

No. 755,939.

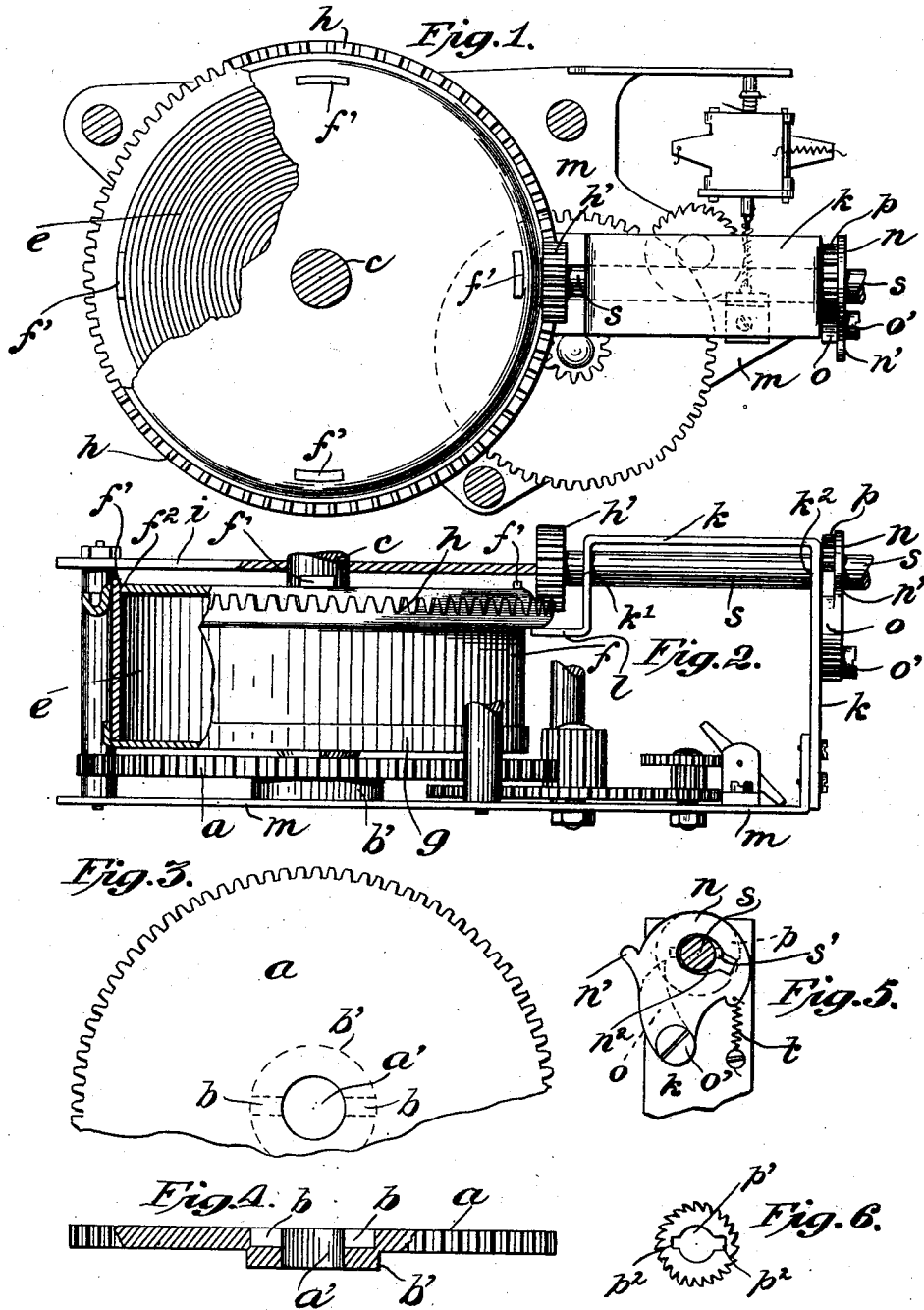
PATENTED MAR. 29, 1904.

F. A. RICHTER.  
SPRING MOTOR.

APPLICATION FILED SEPT. 25, 1903.

NO MODEL.

