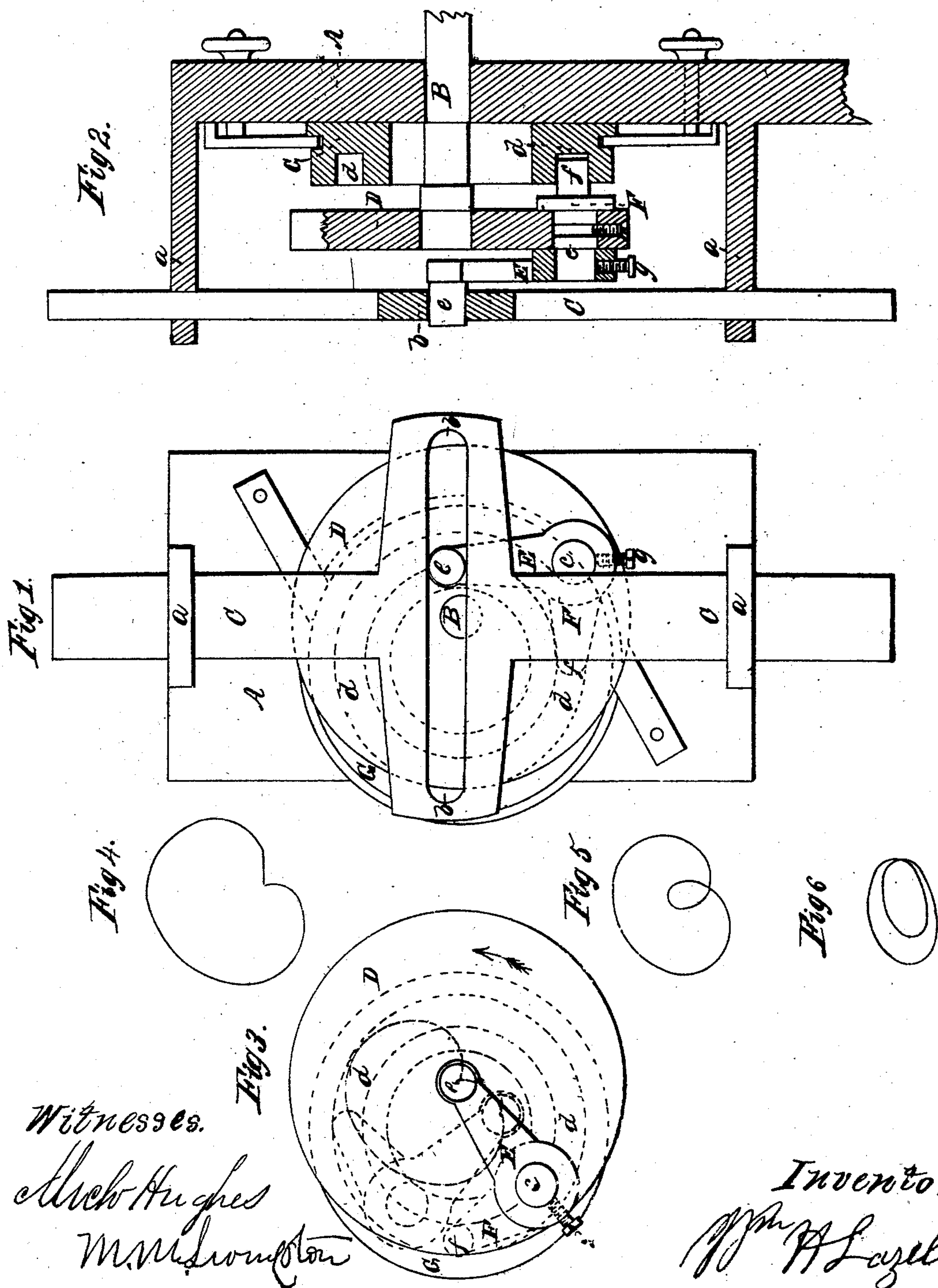


W. H. LAZELLE.

CONVERTING ROTARY INTO RECIPROCATING RECTILINEAR MOTION.



UNITED STATES PATENT OFFICE.

WILLIAM H. LAZELLE, OF NEW YORK, N. Y.

IMPROVEMENT IN CONVERTING ROTARY INTO RECIPROCATING RECTILINEAR MOTION.

Specification forming part of Letters Patent No. 27,057, dated February 7, 1860.

