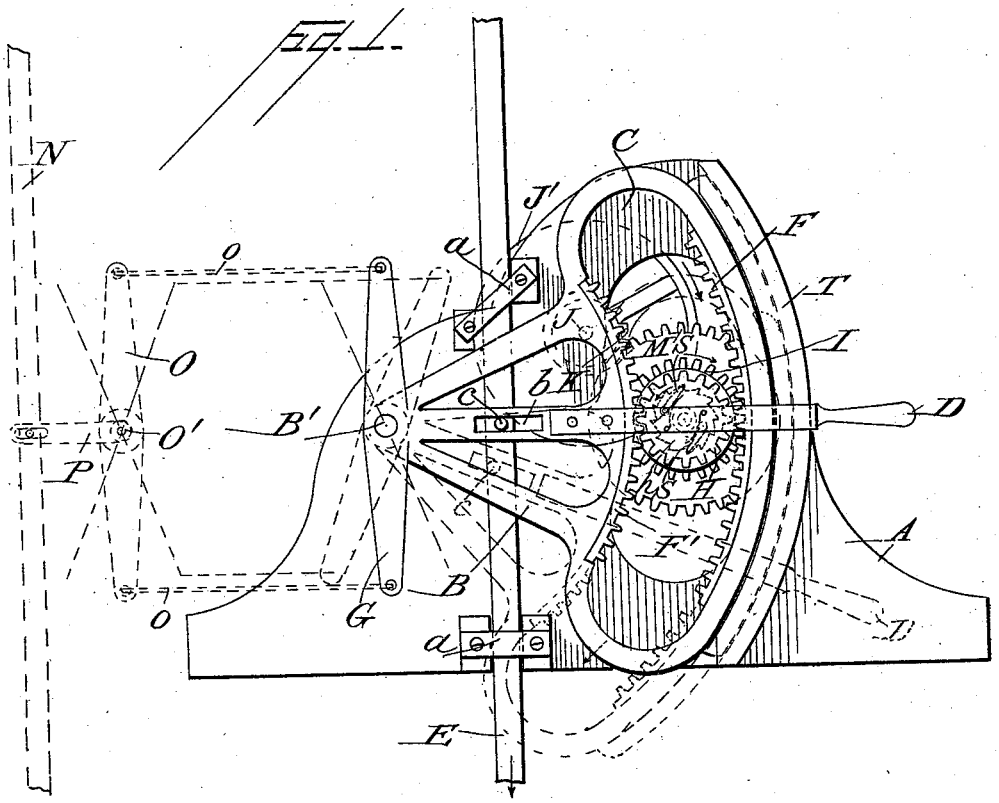
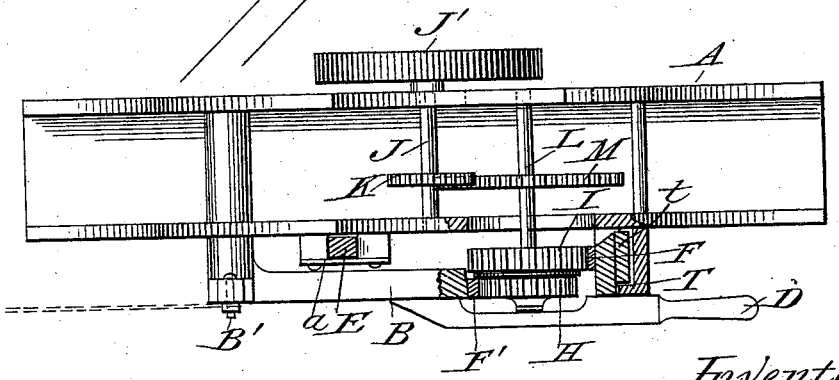


Fig. 2.



Attest:
F. H. Schott
Wm. L. Boyden

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Clinton H. Brandt
per Fred. E. Foster, Atty.

(No Model.) 2 Sheets—Sheet 2.

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Fig. 3.