2 SHEETS—SHEET 1.



Witnesses  
C. M. Schell  
A. L. Owen

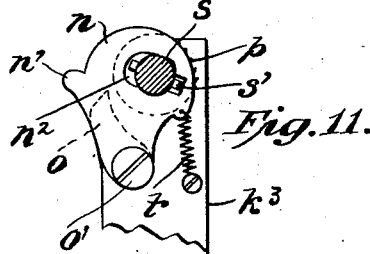
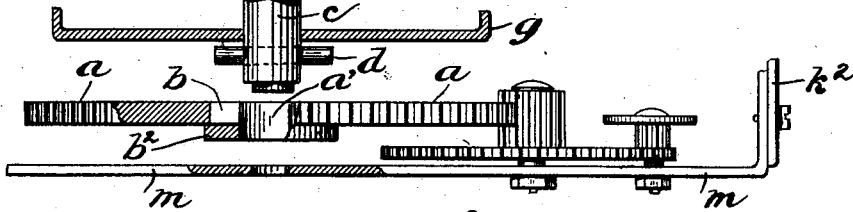
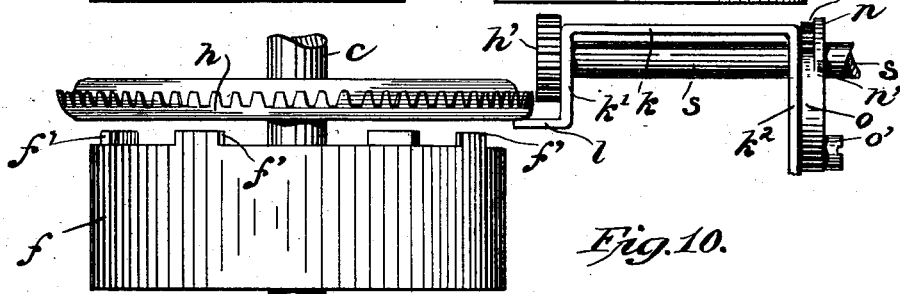
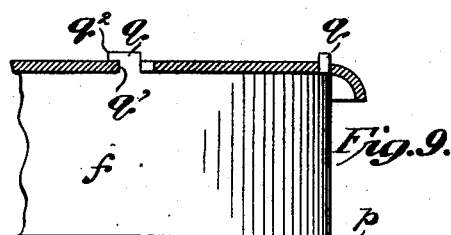
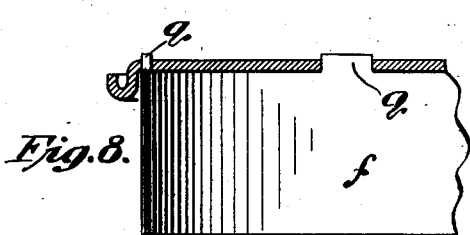
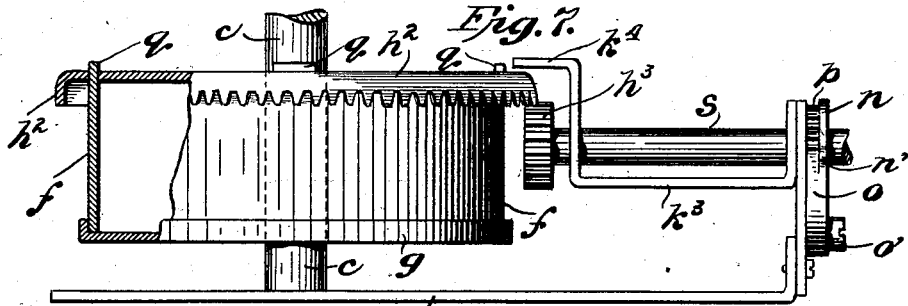
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NO MODEL.

2 SHEETS—SHEET 2.



Witnesses  
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# UNITED STATES PATENT OFFICE.

FRIEDRICH ADOLF RICHTER, OF RUDOLSTADT, GERMANY.

## SPRING-MOTOR.

SPECIFICATION forming part of Letters Patent No. 755,939, dated March 29, 1904.

Application filed September 25, 1903. Serial No. 174,537. (No model.)

*To all whom it may concern:*

Be it known that I, FRIEDRICH ADOLF RICHTER, a subject of the Emperor of Germany, and a resident of Rudolstadt, Germany, have invented certain new and useful Improvements in Spring-Motors, of which the following is a specification.

This invention relates to spring-motors, such as are used in music-boxes and which are provided with central driving means for the music-disks. It is very inconvenient in this class of motors to have the motor wind at the central axis or by means of a ratchet device, as well as to have the driving-gear so firmly secured by means of screws or rivets that when repairs are necessary, as to replace a broken spring, the entire instrument, or at least the whole driving-gear, must be taken apart and repaired by an expert, which causes considerable expense to the owner.

The object of the present invention is to obviate these defects by very simple means. The mechanism may be wound up by means of an outside crank, and in case repairs are necessary the motor can be very easily taken apart and any inexperienced layman may replace the broken spring by a new one.

