

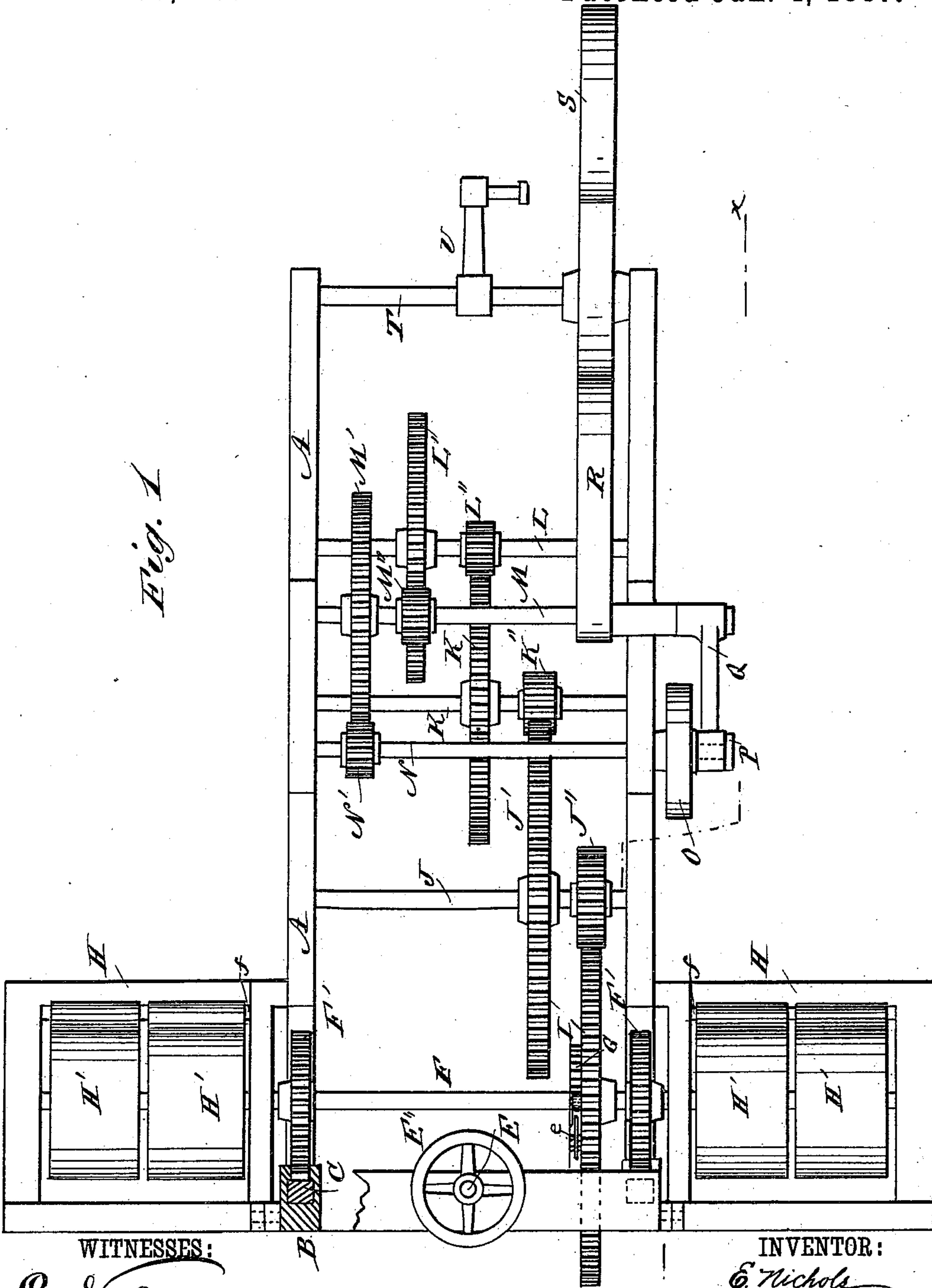
(No Model.)

2 Sheets—Sheet 1.

E. NICHOLS & D. W. CLARK.
SPRING MOTOR.

No. 355,621.

Patented Jan. 4, 1887.



