(No Model.) 2 Sheets—Sheet 1.

O. B. HOWE.

MECHANISM FOR CONVERTING MOTION.

No. 333,226. Patented Dec. 29, 1885.

Fig. 1.

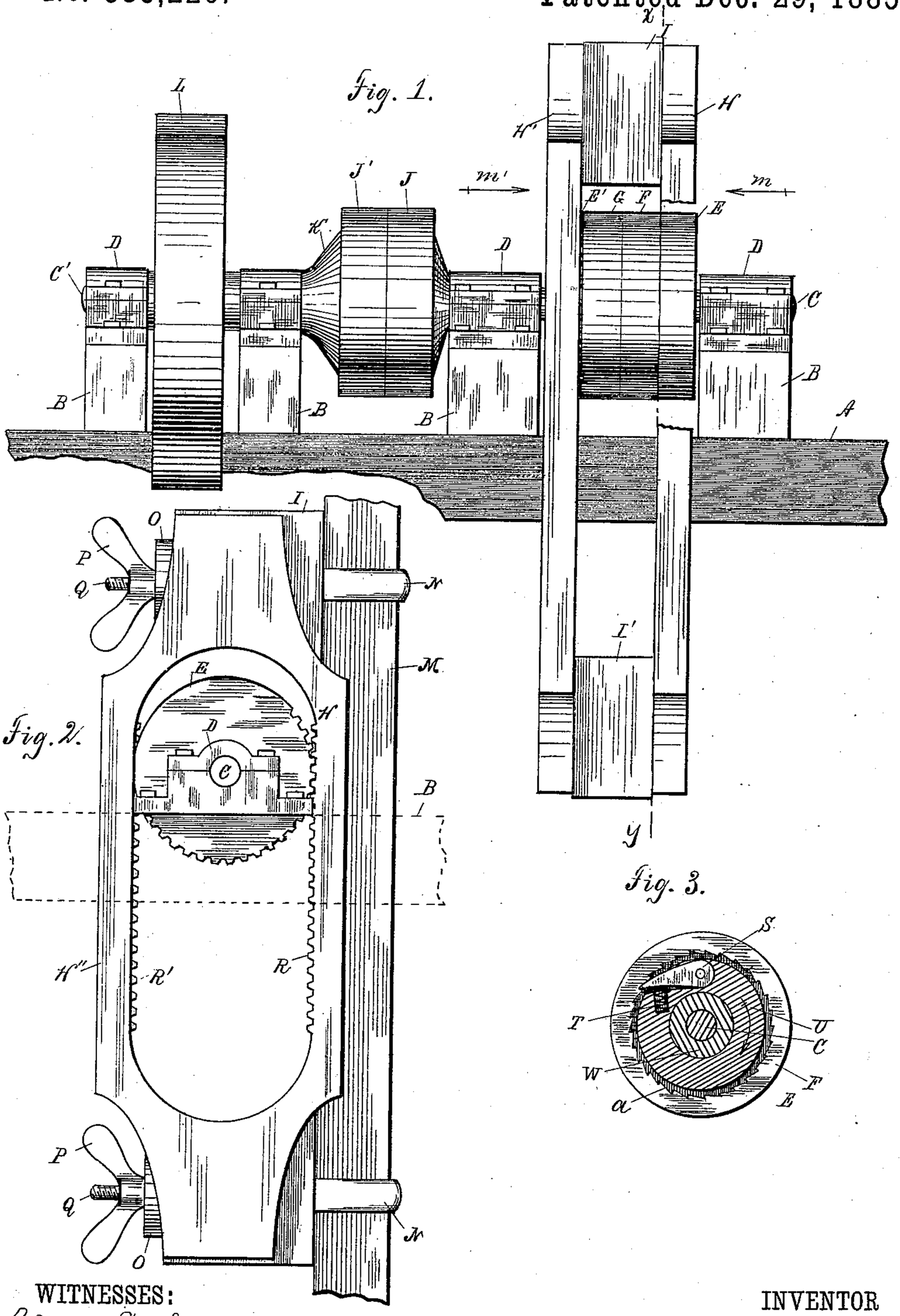


Fig. 2.

Fig. 3.

WITNESSES:

Chas. F. Gilbert.

H. Woodmansee.

INVENTOR

Orlando B. Howe,

BY

Niles & Greene

ATTORNEY

(No Model.) 2 Sheets—Sheet 2.

