

Oct. 25, 1927.

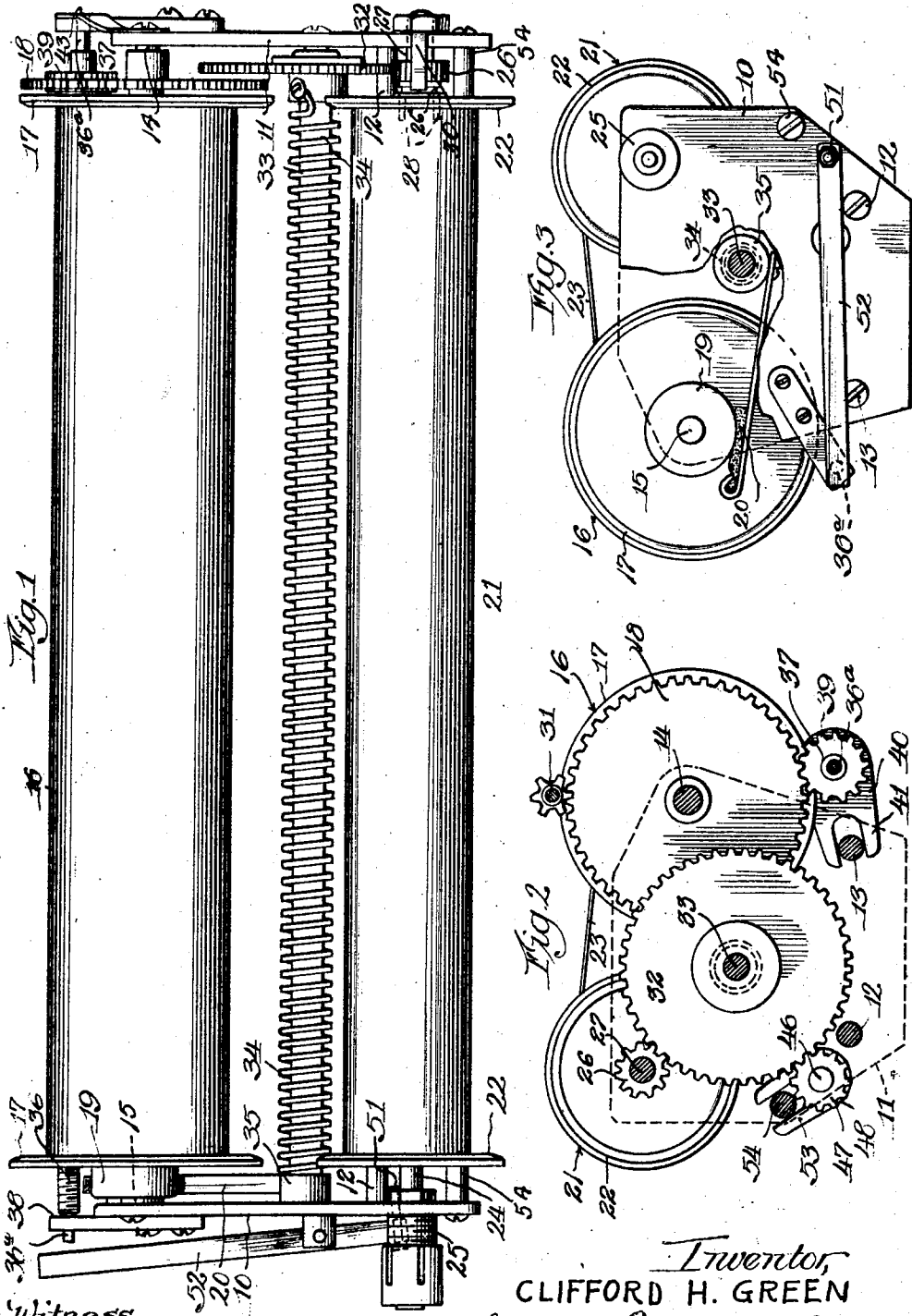
1,647,112

C. H. GREEN

SPOOL MECHANISM FOR MUSICAL INSTRUMENT PLAYER DEVICES

Filed Oct. 3, 1923

3 Sheets-Sheet 1



Witness
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Inventor,
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Oct. 25, 1927.

