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H. E. SHARPS & W. F. COOPER.

AUTOMATIC SPRING WINDING MECHANISM FOR MECHANICAL MUSICAL
INSTRUMENT DEVICES.

(Application filed Feb. 10, 1902.)

(No Model.)

Fig. 1.

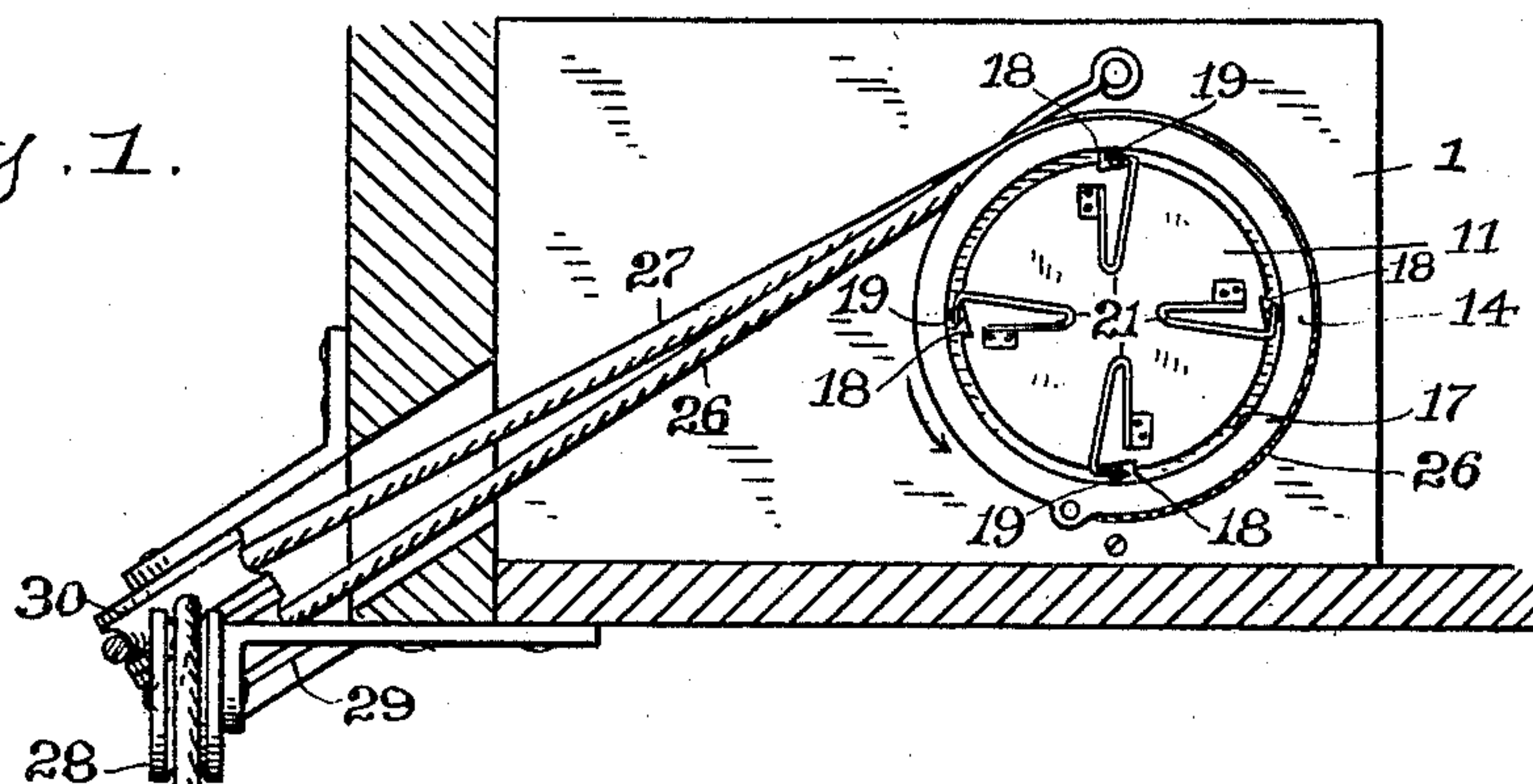
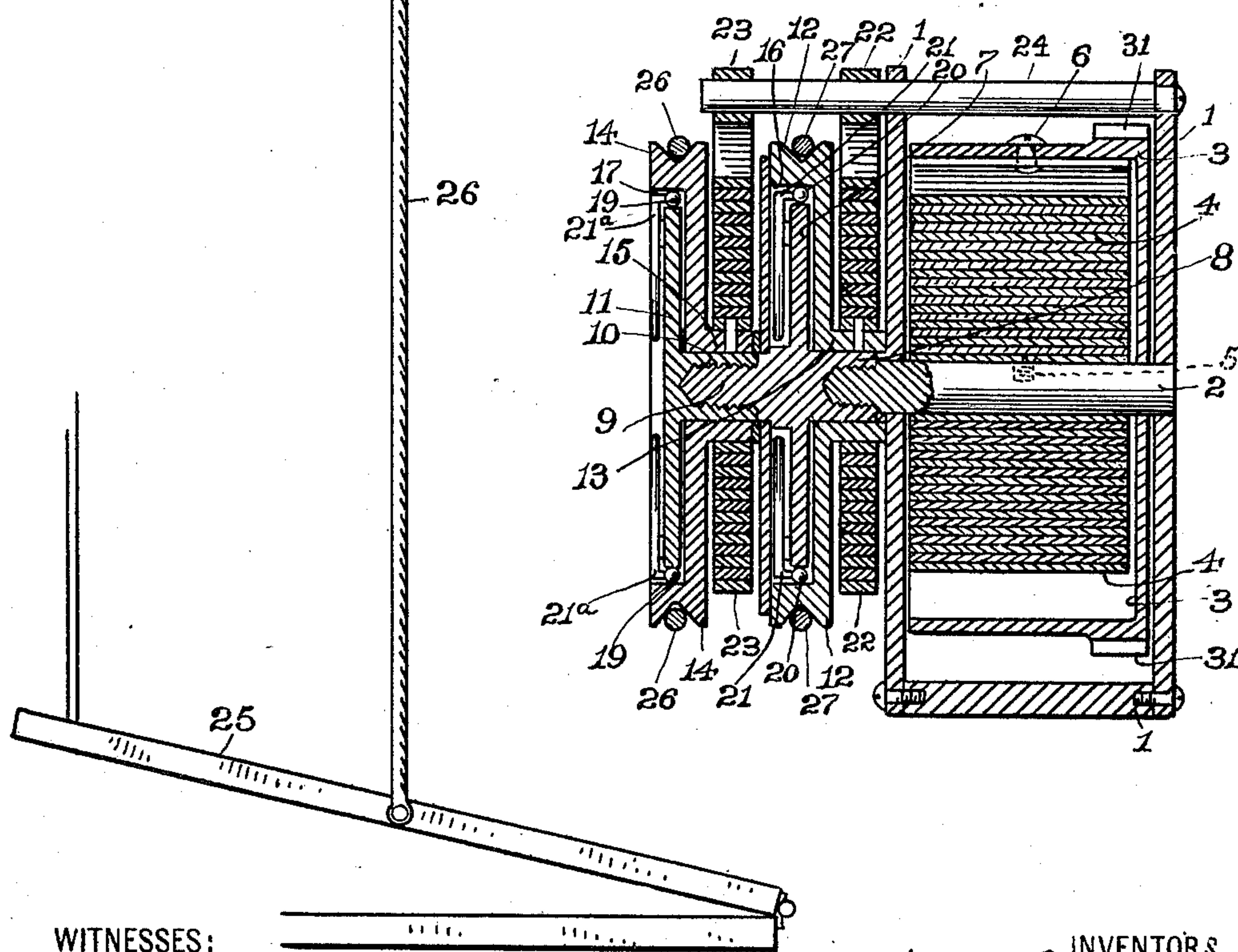