WITNESSES:

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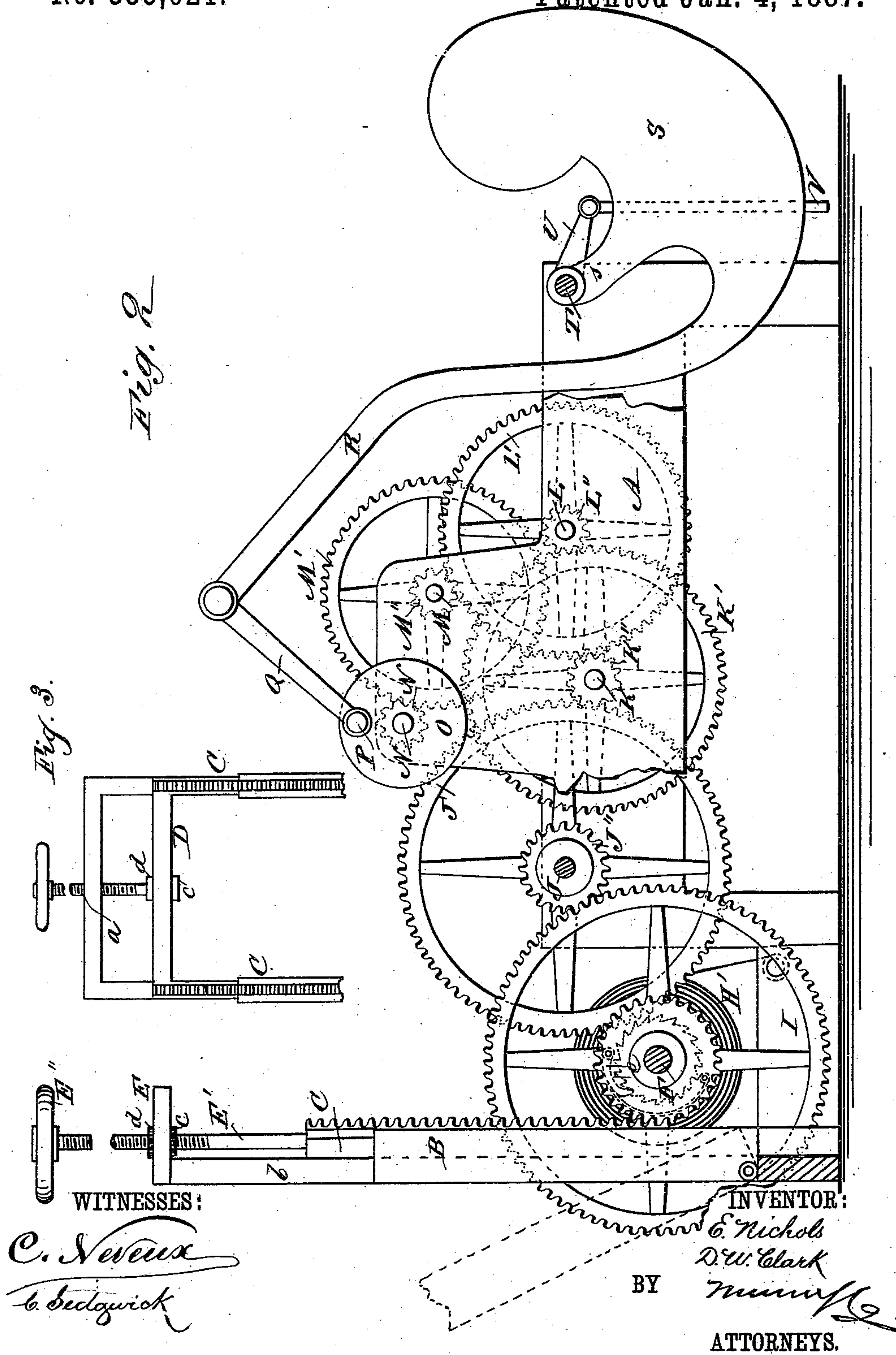
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2 Sheets—Sheet 2.

No. 355,621.

Patented Jan. 4, 1887.



UNITED STATES PATENT OFFICE.

EMANUEL NICHOLS, OF UNADILLA, AND DANIEL W. CLARK, OF GRASS LAKE, MICHIGAN.

SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 355,621, dated January 4, 1887.

Application filed April 1, 1886. Serial No. 197,432 (No model.)

To all whom it may concern:

Be it known that we, EMANUEL NICHOLS, of Unadilla, in the county of Livingston, State of Michigan, and DANIEL W. CLARK, of Grass Lake, in the county of Jackson and State of Michigan, have invented a new and Improved Spring-Motor, of which the following is a full, clear, and exact description.

Our invention relates to the construction of a spring-motor; and it consists, more particularly, of a peculiar arrangement for accelerating and regulating the reciprocations of the rock-shaft through which the power is applied; and the invention further consists of a novel spring-winding attachment and of certain other details of construction and combinations of parts to be hereinafter explained, and specifically pointed out in the claims.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in all the figures.

Figure 1 is a plan view of our improved spring-motor, a portion of the frame supporting the spring-winding mechanism being cut away to disclose the construction of the parts. Fig. 2 is a side elevation of the motor, wherein a portion of the parts is shown in section, the view being taken on broken line *xx* of Fig. 1; and Fig. 3 is a view of the upper portion of the spring-winding attachment.