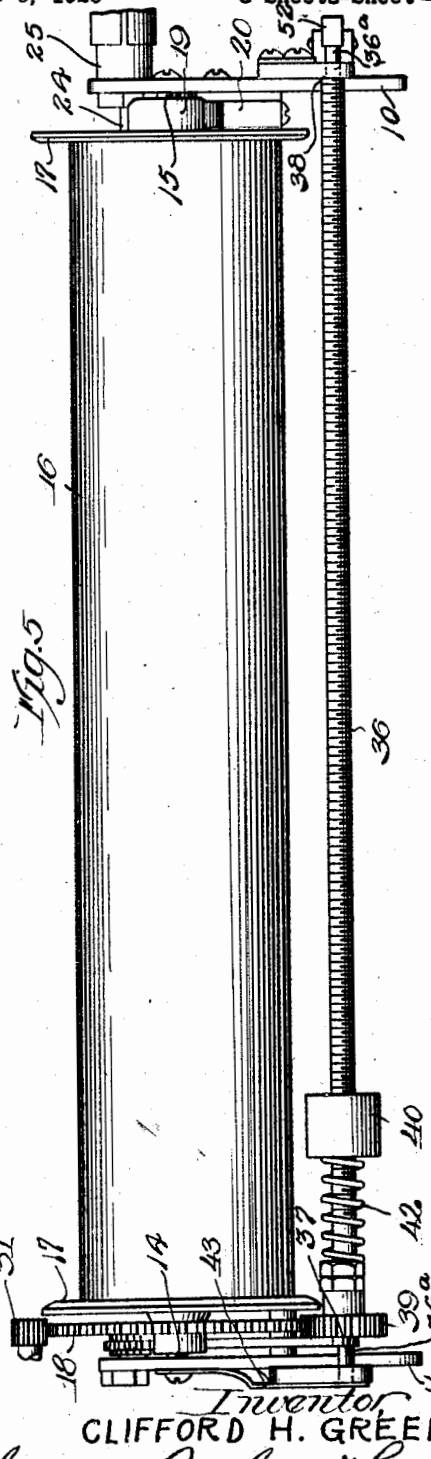
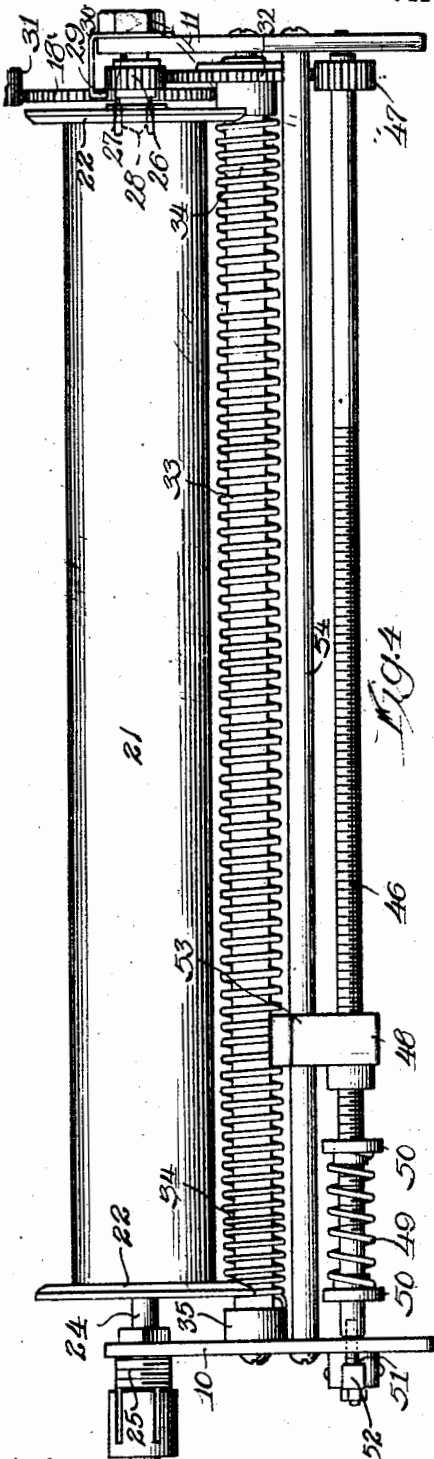
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SPOOL MECHANISM FOR MUSICAL INSTRUMENT PLAYER DEVICES

