No. 847,138. PATENTED MAR. 12, 1907.

C. WARREN.

WINDING MECHANISM FOR SPRING MOTORS.

APPLICATION FILED JUNE 23, 1906.

Fig. 1

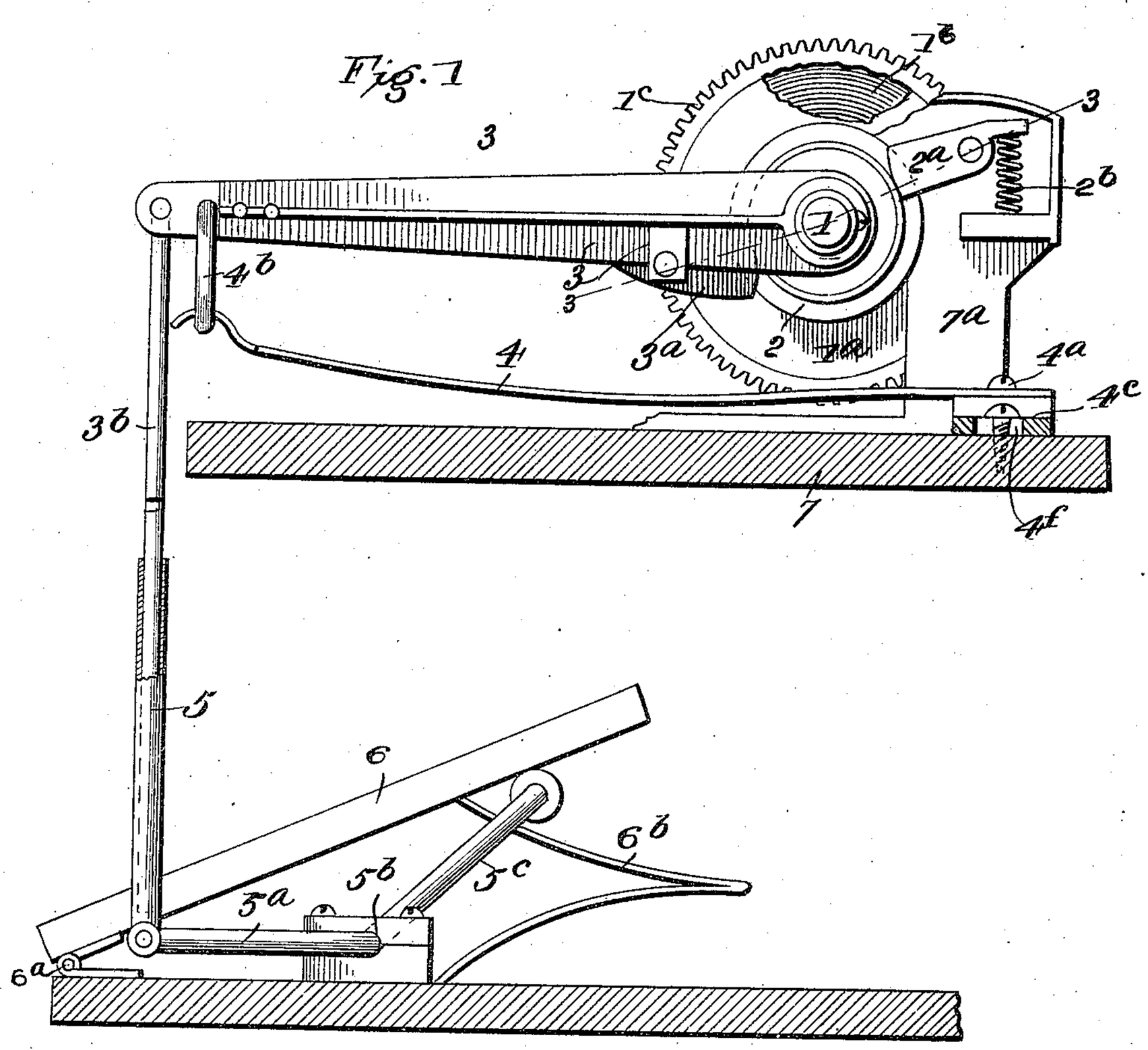


