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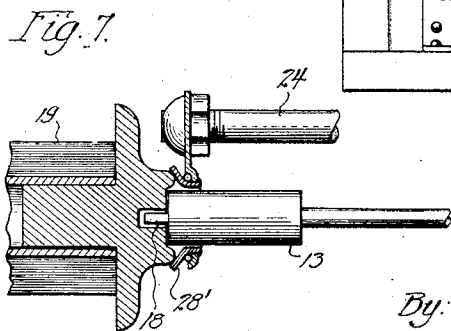
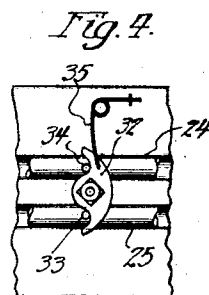
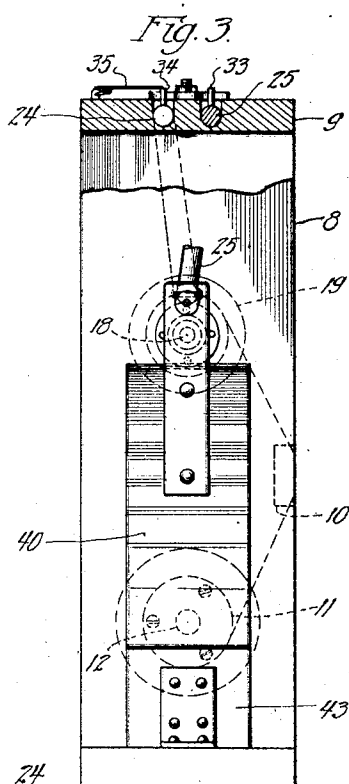
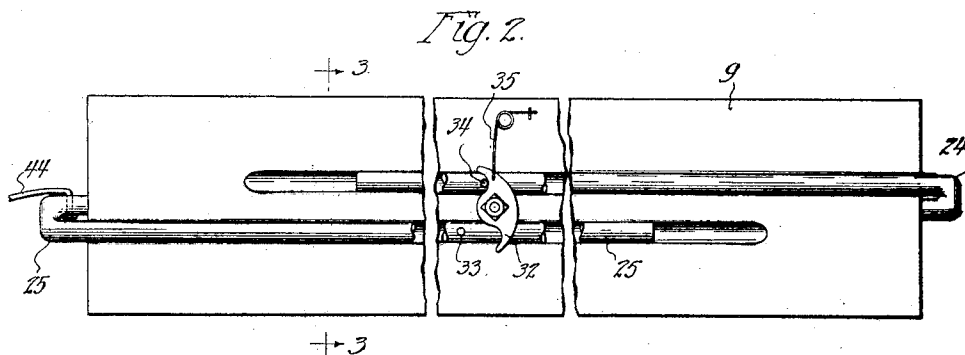
W. G. BETZ

1,444,364

AUTOMATIC MUSIC ROLL CARRIER AND CENTERING DEVICE FOR PNEUMATIC MUSICAL INSTRUMENTS

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2 SHEETS-SHEET 2



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UNITED STATES PATENT OFFICE.

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AUTOMATIC MUSIC-ROLL CARRIER AND CENTERING DEVICE FOR PNEUMATIC
MUSICAL INSTRUMENTS.

Application filed February 12, 1921. Serial No. 444,446.

To all whom it may concern:

Be it known that I, WILLIAM G. BETZ, a citizen of the United States, residing at Hammond, in the county of Lake and State of Indiana, have invented a certain new and useful Improvement in Automatic Music-Roll Carriers and Centering Devices for Pneumatic Musical Instruments, of which the following is a full, clear, concise, and exact description, reference being had to the accompanying drawings, forming a part of this specification.

