No. 690,882. Patented Jan. 7, 1902.

R. H. SEARS.

AUTOMATIC WINDING MECHANISM FOR SPRING MOTORS.

(Application filed May 21, 1900.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

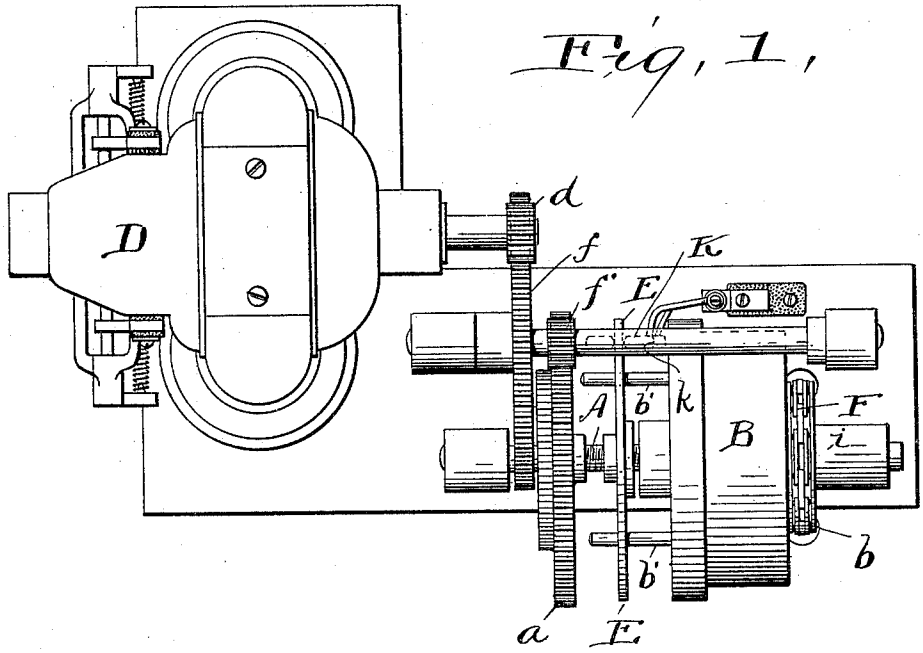
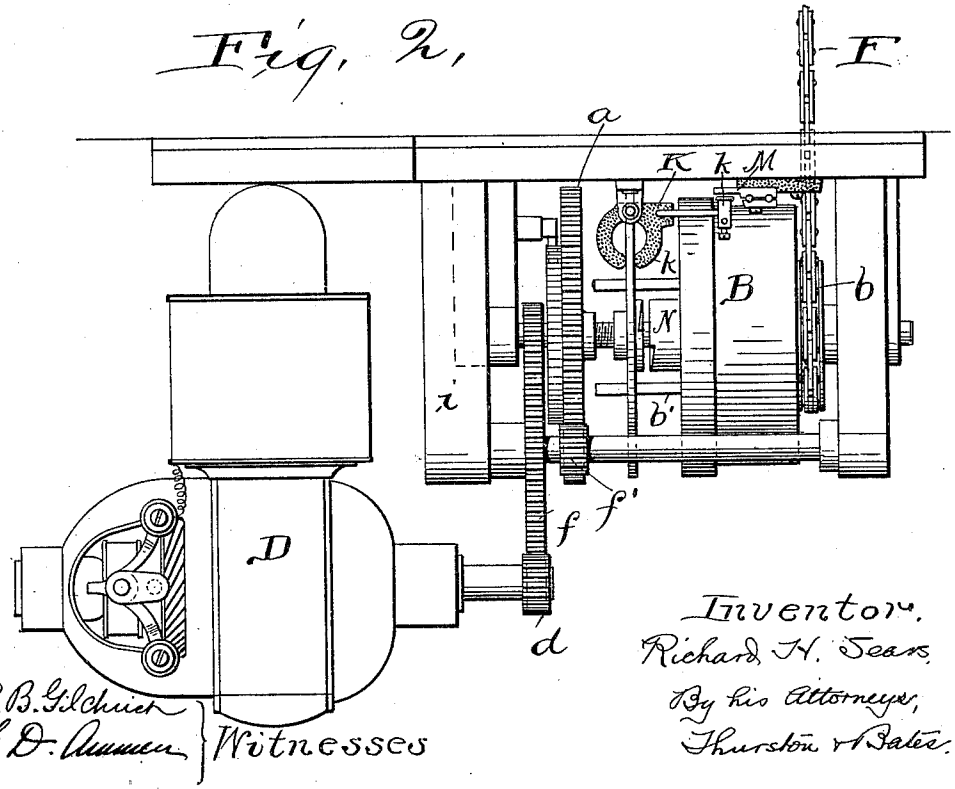


