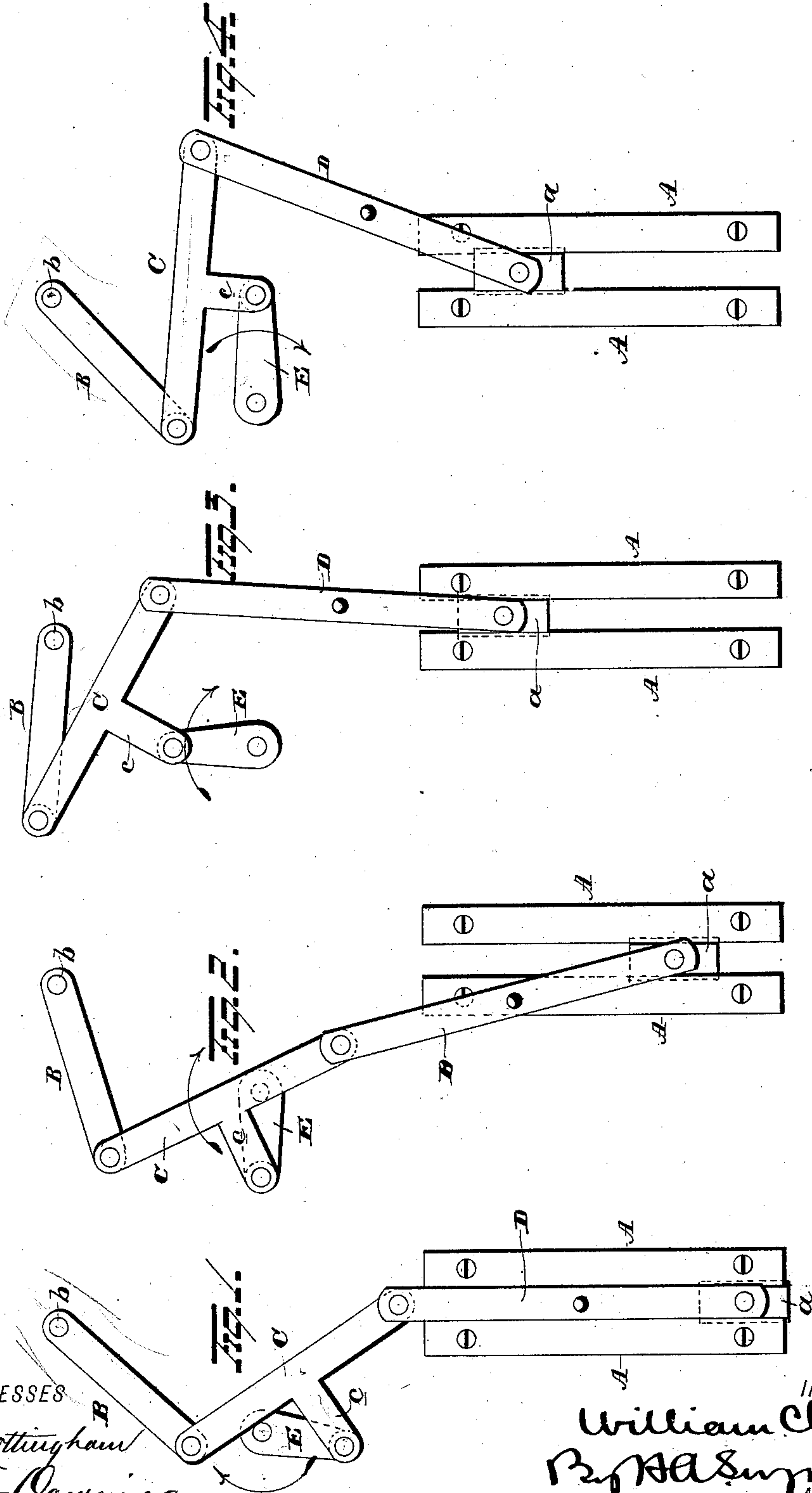


(No Model.)

W. CLEMSON.
MECHANICAL MOVEMENT.

No. 308,653.