My invention relates to automatic music roll carriers and centering devices for pneumatic musical instruments. One of the features of my invention is the provision of a device of the character described in which the music spool is supported for rotation independent of the initial supporting and rewinding drive shafts. That is, I provide rotatable supports for the ends of the music roll which are rigidly mounted and operable to engage the ends of the music spool to carry it free of the shafts so as to relieve them of any supporting strain during the playing operation. These supports are also adjustable so as to align the music spool and music sheet with the take-up spool, being preferably automatically operable. These supports are also preferably arranged so as to automatically release the music spool when the rewinding commences.

In the present type of pneumatic players the supporting shafts for the music spool project inwardly some distance from the bearing in the supporting frame and therefore the shafts are without support at their ends where it is mostly needed. Therefore, the weight of the rotating roll is constantly wearing on the bearings which in time enlarge, permitting a play or lost motion with uneven support. As a result the centers of the roll and the centers of the take-up spool are not in parallel alignment so that the perforated sheet will not travel straight or wind evenly on the take-up spool. Also the tension over the whole width of the paper is not even.

In order to overcome these difficulties I have provided carriers of the character above referred to which are rigidly supported independently of the initial supporting shafts for the music spool and preferably provided with ball bearings arranged to auto-

matically center the spool both horizontally and perpendicularly relatively to the take-up spool. These supports thus take all the weight and wear off of the clutch or music spool shafts during the playing operation. The supports are mounted in ball bearings so as to eliminate friction and wear to the greatest extent, what wear that there is taking place maintaining the parts in definite alignment on account of the construction of the ball bearings.

The device is preferably automatically active only during the playing operation and is effective to centralize the music spool relatively to the tracker bar regardless of variations in width such as frequently occur in commercial rolls where the music sheet varies slightly in width at times and also where spool heads vary slightly in thickness thus causing variations in the length of the spool between its supporting ends.

For a better understanding of my invention reference is to be had to the accompanying drawings in which

Fig. 1 is a front view of my improved control mechanism applied to the usual wind and rewind mechanism, shown only in part;

Fig. 2 is a top or plan view of Fig. 1;

Fig. 3 is a left end view of Fig. 1 partially broken away at the top;

Fig. 4 shows the adjustable stop in a position occupied with a spool in a centralized playing position;

Fig. 5 is a detailed view of the music spool driving or rewind shaft; and

Fig. 6 is a detailed view of the stationary supporting shaft for the music spool; and

Fig. 7 is a detail view of spool head and support.

Referring briefly to the general method of operation of my invention as illustrated, the device is so arranged that it will take the ordinary standard playing spools and adjust or centralize them relative to the tracker bar and take-up spool although there be slight variations in the length of the spool which may be caused by variations in the width of the paper or thickness or construction of the spool heads. Supporting members for the spool are normally ineffective but when the music spool is inserted between the usual initial supporting shafts and the player is started, the music spool end supports engage the ends of the music spool to

support it independent of the shafts and align the spool both horizontally and vertically relative to the tracker bar and take-up spool by the operation of a pneumatic effective during playing only. When the playing operation ceases the pneumatic releases the supports so that the music spool may be rotated to rewind the pneumatic sheet.

Referring more particularly to the preferred form of my invention as illustrated, it comprises the usual frame having a bottom or base, ends 7 and 8 which may be of wood and a top 9 which may also be of wood. Supported in this frame in the usual way is a tracker bar 10 and a take-up spool 11 connected to a driving shaft 12 operated in any of the well known ways, but the mechanism of which it is thought unnecessary to show.

For supporting the music spool I provide the usual shafts, the one at the right hand, rewind shaft 13 being rotatably supported in the usual frame plates 14, 15 and operable in the usual way by a chain driven sprocket 16. This driving shaft 13 is normally pressed toward its extreme left position by means of a coil spring 17. At the spool end of the shaft 13 is the usual tongue 18 adapted to fit into the slotted end of the ordinary music spool so as to drive the same for rewinding. This shaft 13 is preferably arranged so as to assume a normal position toward the left far enough to take up the greatest ordinary inaccuracies present in the standard commercial rolls, that is as to shortness in length of the roll.