O. B. HOWE.

MECHANISM FOR CONVERTING MOTION.

No. 333,226. Patented Dec. 29, 1885.

Fig. 4.

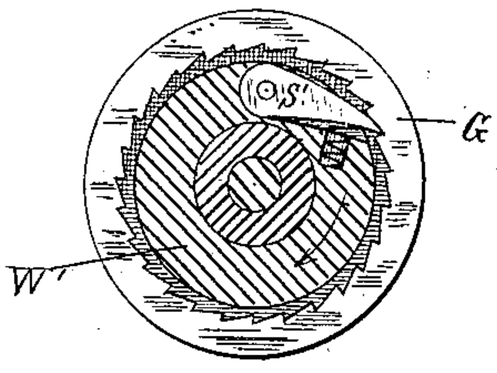


Fig. 5.

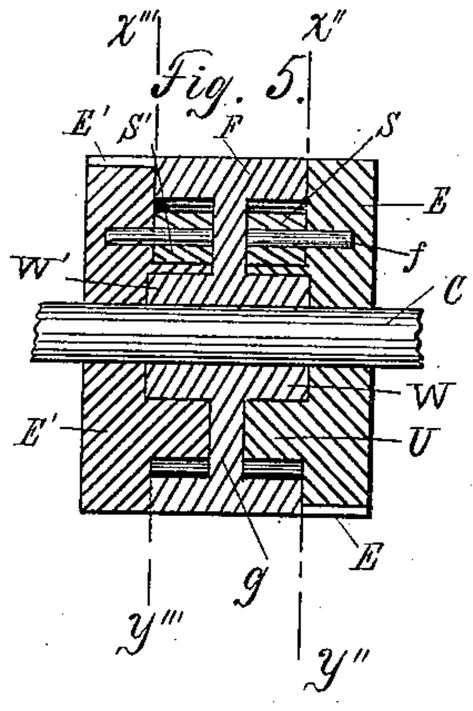


Fig. 6.

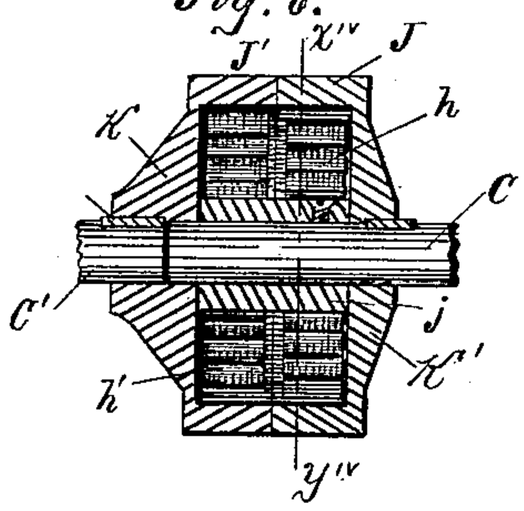


Fig. 7.

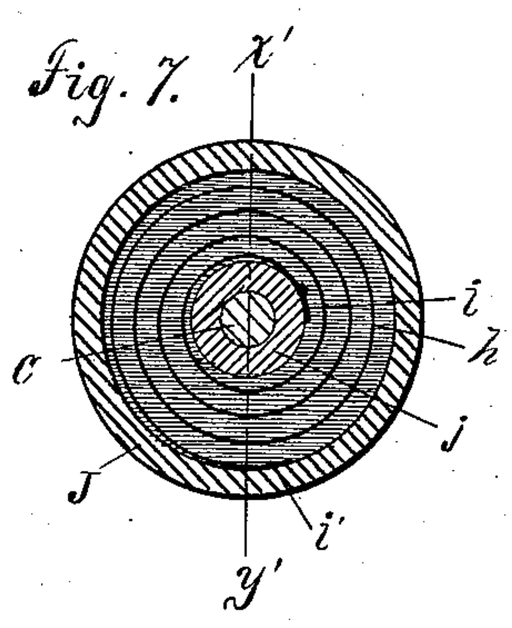
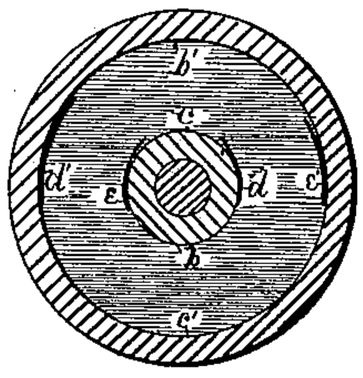


Fig. 8.