Fig. 2.



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AUTOMATIC SPRING-WINDING MECHANISM FOR MECHANICAL MUSICAL-INSTRUMENT DEVICES.

SPECIFICATION forming part of Letters Patent No. 697,754, dated April 15, 1902.

Application filed February 10, 1902. Serial No. 93,365. (No model.)

To all whom it may concern:

Be it known that we, HERBERT E. SHARPS and WILLIAM F. COOPER, citizens of the United States, residing at Bridgeport, in the
5 county of Fairfield and State of Connecticut, have invented certain new and useful Improvements in Automatic Spring - Winding Mechanism for Mechanical Musical-Instrument Devices; and we do hereby declare the
10 following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

Our invention relates to automatic spring-
15 winding mechanism for mechanical musical-instrument devices, and has for its object to provide an improved and simple automatic winding mechanism for winding and keeping wound a spring-motor to be applied to the
20 rolling and rerolling of a perforated tune-sheet for automatic musical instruments and automatic musical attachments.

With these ends in view our invention consists in certain details of construction and
25 combination of parts, such as will be hereinafter fully set forth, and then specifically be designated by the claims.

In the accompanying drawings, which form a part of this application, Figure 1 is a view,
30 partly in side elevation and partly in section, showing our improvement; and Fig. 2 a sectional elevation of the spring-motor and winding-spring in their proper assembled positions.

35 Similar numbers of reference denote like parts in both figures of the drawings.

1 is any suitable and ordinary casing, within which is journaled the motor-shaft 2. 3 is a drum hung loosely around this shaft inside the casing, and 4 is the motor-spring,
40 the inner end of which is secured to the shaft 2 by any suitable means, as a screw 5, (shown in dotted lines,) while the outer end of said spring is secured to the wall of the drum by
45 any suitable means, such as a screw 6.

7 is a disk having one of its hubs 8 secured to the shaft 2, while to the other hub 9 of this disk is secured the hub 10 of a second disk 11,
50 so that it will be clear that the shaft 2 and disks 7 11 are rigidly secured together, so as to revolve in harmony.

12 is a wheel whose hub 13 is loosely journaled on the hub 8, and 14 is a small wheel whose hub 15 is loosely journaled on the hub 11. The wheels 12 14 are recessed or cut away
55 at one side, as shown at 16 17 in each instance, and the disks 7 11 extend within these recessed portions, so that the peripheries of the disks are very close to the inner peripheries of the recesses. The peripheries of these disks are
60 provided with little wedge-shaped pockets 18, as shown at Fig. 1 in the instance of the disk 11, and resting within these pockets of this disk 11 are little balls 19, while corresponding balls 20 rest within the pockets of the
65 disk 7. The diameter of these balls is greater than the width of the space between the peripheries of the disks and the peripheries of the recesses 16 17 at all points, except where
70 these pockets are located, so that it will be clear that when the wheels are turned in the direction of the arrow, as shown at Fig. 1, there will be no wedging or binding between
these wheels and disks; but when said wheels are turned in a reverse direction the balls will
75 be wedged tightly between the peripheries of the disks and recesses, and thereby cause the wheels and disks to revolve in harmony. Small springs 21 21 are secured to the sides of
the disks, the extremities of these springs being extended behind the balls, so as to normally keep the latter away from the widest
80 portions of the pockets, and this will insure an instant binding or clutching between the disks and wheels when the latter are turned in the
85 direction reverse to that of the arrow in Fig. 1. This construction and arrangement of ball-clutch is not new, but is an expedient commonly known, and we therefore do not wish
to be understood as laying any claim thereto, 90 since any suitable clutch mechanism will answer the purposes of our invention, although we prefer the form shown and described.

22 23 are the winding-springs, whose inner ends are secured to the hubs 13 15 of the
95 wheels 12 14, while the outer extremities of these springs are secured to any suitable pin 24, which extends from the casing 1. The springs 4, 22, and 23 are the usual volute springs, and the springs 22 23 are each
100 stronger than the spring 4, and the springs 22 23 are wound in a direction reverse to the

direction in which the spring 4 is wound, and when the wheels are turned in the direction indicated by the arrow at Fig. 1 the springs 22 23 will be wound so that they will impart to the hubs of the wheels a tendency to revolve in a direction reverse to that indicated by the arrow. Therefore should the wheels be turned in the direction indicated by the arrow and then released the springs 22 23 would cause the wheels and shaft 2 to revolve in a direction reverse to that indicated by said arrow and the motor-spring 4 would be wound. The wheels are connected with any suitable treadle or pedal devices, so that at the power-stroke of such treadle or pedal these wheels will be turned in the direction indicated by the arrow, so as to wind the springs 22 23, while at the return movement of such pedal or treadle the motor-spring will be wound by the action of the more powerful springs 22 23. It is of course immaterial as to what form of pedal or treadle or connecting means are utilized in connection with our invention, and we have therefore shown an ordinary form of pedal 25, connected to the wheels by means of cables or cords 26 27. One of these cords 26, being shown at Fig. 1, is connected with the treadle and passed over suitable pulleys 28 29 and then attached to the periphery of the wheel 14. The cord 27 is of course connected at one end with the periphery of the wheel 12 and then passed over a pulley 30 and another pulley similar to the pulley 28 (but not shown) and attached to the other treadle or pedal. We have shown and described two of these wheels and two sets of the more powerful springs, since this is an advantageous construction in that it is quicker and the power and work are better divided; but we do not wish to be limited to the use of two or more of these powerful springs, since a single spring of this sort will answer the purposes of our invention.