Fig. 2.



Inventor.
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E. B. Gilchrist
H. D. Ammen } Witnesses

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Fig. 3.

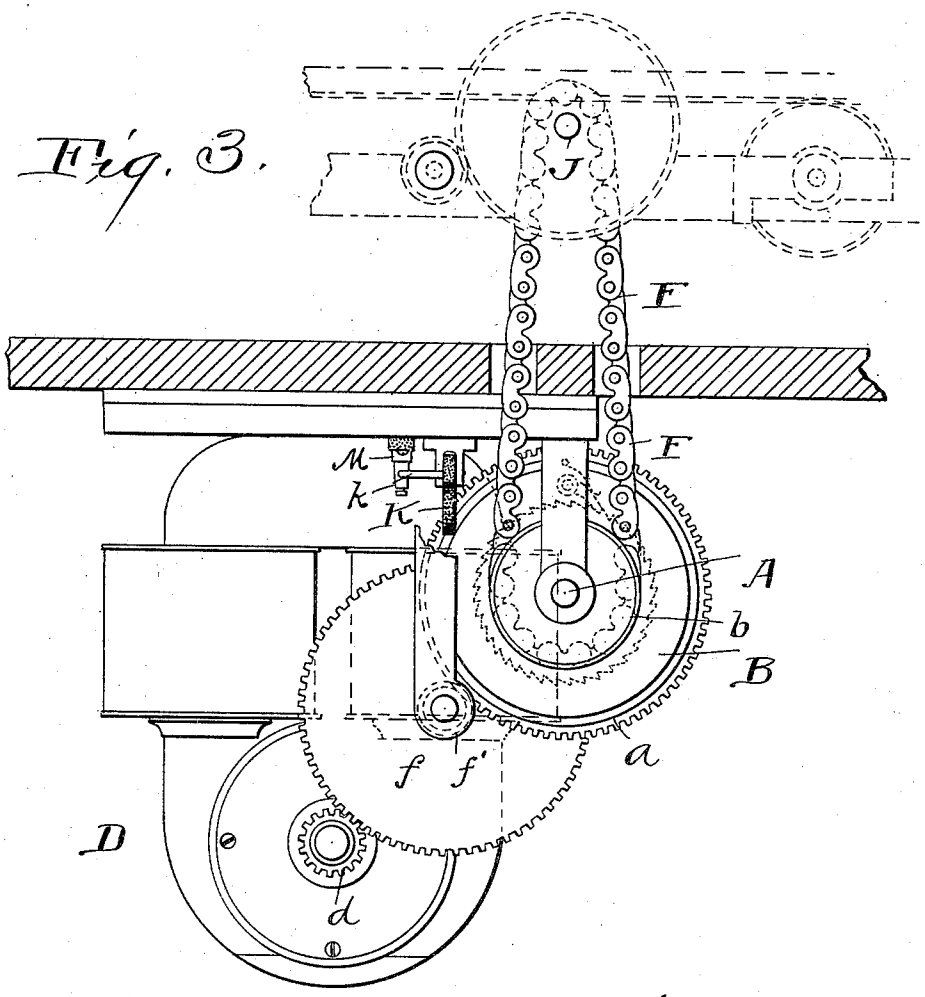
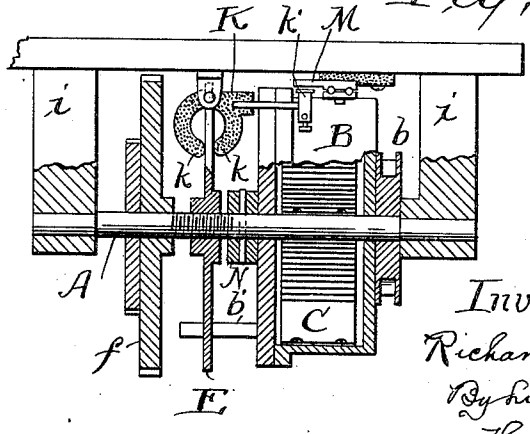


Fig. 4.