My invention consists of certain features of construction and combinations of parts, which will be hereinafter described and then claimed, reference being had to the accompanying drawings, showing a desirable form of the invention, in which—

Figure 1 is a plan view of my improved motor, partly broken away and parts in section. Fig. 2 is a side view, parts being in section and parts broken. Fig. 3 is a plan view of a portion of the driving-wheel. Fig. 4 is a diametrical section thereof, partly in elevation. Fig. 5 is a detail view of a ratchet or click mechanism for the winding mechanism. Fig. 6 is a side elevation of the ratchet-wheel of the ratchet mechanism. Fig. 7 is a broken side elevation of my improved motor of a form in which the spring is turned to the left. Figs. 8 and 9, respectively, show different means for connecting the winding-wheels of the forms shown in Figs. 2 and 7 with the barrel of the motor. Fig. 10 shows the parts of the motor in side elevation and partly in sec-

tion dismounted; and Fig. 11 shows the ratchet or click mechanism in position to permit the dismounting of the parts, as shown in Fig. 10.

The driving-wheel *a* (shown in detail in Figs. 3 and 4) is distinguished from driving-wheels used heretofore by the fact that besides being provided with a central hole *a'* for the shaft *c* it has at the sides of said opening *a'* recesses *b*, which are adapted to receive the pin *d*, which is passed diametrically through the shaft *c*. In this manner an interlocking connection is formed between the driving-wheel *a* and the shaft *c*, so that the said parts are compelled to rotate together. To prevent the gear-wheel *a* from being dislocated by the accidental removal of the pin *d* from engagement therewith, a hub *b'* is formed at one side of the wheel *a* and through which the hole *a'* for the shaft *c* passes. In place of forming the hub *b'* integral with the wheel *a*, as shown in Fig. 4, the said hub may consist of a disk or washer *b''*, as shown in Fig. 10. The hub *b'* or the disk *b''*, as the case may be, serves as a guide, so that the gear-wheel *a*, which is slipped onto the shaft *c* from below, cannot slide off. The driving-wheel *a* is thus loosely connected with the shaft *c* and is only driven by the pin *d*, engaging in the recesses *b*. The gear-wheel *c* can therefore be easily removed and exchanged in case one becomes damaged or if removal is desired for any other purpose. The motor-spring *e*, which is located in the barrel *f*, is of usual form. The barrel *f* is closed at the bottom by a bottom plate *g* and at the top by the winding-wheel *h*. The winding-wheel *h* is applied in the nature of a cap or cover to the barrel *f* and is removably attached thereto, it being interlocked and compelled to turn therewith by reason of lugs or studs *f'* on the barrel, which engage with openings *f''* in the said winding-wheel *h*. The construction of this winding-wheel forms the subject-matter of a separate application, Serial No. 174,536, filed the 25th day of September, 1903. This winding-wheel *h* is so constructed that the space between the top plate *i* and the same or the upper cover of the spring-case is not enlarged by the teeth of the wheel. These teeth are arranged so far below the upper surface of the winding-wheel that only a small

portion of the operating-pinion  $h'$  projects above said surface. It will be seen that not only can the bottom plate  $g$  be removed from the barrel  $f$ , but also the winding-wheel  $h$ .

5 An arm  $k$ , attached to or formed as a part of the bottom plate  $m$ , is so bent as to form two bearings at  $k'$  and  $k''$  for the winding-shaft  $s$ , and it is also provided with an angle piece or finger  $l$ , which engages under that portion of the winding-wheel opposite the teeth, and thus prevents the teeth on the outside or operating pinion  $h'$  from being disengaged from the teeth of the winding-wheel  $h$ . In other words, the finger  $l$  or its equivalent by engaging the winding-wheel, as stated, holds the pinion against movement transverse to the axis of the pinion, whereby the engagement of the pinion with the winding-wheel is assured or made more certain.

20 Pivoted to the arm  $k$  is a locking-pawl  $o$ , and on the same pivot  $o'$  thereof is also mounted a plate  $n$ , which extends over the ratchet-wheel  $p$ , located on the winding-shaft  $s$ . The ratchet-wheel being mounted on the winding-shaft  $s$  to permit longitudinal movement of said shaft, the plate  $n$  serves as a guard to hold the ratchet-wheel in place. The ratchet-wheel  $p$  has at each side of its central opening  $p'$  recesses  $p''$ , which are engaged by studs or projections  $s'$  on the winding-shaft  $s$ , so that the connection between the shaft  $s$  and the ratchet  $p$  is an interlocking one, as is the case with the driving-wheel and its shaft. The guard-plate  $n$  and the pawl  $o$  for the ratchet-wheel are preferably formed in one piece, so that by connecting an actuating-spring  $t$  with the guard-plate  $n$  a tooth of the pawl will be caused to take between the teeth of the ratchet-wheel. The guard-plate  $n$  and the pawl may be shifted so as to disengage the pawl from the ratchet-wheel by means of a thumb-piece  $n'$ , projecting from the plate  $n$ .

