(No Model.)

# D. SHIVE.

## SPRING MOTOR.

No. 328,724. Patented Oct. 20, 1885.

*Fig. 1.*

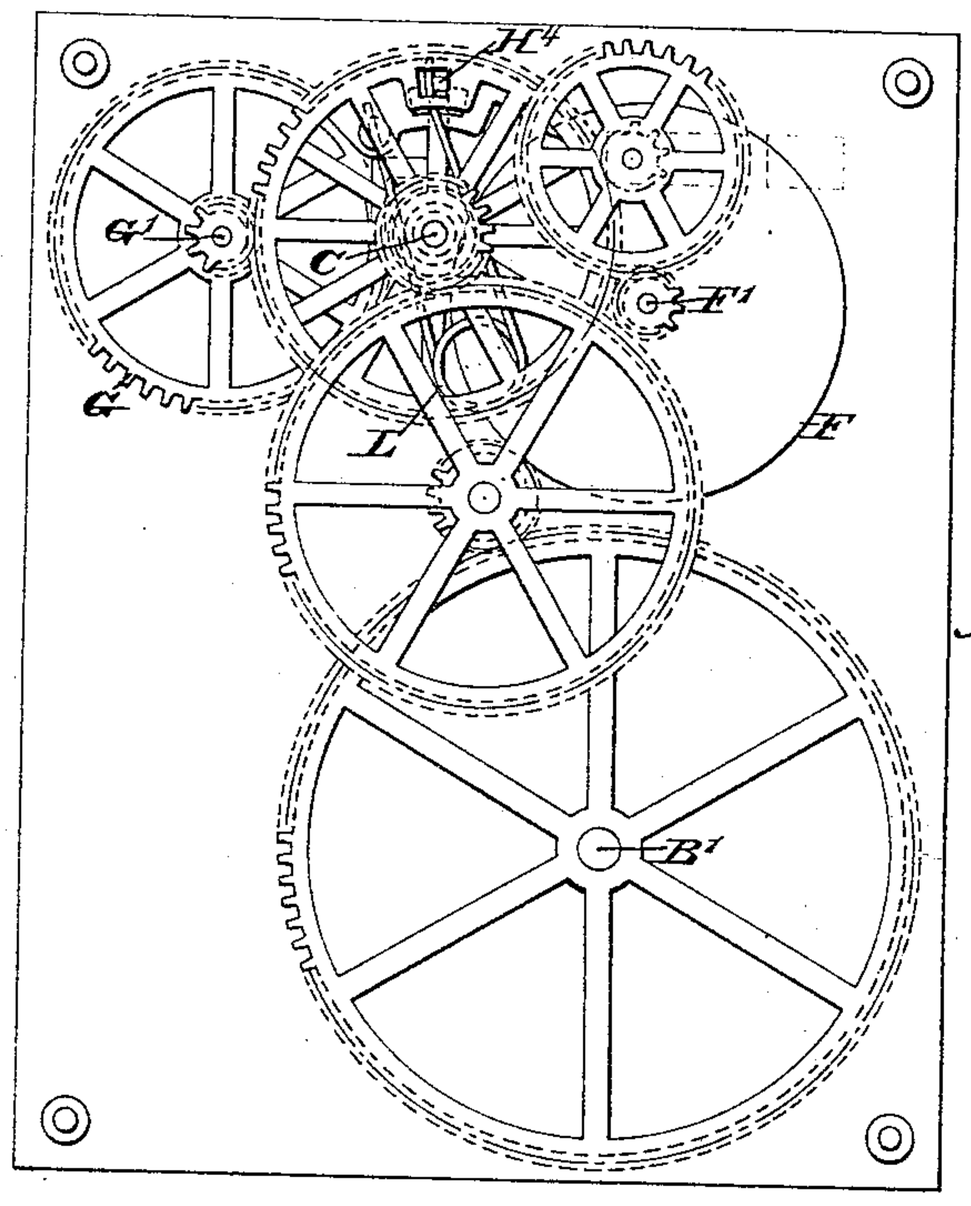



*Fig. 2.*

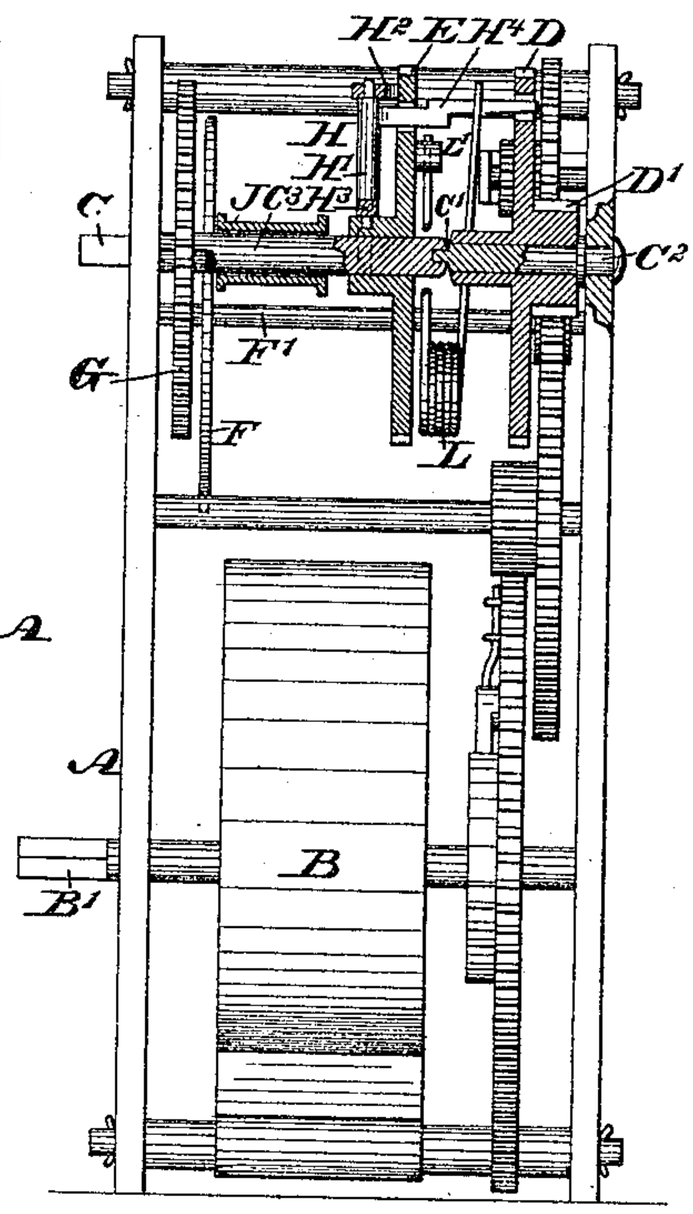



*Fig. 3.*

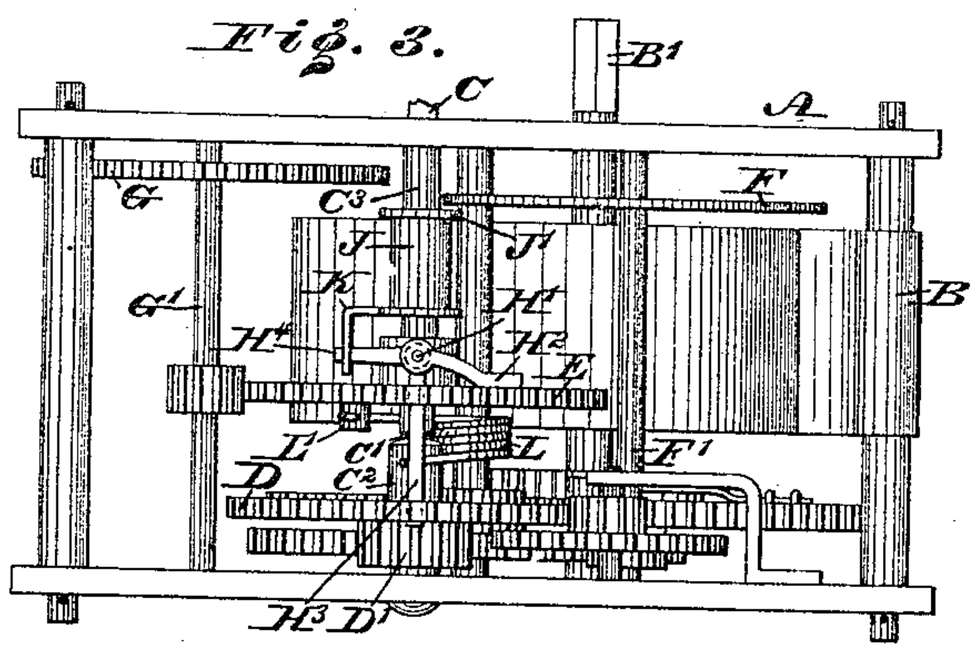



*Fig. 4.*

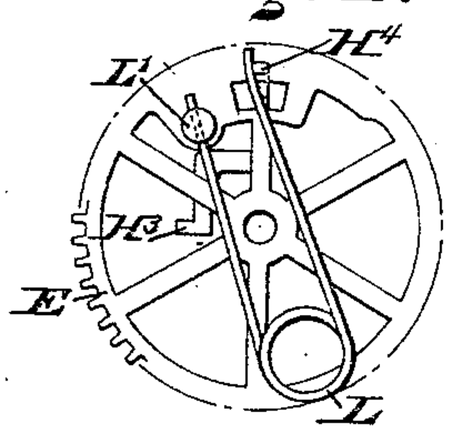



*Fig. 6.*

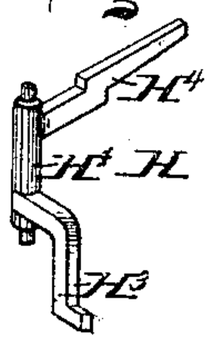
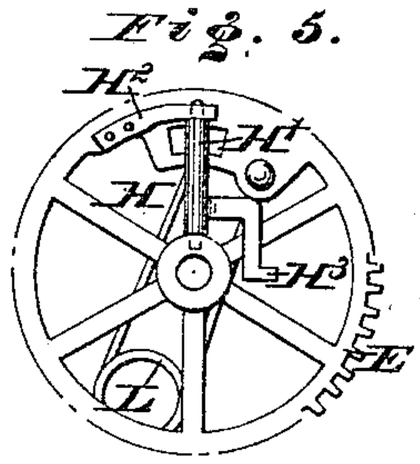



*Fig. 5.*

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# UNITED STATES PATENT OFFICE.

DAVID SHIVE, OF PHILADELPHIA, PENNSYLVANIA.

## SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 328,724, dated October 20, 1885.

Application filed September 15, 1885. Serial No. 177,176. (No model.)

*To all whom it may concern:*

Be it known that I, DAVID SHIVE, a citizen of the United States, residing in the city and county of Philadelphia, State of Pennsylvania, have invented a new and useful Improvement in Spring-Motors, which improvement is fully set forth in the following specification and accompanying drawings, in which—

Figure 1 represents a side elevation of a portion of a spring-motor embodying my invention. Fig. 2 represents a vertical section and partial side elevation at a right angle to Fig. 1. Fig. 3 represents a top or plan view thereof. Figs. 4, 5, and 6 are views of detached portions thereof.

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

My invention consists of a spring-motor wherein the tension of the spring is rendered perfectly uniform upon the movements. For this purpose I employ a train of gearing which is divided into two sections, and the full power of the mainspring is exerted upon the first section; but the power conveyed across the break upon the second section is at all times sufficient to run the movement at its best. The power neither increases nor decreases, the surplus power, as long as there is a surplus, being silently passed off in friction at the end of the first section in the train.

Referring to the drawings, A represents the frame of the motor, and B a coiled spring whose winding-shaft B′ is mounted on said frame.

C represents a divided or sectional shaft, which is connected with the frame A and joined by a journal, C′, which is formed on the end of one section, $C^2$, of said shaft, and freely enters an opening in the end of the other section, $C^3$.