Witnesses
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UNITED STATES PATENT OFFICE.

RICHARD H. SEARS, OF CLEVELAND, OHIO.

AUTOMATIC WINDING MECHANISM FOR SPRING-MOTORS.

SPECIFICATION forming part of Letters Patent No. 690,882, dated January 7, 1902.

Application filed May 21, 1900. Serial No. 17,343. (No model.)

To all whom it may concern:

Be it known that I, RICHARD H. SEARS, a citizen of the United States, residing at Cleveland, in the county of Cuyahoga and State of Ohio, have invented a certain new and useful Improvement in Automatic Winding Mechanism for Spring-Motors, of which the following is a full, clear, and exact description, reference being had to the accompanying drawings.

The object of my invention is to automatically maintain a substantially uniform power in a spring-motor which is employed as the immediate source of power for driving mechanisms of various sorts.

To that end the invention involves the employment of a supplemental motor for winding up the spring and mechanism which will be automatically operated by the spring-motor, whereby when its spring is partially unwound the supplemental motor will wind it up and will discontinue such winding action when the spring is sufficiently wound.

The invention consists in the construction and combination of parts hereinafter described, and pointed out definitely in the claims.

In the drawings, Figure 1 is a bottom plan view of mechanism embodying my invention. Fig. 2 is a front elevation thereof. Fig. 3 is an end elevation, and Fig. 4 is a longitudinal sectional view through the spring-motor mechanism.

The invention, as shown, is embodied in mechanism especially contrived for use in a type-writing machine; but obviously this is only one of the many uses for which the invention is applicable. Because it is especially contrived for the described use, the mechanism, as shown, is suspended from the under side of the bed plate or table I upon which the type-writing mechanism is to be supported.

Referring to the parts by letters, A represents the rotatable shaft of a spring-motor. B represents a spring-barrel which is rotatably mounted upon this shaft.

C represents a volute spring which is inclosed within the spring-barrel around the shaft, and one end of the spring is made fast to the shaft and the other to the spring-barrel. The spring is wound up by turning the shaft A by means of mechanism to be presently described, and the power of the motor is taken from the spring-barrel. In the construction shown a sprocket-wheel b is made fast to the spring-barrel, and a sprocket-chain F, which runs over said sprocket-wheel b, transmits the rotary movement of the barrel to a rotating shaft J, which forms a part of the type-writer mechanism.

D represents an electric motor, which is connected by a train of gears d, f, f', and a with the shaft A, whereby the latter shaft may be turned. This electric motor is connected in a normally open circuit, and a switch is provided by means of which the circuit may be closed, and thereby the motor may rotate and cause the rotation of the shaft A and the consequent winding up of the said spring C. This switch is caused to automatically operate to close the circuit when the tension of the motor-spring C shall have been reduced through the turning of the spring-barrel B upon the shaft A.

Specifically, the switch-operating mechanism is as follows: The shaft A is threaded in part of its length, and a disk E is screwed upon this threaded part of the shaft. Pins b', parallel with the shaft, are secured to the spring-barrel, and they project loosely through the disk, whereby the disk must necessarily rotate or come to rest with the spring-barrel. The turning of the disk upon the shaft by the spring-barrel causes the disk to move toward the spring-barrel. A switch or switch-operating lever K is pivoted to a suitable support, and it has two curved fingers $k\,k$, which take over the edge of the disk. The movement of the disk, therefore, along the shaft causes this lever to be rocked in one direction or the other, with the result of opening or closing the electric circuit in which the motor is connected. One wire of the motor is connected to a contact-plate M, and another wire is connected with an arm k', carried by said switch-lever, which arm is moved against the contact-plate when the disk has been moved far enough toward the spring-barrel through the revolution of said spring-barrel. The electric circuit being thereby closed, the motor operates and turns the shaft A, the result of which is that the spring C is wound up and the disk is caused to move along said shaft away from the spring-barrel, and this

movement operates said switch-lever K in the reverse direction and breaks the circuit, whereupon the motor stops.