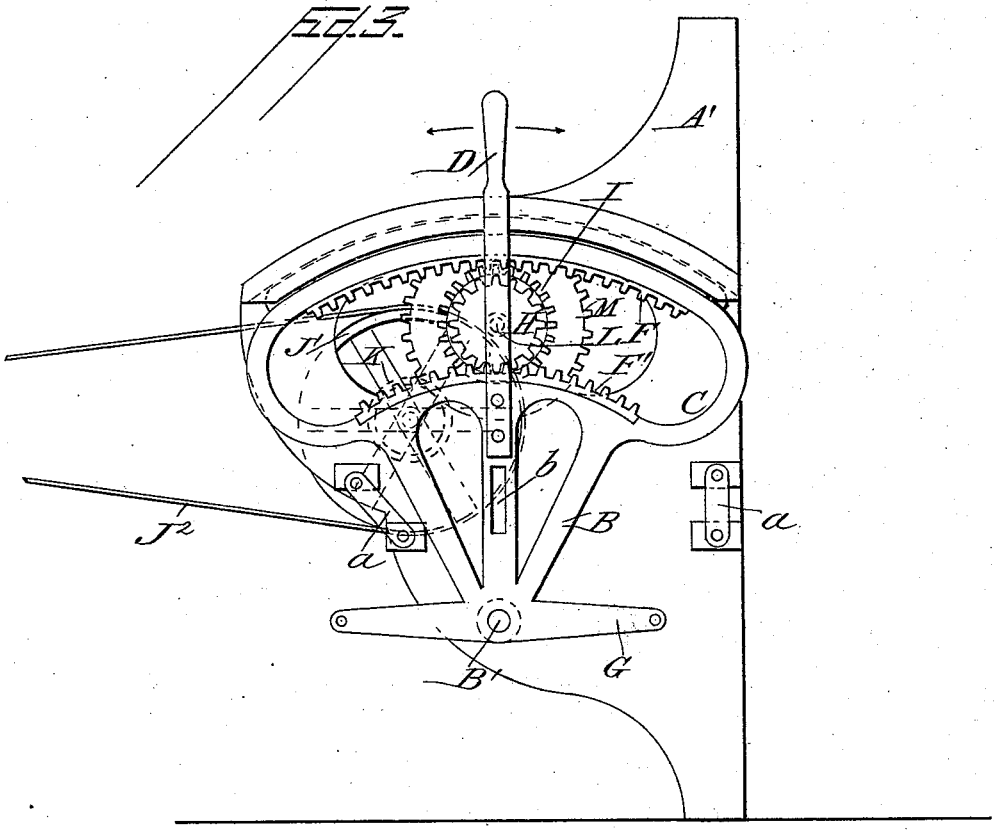


Fig. 4.

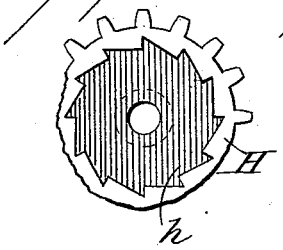


Fig. 5.

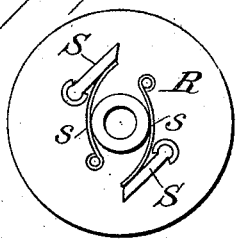


Fig. 6.

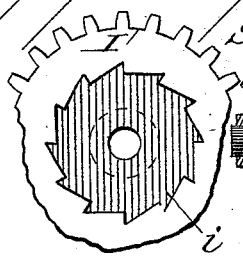
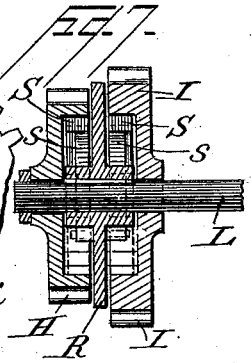


Fig. 7.



Attest:

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Inventor

Clinton H. Brandt.

per Fred. E. Tasker, Atty.

UNITED STATES PATENT OFFICE.

CLINTON H. BRANDT, OF ALTENWALD, PENNSYLVANIA, ASSIGNOR OF ONE-HALF TO WILLIAM S. REED, OF SAME PLACE.

