J. W. H. DOUBLER.

Mechanical-Motor.

No. 167,999. Patented Sept. 21, 1875.

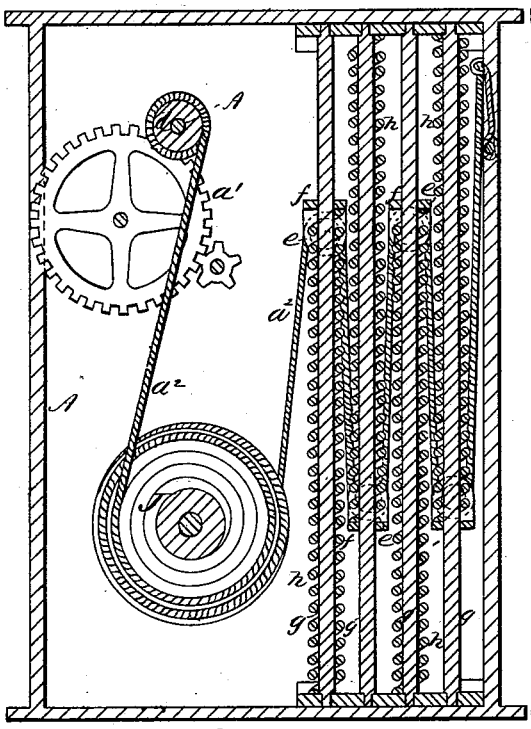

Fig. 1

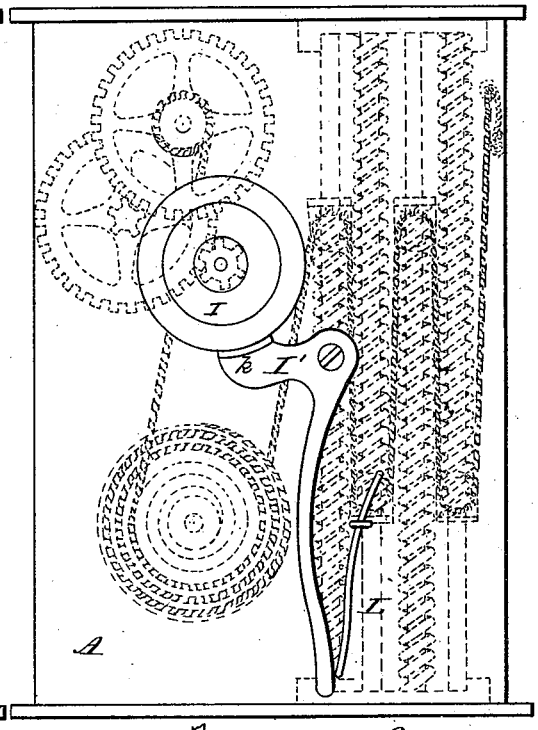

Fig. 2

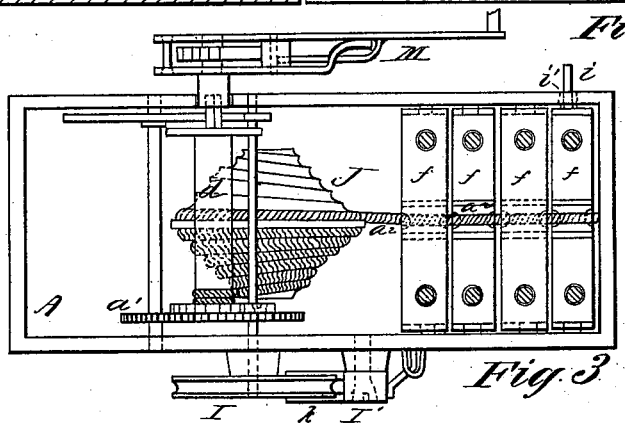

Fig. 3

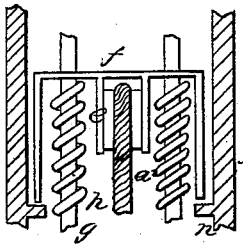

Fig. 4

Witnesses

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UNITED STATES PATENT OFFICE.

JOHN W. H. DOUBLER, OF PHILADELPHIA, PENNSYLVANIA, ASSIGNOR OF ONE-HALF HIS RIGHT TO WM. V. T. CRAMER, OF SAME PLACE.

IMPROVEMENT IN MECHANICAL MOTORS.

Specification forming part of Letters Patent No. **167,999**, dated September 21, 1875; application filed April 28, 1875.

