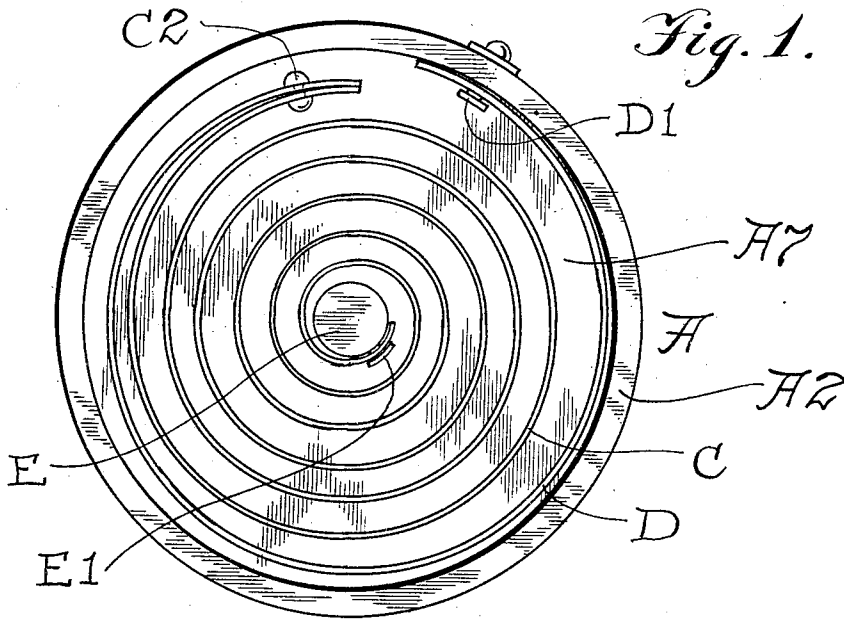


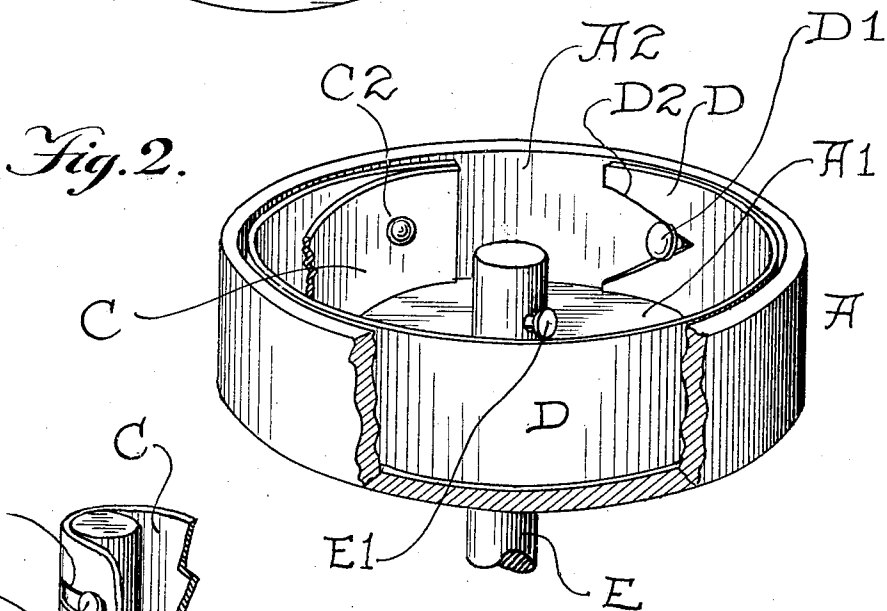
A. F. LOEBKER.  
 SPRING MOTOR.  
 APPLICATION FILED APR. 8, 1920.

1,389,953.

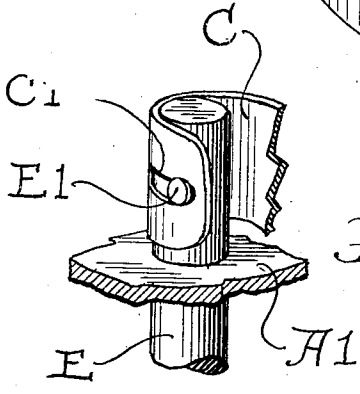
Patented Sept. 6, 1921.



*Fig. 1.*



*Fig. 2.*



*Fig. 3.*

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334

# UNITED STATES PATENT OFFICE.

ALBERT F. LOEBKER, OF KNOXVILLE, TENNESSEE.

## SPRING-MOTOR.

1,389,953.

Specification of Letters Patent. Patented Sept. 6, 1921.

Application filed April 8, 1920. Serial No. 372,175.

*To all whom it may concern:*

Be it known that I, ALBERT F. LOEBKER, a citizen of the United States, residing at Knoxville, in the county of Knox and State of Tennessee, have invented a new and useful Improvement in Spring-Motors, of which the following is a specification, reference being had to the accompanying drawing.