MACHINE FOR CONVERTING MOTION.

SPECIFICATION forming part of Letters Patent No. 455,961, dated July 14, 1891.

Application filed March 17, 1891. Serial No. 385,389. (No model.)

To all whom it may concern:

Be it known that I, CLINTON H. BRANDT, a citizen of the United States, residing at Altenwald, in the county of Franklin and State of Pennsylvania, have invented certain new and useful Improvements in Machines for Converting Motion; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improvement in machines for converting reciprocatory into rotary motion, the machine being in reality a new and improved device for use in connection with the reciprocating shaft of a windmill or other similar machine, the object of the invention being to provide a simple, cheap, and efficient movement or converting device to be applied to a windmill or other machine for converting the motion derived therefrom, so that it may be conveniently applied for use in any desired manner and for any desired purpose, either at a point adjacent to the derivative machine or at a point distant therefrom; and the invention therefore consists in the construction, arrangement, and combination of parts, substantially as will be hereinafter described and claimed.

In the annexed drawings, illustrating my invention, Figure 1 is a side elevation of my improved machine for converting motion. Fig. 2 is a top plan view. Fig. 3 is a side elevation showing the machine arranged in a different position from what it is in Fig. 1, so that it may be adapted for a different purpose. Fig. 4 is a partial side elevational view of one of the gear-wheels having the ratchet-teeth. Fig. 5 is a side elevation of the intermediate pawl-provided disk which lies between the two gears on the main shaft. Fig. 6 is a partial side elevation of the larger of these two gears, showing the ratchet-teeth with which it is provided. Fig. 7 is a transverse section of the larger and smaller gears and the intermediate pawl-provided disk which lies between them, the shaft on which these three elements are mounted being also represented, but in elevation.

Like letters of reference designate corresponding parts throughout all the different figures of the drawings.

A designates the main frame of my improved machine for converting reciprocatory into rotary motion, or vice versa. This frame may be of any suitable and desirable form, shape, size, and arrangement, preferably, as shown in the drawings, consisting, simply, of two parallel uprights, which permit the several shafts belonging to the device to be properly journaled therein. This frame A may be situated in the horizontal position shown in Fig. 1 or in the upright position shown in Fig. 3, where the frame is designated A′. In fact, it may be situated in any position, so as to adapt it the better for the work which the machine may be designed at any particular time to perform.

B denotes a vibrating or oscillating frame, which is pivoted at B′ to the main frame. The frame B is of any suitable and desirable form. It is provided with the handle D, which is intended to be easily grasped by the hand of the operator for the purpose of vibrating the same. This frame is provided with a slot C, preferably of a curved form, having its two edges curved in parallel arcs. The size of this slot may vary considerably, of course, in the actual construction of the vibrating frame; but it preferably has a width sufficient to accommodate between it certain gear-wheels, which will hereinafter be described. The parallel curved edges of the slot C are provided with toothed bars or racks. These teeth may be integral with the edge of the slot, or they may be formed on strips secured to the edges of the slots. Furthermore, it will be noted that the pivot on which the frame B oscillates is the center of the concentric circles of which the parallel curved edges of the slot are arcs. Obviously, therefore, one of the toothed edges or bars—that which is situated the farthest from the pivot or center—will have a longer radius than the other toothed edge or bar, which is situated a shorter distance from the pivot or center on which the vibrating frame swings.

F denotes the toothed bar having the longer radius, and F′ the toothed bar having the

shorter radius. Said racks F and F′ are therefore preferably of unequal length, the one of the shorter radius having the shorter length. When the device is in the position shown in Fig. 1, the vibrating frame B is moved up and down by means of the handle D—that is to say, it is oscillated vertically. When the device is in the position shown in Fig. 3, the vibrating frame is moved from right to left—that is to say, by grasping the handle D the vibrating frame is oscillated horizontally.

The frame B is provided with a flange *t*, which lies in a groove beneath the guide-flange T, which is secured to the outside of the frame A, and by means of which, therefore, the frame is guided in its movements.