At the left end of the music spool 19 (shown in dotted lines) I provide the usual spring pressed supporting shaft 20 carried by the bearing 21 so that the shaft 20 may be slidably moved therein against the tension of the spring 22. At the end of the shaft 20 is a rotatable button 23 which may be of the usual construction and adapted to support the music spool by engaging the recessed end of the head. Thus when the spool is rotated while supported by the shaft 20, the tip 23 rotates in the end of the shaft 20 in preference to having the shaft 20 rotate in its slidably bearing.

The two spool supporting shafts 13 and 20 are thus normally pressed toward each other under spring tension as explained and adjusted so as to take a spool of the shortest length ordinarily found. The spool 19 is initially inserted between the shafts 20 and 13 in the usual way by first placing the left head against the shaft 20 and moving it toward the left until the right head of the spool may be positioned opposite the rewind shaft 13 and allowed to spring into place.

Now it will be apparent that due to the ordinary inaccuracies in commercial music spools or rolls they do not always line up with the tracker bar and this will be apparent

from an understanding of the supporting shafts as so far described. In order to properly line up and support the music spool during playing, I provide rigidly mounted supports carried by the slidable rods 24, 25. The support at the left end carried by rod 25 consists of a plate 26 encircling the shaft 20 and cupped at 27 to take bearing balls against which rests the cupped member 28 which extends through the plate 26 and suitably held therein preferably by up-setting the end sufficiently to retain it in place. This member 28 is so cupped as to support the outer end of the spool head and by its shape adapted to take heads of various outline and automatically center them. This member 28 is carried clear of the shaft 20 so that it does not depend upon the shaft for guidance, being rigidly attached to the rod 25 adjustably by lock-nuts 29.

At the other end of the music roll is a rotatable support 28 rigidly secured to the rod 24 and of a construction similar to that support carried at the other end of the spool and just described. The support 28' at the right end of the spool is adjusted so as to be normally at the extreme left position necessary to take the shortest spool, being movable toward the right when longer spools are inserted as will be described. The rod 24 is slidably supported in a suitable bearing in the up-right 8 and extends upwardly and along a groove in the top 9 so that the rod 24 may be free to slide therein. The rod 25 like-wise extends upwardly and over the top, being slidably carried in a slot cut therein.

These two support carrying rods 24 and 25 are arranged so that one or both may be operated when necessary to move the supports 28—28' into operative engagement with the inserted player roll so as to suitably support it free of the shafts and also adjust it in proper relation with the tracker bar. In order to control the extent of movement of the supports, I provide a stop 32 pivotally secured at the upper face of the top-piece 9 and adapted for engagement with stop pins 33, 34 carried by the rods 25, 24 respectively. A light tension spring 35 engages stop 32 so as to normally hold it under a slight tension to prevent rattling of the parts and also hold the support 24 at the left extreme of its movement, this being limited by the stop button 36 secured to the right up-right 8.

The pivoted stop 32 is so shaped at its pin engaging portions that, within the ordinary range of differences in length of the music spools, the parts will cooperate to align the music spool 19 with the tracker bar 10.

In initially placing the music spool between the shafts 13—20 it is held in position but if not of the standard length will

not be aligned with the tracker bar and take-up spool 11. In Fig. 1 the dotted music spool is shown as slightly out of alignment with the tracker bar being off-center toward the left. However, when the left end bearing support 26 is moved toward the music spool 19 and engages the rounded end of the spool head as indicated by the dotted lines, the continued movement of the support 26 will move the spool 19 toward the right into effective engagement with the bearing support 28'. The movement of these parts is now continued toward the right but is automatically brought to a stop when the music spool is aligned with the tracker bar. This is due to the engagement of the front end of the adjustable stop 32 with the advancing stop 33 carried by the rod 25. This movement of adjustable stop 32 is, of course, brought about by the movement of rod 24 whose pin 34 by engagement with stop 32 rotates it until it meets stop 33 of rod 25. When this occurs the music spool is in alignment with the tracker bar. In Fig. 4 the engaging position of the parts is shown, this being about the position assumed by the parts when a music spool of proper length is inserted. If the inserted roll is shorter than the standard length the movement of the stop 32 shown in Fig. 4 is less than that illustrated, while if the roll is longer than the standard length the movement is greater. It is to be understood, however, that the shape of the stop 32 is such that the bearing supports 28—28' and the music spool supported thereby are always automatically aligned with the tracker bar.