Patented Dec. 2, 1884.



WITNESSES

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WILLIAM CLEMSON, OF MIDDLETOWN, NEW YORK.

MECHANICAL MOVEMENT.

SPECIFICATION forming part of Letters Patent No. 308,653, dated December 2, 1884.

Application filed September 30, 1884. (No model.)

To all whom it may concern:

Be it known that I, WILLIAM CLEMSON, of Middletown, in the county of Orange and State of New York, have invented certain new and useful Improvements in Mechanical Movements; 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.

My invention relates to an improvement in mechanical movements, the object of the same being to transmit motion from a reciprocating rod to a crank in such a manner that the crank-arm and length of stroke of the reciprocating rod may be diminished, while the effective force transmitted remains undiminished or is increased.

With these ends in view my invention consists in certain features of construction and combinations of parts, as will be hereinafter described, and pointed out in the claims.

In the accompanying drawings, Figure 1 represents the device in side elevation at the beginning of a stroke; Fig. 2, the same at the end of the first quarter-revolution of the crank; Fig. 3, at the end of the half-revolution, and Fig. 4 at the end of the three-quarter revolution.

A represents a set of ways or guides between which a bar or slide, *a*, is adapted to be reciprocated by means of steam, hand, or any other power. A vibrating arm or bar, B, is secured at one end to a stationary pivot or hinge, *b*, located on or nearly on a line with the slide *a*. A lever, C, is pivotally secured at one end to the free end of the arm B, the opposite end of C being connected with the slide *a* by the rigid connecting-rod D. The lever C is provided at its central portion with an arm, *c*, rigidly secured thereto and preferably extending at right angles therewith. The end of *c* is pivotally attached to a crank-arm, E. The reciprocating of the slide *a* revolves the crank-arm E.

The relative lengths of the several parts above described are substantially as follows: Considering the length of the crank-arm E as one, the vibrating arm B is about two, the lever C about three, the length of arm *c* one, the length of the connecting-rod D four, and

length of stroke of slide *a* about three and one-half. Other proportions than those given may be found by theory and experiment to be more advantageous; hence I do not wish to be understood as limiting myself to these.

My theory of the movement is as follows: Assuming that a two-inch crank operated by a connecting-rod in the ordinary way will average one inch of full power in passing from dead-center to dead-center, or from zero to its maximum and on to zero, and assuming the crank E as one inch in length, it will be observed that the crank E is pushed or drawn by the arm *c* at or nearly at right angles—viz., at full power—during nearly its entire revolution. This should make the crank E nearly or quite as efficient as the two-inch crank as ordinarily run. There is still a reserve force in the lever C equal to a one-inch crank as ordinarily run—that is, when the lever C is at its best point in connection with the one-inch crank it doubles its power; hence the average power of the crank E during its revolution is nearly equal to that of a three-inch crank as ordinarily run. Furthermore, the length of stroke of the slide *a* is about twelve per cent. less than the length of stroke required for a two-inch crank as ordinarily run. The shortening of the stroke is due to the combined effect of the vibrating arm B and the arm *c* on the lever C. Experiment has shown that the increased power exists and that the movement has peculiar and marked advantages.

Having fully described my invention, what I claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a reciprocating rod or slide and a crank, of a lever pivotally attached to the crank, to the slide, and to a vibrating arm, the point of attachment of the lever to the crank lying outside of a line passing through the pivotal points of the lever with the slide and vibrating arm, whereby the reciprocating bar rotates the crank, substantially as set forth.

2. The combination, with a reciprocating slide, a crank, and a vibrating arm, of a lever pivotally attached to the vibrating arm and to the slide, the lever being provided with a third arm, by which it is pivotally attached to

the crank, the whole constructed to operate in the manner substantially as set forth.

3. The combination, with a reciprocating rod or slide, of a connecting-rod, a three-arm lever, a vibrating arm, and a crank, connected in the manner and adapted to operate substantially as set forth.

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

WILLIAM CLEMSON.

Witnesses:

J. J. ELLIS CLARK,
J. L. WIGGINS.