It is apparent from the foregoing statement that the tension of the spring will always be maintained between certain predetermined operative limits—that is to say, it will be wound up by the turning of the shaft A until when the spring has been placed under the proper tension the motor is automatically stopped by the breaking of the electric circuit in which it is connected, and when the spring is unwound through the turning of the spring-barrel upon the shaft this unwinding continues until through the revolution of the spring-barrel the electric circuit is again closed. The result is that the spring-motor is one of substantially constant power. It is ready at all times to drive the mechanism it is intended to drive smoothly, regularly, and effectively.

A safety device of simple character is provided to prevent the complete and rapid unwinding of the spring in case the load is removed by the breaking of some of its connections with the load or work. One member N of a ratchet-clutch is made fast to the shaft A, and the other member is formed on the hub of the disk E. The movement of the disk along the shaft due to the unwinding of the spring and consequent rotation of the spring-barrel will cause the engagement of the two clutch members and the consequent connection of the spring-barrel with the shaft.

Having described my invention, I claim—

1. The combination of a spring-motor which includes a rotatable shaft having a threaded portion and an unthreaded portion, a spring-barrel rotatably mounted upon the unthreaded portion of said shaft, and a volute spring embracing the shaft and connected at one end with the shaft and at the other end with the spring-barrel, with a disk screwed and rotatably mounted upon the threaded portion of said shaft, connections between the disk and spring-barrel whereby the disk will rotate with the spring-barrel but is permitted to move lengthwise of the shaft as it rotates, a supplemental motor operatively connected with said shaft, and mechanism operated by said disk whereby said motor is stopped and started, substantially as specified.

2. The combination of a spring-motor which includes a rotatable shaft having a threaded portion and an unthreaded portion, a spring-barrel rotatably mounted upon the unthreaded portion of said shaft, a volute spring embracing the shaft and connected at one end with the shaft and at the other end with the spring-barrel, with a disk screwed and rotatably mounted on the threaded portion of said shaft, connections between said disk and spring-barrel whereby the disk rotates with the spring-barrel but is permitted to move lengthwise of the shaft as it rotates, an electric motor in a normally open circuit, mechanism connecting said motor with the spring-motor shaft, a switch for closing the electric-motor circuit, and connections between said switch and disk whereby the movement of the latter lengthwise of the spring-motor shaft opens and closes said electric circuit, substantially as specified.

3. The combination of a spring-motor comprising a rotatable shaft having a threaded portion and an unthreaded portion, a spring-barrel rotatably mounted upon the unthreaded portion of said shaft, and a volute spring embracing the shaft and connected at one end with the shaft and at the other end with the spring-barrel, with a disk which is screwed and rotatable upon said shaft and has holes through it parallel with the axis of the shaft, pins parallel with said shaft and fast to the spring-barrel and loosely passing through said holes, a supplemental motor, and mechanism whereby the movement of the disk along the shaft causes said motor to stop and start, substantially as described.

4. The combination of a spring-motor which includes a rotatable shaft having a threaded portion and an unthreaded portion, a spring-barrel rotatably mounted upon said shaft, and a volute spring embracing the shaft and connected at one end with the shaft and at the other end with the spring-barrel, with a disk screwed and rotatable upon said shaft, connections between the disk and spring-barrel whereby the disk rotates with the spring-barrel and moves lengthwise upon the shaft as it rotates, an electric motor connected in a normally open circuit, mechanism operatively connecting said motor with the spring-motor shaft, a pivoted switch-lever having fingers which lie on opposite sides of said disk, and a switch connected with said lever whereby to close and open the electric circuit, substantially as described.

In testimony whereof I hereunto affix my signature in the presence of two witnesses.

RICHARD H. SEARS.

Witnesses:
F. D. AMMEN,
ALBERT H. BATES.