In order to operate the spool supports I preferably provide automatic means in the nature of a pneumatic 40 which is connected through the action chamber so that when the treadles are started the pneumatic 40 is operated to adjust the spool before the note sheet perforations advance to the tracker bar. The pneumatic 40 is connected to the supporting bar 25 by means of a link 44 pivotally attached to bar 25 and extending through a slot in the end of spring 45. This spring is securely attached to the pneumatic and of such construction that the initial movement of the pneumatic 40 will adjust the spool but any further collapse does not sufficiently increase the pressure of the rotatable supports 28—28' upon the music spool to prevent a smooth operation thereof. Thus it will be seen that although the pressure upon the pneumatic may vary due to the variation in the suction or vacuum in the pneumatic, the spring 45 by its flexibility effects a practically constant pressure upon the parts.

The pneumatic 40 being connected to the action chamber, the supports for the spool are automatically operated to initially align

the spool with the tracker bar before the playing commences and also to hold the spool during the playing operation. As soon as the playing operation ceases, the pneumatic 40 is preferably retracted so that the supports disengage from the spool during the rewind period. Of course, it will be apparent that the pneumatic may be held collapsed during the rewind operation so as to hold the spool by the adjustable supports, if desired by simply providing a catch which may be mounted in a suitable place such as upon the up-right 7 to latch over the movable arm of pneumatic 40 when collapsed and the catch manually released either before or after rewind so that the music roll may be more readily removed.

I claim:

1. In a device of the character described, a music spool driving shaft, a music spool supporting shaft, and music-spool end supports mounted independent of said shafts. 85
2. In a device of the character described, a music spool driving shaft, a music spool supporting shaft, and music-spool end supports mounted rotatably independent of said shafts. 90
3. In a device of the character described, a music spool driving shaft, a music spool supporting shaft, and music-spool end supports mounted rotatably independent of and encircling said shafts. 95
4. In a device of the character described, a music spool driving shaft, a music spool supporting shaft, music-spool end supports mounted independent of said shafts, and means for holding said supports against the music-spool heads so as to take the supporting strain off of the shafts. 100
5. In a device of the character described, a pair of music-spool shafts, and means automatically operative for supporting a music spool independent of said shafts during playing. 105
6. In a device of the character described, a pair of music-spool shafts, and means automatically operative for supporting a music spool independent of said shafts during playing and to release the supports during rewind. 110
7. In a device of the character described, a pair of music-spool end supports, means for initially holding a music spool in position to be operatively engaged by the supports, and means for effecting an operative engagement of the spool by the supports independent of the initial holding means. 115
8. In a device of the character described, a pair of music-spool end supports, means for initially holding a music spool in position to be operatively engaged by the supports, means for effecting an operative engagement of the spool by the supports independent of the initial holding means, and a stop device for modifying said last means 120 125 130

to centralize the positioning of the spool supports.

9. In a device of the character described, a tracker bar, and means for automatically aligning a music-spool horizontally and vertically relatively to the tracker bar.

10. In a device of the character described, a tracker bar, a music-spool rewind shaft and a supporting shaft, a music spool initially carried by said shafts, music-spool end supports, means for moving one support into engagement with the spool, continuing the movement of said support and spool so as to effectively engage the other support, and continuing the movement of the supports and spool in the initial direction until a predetermined alignment of the spool and tracker bar is effected.

11. In a device of the character described, a pair of music-spool end bearing-supports with means for pressing said supports against the spool heads so as to frictionally affect the bearing-supports to prevent free running of the spool.

12. In a device of the character described, a pair of music-spool end bearing-supports, means for holding the supports in operative position for a music-spool, and means for automatically preventing excessive pressure of the supports against the music-spool.

