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PATENTED MAY 28, 1907.

H. P. BALL.
MUSIC ROLL FOR MECHANICAL MUSICAL INSTRUMENTS.
APPLICATION FILED FEB. 9, 1903.

FIG. 3.

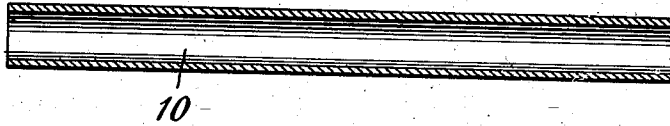


FIG. 4.

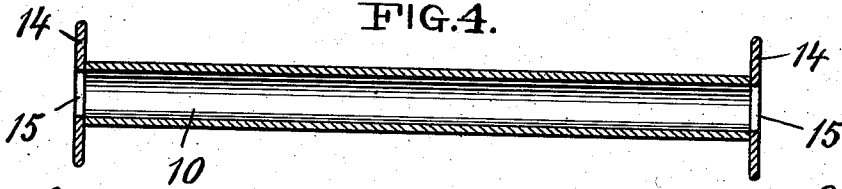


FIG. 1.

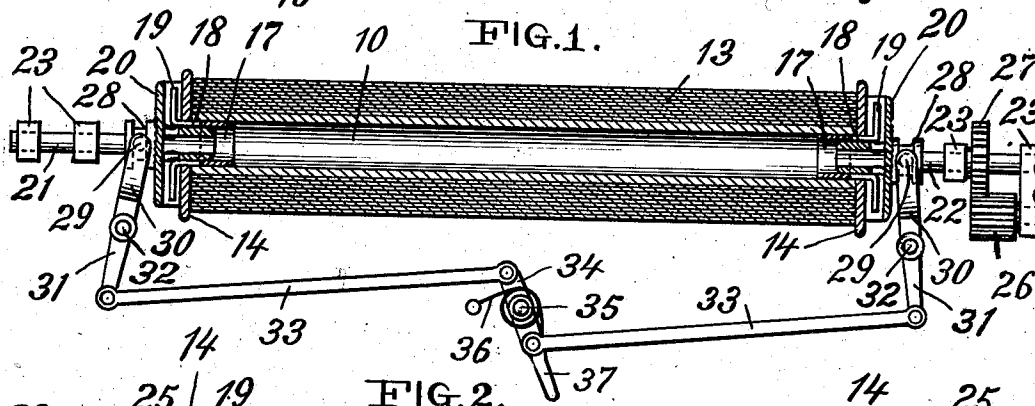


FIG. 2.

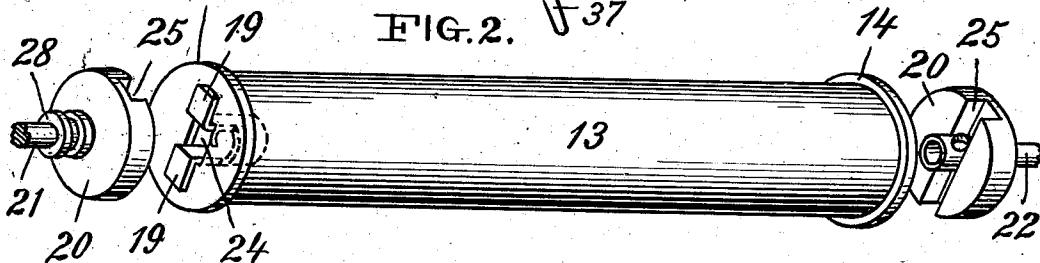
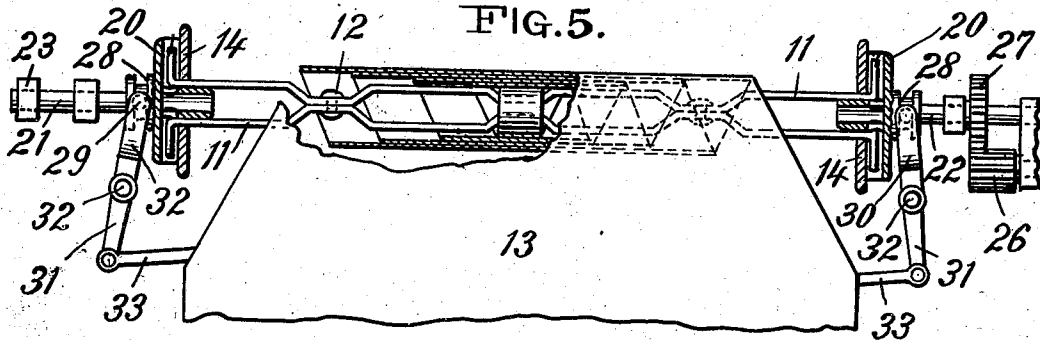


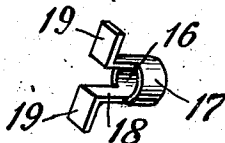
FIG. 5.