Filed Oct. 3, 1923

3 Sheets-Sheet 2



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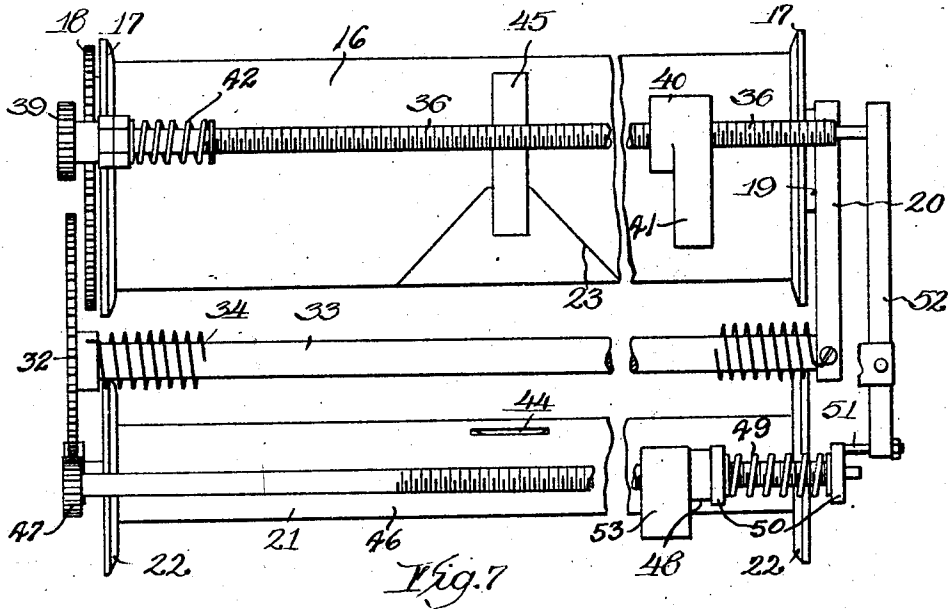
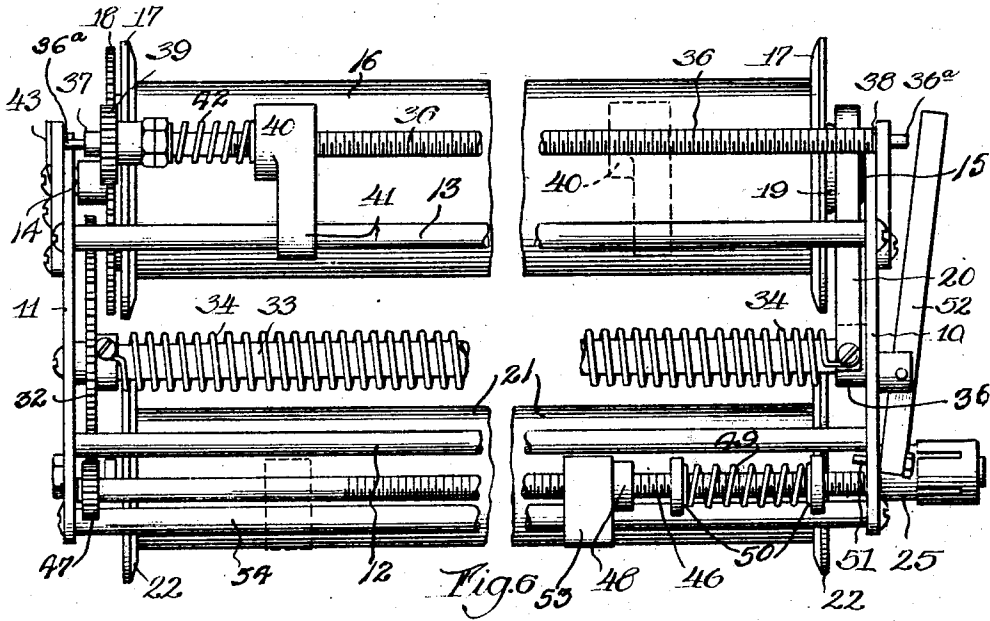
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1,647,112

SPOOL MECHANISM FOR MUSICAL INSTRUMENT PLAYER DEVICES

Filed Oct. 3, 1923

3 Sheets-Sheet 3



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UNITED STATES PATENT OFFICE.

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SPOOL MECHANISM FOR MUSICAL-INSTRUMENT-PLAYER DEVICES.

Application filed October 3, 1923. Serial No. 666,220.

My present invention relates to player-devices of the coin-controlled type, and has more particular reference to the mechanism which unwinds the record-sheet past the tracker-board from the spool containing the same while the musical selection is being played and which, after the selection has been played will re-wind the record-sheet upon the original spool and stop the sheet in a position where the tracker-board may, if desired, be again brought into contact therewith, close to the first perforations adjacent to the starting end of the record-sheet. In this connection, I have provided devices that will be automatically brought into operation to govern the speed of the re-winding operation, and to slow up and stop such operation at the proper time and in the proper manner to stop the sheet in the aforesaid position, connected to the take-up spool, ready for a repetition of the unwinding and re-winding operation. I have also provided devices which in the event the re-winding mechanism fails to perform its functions at the end of the selection, will operate automatically to prevent the record-sheet from being torn or damaged and which, if such an emergency arises, will operate automatically to prevent jamming or straining of any part of the mechanism. This structure also contains a novel brake device that is actuated automatically to stop the re-wind of the record sheet and which is set in operation through the medium of the re-winding mechanism.