13. In a device of the character described, a tracker bar, a pair of music-spool bearing-supports, a pair of slidable bars each carrying one of said supports, and a movable stop co-operable with said bars and having engaging surfaces shaped to align the supports and tracker bar throughout a predetermined range of movement.

14. In a device of the character described, a tracker bar, music-spool end supports, means for moving one support into engagement with the spool, continuing the movement of said support and spool so as to effectively engage the other support, and continuing the movement of the supports and spool in the initial direction until a predetermined alignment of the spool and tracker bar is effected.

15. In a device of the character described, a tracker bar, music spool end supports, means for moving said supports so as to move the music spool along the tracker bar, and a pivoted stop and pair of cooperating members corresponding with the end supports movable with the end supports for stopping the said movement of the supports when the music spool is in predetermined alignment with the tracker bar.

16. In a device of the character described, a pair of music spool end supports, each support comprising a rotatable spool head engaging member, a stationary support for said member, and interposed bearing-balls between the rotatable member and stationary support.

17. In a device of the character described, a tracker bar, a pair of music-spool end supports, each support comprising a rotatable spool-head engaging member, a stationary support for said member, bearing-balls interposed between said member and support, said member and support being shaped to take the interposed bearing-balls so as to maintain a predetermined alignment of the supports and tracker bar regardless of wear.

18. In a device of the character described, a tracker bar, a pair of music-spool end supports, each support comprising a rotatable cup-shaped spool-head engaging member, a stationary ring-shaped support for said member, bearing-balls interposed between said member and support, said member and support being nested to take the interposed bearing-balls so as to maintain a predetermined alignment of the supports and tracker bar regardless of wear.

19. In a device of the character described, a pair of ball-bearing music-spool end supports with mechanism for pressing the supports into frictional engagement with the spool-head whereby the supports are rotatable at the ball-bearing.

20. In a device of the character described, a pair of music-spool end supports cup-shaped to engage the spool head so as to hold and axially centralize the music-spool.

21. In a device of the character described, a pair of music-spool end supports cup-shaped to engage the spool head so as to hold and axially centralize the music-spool, and means for shifting the supports to laterally centralize them to a predetermined position.

22. In a device of the character described, a music-spool shaft, a music-spool end support for carrying the spool independent of the shaft, and means for adjustably carrying the end support relative to the shaft.

23. In a device of the character described, a tracker bar, music-spool supporting shafts, music-spool end supports mounted rotatably independent of said shaft, and mechanism for operating said supports so as to centralize the music spool relative to the tracker bar.

24. In a device of the character described, a tracker bar, music-spool supporting shafts, music-spool end supports mounted rotatably independent of said shaft, mechanism for operating said supports so as to centralize the music-spool relative to the tracker bar, and a pneumatic for operating said mechanism during playing.

25. In a device of the character described, a tracker bar, music-spool supporting shafts, music-spool end supports mounted rotatably independent of said shaft, mechanism for operating said supports so as to centralize the music-spool relative to the tracker bar, a pneumatic for operating said

mechanism, and a connection for said pneumatic effective to operate the mechanism during playing but release it during re-wind.

5 26. In a device of the character described, a tracker bar, music-spool supporting shafts, music-spool end supports mounted rotatably independent of said shaft, mechanism for
10 operating said supports so as to centralize the music-spool relative to the tracker bar, a pneumatic for operating said mechanism, and means to prevent resultant variations
15 of pressure on the pneumatic within a predetermined range from effecting the operated mechanism.

27. In a device of the character described,

a tracker bar, music-spool supporting shafts, music-spool end supports mounted rotatably independent of said shaft, mechanism for
20 operating said supports so as to centralize the music-spool relative to the tracker bar, a pneumatic for operating said mechanism, and a yielding connection between the pneumatic and said mechanism to prevent resultant variations of pressure on the pneumatic within a predetermined range from
25 effecting the operated mechanisms.

In witness whereof, I hereunto subscribe my name this 14th day of January A. D. 1921.

WILLIAM G. BETZ.