On the section $C^2$, which is fixed to the frame A, is mounted a gear-wheel, D, and its pinion D′, and on the section $C^3$, which is rotary, is mounted a gear-wheel, E.

F represents a disk or untoothed wheel, which is connected with the shaft F′, and G represents a toothed wheel, which is connected with the shaft G′, said shafts being mounted on the frame A, it being noticed that there are two sections of train, E being the first wheel in the second section of the train, G the second wheel of said section, and F the end of the first section.

To the wheel E is journaled a bell-crank or elbow lever, H, the shaft or pivotal portion H′ of said lever being mounted in the hub of the wheel and a bracket, $H^2$, which is secured to the side of the said wheel, said shaft H′ extending radially, and the arms $H^3$ $H^4$ of the lever H projecting laterally therefrom and right angularly in opposite directions.

On the section or arbor $C^3$ is fitted a sliding sleeve, J, one end whereof having a flange, J′, and the other end carrying an arm, K, with which is freely connected the arm $H^3$ of the elbow-lever H.

Connected with the wheel E is a bent spring, L, one limb whereof is attached to a stud or lug, L′, on said wheel, and the other limb bears against the arm $H^4$ of the elbow-lever H, it being noticed that said arm projects freely through openings in the wheels E D, near the peripheries thereof, and while the axial line of the wheels D E is the same the wheels have limited motions independent of each other.

The motor is set in operation by the uncoiling or unwinding of the spring B, it being seen that suitable gearing is employed intermediate of the spring and the wheel G, from which latter the power of the motor may be transmitted elsewhere. As long as the arm $H^4$ of the bell-crank lever H is in direct line with the arbor $C^3$ the two wheels D and E move in unison, and the disk F moves unobstructed by the flange of the sleeve J. As long as the mainspring has more power than is required to run the train, the arm $H^4$ of the lever H assumes a very slight angle from the line of the arbor, imparting motion to the sleeve J by means of the connecting-arms K $H^3$, causing the flange J′ to impinge upon the edge of the disk F, locking the first section of the train and stopping the wheel D. The wheel E being continuous in its motion brings forward the other end of the arm $H^4$ until the disk F is sufficiently free to again move forward, though slightly in contact with the flange, thereby expending in friction the surplus power of the mainspring.

The arm $H^4$ of the lever H receives power from the wheel D. One end of the spring L

rests upon the arm $H^4$, and the other end thereof is attached to the wheel E, conveying to said wheel the power received from the arm $H^4$. As long as the two limbs of the spring hold their position in the same relation to each other, so long will the tension upon the second section of the train be the same, the object being to bend the spring to a certain point and retain it thereat.

By means of the bell-crank or elbow lever H the direction of the surplus power of the mainspring is changed from the line of motion of the wheels to a motion in line with the arbors. By this change of direction I am enabled to pass off all surplus power without jar or noise.

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

1. In a spring-motor, a train of gearing divided into sections, the full power of the spring being exerted upon the first section, substantially as described.

2. A spring-motor having a gearing divided into sections and formed of parts, substantially as described, whereby the tension of the spring is rendered uniform upon the movements, as stated.

3. In a spring-motor, a wheel having an elbow-lever journaled to it, an adjacent wheel having an opening through which one of the arms of said lever projects, and a spring attached to the first-named wheel and bearing against said arm, substantially as set forth.

4. A divided shaft, one section thereof being fixed and the other rotary, in combination with wheels mounted on the two sections, the axial line of the wheels being the same while the wheels have limited motions independent of each other, substantially as described.

5. In a spring-motor, a friction disk or wheel, in combination with an arbor having a sliding sleeve which is provided with a flange for engagement with the said disk, substantially as described.

6. In a spring-motor, gear-wheels mounted on a divided shaft, an elbow-lever connected with one of the wheels, a spring attached to said wheel and bearing against the lever, a sliding sleeve mounted on one of the sections of said shaft, and a friction-disk, said sleeve carrying at one end an arm which engages with the elbow-lever and at the other end a flange which is adapted to engage with said disk, substantially as described.

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