WITNESSES:

Chas. F. Gilbert.

J. F. Goodman

INVENTOR

Orlando B. Howe

BY

Wilkes Greene

ATTORNEY

UNITED STATES PATENT OFFICE.

ORLANDO B. HOWE, OF FAIR HAVEN, ILLINOIS.

MECHANISM FOR CONVERTING MOTION.

SPECIFICATION forming part of Letters Patent No. 333,226, dated December 29, 1885.

Application filed October 16, 1885. Serial No. 180,051. (No model.)

To all whom it may concern:

Be it known that I, ORLANDO B. HOWE, a resident of Fair Haven, in the county of Carroll and State of Illinois, have invented certain new and useful Improvements in Mechanism 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 pertains to make and use the same.

In this specification reference is had to the accompanying drawings, in which Figure 1 is a side elevation of my device as applied in an ordinary pumping windmill. Fig. 2 is an elevation of the same mechanism, looking in the direction of the arrow *m* in Fig. 1. Fig. 3 is a view of the cylindrical portion F of Fig. 1, looking in the same direction, section having been made on the line *x y*. Fig. 4 is a similar representation of the adjacent part G, looking in the direction *m'*. Fig. 5 is a vertical section of same parts, the axis of the cylinder lying in the cutting plane. Fig. 6 is a section similar to the last, through the cylinder J J', Fig. 1. Fig. 7 is a section on the line x^{iv} y^{iv}, Fig. 6; and Fig. 8 a like section, but showing an additional feature in the mechanism within the cylinder, as will be hereinafter fully explained.

I am aware that numerous devices for converting motion have been heretofore invented; but most or all of them only partially obtain the result sought, inasmuch as the rotary motion secured is not uniform. My mechanism as a whole obviates this difficulty by first securing, through mechanism believed to be new, an irregular rotary motion, a portion of each impulse from the reciprocating parts being at the same time stored in springs, and then transmitting the motion thus stored through said springs to a shaft, which is thus caused to rotate with nearly perfect uniformity.

In Figs. 1 and 2, H H'' H'' represent two parallel yokes, each rigidly fastened to intermediate blocks, I I', and to these the reciprocating pump-rod of a windmill is attached. The yoke H is provided with teeth R, Fig. 2, upon one of its branches only, and thus acts as a rack-bar engaging with corresponding teeth upon the circumference of a partially-toothed wheel, E, loosely mounted on a horizontal shaft, C. The other yoke is similar in construction, and engages with a similar partially-geared wheel, E', loosely mounted upon the same shaft C; but the engagement in this case is upon the opposite of the shaft C, the rack-bar teeth being shown at R', Fig. 2. Evidently then the motion of the united yokes rotates each of the partially-geared wheels E E', but in opposite directions. Between these wheels E E', rigidly attached to the shaft C, is a cylinder, F G, formed of one or more pieces and containing mechanism whereby the downward stroke of the yokes rotates the shaft C in the same direction as the motion of the wheel E', while the wheel E is rotated in a contrary direction, moving freely upon the shaft C, and whereby the upward motion of the yokes, by means of the wheel E, rotates the shaft C in the same direction as before, while the wheel E' rotates freely in a contrary direction upon the shaft C. This mechanism is shown and will be explained farther on.

In the same straight line with the shaft C is a second shaft, C', which receives motion from the shaft C only through the medium of springs concealed within the cylinder J J', which is rigidly attached to the shaft C', but free to rotate about the shaft C. Upon the shaft C', a pulley, gear, or sprocket wheel, E, is rigidly mounted, and from this power may be transmitted to other machinery to be operated. The shafts C and C' are independently journaled in suitable bearings, D D, and these are supported on suitable timbers, B B A, attached to the windmill-tower.

In Fig. 2, M is the pump-rod of the mill passing through loops N N upon the bolts Q Q. By means of the wing-nuts P P, pressing against the washers O, the pump-rod, whether square or round, may be firmly clamped against the blocks I I'; or, if desired, it may be completely disengaged.