Referring to Fig. 1, E designates a vertical bar, which is adapted to reciprocate vertically. This bar may belong to a windmill and may be reciprocated by a connection with said mill. It may of course belong to any other kind of a machine and may derive its actuating-power from any source. As represented in Fig. 1, it moves in guides *a a*, secured to the main frame A. It is provided with a horizontal projecting pin *c*, which enters a slot *b* cut in a suitable part of the frame B—as, for instance, in one of its spokes when said frame is made in the skeleton pattern shown in Fig. 1. Slot *b* is long enough to give the pin *c* sufficient play during the oscillation of the frame B. As the rod or bar E moves up and down it will be clearly manifest that the result thereof will be to oscillate the frame B. Thus it will be seen that this oscillating or vibrating frame may be actuated either by hand or by connection with some suitable power applied thereto by a shaft driven by some machinery.

In the main frame A (or A′, as the case may be) there is journaled a horizontal shaft L, having thereon a gear-wheel M. Parallel to shaft L is another shaft J, carrying a small pinion K, which meshes with the gear-wheel M. (See Fig. 2.) The shaft J also carries a band wheel or pulley J′ on the end thereof outside of the frame A. This wheel J′ may serve as a balance-wheel or as a pulley to carry off power to any suitable machinery which it may be desired to run. On the shaft L are also two gear-wheels H and I. These wheels are loose on shaft L. Between them is an intermediate disk R, having a suitable hub projecting on each side and keyed to the shaft L. (At this point observe particularly Figs. 4, 5, 6, and 7.) The gear-wheels H and I have their faces which are opposite each other, or, in other words, their faces which lie next to the intervening disk, are provided with recesses, the edges of which recesses are notched to form ratchet-teeth. Thus the wheel H is provided with a series of ratchet-teeth *h*, cut in the edge of the recess in its face, and the gear I is provided with a circular series of ratchet-teeth *i*, cut in the edge of the recess in its face. The disk R is provided on each side with a pair of pawls S S, suitably pivoted to the opposite faces of the disk.

s s denote springs acting against these pawls to force them into engagement with the ratchet-teeth *h* and *i*, respectively. The ratchet-teeth of the two gears are cut with their points projecting downwardly, so that the pawls S S may operate properly in connection therewith. The gears H and I are of unequal diameter, the gear I being the larger. These gears H and I are so placed that the gear I will engage the rack-bar F and the gear H will engage rack-bar F′. Since the rack-bar F′ is curved on an arc having a shorter radius than the radius of arc of rack-bar F, it will be obvious that the teeth thereof will travel through a shorter distance than the teeth of rack-bar F during each vibration of the frame B, and therefore it is necessary that the gear H, which engages the rack-bar F′, should be of less diameter than the gear I, which engages the longer rack-bar, in order that the impulses of rotation which are given to the shaft L at each vibration of the frame B may be equal.

When the frame B is vibrated in one direction, it will be obvious that gear H will rotate in one direction and gear I will rotate in a reverse direction. (See the arrows in Fig. 1.) One of these gears will be so engaged by the pawls S S on the disk R that it will be locked to said disk, and the rotation of the gear will be communicated to the shaft L, whereas the other gear will be moving in such a direction that the pawls S S on the side of the disk R will slip idly over the ratchet-teeth at the next vibration. The gear which was idle on the preceding vibration will become active, inasmuch as its direction of rotation will be reversed, and therefore it will engage the pawls and communicate a rotative motion to the shaft L, while the other gear, which was active before, is now idle. Thus at each vibration of the shaft B one of the gears will operate to communicate a rotary motion to the shaft L. The rotary motion of shaft L will be continuously forward or continuously backward, as the case may be, inasmuch as this actuation of the gears will result in rotating the shaft L continuously in one direction. Therefore the pulley J′ will be driven with a positive constant forward motion or backward motion, as the case may be.

