C. CHADWICK.

CONVERTING RECIPROCATING INTO ROTARY MOTION.

No. 191,654. Patented June 5, 1877.

FIG. 1.

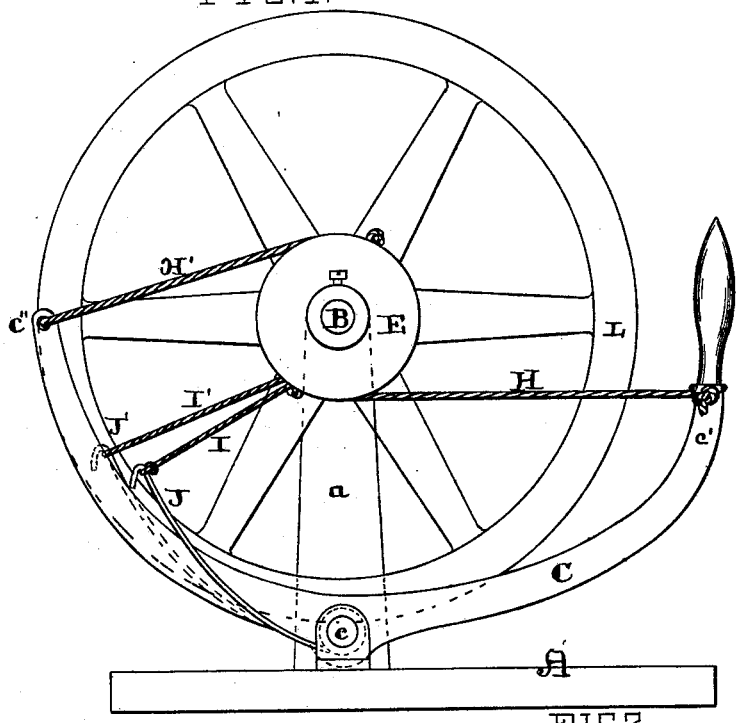


FIG. 3.

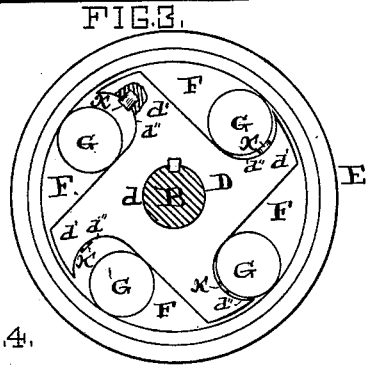


FIG. 2.

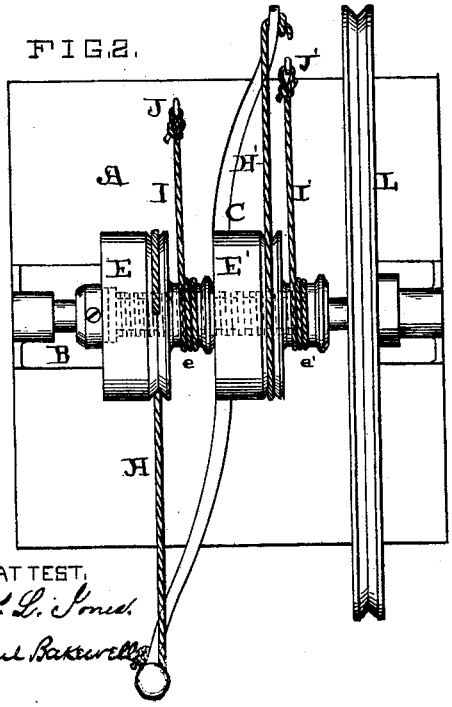
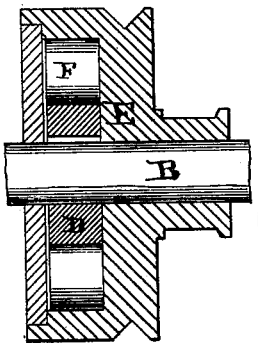


FIG. 4.



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UNITED STATES PATENT OFFICE.

CHARLES CHADWICK, OF HANNIBAL, MISSOURI, ASSIGNOR OF ONE-HALF HIS RIGHT TO PETER B. GROAT, OF SAME PLACE.

IMPROVEMENT IN CONVERTING RECIPROCATING INTO ROTARY MOTION.

Specification forming part of Letters Patent No. **191,654**, dated June 5, 1877; application filed March 19, 1877.