To all whom it may concern:

Be it known that I, WILLIAM H. LAZELLE, of the city, county, and State of New York, have invented certain new and Improved Means of Converting Rotary into Reciprocating Rectilinear Motion; and I do hereby declare that the following is a full, clear, and exact description of the same, reference being had to the accompanying drawings, forming part of this specification, in which—

Figure 1 is an elevation of my invention. Fig. 2 is a vertical section of the same at right angles to Fig. 1. Fig. 3 represents part of the mechanism shown in Fig. 1 in a different position. Figs. 4, 5, 6 are diagrams of some of the movements of the wrist of the compound crank.

Similar letters of reference indicate corresponding parts in the several figures.

My invention consists in the combination, with a rotary shaft and a slotted rod or other piece arranged to slide or work rectilinearly in a plane perpendicular to the axis of the shaft, of a compound crank of peculiar construction carried by said shaft, and having its wrist fitted to the slot of the said rod or piece, and a stationary eccentric guide surrounding the axis of the shaft and receiving a guide-pin on the crank, the whole operating together, so that by the rotation of the shaft a great variety of irregular reciprocating rectilinear movements of the slotted rod may be obtained.

To enable others skilled in the art to make and use my invention, I will proceed to describe its construction and operation.

A is a standard or framing containing the bearing for the shaft B, and having attached to it the guides *a a*, in which the slide C is fitted to work perpendicularly to the axis of the shaft B, said slide containing a straight parallel slot, *b*, arranged at right angles to the direction of which it is permitted to work by the guides *a a*. To the shaft B is firmly secured a disk, D, instead of which a simple crank may be used, said disk or crank containing a bearing for a short shaft or pin, *c*, to one end of which is firmly secured a crank-arm, E, whose wrist, *e*, fits in the slot *b* of the slide, and to the other end of which is firmly secured another crank-arm, F, whose wrist *f* fits in a circular stationary groove or way, *d*, arranged eccentrically to but surrounding the shaft B.

In the example of my invention represented the eccentric groove or way *d* is formed in a plate, G, which is attached to the standard or frame in such a manner as to be adjustable relatively to the shaft to vary the degree or direction of its eccentricity; but in most cases the position of the groove may be absolutely fixed.

The disk or crank D, the shaft *c*, arms E F, and wrists *e f* combined constitute what I have hereinbefore spoken of as the "compound crank." The length of the arm E, from the center of the shaft *c* to the center of the wrist *e*, should be about the same as the distance between the center of the shaft B and the center of the shaft *c*, and the length of the arm F may be about or nearly the same as the length of the arm E. The arm E is represented as being adjustable on the shaft *c* relatively to the arm F, and secured by a set-screw, *g*; but this in practice will be generally unnecessary.

The action of the compound crank as it revolves with and around the shaft B under the control of the stationary eccentric guide *d* is as follows: The shaft *c* always moves in a circle concentric to the shaft B; but the wrist *f* is carried round in the circle of the eccentric guide *d*, and by that means the shaft *c* is caused to oscillate in its bearing in the disk or crank D, and the wrist *e* is caused to have a movement which approximate, less or more to a perfect circle, according as the guide *d* is more or less eccentric to the shaft B, but which is of such character as by its action in the slot *b* to produce two distinct reciprocating rectilinear movements of slide C, or a single movement back and forth, with a rest at one point in its movement in one direction for every revolution of the shaft B, according to the degree and direction of eccentricity of the guide *d* and the positions of the arms E and F relatively to each other. The figure described by the wrist *e*, with the arrangement of the eccentric and arms represented in Figs. 1 and 2, is represented in blue color upon Fig. 3, and also in the diagram Fig. 4, and the said wrist, in describing this figure within the slot *b*, gives the slide an uninterrupted movement in one direction and a movement in the other direction which is temporarily suspended or almost suspended at a point near its lower end, such suspension taking place during the movement

in the upward or downward direction, according to the direction of the revolution of the shaft B. When the shaft revolves in the direction of the arrow shown on the disk D in Fig. 3, the stoppage takes place in the upward portion of the movement, and the movement obtained is precisely what is desired for, and ordinarily given to, the needle-bar of a sewing-machine. By varying the relation of the arms E and F, the wrist *e* may be made to describe such figures as are represented by the diagrams, Figs. 5 and 6, either of which will give the slide C two strokes of unequal length for every revolution of the shaft B; and it is obvious that by varying the positions of the arms and the eccentric a great variety of movements of similar character to those described may be produced, and these movements

may be further varied by making the eccentric guide *d* of other than circular form.

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

The combination, with a rotary shaft, B, and a slotted rod or slide, C, of a compound crank, D *c* E F *e* *f*, constructed and applied substantially as herein described, in connection with a stationary eccentric groove or way, *d*, for the purpose of obtaining an irregular reciprocating rectilinear movement of the said rod or slide by the rotary movement of the said shaft.

WM. H. LAZELLE.

Witnesses:

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