It will be obvious that among the objects of my invention are the provision of a mechanism, having the above-mentioned characteristics, which is so compact in construction that it may be placed in the space allotted to it in a drum or magazine containing a plurality of such mechanisms. It is also simple in the arrangement of its parts, so that there is nothing to get out of order, and it is dependable and effective in operation.

I prefer to carry out my invention in substantially the manner hereinafter described, reference being had to the accom-

panying drawings that form a part of this specification.

In the drawings:

Figure 1 is a top plan of one of my improved spool-mechanism units of a coin-controlled player-device detached from the cylinder or drum upon which a plurality of such units are usually mounted.

Fig. 2 is a sectional view, looking at the right-hand end of the structure shown in Figure 1, with the adjacent side plate for journaling or supporting the elements removed but shown in broken lines.

Fig. 3 is an end view, looking at the left-hand end of the structure shown in Figure 1, with a portion of the adjacent journaling and supporting plate broken away.

Fig. 4 is a longitudinal side elevation, looking at the left side of the structure shown in Figure 2, showing one part of the automatic throw-off mechanism in detail.

Fig. 5 is a longitudinal side elevation, looking at the right side of the structure shown in Figure 2 showing another part of the automatic throw-off mechanism in detail, which part also serves as part of the means for slowing up and stopping the re-winding operation.

Fig. 6 is a bottom plan of the device shown in Figure 1, the parts being in normal position for slowing up and stopping the re-winding operation.

Fig. 7 is a view similar to Figure 6, drawn schematically and showing the relative positions of the parts when the mechanism for slowing up and stopping the re-winding is thrown out of operation.

In the drawings, I have employed similar reference characters to designate the same parts wherever they occur in the several views and, by referring to said drawings, it will be seen the structure is of a unitary character and comprises two side plates 10 and 11, respectively, that are connected together by parallel, longitudinally, disposed tie-rods 12, 13 and 54, two of which tie-rods, as will hereinafter appear, act as guides for the bifurcated arms or lateral extensions of certain traveling blocks or threaded sleeves

used in connection with the throw-off mechanisms and with the mechanism for slowing up and stopping the re-winding operation. Adjacent one of the upper corners of the plates 10 and 11 are mounted the spindles 14 and 15 of the take-up spool 16 which is of the usual type, being cylindrical in form and having end flanges 17 to guide the paper record-sheet as it winds thereon from the record-carrying spool. One of the flanges 17 has a large gear 18 secured to it outside of the cylindrical portion of the spool 16, while the opposite flange of said spool has an enlarged hub or axial embossment 19 that is acted upon by a suitable brake-arm 20, as will hereinafter be described.

Suitably mounted in the upper portions of plates 10 and 11, opposite the take-up spool 16 are the devices for receiving and journalling the removable record spool 21, which is also of the usual type, having end flanges 22, and which has wound upon it, when placed in the unit, the perforated record-sheet 23. The spool receiving and journalling devices just above mentioned, comprise a retractable bolt 24, mounted in a cylindrical housing 25 projecting outwardly from the side plate 10, the projected end of said bolt passing through the plate 10 and entering an axial aperture or recess in the adjacent end of the spool 21, and a pinion 26, mounted to turn upon a short shaft 27 projecting inwardly from plate 11, which pinion has a pair of clutch-pins 28 projecting from the hub thereof that enter corresponding apertures in the adjacent end of the spool 21 when they are brought into alinement therewith. The pinion 26 is provided with an annular groove 26^a and is maintained upon shaft 27 by means of the depending flange 29 on the upper horizontal arm of an inverted L-shaped bracket 30, secured to the side plate 11 so as to overhang the pinion so that the flange 29 projects into the annular groove 26^a as seen at the right-hand end of Figure 4 of the drawings. The pinion 26, when rotated during the re-winding of the record-sheet, will thus rotate the spool 21 and, by retracting bolt 24, the spool 21 may be withdrawn from the clutch-pins 28 and removed from the unit. By retracting bolt 24 the spool 21 may be removed.

The gear 18 of the take-up spool 16 is engaged and driven by a rotatable spur-gear 31, which derives its motion from any suitable source of power and is moved bodily by certain pneumatics or other elements of the player-devices into engagement with the gear 18 when the tracker-board is in co-action with the record-sheet, and said drive spur-gear is disengaged from said gear 18 when the end of the record-sheet has been reached and the tracker-board is lifted out of contact with said record-sheet. As such mechanisms are not a part of this invention they

have not been disclosed herein and therefore need not be further described.