Fig. 2

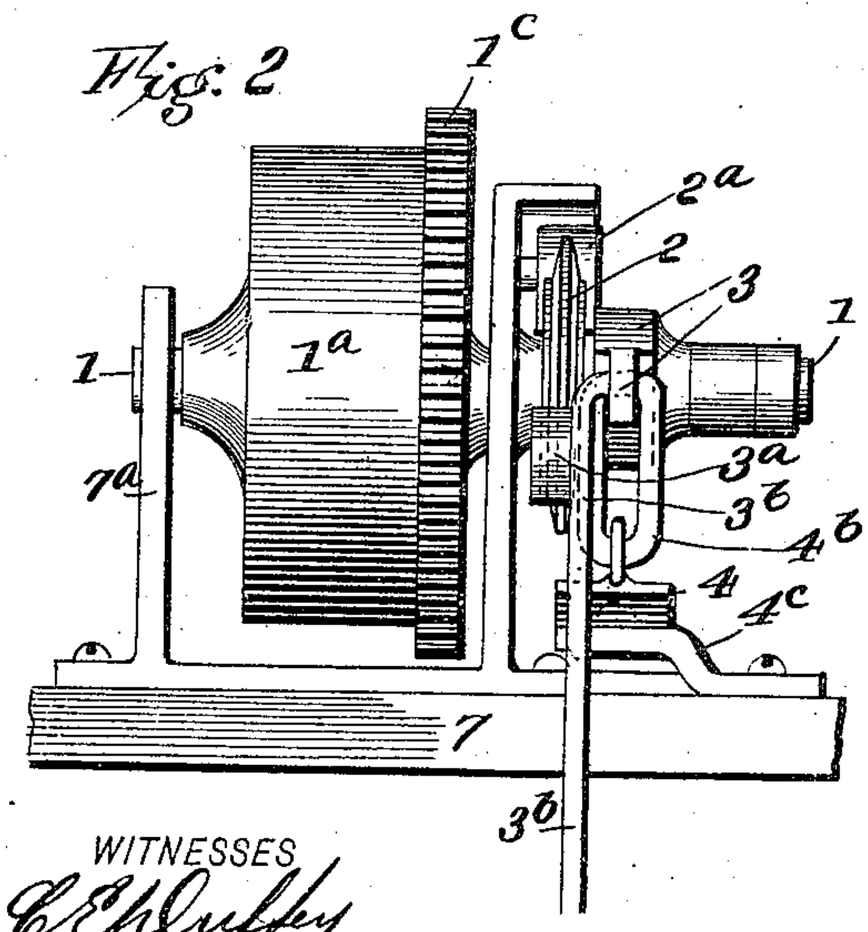
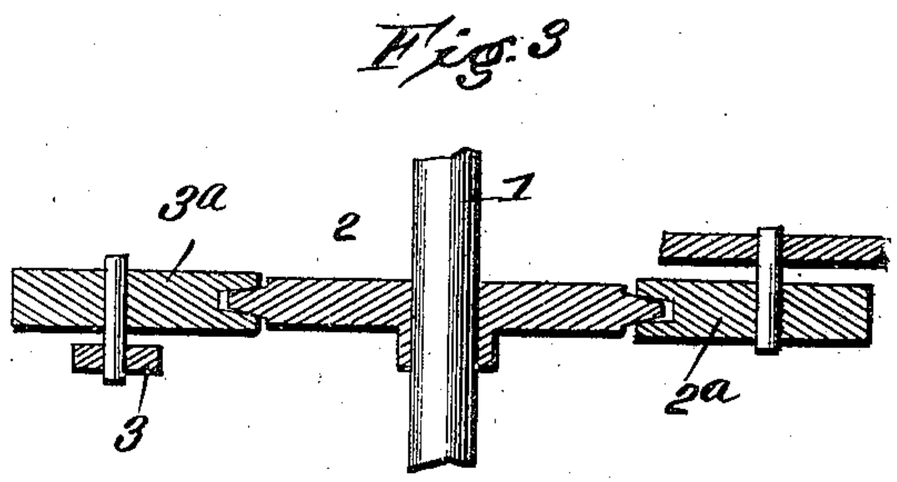


Fig. 3



WITNESSES

C. E. Duffey

James B. Mansfield.