My improved machine for converting reciprocatory into rotary motion may be placed in the position shown in Fig. 3, where the oscillating frame is seen as vibrating in a horizontal direction, and J^2 designates the belt passing around the band-wheel J′, which belt can be connected with any suitable machine or device which it may be desired to drive. Another application of my improved device for converting motion to do actual work is represented in dotted lines in Fig. 1. In this figure the frame B is shown as provided with a bar G, located at right angles to the handle

D and having the pivot B′, on which the oscillating frame swings, serving as a pivot on which the bar G can be vibrated. This bar is formed as a part of the vibrating frame and is located at the pivotal point B′. O O denote, wires, cables, or cords connected to the opposite ends of the bar G. These cables or cords may have any suitable length, and therefore may be run to any desired distance, and their other ends are connected to the opposite ends of a bar O, which is similar to bar G and is pivoted at its center at O′, said bar O being provided with an arm P, which is slotted, its slot receiving a pin on a rod or bar N. It will thus be seen that the oscillation of bar G will serve to oscillate the bar O, and this will in turn communicate a reciprocatory motion to the rod N. Thus the power of my improved device may be communicated to a pump or other apparatus to actuate the same in any desired manner.

Numerous details and changes may be made in the construction and relative arrangement and adaptation of the several parts as experience may suggest, and I reserve the liberty of varying the details of the invention as necessity and practice may require or advise.

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 an oscillating frame having a curved slot provided with parallel rack-bars and a horizontal shaft, together with gear-wheels on said shaft, and an intermediate pawl-provided disk whose pawls engage ratchet-teeth formed in the faces of the said gears, which gears are engaged by the aforesaid rack-bars, all combined and arranged so that when the frame is oscillated the shaft on which the gears are located will be rotated continuously in one direction.

2. As an improvement in means for converting motion, the combination of a main frame, a vibrating frame pivoted thereto and provided with two parallel rack-bars, two gears situated loosely on a shaft and engaging the said rack-bars, and an intermediate pawl-provided disk keyed rigidly to the shaft between the gears, the pawls of said disk being set in recesses in the faces of the gears and engaging ratchet-teeth formed in said faces, all being arranged so that as the vibrating frame oscillates the shaft may be rotated continuonsly in one direction.

3. The combination of the main frame, a vibrating frame pivoted thereto having a curved slot, two rack-bars fixed at the opposite edges of said slot parallel to each other on arcs of concentric circles of which the pivotal point of the frame is the center, a shaft suitably journaled in the frame, two gears on said shaft, said gears being of unequal diameter and engaging the aforesaid rack-bars, an intermediate disk keyed rigidly to the said shaft between gears, said gears being provided on each side with a pair of pawls which are located within recesses in the faces of the gears and engaging ratchet-teeth formed in said faces, and means for oscillating the vibrating frame, substantially as described.

4. The combination of the main frame, the oscillating frame B, pivoted thereto and having the curved rack-bars F and F′, the shaft L, the gears H and I, mounted loosely on said shaft, engaging the rack-bars, and having recessed faces provided with ratchet-teeth, the intermediate pawl-provided disk R, secured rigidly on the shaft between the two gears, the gear M, likewise on shaft L, parallel shaft J, having pinion K, intermeshing with gear M, and the wheel J′ on shaft J, substantially as described.

5. The combination of the main frame, the oscillating frame B, pivoted thereto at B′ and having handle D, the curved rack-bars F and F′, arranged in the slot C of frame B, the gear-wheels H and I on shaft L, the intermediate pawl-provided disk R between the gears H and I, the reciprocating rod E, having pin *c*, entering slot *b* in frame B, and the mechanism for actuating rod E, substantially as described.

6. The combination, with the vibrating frame B, having rack-bars F and F′, of the gears H and I, engaging said rack-bars, said gears having recessed faces provided with ratchet-teeth *h* and *i*, respectively, and said gears being loosely mounted on shaft L, and the disk R, securely keyed to the shaft L and provided on each side with a pair of pawls S, the springs *s* acting to force said pawls into engagement with the ratchet-teeth *h* and *i*, all substantially as described.

In testimony whereof I affix my signature in presence of two witnesses.

CLINTON H. BRANDT.

Witnesses:
WM. R. KEEFER,
D. K. WUNDERLICH.