The pinion 26 meshes with a large gear 32 mounted on a longitudinal rod 33 connecting the side plates 10 and 11. A comparatively long coiled spring 34 surrounds this rod 33 practically throughout its length and has one end connected to the hub of the gear 32, while its opposite end is connected to a block 35 which is mounted to turn on the opposite end-part of the rod and to which block the brake-arm 20 is rigidly connected. The spool 21 containing the record-sheet is not connected directly with the take-up spool 16 except through the medium of the record-sheet 23 and, when the take-up spool 16 is rotated by the spur-gear 31 it will cause a rotation of the spool 21 by the unwinding of the record-sheet therefrom. This actuates pinion 26, which drives the gear 32 and winds up the spring 34 upon the rod 33. The winding of the spring 34 is for the purpose of creating and storing the power or motive force by which the record-sheet may be rewound upon its spool 21. Under normal conditions, when the last of the sheet-perforations have been reached, the aforesaid certain pneumatics or other elements of the player-devices raise the spur-gear 31 so that no further winding motion of the spool 16 is had. The lifting of spur-gear 31 leaves the spool 16 free to rotate, and it is then turned in a reverse direction through the action of the spring 34 which now begins to rewind the record-sheet, the latter being driven through the large gear 32 and pinion 26.

While the spring 34 is being wound tighter, the brake-arm 20 is being pressed with increasing friction against the hub 19 of the spool 16. This, however, does not effect the driving of the spool 16 by the spur-gear 31 while the music is being played, as the spur-gear is actuated by a motor strong enough to overcome the friction of the brake-arm but upon the completion of the selection and the disengagement of spur-gear 31, the spool 16, except for the action of the brake-arm 20, would rotate too rapidly and, at the end of the re-winding action the momentum of the spool would tend to carry it beyond the desired stopping point and wind the record-sheet reversely thereon. The brake-arm, however, exerts a compensating action frictionally against the hub 19, the greatest pressure being applied at the moment re-winding is started and gradually decreased as the rewinding continues, such decrease being due to the slacking of the spring 34.

In order to stop the re-winding action at the desired time without causing a sudden jar or jerk upon the record sheet, I have provided a novel mechanism which will now be described. Mounted in the side plates 10 and 11 is a rotatable screw 36, which is of a length to extend from one side plate to

the other, the end-parts thereof being reduced and projecting through said plates, as seen in Figure 5 of the drawings. Shoulders 37 and 38 are formed by reducing the end-parts of the screw as above-mentioned, and such shoulders are arranged to permit a slight longitudinal movement of said screw between its bearings in the plates 10 and 11, which movement is utilized in connection with an emergency device which I have provided and will later describe. Secured upon the end-part of the screw nearest the shoulder 37 is a pinion 39, in mesh with the gear 18 of the take-up spool 16 so that the screw 36 is rotated while the record-sheet is being wound upon said take-up spool. While the screw 36 is rotating, it feeds a traveling block 40 carried thereby, which block is bored and interiorly threaded to provide for this movement and is provided with a lateral extension 41 that is bifurcated so as to pass upon opposite sides of the cross-bar or tie-rod 13. The tie-rod 13 thus prevents rotation of the block 40 while it is being moved longitudinally upon the screw 36. Interposed between the traveling block 40 and the pinion 39 is a short coiled spring 42 that surrounds the screw 36, and a leaf-spring 43 presses against the outer end of said screw adjacent said pinion to maintain the screw in its normal position, with the pinion 39 in mesh with the gear 18. When the end of the selection has been reached, the traveling block 40 will have been moved to some position along the screw 36, as shown in dotted lines in Figure 6. The driving spur-gear 31 having been disengaged from the gear 18 on the take-up spool, the power from the tightly coiled spring 34 begins to unwind the record-sheet from the spool 16 which, through the gear 18 and pinion 39, rotates the screw 36 in the opposite direction and returns the traveling block 40 to normal position, and in doing so presses the same against the interposed spring 42, compressing it until the friction of the spring acting between and upon the rotating pinion 39 and the non-rotatable block 40 is sufficient to counteract the re-winding action of the power-spring 34, whereupon the entire mechanism will stop. This will be at such a point on the record-strip that the initial perforations therein will be in a position to be again engaged by the tracker-board whenever the selection is to be played.