My improvement relates particularly to spring motors comprising a drum-form casing and a shaft on the axial line of the casing and a ribbon-form spring coiled upon itself within the drum and having one end joined to the shaft and having the other end engaged directly or indirectly to the casing, the shaft and the casing being relatively rotatable.

The object of the invention is to provide such a spring motor in a form adapted to reduce the danger of overstraining the spring and avoiding the binding of the coils of the spring upon each other through over-tight winding.

In the accompanying drawings,

Figure 1 is a plan illustrating the principal elements of a spring motor embodying my improvement;

Fig. 2 is a perspective showing the outer end of the main spring and the auxiliary spring and the adjacent wall of the casing, parts being broken away;

Fig. 3 is a detail view showing the inner end of the main spring and the adjacent part of the shaft.

Referring to said drawings, A is the drum-form casing. This has a bottom, A<sup>1</sup>, and a rim, A<sup>2</sup>. E is the axle or shaft. This is of ordinary form and extends along the axial line of the drum or the casing. It is deemed unnecessary to show means for rotating the casing or the shaft.

On said shaft is a hook or stud, E<sup>1</sup>. C is the main spring. At its inner end said spring has an elongated aperture, C<sup>1</sup>, through which the hook or stud, E<sup>1</sup>, of the shaft, E, extends to make engagement between the spring and the shaft. The main spring is of the usual ribbon form heretofore in use in such drum-shape spring motors, and said spring is coiled upon itself around the shaft and within the casing. But the outer end of said spring is not joined directly to the rim, A<sup>2</sup>, of the casing, as is the ordinary practice.

An auxiliary spring, D, also of ribbon

form, is placed between the rim, A<sup>2</sup>, and the main spring, C, one end of the auxiliary spring being made even with the outer end of the spring, C, and the auxiliary spring extending thence in reverse direction around the spring, C, to a stud, D<sup>1</sup>, on the inner face of the rim. A rivet, C<sup>2</sup>, extends transversely through the overlapping ends of the two springs and joins said ends to each other. The stud, D<sup>1</sup>, has a head spaced from the inner face of the rim far enough to allow the auxiliary spring to enter the space between said head and said face. The adjacent or outer end of the auxiliary spring, D, has a notch, D<sup>2</sup>, which receives the body of the stud, D<sup>1</sup>.

In assembling the parts, the main spring and the auxiliary spring are joined to each other by means of the rivet, C<sup>2</sup>. Then both springs are placed into the casing, the inner end of the main spring being put into engagement with the hook, E<sup>1</sup>, of the shaft, E. Then the outer end of the main spring is drawn for winding far enough to draw the auxiliary spring over the head of the stud, D<sup>1</sup>, until the V-form outer end of the auxiliary spring slips over and astride the stud and against the rim, A<sup>2</sup>, of the casing. Then the main spring is released, whereupon it begins to unwind and tends to reverse the movement of the auxiliary spring. But such movement is arrested when the outer or notched end of the auxiliary spring has passed between the head and the adjacent face of the rim and makes engagement with the body of the stud, D<sup>1</sup>. Then the stud forms an abutment which prevents further movement of the auxiliary spring in the direction of the strain on the main spring and also crosswise of the auxiliary spring.

Now when either the casing, A, or the shaft, E, is turned in the proper direction to wind the main spring, the outer end of the main spring is held by the end of the auxiliary spring which is riveted to the main spring. But such holding is yielding, the free end of the auxiliary spring allowing its free end to be carried to some extent in the direction of the pull of the main spring. This elasticity precludes such dead strain as is placed upon the main spring when the latter is attached directly to the rim and the main spring is wound to the limit. Furthermore, the auxiliary spring allows the attachment of the free end of the main

spring to shift from the rim toward the shaft during the winding of the main spring, this movement toward the shaft continuing until the winding has been completed.

Thus the attachment of the outer end of the main spring has allowed to it a compound elastic movement during the winding of the main spring, one of the components of said movement being concentric to the shaft and the other being toward the shaft.

I claim as my invention,

1. In a spring motor, the combination of a relatively rotatable casing and shaft, a stud supported by the casing, a main spring located within the casing and surrounding the shaft and having one end secured to the shaft, and an auxiliary spring located between the main spring and the rim of the

casing and having one end secured to the outer end of the main spring and having its other end notched and astride said stud, substantially as described.

2. In a spring motor, the combination of a relatively rotatable casing and shaft, a stud supported by the casing, a main spring located within the casing and surrounding the shaft and having one end secured to the shaft, and an auxiliary spring located between the main spring and the rim of the casing and having one end riveted to the outer end of the main spring and having its other end notched and astride said stud, substantially as described.

In testimony whereof I have signed my name, this 30th day of March, in the year one thousand nine hundred and twenty.

ALBERT F. LOEBKER.