To all whom it may concern:

Be it known that I, CHARLES CHADWICK, of Hannibal, Missouri, have made a new and useful Improvement in Converting Reciprocating into Rotary Motion, of which the following is a full. clear, and exact description, reference being had to the annexed drawing, making part of this specification, in which—

Figure 1 is a side elevation of a device embodying the improvement; Fig. 2, a plan of the same; Fig. 3, a side view of the casing surrounding the shaft to which the rotary movement is imparted, the side of the casing being removed to show the interior mechanism; and Fig. 4 a cross-section of the parts shown in Fig. 3.

Similar letters denote similar parts.

Referring to the drawing, A represents a frame having the uprights *a*, in which is journaled a shaft, B, and being the shaft exhibiting the desired rotary movement. C represents a lever. It is pivoted to the frame at *c*, and is arranged suitably to obtain a reciprocating movement. D represents a peculiarly-shaped construction (for convenience termed a spider) that is keyed to the shaft B and turns with it. It is of the shape shown in Figs. 3 and 4, having a center, *d*, that, in its general outline, is square, and arms *d'*, one or more, standing out from the center, substantially as shown.

The spider D is inclosed in casings E E′ that turn loosely upon the shaft B and around the spider, saving as hereinafter described. The casing and spider have such relative shape as to inclose between the periphery of the spider and the rim of the casing a tapering space, F, (or spaces according to the number of arms *d'*,) that is larger toward the face *d''* of the arm *d'* and smaller toward the back of the succeeding arm.

G represents wedges arranged loosely within the spaces F. They are preferably in the form of disks, as shown, and, in diameter, large enough, when against the face *d''* of the arm, to nearly fill that end of the space and touch both the spider and the casing.

A cord, H, extends from one end, *c'*, of the lever to one, E, of the casings, passing around the casing from the direction of the smaller end of the space F, and another cord, H′, extends from the other end *c''* of the lever similarly to and around the other casing E′.

The operation is as follows: Let the end *c'* of the lever be depressed so as to draw the cord H, and, from being connected with the casing E, to turn the latter partly around. In turning, the casing comes in contact with the wedges G and draws them away from the faces *d''* of the arms *d'* and into the position occupied by the wedges in the other clutch, where they operate, by coming in contact with both the spider and the casing, to bind these two parts together, and, in consequence, to rotate the spider, and with it the shaft B. The latter continues to rotate until the downward movement of the end *c'* of the lever ceases. The other end *c''* of the lever now being depressed in turn, the rotation of the shaft is maintained, through the action of the cord H′ upon the casing E′ and spider therein, and the movement made continuous. It is necessary, however, as each end of the lever is elevated, to reinstate the casings and cords in their original positions, respectively. To this end the following mechanism is employed: Cords I I′ are attached at one end to the casings E E′, respectively, and wound around the same in the opposite direction to that of the cords H H′, and at the other end are connected with springs J J′, respectively, that are arranged to produce a tension upon them. Now, as soon as the strain upon either cord H or H′ is relieved, the springs J J′ alternately operate to turn the casings E and E′ back upon the shaft B, and, in turning the casings, to wind the cords H and H′ again upon them. As the casings turn back the wedges are relieved and allowed to fall back into their original positions against the faces *d''*, where they cease to bind the casing and spider together until again drawn forward.

The cords I and I′ are, preferably, wound around a smaller portion or hub, *e e'*, of the casing. Springs K are inserted in the faces of the arms *d* to facilitate the action of the wedges. L represents the fly-wheel.

Several advantages accrue from the above-described construction. The difficulty arising from the dead-center of a crank is entirely ob-

viated. The rotary movement of the shaft can be initiated whatever position the lever is in, and can be maintained however short or long the stroke of the lever may be. The movement is practically noiseless, and the working parts of the machine are favorable to durability.

It is apparent that, so far as wedging the spider and casing together is concerned, the result can be equally as well attained by making the spider round and the inner side of the rim of the casing irregular, and of such a shape as to inclose between the spider and rim a space or series of spaces of a tapering form for the wedge or wedges to fall into.

I claim—

The combination of the shaft B, lever C, spider D, casings E E′, rollers G, cords H H′ I I′, and springs J J′, substantially as described.

CHAS. CHADWICK.

Witnesses:

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R. H. KNIGHTON.