WITNESSES:

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FIG. 6.



INVENTOR

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MUSIC-ROLL FOR MECHANICAL MUSICAL INSTRUMENTS.

No. 855,038.

Specification of Letters Patent.

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To all whom it may concern:

Be it known that I, HENRY PRICE BALL, a citizen of the United States, residing at New York city, county and State of New York, have invented certain new and useful Improvements in Music-Rolls for Mechanical Musical Instruments, of which the following is a specification.

My invention consists in the construction of a music roll and its supports, as also in the means whereby the music strip upon the music roll is centered relative to the tracker-board.

The object of my invention is to provide a music roll on which a music strip may freely expand and contract when influenced by atmospheric conditions, and which will serve to guide the music strip and cause it to register with the desired openings in the tracker-board, and thus overcome the objection of irregularity of movement of the music strip over the tracker-board and the consequent mingling or lack of definition of sounds now common with all mechanical musical instruments employing a music strip and a tracker-board.

The accompanying drawings will serve to illustrate my invention.

Figure 1 is a longitudinal section through my improved music roll and the music strip thereon, and also showing partially in section and partially in elevation the mechanism for supporting the music roll, giving motion to it and centering it upon the tracker-board. Fig. 2 is a view in perspective of the music roll and the devices for exerting an inward pressure upon the guiding flanges and giving motion to the roll. Fig. 3 is a longitudinal section through the tube forming part of the music roll. Fig. 4 is a longitudinal section through the tube, and vertical section through the guiding flanges at the ends of the tube. Fig. 5 is a longitudinal section and elevation of a modified form of roll, its supporting mechanism and centering mechanism, and also showing in elevation and section a music strip partially wound upon the music roll. Fig. 6 is a perspective view of the nipple used to transmit motion of the power shaft to the music roll.

In the drawings, 10 indicates the supporting body for the music strip. This may be constructed as shown in Figs. 1, 3 and 4, of a

hollow tube, formed of any material which will have substantially the same coefficient of expansion and contraction, under atmospheric conditions, as the substance of which the music strip is made. As music strips are now commonly formed of paper, I may form this tube of paper; that is, I may form the tube of paper pulp or by superposing layers of paper of the required width upon each other until the desired diameter of tube is obtained. I wish it understood that I do not limit myself in anywise to the manner of making the tube, or of the material from which it may be made, so long as it will contract and expand in accordance with the contraction and expansion of the music strip wound thereon.

Instead of primarily forming the tube as shown in Figs. 1, 3 and 4, I may form the supporting body by winding a portion of the material from which the music strip is made upon a separate body, as shown in Fig. 5. In this figure, strips or other forms of metal, or other material, 11, are connected together by means of rivets 12, and upon such body there is wound the required number of layers of the music strip 13. It will be observed from a comparison of Figs. 1, 3, 4 and 5, that in each form of music roll provision is made for the admission of atmospheric air to the interior of the supporting body. This I find to be necessary owing to the fact that if air is only allowed access to the outside of the supporting body, it will not contract and expand at the same ratio as that of the music strip wound on it, but at a different ratio. In other words, to produce the best results, the supporting body must be so constructed that the air will act equally on all sides.

The supporting body 10 is made preferably slightly longer than the width of the music strip. Arranged at each end of the supporting body are the guiding flanges 14, having openings 15. To carry the supporting body and flanges 14 in a mechanical musical instrument, with which it is to be used, and to provide means for transmitting motion to the music roll, there is arranged in each end of the supporting body the nipples 16, Fig. 6. These nipples consist of a cylindrical portion 17, having the projecting parallel extensions 18, and ends turned oppositely at right angles 19. These nipples have their cylindrical portions 17 introduced into the supporting

body 10, and carry the guiding flanges 14 upon the parallel extensions 18, as will be clearly seen by reference to Fig. 4. The location of the nipples 16 relative to the supporting body is such that the guiding flanges 14 may be moved longitudinally toward or from each other on the parallel extensions 18 of the nipples 16. Such movement in an outward direction, it will be understood, will occur when the material which forms the music strip 13 expands.

The music roll, so far as described, together with the music strip wound thereon, forms what may be termed a commercial music roll, such as is now sold for use with mechanical, musical instruments.