To all whom it may concern:

Be it known that I, JOHN W. H. DOUBLER, of Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented a certain new and useful Mechanical Motor; and 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 it, reference being had to the accompanying drawings, which form part of this specification, in which—

Figure 1 is a vertical section of my invention. Fig. 2 is a front elevation. Fig. 3 is a top view; and Fig. 4 is a sectional detail.

This invention has relation to mechanical motors for the propulsion of sewing-machines, and all other kinds of machinery to which such motors are applicable; and it consists in the novel construction, combination, and arrangement of devices having specially in view the utilization of a series of spiral springs, the same being so connected by cord and pulley mechanism that their united expansive powers may be employed to produce a continuous motion corresponding to their aggregate lengths, or, in other words, that a series of short spirals, compactly arranged, may be made to perform the same amount of work or effect the same duration of motion as a single spring equaling their combined lengths. This invention also consists in the provision in a motor of a double fusee, to compensate for the variation in the tension of the springs, as hereinafter described.

Referring to the accompanying drawings, A designates a suitable box or cabinet, containing the working parts of the motor. B represents the winding-shaft, through which motion is transmitted to the power-shaft *a* by means of suitably-arranged gearing a^1, &c. This motion is obtained from a set of spiral springs, through the medium of a cord, a^2, passing around a fusee, which compensates for the variation in the tension of the springs under different degrees of contraction and expansion. From said fusee the cord passes in one direction to a drum, *d*, on the winding-shaft B, and, in the other direction, is carried alternately over and under a series of pulleys, *e e*, &c., attached to plates *f f*, which slide upon upright rods *g g*, around which are wound the spiral springs *h h*, &c., arranged in pairs, bearing alternately upon the upper and lower surfaces of said plates. The end of the cord is fastened to the frame of the motor.

In winding up the apparatus the springs are merely compressed in the direction of their length by the movement of the plates upon the rods, the plates traveling alternately upward and downward, or all toward a central point, in consequence of the shortening of the cord. As the springs expand the plates separate, lengthening the cord and unwinding the same from the drum on winding-shaft. The motion so imparted to the latter is communicated by the gearing to the power-shaft.

The duration of the motion resulting from the expansion of the springs depends upon their length and number. Their successive numbers and length do not, however, in any degree influence the amount of power, the latter being dependent upon the individual character, or that which is the equivalent, the number of springs taken to complete each set of the series, the same being a matter of discretion.

The completion of the contraction of the springs is externally indicated by means of a pointer, *i*, projecting from one of the sliding plates through a slot, *i'*, in the back of the cabinet, as shown. The fusee J is of a peculiar character, diminishing toward both ends from the middle part or greatest diameter, as shown. The cord from the spring-pulleys to the drum unwinds from one end of the fusee toward the greatest diameter, and on the other side winds from the greatest diameter toward the opposite end. Thus, according as the tension of the springs increases by their contraction, the leverage of the fusee increases so as to compensate for said increase of tension. The same compensation occurs in a reverse direction, as the springs expand the wound portion of the cord unwinding, and the balance winding upon the fusee. I designates a fly or belt wheel upon the end of the power-shaft, and I' a brake-lever, having a cushion, *k*, of rubber or other suitable ma-

terial on its short arm, which, being pressed against the periphery of the wheel I, either regulates its speed or arrests its rotation altogether, according to the degree of pressure. A spring, L, bearing against the end of the long arm of said lever, serves ordinarily to keep the cushion from contact with the wheel. M designates a winding-key, having a ratchet and pawl applied to a pivoted handle, so that the stem of the key can be turned in one direction only, thus allowing the handle to be drawn back after each half revolution. *n n* are stops to arrest the movement of the sliding plates and prevent their over-contraction.

I claim—

1. A mechanical motor, receiving impulse from a series of spiral springs, connected by means substantially as described, so as to produce motion corresponding in duration to their aggregate lengths.

2. The combination, with the spiral springs *h h*, of the sliding plates *f f*, the pulleys *e e* attached to said plates, and the cord a^2, passing around said pulleys from the winding-shaft, and causing the plates to rise and descend alternately when the springs are compressed, and allowed to expand, substantially as described.

3. In a motor, the double fusee, constructed and operating as and for the purpose set forth.

In testimony that I claim the foregoing I have hereunto set my hand this 19th day of April, 1875.

JOHN W. H. DOUBLER.

Witnesses:
GEO. C. SHELMERDINE,
M. DANL. CONNOLLY.