If, for any reason, the spur-gear 31 should not be disengaged from the large gear 18 when the end of the record-sheet had been reached, after the selection had been played, the record-sheet would continue to be wound upon the take-up spool 16 and would be torn from the spool 21. In such a contingency, in order to avoid such tearing of the record-sheet, I provide a longitudinal slot 44 in the record-spool 21 and insert therein a

tape 45, secured to and extending from the end of the record-sheet 23, such structure being illustrated in Figure 7 of the drawings. This method of securing the record-sheet to its spool permits the sheet to be entirely withdrawn from the spool when the end of the sheet has been reached, and the connection between the take-up spool 16 and the record spool 21 may thus be broken without damage to the sheet. Obviously, however, the record-spool would then be free to be driven in a reversed direction, as in re-winding, by the power-spring 34, the pinions 26 and gear 32, and the continued driving of the take-up spool 16, by the spur-gear 31, would continue the rotation of the screw 36 and result in jamming the traveling block 40 against the side plate 10. In order to avoid this, I arrange to disconnect the pinion 39 from the gear 18, and to this end I have provided a threaded rod 46, which extends from one side plate to the other and is journaled therein so that it may be rotated. A pinion 47 is fast on this rod, preferably beyond the threaded portion thereof and is in mesh with the gear 32 that is actuated by the unwinding of the power-spring 34. During the playing of the selection and the unwinding of the record-sheet from the spool 21, the threaded rod 46 is rotated and a traveling block 48 carried thereby is moved from adjacent one end of the rod toward the other end thereof. Mounted upon the rod, but not engaged by the threads thereof, is a compressible sleeve-structure consisting of a coiled expansion spring 49 surrounding the threaded rod 46, the ends of said spring being convoluted upon the reduced portions of shouldered washers 50, which are maintained on said rod 46 but have smooth bores so as to be free to move longitudinally thereon independently of the threads of said rod. Under normal operation of the device, the traveling block 48 will not be moved toward this compressible sleeve far enough to contact with same, but whenever the hereinbefore-mentioned contingency arises, this block 48 will travel down into contact with the adjacent end of the compressible sleeve 49—50 and carry the same to the end of the rod, where the opposite end of said compressible sleeve 49—50 will engage with a lateral projection or pin 51 carried upon the adjacent end of a rocker-arm 52, which latter is fulcrumed intermediate its ends on the side plate 10 and at its opposite end is engageable with the reduced projecting end 36^a of the rotatable screw 36. The arm 52 will be rocked by the thrust of the compressible sleeve 49—50 and shift the screw 36 bodily in a longitudinal direction, against the tension of leaf-spring 43, until the pinion 39 has been shifted out of mesh with the gear 18; the screw 36 will then no longer be ro-

tated by the take-up spool 16; the traveling block 40 will remain stationary upon the screw 36; and the structure will be maintained in this condition without damage to any portion of the unit although in the meantime, the driving spur-gear 31 may continue to actuate the gear 18 and rotate the take-up spool 16 upon which the record-sheet has been wound. The traveling block 48 on the threaded rod 46 has a bifurcated arm 53 that extends laterally therefrom into engagement with the tie-rod 54 connecting the side plates 10 and 11, so that rotation of the block 48 is prevented in the same manner as is that of the block 40, heretofore described. The spring 49 of the compressible sleeve cushions the action of the block 48 and thus prevents a sudden jar to the mechanism, and gradually slowing down the further longitudinal movement of block 48 on the rod 46 and finally stopping the motion of the gearing and other mechanism that has been actuated by power-spring 34.

When a new spool is to be placed in position the attendant shifts screw 36 to disengage the pinion 39 from the take-up spool-gear 18, whereupon the record-sheet may be manually wound upon its spool 21 and the latter removed by retracting the bolt 24. The new spool is then inserted in position and the end of the sheet drawn therefrom and wound upon the spool 16 (with the pinion 39 still disengaged) until the first perforations are below the tracker-board whereupon the pinion 39 is moved back into mesh with gear 18.

I have herein disclosed my invention in connection with a player-device of the automatic coin-controlled type, which is merely a typical embodiment, as it is apparent the structure with but slight alteration may be adapted for use in connection with other types of player-devices and mechanically operated musical instruments. It will be understood that I do not herein limit myself to any particular type of device, and such changes or modifications as may be made are fully contemplated as coming within the scope of the appended claims.

What I claim is:—

1. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, and means operated by said record-spool and acting upon said take-up spool to retard the re-winding of said record-sheet upon said record-spool after it has been unwound therefrom by said take-up spool.

2. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, and means operated by the unwinding of said record-sheet from said record-spool for storing power to retard the re-winding of said record-sheet upon said record-spool.

3. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, and means operated by said record-spool and acting with variation upon said take-up spool to retard the re-winding of said record-sheet upon said record-spool after it has been unwound therefrom by said take-up spool, such variation in the action of said means being proportionate to the amount of said record-sheet which is unwound from said record-spool.

4. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, and means operated by the unwinding of said record-sheet from said record-spool for storing power to retard the re-winding of said record-sheet upon said record-spool, the degree of retarding power thus stored being dependent upon the amount of said record-sheet which is unwound from said record-spool.

5. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, a brake acting upon said take-up spool, and means operated by said record-spool to vary the braking action of said brake upon said take-up spool.

6. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means acting upon said take-up spool to retard free rotation thereof, and power-storing means acting upon said spool-retarding means and actuated by the unwinding of said record-sheet from said record-spool to increase the power stored in said power-storing means as said record-sheet is unwound from said record-spool.

7. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, a gear-train actuated by the unwinding of said record-sheet from said record-spool, a power-spring operatively connected to said gear-train and wound by the actuation thereof, and braking means acting upon said take-up spool and operatively connected with said power-spring.

8. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, releasable means for actuating said take-up spool to unwind said record-sheet from said record-spool, and means operated by such unwinding of said record-sheet for storing power increasingly as said record-sheet is unwound to re-wind said record-sheet upon said record-spool and to retard such re-winding, whereby, when said take-up spool actuating means is released, said record-sheet will be re-wound upon said record-spool and the decrease in the stored re-winding power,

which decreases as such re-winding progresses, will be proportionate to the decrease in the power acting to retard such re-winding.

5 9. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, releasable means for actuating said take-up
10 record-spool, a power-spring arranged to be wound by such unwinding of said record-sheet and to effect the re-winding thereof, when permitted, and a brake acting upon said take-up spool and actuated by said power-
15 spring to retard the re-winding of said record-sheet, whereby, when said take-up spool actuating means is released, said power-spring will effect the re-winding of said record-sheet upon said record-spool and will
20 retard such re-winding through the action of said brake upon said take-up spool, the retarding action of said power-spring being proportionate to the re-winding action thereof.

25 10. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, releasable devices for actuating said take-up spool to wind said record-sheet thereon from
30 said record-spool, a coiled power-spring, means operatively connecting said power-spring with said record-spool whereby, upon the release of said take-up spool actuating devices, said record-spool is driven by said
35 power-spring, and a brake operatively connected with said power-spring and controlling the unwinding speed of said take-up spool.

40 11. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, a gear-train actuated by the unwinding of said record-sheet from said record-spool, a power-spring operatively connected to said
45 gear-train and wound by the actuation thereof, releasable means for actuating said take-up spool to unwind said record-sheet from said record-spool, and a brake, operatively connected with said power-spring and
50 engaging said take-up spool, whereby, upon the release of said take-up spool actuating means, said record-sheet is re-wound upon said record-spool by said power-spring and gear-train and the braking effect of said
55 brake upon said take-up spool is decreased.

60 12. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means for rotating said take-up spool to
wind said record-sheet thereon from said record-spool, separate means for re-winding said record-sheet upon said record-spool, a shaft, a traveling block movable along said shaft during the re-winding of said record-sheet, a device actuated by the rotation

of said take-up spool, and friction means interposed between said device and said block, whereby the movement of said block along said shaft may cause frictional engagement between said device and said means.

70 13. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means for rotating said take-up spool to
75 wind said record-sheet thereon from said record-spool, separate means for unwinding said record-sheet from said take-up spool and re-winding it upon said record-spool, a worm-shaft, a traveling block propelled along said worm-shaft as said record-sheet
80 is unwound from said take-up spool, a device carried upon said worm-shaft and actuated by the rotation of said take-up spool, and friction means interposed between said block and said device, whereby, as said record-sheet is unwound from said take-up
85 spool, said block will travel along said worm-shaft, encounter said friction means and cause it to engage said device and thereby retard and subsequently stop the unwinding of said record-sheet from said take-up
90 spool.

95 14. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means for rotating said take-up spool to wind said record-sheet thereon, separate means for re-winding said record-sheet upon said record-spool, a worm-shaft, a traveling block movable longitudinally thereon
100 from adjacent one end towards the other end of said worm-shaft during the winding of said record-sheet upon said take-up spool, a device fixed on said worm-shaft and actuated by the rotation of said take-up spool, and means interposed between said device and said block whereby to cause a frictional engagement between said device and said means when the latter is engaged by said block.