In order to provide for moving the guiding flanges inward upon contraction of the music strip upon the music roll, I provide the disks 20. These disks are mounted on and secured to short shafts 21, 22, carried in bearings 23, on the mechanical musical instrument and in which they are longitudinally movable. These shafts extend through the disks 20 and are adapted to be introduced into the openings 24 between the parallel extensions 18 of the nipples 16, thereby supporting the roll. In order to give motion to the roll, the disks 20 are slotted across their inner faces, 25, to receive the ends 19 of the nipples 16. The slots 25 are made of such depth that when the disks 20 are moved inwardly the flanges 14 will be brought in contact with the outer ends of the supporting body 10, before the ends of the nipples 16 seat themselves in the bottom of the slots. Motion is transmitted to the music roll by means of the broad faced gear 26, in mesh with a narrow faced gear 27, on shaft 22.

In order to center the music roll relative to the tracker-board, as well as to provide for the inward movement of the disks 20, there is mounted upon the shafts 21, 22, the collars 28. These collars are slotted and located in the slots are pins 29, mounted in yokes 30, on the upper end of levers 31, pivoted at 32. Connected to the lower end of the levers 31, are the links 33, pivoted to a lever 34, which is pivoted at 35 to the frame of the instrument and centrally of the tracker-board.

In order to exert a constant elastic tension in an outward direction upon the links 33, the spring 36, is employed. The lever 34 is also provided with a handle 37, by means of which the position of the links 33 and the disks 20 may be regulated by hand.

The operation of the device is as follows:—When changes in atmospheric conditions take place, the supporting body will expand and contract with the music strip mounted on it. Where expansion takes place, guiding flanges 14 are moved outwardly. When contraction takes place, the guiding flanges 14 under the action of the spring 36, acting through the links 33 and disks 20, are moved

inward. Centering of the roll is effected, owing to the fact that the disks 14 make equal pressure on opposite ends of the roll.

The centering device and means for moving the disks 20 inwardly I find to be well adapted for the purpose. I wish it understood, however, that I do not limit myself to the employment of the mechanism described, as it is obvious that very many devices may be employed which will accomplish the same result.

Having thus described my invention, I claim:—

1. A music roll comprising in its construction, a supporting body having the same coefficient of expansion as the music strip wound thereon, nipples in the ends of said supporting body, and guiding flanges longitudinally movable on said nipples.

2. A music roll comprising in its construction, a supporting body variable in length under atmospheric changes, nipples in the end of said supporting body, having ends at right angles to the body of the nipple, and guiding flanges carried by said nipples and longitudinally movable thereon.

3. A music roll comprising a tube having the same expansion and contraction as the music strip wound thereon, separate and freely movable guiding flanges pressed against each end of the tube, and means whereby the tube and its flanges are centered in relation to the tracker-board of the instrument with which they are used.

4. In combination with a music roll comprising in its construction a supporting body variable in length under atmospheric changes and provided with longitudinally movable guiding flanges, also supports on which said flanges move having turned up ends, of longitudinally movable disks slotted on their inner faces to receive the turned up ends of the supports.

5. The combination with a music roll having a supporting body variable in length under atmospheric changes, of means for centering said roll relative to the tracker-board, said means consisting of a lever pivoted centrally of the tracker-board upon the musical instrument, an elastic device exerting a constant tension on said lever in one direction, and means interposed between the lever and the ends of the music roll, whereby the elastic tension exerted upon the lever will be transmitted to and equally exerted upon opposite ends of the music roll.

6. In combination with a music roll provided with a supporting body and longitudinally movable flanges, of a pair of longitudinally movable supporting shafts, disks secured to said shafts, and means for exerting an inward elastic tension through said disks upon said guiding flanges.

7. The combination with a music roll, of longitudinally movable supports therefor,

and means external to the roll for producing equal longitudinal travel of said supports.

8. In combination with a music roll, of means external to the roll for centering the roll in relation to the tracker-board in accordance with the expansion and contraction of such roll.

9. In combination with a music roll, of bearings therefor, and means for moving the roll upon its bearings to maintain a central relation with the tracker-board.

10. The combination of a tubular body, freely movable guiding flanges located in relation to said body, supporting bearings for said body and flanges, and means pivoted centrally of the tracker-board of the machine upon which the roll is used, adapted to exert constant inward pressure upon the guiding flanges and to center the roll relative to the tracker-board.

11. A music roll comprising in its construction, a tubular body, nipples in the ends of said body, guiding flanges longitudinally movable on said nipples.

12. In a mechanical musical instrument and in combination with the means for driving the music roll, a music roll comprising a tubular body, structurally independent guiding flanges, nipples situated in the ends of said body and serving as a support for said guiding flanges, and adapted to co-act with said driving means.

13. The combination with a music roll and the longitudinally movable bearings upon which it is supported, of collars on said bearings, levers co-acting with said collars, a pivoted lever, means for exerting a constant tension in one direction upon said last named lever, and links interposed between said last named lever and said first named lever.

14. The combination with a music roll, of guiding flanges at the ends of the roll but not connected to said roll, journal pins carrying said guiding flanges, and means for shifting said journal pins in their bearings to maintain a point on the roll at the center of the tracker-board.