If the spring-barrel  $f$  is to be turned to the left while winding the spring, a modified form of winding-wheel  $h^2$  is used, as shown in Fig. 7. In this form of the invention the teeth are turned downwardly instead of upwardly, as in the other views. Also modified forms of interlocking studs are used. These studs  $q$  are undercut at  $q'$ , so that the lateral projections  $q''$  thereof may engage over the upper surface of the winding or gear wheel  $h^2$ . It will be seen from this construction of interlock that the winding-wheel  $h^2$  cannot by the winding up of the spring be shifted off by pressure, and thus be detached from the barrel or disengaged from the driving-pinion  $h^3$ . The bottom plate  $m$  is here provided with a modified form of arm  $k^3$ , which instead of being bent upwardly, as shown in Fig. 2, is bent downwardly to provide two bearings for the winding-shaft and is furthermore provided with a finger or keeper  $k^4$ , which instead of engaging under the winding-wheel  $h^2$  engages over the same to furnish additional

security against displacement of the said winding-wheel.

To dismount the parts, the plate  $i$  is first removed, and then the guard-plate  $n$  and pawl  $o$  are shifted into the position shown in Fig. 11, so that a suitable opening  $n^2$  in the guard-plate and through which the shaft  $s$  passes will permit a longitudinal shifting of said shaft, thus drawing the driving-pinion against the arm  $k$  or  $k^3$ . The driving-pinion is thus disengaged from the winding-wheel, as shown clearly in Fig. 10. The parts of the motor may then be separated, as shown in this figure. The winding-wheel and the spring-case are lifted to disengage the pin  $d$  from the driving-wheel  $a$ , which is loosely mounted in the manner before described. The winding-wheel  $h$ , which serves as a cover to the barrel  $f$ , may now be lifted off of the barrel, so that the spring therein is exposed and is rendered accessible. The parts are again reassembled in evident manner, and the connections and adjustments are such that any person not an expert may readily dismount the parts or assemble them for the purpose of repair or otherwise.

It is evident that changes are within the spirit and scope of my invention and may be resorted to without departing therefrom, as they will be evident to any skilled mechanic. Having thus described my invention, what I claim as new therein, and desire to secure by Letters Patent, is—

1. In a spring-motor, the combination of the spring-barrel, a winding-wheel removably applied thereto, a suitably-mounted driving-shaft provided with a pinion, and means engaging the winding-wheel for holding the pinion against movement transverse to its own axis, whereby the engagement of the pinion with the winding-wheel is assured, for substantially the purposes set forth.

2. In a spring-motor, the combination of the barrel, a toothed winding-wheel applied removably to the barrel, a suitably-supported arm provided with bearings, a winding-shaft journaled in said bearings and provided with a pinion in mesh with the teeth of the winding-wheel, and a finger or keeper projecting from said arm for holding the removable winding-wheel and pinion upon the barrel, for substantially the purposes set forth.

3. In a spring-motor, the combination of the barrel, a winding-wheel applied removably to the same, a bottom plate having an arm provided with bearings, a winding-shaft journaled in said bearings and provided with a pinion engaging with the teeth of the winding-wheel, and a finger or keeper projecting from said arm and engaging under the winding-wheel to hold the same in engagement with the pinion, for substantially the purposes set forth.

4. In a spring-motor, the combination with the winding-shaft, of a relatively shiftable ratchet-wheel on the winding-shaft mounted

to turn with the winding-shaft, a pawl for the ratchet-wheel, and a guard device for the same, for preventing movement of the said ratchet-wheel, for substantially the purposes set forth.

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5. In a spring-motor, the combination of the barrel, the winding-wheel applied thereto, a suitably-journaled winding-shaft provided with a pinion meshing with the teeth of the winding-wheel, said shaft being longitudinally shiftable in the bearings, a ratchet-wheel applied to rotate with the winding-shaft and permitting longitudinal movement of the winding-shaft within it, a pawl for the ratchet, and a guard device for holding the ratchet in position, for substantially the purposes set forth.

6. In a spring-motor, the combination of the barrel, the winding-wheel applied thereto, a suitably-journaled winding-shaft provided with a pinion meshing with the teeth of the winding-wheel, said shaft being longitudinally shiftable in the bearings, a ratchet-wheel applied to rotate with the winding-shaft and permitting longitudinal movement of the

winding-shaft within it, a pawl for the ratchet, and a guard device for holding the ratchet in position, said guard device and pawl being mounted to move together, and the guard device being provided with an enlarged opening, for substantially the purposes set forth.

7. In a spring-motor, the combination of the spring-barrel, a winding-wheel removably applied thereto, a suitably-mounted shaft provided with a pinion, means for supporting the shaft, and means connected with said supporting means and engaging the winding-wheel and holding the pinion against movement transverse to its own axis, whereby the engagement of the pinion with the winding-wheel is assured, substantially as and for the purposes set forth.

In testimony whereof I have signed this specification in the presence of two subscribing witnesses.

FRIEDRICH ADOLF RICHTER.

Witnesses:

F. MALLEISER,  
CHAS. B. DRUGULIN.