110 15. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means for actuating said take-up spool to wind said record-sheet thereon, a worm-shaft, a traveling block movable longitudinally on said worm-shaft from and towards one end thereof during the winding and unwinding of said record-sheet upon and from said take-up spool, respectively, a
115 device fixed on said worm-shaft and actuated by the rotation of said take-up spool, and a coiled expansion-spring surrounding said worm-shaft between said device and said block, whereby, when said block moves
120 towards said device said expansion-spring is compressed into frictional engagement therewith.

125 16. In a device of the class described, a record-sheet, a record-spool upon which

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said record-sheet is wound, a take-up spool, means for rotating said take-up spool to wind said record-sheet thereon from said record-spool, separate means for unwinding said record-sheet from said take-up spool and re-winding it upon said record-spool, a worm-shaft having actuating means through which it is rotated by said take up spool rotating means, a traveling block engaged by said worm-shaft and moved thereby away from and towards one end thereof as said take-up spool is turned respectively in one or the other direction, and a coiled expansion-spring surrounding said worm-shaft adjacent its actuating means, said expansion-spring being positioned to be engaged by said block and compressed against said actuating means to frictionally retard and subsequently stop the re-winding of said record-sheet upon said record-spool.

17. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means for rotating said take-up spool to wind said record-sheet thereon from said record-spool, separate means for unwinding said record-sheet from said take-up spool and re-winding it upon said record-spool, a worm-shaft actuated by said take-up spool rotating means, a traveling block engaged by said worm-shaft and reciprocable longitudinally thereon, a pinion fast on said worm-shaft and engaged by said take-up spool rotating means, and a spring surrounding said worm-shaft and adapted to be compressed between said block and said pinion when the former approaches the latter, whereby to frictionally retard and subsequently stop the rotation of said take-up spool at the end of the re-winding operation.

18. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, a first means for rotating said take-up spool to wind said record-sheet thereon from said record-spool, a second means for unwinding said record-sheet from said take-up spool and re-winding it upon said record-spool, a third means disengageably connected with and operated by said first means, and a fourth means actuated by said second means to effect the disengagement of said third from said first means.

19. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means for rotating said take-up spool to wind said record-sheet thereon from said record-spool, means for unwinding said record-sheet from said take-up spool and re-winding it upon said record-spool, means disengageably connected with said rotating means for retarding and subsequently stopping the unwinding of said record-sheet

from said take-up spool at the end of the re-winding operation, and means actuated by said re-winding means for disengaging the last said means from said rotating means.

20. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means for rotating said take-up spool to wind said record-sheet thereon from said record-spool, means for unwinding said record-sheet from said take-up spool and re-winding it upon said record-spool, means disengageably connected with said rotating means for retarding and subsequently stopping the unwinding of said record-sheet from said take-up spool at the end of the re-winding operation, a worm-shaft actuated by said re-winding means, a traveling block engaged by said worm-shaft and reciprocable longitudinally thereon, and means whereby the movement of said block beyond a given point will effect the disengagement of said retarding means from said rotating means.

21. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means for rotating said take-up spool to wind said record-sheet thereon from said record-spool, means for unwinding said record-sheet from said take-up spool and re-winding it upon said record-spool, an end-wise movable worm-shaft actuated by said take-up spool rotating means, a traveling block engaged by said worm-shaft and reciprocable longitudinally thereon, a pinion fast on said worm-shaft and engaged by said take-up spool rotating means, and means actuated by said re-winding means for shifting said worm-shaft endwise to disconnect said pinion from said take-up spool rotating means.

22. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means for actuating said take-up spool whereby said record-sheet is unwound from said record-spool, a worm-shaft, a pinion thereon rotated by said take-up spool actuating means, a traveling block carried upon said worm-shaft and reciprocated thereby, a friction element engaged by said block upon its movement in one direction, and means for bodily shifting said worm-shaft whereby said pinion is disengaged from its actuating element.

23. In a device of the class described, a record-sheet, a record-spool upon which said record-sheet is wound, a take-up spool, means for actuating said take-up spool whereby said record-sheet is unwound from said record-spool, a gear-train actuated by the unwinding movement of said record-spool, a coiled power-spring operatively con-

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5 nected to said gear-train and wound by the
actuation thereof, a worm-shaft, a pinion
thereon rotated by said take-up spool actuat-
ing means, a block reciprocated by said
worm-shaft, a friction element engaged by
said block upon its movement in one direc-
tion, and means for longitudinally moving

said worm-shaft to disengage said pinion
from its actuating means.

Signed at Grand Rapids, county of Kent 10
and State of Michigan, this eleventh day of
September, 1923.

CLIFFORD H. GREEN.