In the drawings above referred to, A represents the supporting-frame of the several parts of the motor, and at one end of this frame there are arranged hinged vertical posts B, provided with slots in their inner face, in which there are arranged toothed racks C, the upper ends of which are rigidly connected by a cross-bar, D. The posts B are each formed with upwardly-extending sections *b*, which carry a cross head or beam, E, that is provided with a central threaded socket, *a*, in which there is arranged a vertical threaded shaft, E', the lower end of said shaft passing through the cross-bar D to engage with a nut, *c*, a collar, *d*, being formed upon the shaft in position to rest upon the upper face of the cross-bar.

The main shaft of the motor, which is shown at F, is provided with two gear-wheels, F' F',

that are rigidly mounted on the shaft, a loose gear, I, and a ratchet-wheel, G, that is engaged by a pawl, *e*, carried by the gear I, said ratchet-wheel being fast on the shaft.

Upon either side of the main supporting-frame A there are arranged auxiliary frames H H, across which the shaft F extends to engage with springs H', one end of each of said springs being fixed to a cross-rod, as *f*, that is rigidly fixed in the auxiliary frame, while the other end is secured to the shaft F.

The large gear I engages with a pinion, J'', carried by a shaft, J, which shaft also carries a large gear-wheel, J', that engages with a pinion, K'', upon a shaft, K, which carries a gear, K', the accelerating-gearing being continued through the gears L' M' and pinions L'' M'' of the shafts L and M, respectively, motion being finally imparted to a crank-shaft, N, through its pinion N', said pinion being engaged by the gear M'. To one end of the shaft N there is keyed a balance-wheel, O, that is provided with a crank-pin, P, which, through the medium of a connecting-rod, Q, is connected to the upwardly-extending-arm R of a regulator, S, that is rigidly fixed to and supported by a rock-shaft, T, which carries a lever-arm, U, to which there is fixed the connecting-rod V, leading to the mechanism which the motor is designed to operate.

The swinging regulator is of peculiar construction, the main body of the regulator consisting of a heavy weight, from which there extends a small arm, *s*, which is fixed to the shaft T, the lower and outer face of the weighted portion of the regulator being substantially concentric with the shaft T. In addition to the arm *s*, the regulator, as above stated, is provided with an arm, R, said arm extending upward in front of the shaft T, and then forward to engage with the connecting-rod Q.

In winding up the springs H', the shaft E' is turned by means of its hand-wheel E'' so as to force the racks C C downward, thus rotating the gears F' F' and turning the shaft F and winding the springs H'. If the springs are to be fully wound up, it will of course require more than one downward movement of the racks; but this movement is readily brought about, as, from the construction de-

scribed, it will be understood that when the hand-wheel E'' is turned so as to draw the shaft E, and consequently the racks C C, upward the posts B can be moved back on their pivotal connection, thus releasing the racks C from engagement with the gears F' F', the parts at this time being held by a stop applied to any portion of the train of gearing or to the regulator.

10 Unless the springs are very heavy, they might be wound by a simple crank attached to the end of the shaft F. After the springs have been wound, their action upon the shaft F will cause such shaft to revolve, and this

15 forward rotary motion of the shaft F will be transmitted through the intermediate accelerating-gearing to the crank-shaft N, which, in revolving, will impart a reciprocating motion to the regulator; and it will be readily

20 understood from the construction described, and illustrated in the drawings, that the motion imparted to the regulator will be by it transmitted to the shaft T, thus giving a reciprocating motion to the connecting-rod V,

25 leading to the mechanism which it is desired to actuate; and it will also be understood that the motion of the shaft T will be regulated and defined, owing to the pendulous character of the regulator S.

30 Although this motor is applicable for use in

the running of any form of light machinery, it is designed more particularly for use in connection with a pump.

Having thus fully described our invention, what we claim as new, and desire to secure by Letters Patent, is—

1. The combination, with a mainspring and its winding mechanism, of a train of accelerating-gearing, a crank-shaft, N, operated thereby, the rock-shaft T, having an arm, U, the pendulous regulator S, having an arm, s, rigidly connected to rock-shaft T, and an arm, R, and the rod Q, connecting the outer end of arm R with the crank-shaft N, substantially as set forth.

2. The combination, with a shaft, F, carrying a fixed ratchet-wheel, G, and connected with springs H', of gear-wheels F', racks C C, threaded shaft E', a train of accelerating-gearing, substantially as described, a crank-shaft, N, driven by said accelerating-gearing, and a regulator, S, connected to the crank-pin P of the shaft N by a rod, Q, and connected to and supported by a rock-shaft, T, formed with an arm, U, substantially as described.

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Witnesses:

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