INVENTOR

Charles Warren

BY

Alexander & Dowell

ATTORNEYS

UNITED STATES PATENT OFFICE.

CHARLES WARREN, OF MILAN, ILLINOIS, ASSIGNOR TO ARTISTA PIANO PLAYER COMPANY, OF MILAN, ILLINOIS, A CORPORATION OF ILLINOIS.

WINDING MECHANISM FOR SPRING-MOTORS.

No. 847,138. Specification of Letters Patent. Patented March 12, 1907.

Application filed June 23, 1906. Serial No. 323,114.

To all whom it may concern:

Be it known that I, CHARLES WARREN, of Milan, in the county of Rock Island and State of Illinois, have invented certain new and useful Improvements in Winding Mechanism for Spring-Motors; and I hereby declare that the following is a full, clear, and exact description thereof, reference being had to the accompanying drawings, which form part of this specification.

This invention is an improvement in winding mechanism for spring-motors, especially such as are used in automatic musical instruments; and its object is to prevent overwinding of the motor-spring in event of continued operation of the pedals or winding-lever-actuating devices and to insure that only a certain amount of tension can in any event be imparted to the motor-spring, the amount of such maximum tension being regulable by the tension of a superior controlling-spring which operates the winding-lever on its winding strokes to a greater or less extent, according to the tension of the motor-spring.

Another object is to enable the cumbersome and more or less unreliable safety and frictional clutches and tension-regulating devices heretofore customarily employed in connection with the motors of automatic piano or other musical-instrument playing mechanisms to prevent overwinding to be dispensed with.

The invention therefore consists in the novel combinations and constructions of parts set forth in the claims, and the accompanying drawings illustrate the invention sufficiently to enable any one to readily comprehend, make, and use the same when examined in connection with the following specification and explanation thereof.

In said drawings, Figure 1 is an end elevation, partly in section, of my novel winding mechanism. Fig. 2 is a detail front elevation thereof. Fig. 3 is a transverse section on line 3 3, Fig. 1.

In the drawings, 1 designates a shaft mounted in suitable bearings 7^a on a support 7 and carrying a loose rotatable drum or casing 1^a, in which is an ordinary coiled flat mainspring 1^b, one end of which is attached to the casing and one to the shaft in the customary manner, so that if the spring 1^b is wound and the shaft locked the drum will be rotated upon the shaft as usual.

The casing 1^a has fixed to it a gear 1^c, by which motion may be transmitted through gears (not shown) to the mechanism (not shown) for feeding and rewinding the perforated music-rolls, if the invention is applied to automatic musical instruments, for which use it is primarily intended.

On the shaft 1 is keyed a disk 2, preferably bevel-edged, and which is engaged by a friction-pawl 2^a, pivoted on a fixed support, as shown, and held in engagement with the disk by a spring 2^b, so as to prevent backward rotation of shaft 1.

Hung on shaft 1 beside disk 2 is a lever 3, capable of swinging movements in a plane parallel with the disk 2, and to said lever is pivoted a friction-pawl 3^a, adapted to engage disk 2 and turn it and shaft 1 forwardly and wind up spring 1^b when lever 3 is moved in one direction and to slip on the disk 2 when the lever is moved in the opposite direction. While I show and prefer to use friction-pawls at 2 and 3^a, obviously other mechanically equivalent devices may be employed. Lever 3 is moved down or in a direction to wind spring 1^b by means of a stronger spring, which is preferably a flat spring 4, fastened at one end, as at 4^a, to a suitable support 4^c and extending approximately parallel with lever 3 and having its outer end connected thereto by a link 4^b, which will permit the necessary vibrations of lever 3. If lever 3 be forced upward or in a direction to cause pawl 3^a to slide on disk 2, it will also put spring 4 under tension, and when the lever is freed obviously spring 4 will retract the lever or move it downward, and in so doing the lever, through pawl 3^a, will impart more or less rotary motion to disk 2, and consequently spring 1^b will be more or less wound up until the resistance of the latter spring equals the pull of spring 4 on lever 3 or the movement of lever 3 is arrested. The lever 3 can be moved upward or in a direction to tension spring 4 in any desired manner. I preferably use pedal devices for this purpose. As shown, a rod 3^b is pivotally connected to the outer end of lever 3 and has a telescopic engagement with a tube 5, pivoted to one arm 5^a of a bell-crank lever fulcrumed at 5^b on a suitable support, and its other arm 5^c underlies a pedal 6, pivoted at 6^a, and by depressing the pedal 6 the crank-lever is rocked so as to raise tube 5 and rod 3^b and lift lever 3, tensioning spring

4, and then spring 4 will retract the lever 3 more or less (according to the tension of spring 1^b) and wind up spring 1^b.