Fig. 5, as has been stated, shows a vertical section through the parts E F G E', Fig. 1, and Figs. 3 and 4 are respectively sections on the lines x''' y''' and x'' y'', Fig. 5. This figure shows that the cylinder F G of Fig. 1 consists of an outer shell, F, from which a central web, *g*, extends inward to a sleeve, W W', rigidly fixed upon the shaft C. From the side of the wheel E an annular boss, U, extends inward about the sleeve W to the web *g*.

Fig. 3 shows that the shell F is provided

with ratchet-teeth upon its interior surface, and that a pawl, S, actuated by a spring, T, both lying in a recess in the annular boss U upon the wheel E, engages with these teeth when the wheel E rotates in one direction, but slides over them when a reverse rotation occurs. The connection between the wheel E′ and the cylinder is precisely similar; but as the yokes engage the wheels E E′ upon opposite sides their respective rotations during the downward stroke of the yokes are as indicated by the arrows in Figs. 3 and 4.

Figs. 6 and 7 illustrate the connection between the shafts C and C′. Rigidly fixed upon the shaft C′ is a cylindrical box, J J′ of suitable diameter, formed of two rigidly-joined parts, J J′. The shaft C extends through the the side K′ and the interior of the box, and for a short distance into the side or hub K, and these hubs K K′ form bearings to support the end of said shaft. A sleeve, *j*, is rigidly attached to this shaft in the interior of the cylinder J J′, Figs. 6 and 7. Two spiral springs, *h h′*, Fig. 6, have their inner ends respectively fixed on diametrically-opposite sides of the sleeve *j*, and their outer ends respectively fixed to diametrically-opposite sides of the cylinder J J′. One of these springs, *h*, is shown in Fig. 7. Motion of the shaft C must be transmitted to the shaft C′ through the coils of these springs, and if motion be given to the shaft C by sudden impulses the springs will be suddenly coiled or wound up, and will be gradually uncoiled by the uniform motion of the shaft C′ caused by their elastic force.

The method of attaching the springs is further illustrated in Fig. 8, a section similar to Fig. 7, the ends only of both springs being shown. The end of a spring being fastened at *d* the other end may be attached at any point *d′* upon the cylinder. The inner end of the second spring is fastened at a point, *e*, on the diametrically-opposite side of the sleeve from the point of attachment of the first, and its outer end, *e′*, is attached at a point diametrically opposite to the element containing the point *d′*. Another pair of springs may be attached at any points, *b b′ c c′*, having the same relation, and so for any desired number of pairs.

The operation of my devices is evident from the explanation already given.

I do not wish to limit myself to the exact constructions shown, for many modifications can be made, and many have been made by me, especially in the mode of attaching and covering the springs connecting the shafts. A single spring, coiled as shown, or as a helix, or as a combination of both forms, gives good results. So parts corresponding to the halves J J′ of the spring-covering cylinder may be attached, respectively, to the two shafts, and compression or extension instead of torsion springs be employed.

What I claim is—

1. In a device for converting motion, the combination of a driving and a driven shaft and springs connecting said shafts, substantially as set forth, and adapted to equalize the motion transmitted from said driving to said driven shaft.

2. Two shafts lying in the same straight line and connected by springs adapted to communicate to the second the rotary motion of the first, whereby sudden application of rotary force to the first shaft flexes said springs and the elasticity of the springs gradually transmits the motion so stored to the second shaft.

3. Springs for transmitting rotary motion from one shaft to a second shaft, said springs beings attached upon diametrically-opposite sides of each of the respective shafts, whereby tension in the springs has no tendency to produce friction of said shafts in their bearings.

4. In a device for converting motion, the combination, with a driving and a driven shaft, of two or more connecting-springs, whose corresponding ends are attached to the driving-shaft or elements lying in different parts of its surface, and thin opposite ends similarly attached to the driven shaft.

5. In a device for converting motion, the combination of a driving and a driven shaft and one or more pairs of connecting-springs, the springs of each pair being attached to each shaft at diametrically-opposite points in the surface thereof.

6. In mechanism for converting motion, the combination of two pinions on the same shaft, each rotated forward and back by a reciprocating rack, means whereby the first engages and rotates their common shaft when its rack moves forward, and the second engages and rotates the same shaft during the reverse motion of its rack, and springs connecting said shaft to a second shaft to be rotated, whereby the reciprocating rock movement produces a substantially uniform rotation of said second shaft.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

ORLANDO B. HOWE.

Witnesses:
ALBERT J. LAMPERT,
P. P. PORTER.