The drum 3 carries a gear 31, which meshes with the usual train of gears, by means of which the unrolling of the perforated tune-sheet is effected, and the transferring of the power of the motor-spring to the usual re-winding-roll is accomplished by the ordinary gear-shifting mechanism which we have not shown and which will require no illustration or description herein.

There are several forms of spring-motors that are used in automatic piano-players, and we have illustrated a well-known form of motor in which the motor-spring winds continuously. It will of course be apparent that the drum 3 may be a stationary element and for all practical purposes a part of the casing 1, while the winding and unwinding of the motor-spring 4 may both be effected through the connection of the motor-spring with the shaft 2, and in this instance this shaft would be operatively connected with the usual train of gears by means of which the unrolling of the perforated tune-sheet is accom-

plished, and this construction would cause the unwinding of the motor-spring to be effected intermittently. Also spring-motors are commonly used in which no drum whatever is employed, the outer extremity of the motor-spring being connected in any suitable and ordinary manner with the perforated tune-sheet-unrolling devices. We therefore do not wish to be limited to any particular form of spring-motor, since the gist of our invention resides in the broad idea of winding the motor-spring by means of the action of a more powerful spring at the return movement of the pedal.

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

1. In an automatic spring-winding mechanism for mechanical musical-instrument devices, the combination of the stationary casing, the shaft journaled within said casing, the motor-spring having its inner and outer extremities respectively secured to said shaft and to the mechanism by means of which the unrolling of the perforated tune-sheet is effected, a wheel capable of revolution independent of said shaft, a spring relatively more powerful than the motor-spring and having its inner and outer extremities respectively secured to said wheel and to a stationary element, means—as a cord—secured to said wheel and to the pedal whereby the power-stroke of the latter will revolve the wheel in one direction to wind the more powerful spring, and a friction-clutch whereby said wheel will, when revolved in a reverse direction, be rigidly connected with said shaft to wind the motor-spring on the return movement of the pedal, substantially as set forth.

2. In an automatic spring-winding mechanism for mechanical musical-instrument devices, the combination of the stationary casing, the shaft journaled within said casing, a motor-spring having its inner and outer extremities respectively secured to said shaft and to the mechanism by means of which the unrolling of the perforated tune-sheet is effected, a wheel capable of revolving independent of said shaft, a spring relatively more powerful than the motor-spring and having its inner and outer extremities respectively secured to said wheel and to a stationary element, said springs being wound in reverse directions, the pedal, a connection between said wheel and pedal whereby the power-stroke of the latter will revolve said wheel in one direction and wind said powerful spring, and a friction-clutch carried by said shaft and adapted to engage with said wheel on its reverse movement whereby at the return stroke of the pedal said powerful spring will effect this reverse movement of the wheel and thereby wind the motor-spring, substantially as set forth.

3. In an automatic spring-winding mechanism for mechanical musical-instrument devices, the combination of the stationary cas-

ing, the shaft journaled within said casing, the motor-spring having its inner and outer extremities respectively secured to said shaft and to the mechanism by means of which the
5 unrolling of the perforated tune-sheet is effected, the friction-clutches moving in harmony with said shaft, the wheel capable of independent rotation in one direction, the springs which are each relatively more powerful
10 than the motor-spring, and which are each wound in a direction reverse to that of said motor-spring and whose inner and outer extremities are respectively secured to said wheels and to a stationary element, the pedals,
15 and connections between said wheels and pedals whereby the power-strokes of the latter will effect the free rotations of said wheels thereby winding the powerful springs, while at the return movements of said pedals the
20 relaxation of said powerful springs will effect the engagement of said clutches and wheels and cause the latter to revolve in a reverse direction thereby winding the motor-spring, substantially as set forth.

25 4. In an automatic spring-winding mechanism for mechanical musical-instrument devices, the combination of the stationary casing, the shaft journaled within said casing,

the drum loosely carried by said shaft, the motor-spring whose inner and outer extremities are respectively secured to said shaft and drum, a wheel capable of revolving independent of said shaft, a spring relatively more powerful than the motor-spring and having
30 its inner and outer extremities respectively secured to said wheel and to a stationary element, said springs being wound in reverse directions, the pedal, a connection between said wheel and pedal whereby the power-stroke of
35 the latter will revolve said wheel in one direction and wind said powerful spring, and a friction-clutch carried by said shaft and adapted to engage with said wheel on its reverse movement whereby at the return stroke
40 of the pedal said powerful spring will effect this reverse movement of the wheel and thereby wind the motor-spring, substantially as set forth.

In testimony whereof we affix our signatures in presence of two witnesses.

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WILLIAM F. COOPER.

Witnesses:

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M. T. LONGDEN.