Owing to the telescopic connection between rod 3^b and tube 5 the lever 3 is free to return under the action of spring 4, although tube 5 may be retracted immediately upon the rise of the pedal 6. As the tension of spring 1^b increases the extent of effective movement imparted from the pedal 6 to lever 3 will become less and less until the lever 3 becomes practically ineffective. The pedal 6 has no direct winding action upon the spring 1^b. It simply causes lever 3 to tension spring 4, and the strength of this spring 4 regulates the tension which can be put upon spring 1^b, and thus overwinding of the latter is effectually prevented, and continual oscillation of the pedal cannot overwind the spring 1^b.

The pull of spring 4 on lever 3 can be regulated or varied by varying the points of connection between the lever and spring—as, for example, by engaging link 4^b in different holes 3^e in lever 3 or by shifting the connection of spring 4 with the base, as at 4^f, or by varying the size of such spring. Other forms or springs might also be substituted for the flat single leaf-spring 4 shown in drawings without departing from the spirit of the invention. The pedal may also be lifted by any suitable means—for example, by a spring, as indicated at 6^b. Customarily the pedal is connected to an exhaust-bellows (not shown) which is opened by a spring, and in such cases the spring 6^b could be dispensed with.

When spring 1^b is wound to the desired maximum, the spring 4 will become inactive and lever 3 will remain more or less elevated until the mainspring 1^b has more or less relaxed; but as soon as the spring 4 again becomes effective the pedal-action will become effective to operate thereon.

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

1. In combination, a shaft, a drum loose thereon, a winding spring in the drum connected to the drum and shaft; a swinging lever pivoted on the shaft, devices actuated by the lever when moving in one direction for turning the shaft to wind the spring, a more powerful spring connected to the outer end of said swinging lever for moving it in the direction to turn the shaft, and a treadle and connections for positively moving said lever in the opposite direction and thereby tensioning the more powerful spring.

2. In combination, a shaft, a casing thereon, a winding spring in the casing connected to the casing and shaft, a disk on the shaft, a clutch device engaging said disk to prevent unwinding rotation of the shaft, a swinging lever pivoted on the shaft, a clutch device on said lever engaging said disk to impart winding motion to the shaft when the lever swings in one direction, a more powerful flat spring for moving the lever in the opposite or winding direction, and manually-operated means for moving the lever in opposition to the flat spring.

3. In combination, a motor-spring, a pivoted lever and connections for winding said spring when the lever is moved in one direction, a more powerful spring connected to the outer portion of the lever to move it in the direction to wind the spring; a treadle-actuated lever, and a connection between the latter lever and the winding-lever whereby the winding-lever may be positively moved in opposition to the more powerful spring.

4. In combination, a motor-spring, a lever and connections for winding said spring when the lever is moved in one direction, and a more powerful spring for moving the lever in the direction to wind the spring; with a treadle, a crank-lever operated thereby, and a telescopic connection between the crank-lever and the winding-lever, substantially as described.

5. In combination, a rotatable shaft, a casing rotatable thereon, a winding spring connected to the casing and shaft, a lever pivoted on the shaft, devices for turning said shaft upon the oscillation of the lever, and a more powerful spring for moving the lever in a direction to wind the shaft; with a treadle, a crank-lever operated thereby, a tube connected to the crank-lever, and a rod pivoted to the winding-lever and telescoping into said tube, for the purpose and substantially as described.

In testimony that I claim the foregoing as my own I affix my signature in presence of two witnesses.

CHARLES WARREN.

In presence of—
JOSIE M. PEARD,
J. E. SPENCER.