15. The combination with a music roll, of means not connected to the roll for supporting the roll and centering it in relation to the tracker-board, said means comprising supporting flanges mounted on spindles located in bearings in which they are longitudinally movable, and means for effecting longitudinal movement of said spindles in their bearings.

16. The combination with a music roll, of means for supporting said music roll, centering it in relation to the tracker-board and rotating it, said means consisting of supporting flanges not connected to said roll, spindles situated in bearings in which they are longitudinally movable connected to said flanges, a narrow-faced gear mounted on one of said

spindles, a broad-faced gear with which said narrow-faced gear co-acts, and means for effecting a coincident longitudinal movement of the spindles in their bearings.

17. The combination with a music roll, of supporting and guiding flanges not connected to the roll, means for effecting a constant inward tension upon said flanges, spindles connected to said flanges, bearings in which said spindles are longitudinally movable, means for centering said roll in relation to the tracker-board, and means for rotating said roll irrespective of its position relative to its supporting bearings.

18. A music roll comprising a tube having the same expansion and contraction as the material to be wound thereon, and means whereby the tube is centered relative to the tracker-board of the musical instrument in which it is used, and a flange pressed against each end of the tube.

19. A music roll, comprising a cylindrical body variable in length under atmospheric conditions, a perforated music strip wound upon said body, independent guiding flanges situated at the opposite ends of said body and sides of said music roll, independent means located in the ends of the supporting body for supporting and permitting longitudinal movement of said flanges relative to said supporting body, together with means for supporting and rotating said parts in a mechanical musical instrument.

20. In combination, a music roll comprising a supporting body and a perforated music strip formed of material which will coincidentally expand and contract under atmospheric changes, and mechanism for supporting and centering said music roll, comprising supporting and guiding flanges, spindles upon which said flanges are mounted, and means for effecting longitudinal movement of said spindles and flanges to maintain a point on the music roll at the center of the tracker-board.

21. The combination with a music roll, of longitudinally movable bearing supports therefor, and means external to the roll for producing equal longitudinal travel of said supports.

22. A music roll comprising in its construction, a tubular body, guiding flanges at each end thereof, and nipples securing the flanges to the body.

23. A music roll comprising a tubular supporting body, a music strip thereon, separable flanges, tubular bodies for holding said flanges in relation with the supporting body, and means for imparting rotary motion to the supporting body, music strip and flanges.

24. A music roll comprising a tubular supporting body, a music strip thereon, separable flanges, supporting means for said flanges held in relation with said body by

friction, and means for driving said parts when placed in a mechanical musical instrument.

25. A music roll comprising a tubular body, separable flanges at each end of said body, separable nipples at each end of said body, said nipples adapted to co-act with the driving means of a mechanical musical instrument to impart rotary movement to the roll.

26. In a mechanical musical instrument, a music roll comprising a tubular body, a music sheet wound thereon, a nipple at each end, disks independent of the tubular body, and means for transmitting rotary motion from the disks to the body through the nipple.

27. In a mechanical musical instrument, a music roll comprising a tubular body, a music sheet wound thereon, a flange at each end of the body, means for securing the flanges to the body, a pair of independent disks, and means for transmitting motion from the independent disks to the music sheet.

28. In a mechanical musical instrument, a paper tube, a flange at each end thereof, a nipple holding each flange in position, a disk at each end of the tube engaging with but detachable from each nipple, said disks having free longitudinal movement on but no rotary movement relative to said nipples.

29. A spool for a music roll comprising a tubular body, terminal flanges therefor, and means structurally independent of the flanges for reinforcing the tubular body and securing the flanges in position.

30. A spool for a music roll comprising a tubular body, flanged members fitted in the ends of the tubular body, and flanges secured in position by said flanged members but not attached thereto.

31. In a mechanical musical instrument, the combination with a music sheet take-up roller, comprising opposed flange members adjustable toward and away from each other; of means operatively connecting said

flange members, arranged to insure their reciprocatory movement in definite relation to each other.

32. A spool for a music roll comprising a tubular body, flanges at each end of the body, and tubular members securing the flanges in position but not attached thereto.

33. A spool for a music roll comprising a tubular body, flanges at each end of the body, and tubular flanged members securing the flanges in position but not attached thereto.

34. A spool for a music roll comprising a tubular body, flanges at each end of the body, and hollow flanged members securing the flanges in position but not attached thereto.

35. A spool for a music roll comprising a tubular body, a flange at each end thereof, re-inforcing means for the tubular body securing the flanges in position, and separable flanged members serving as supports for the spool.

36. A spool for a music roll comprising a tubular body, a flange secured at each end thereof, and separable flanged members serving as supports for the spool.

37. A spool for a music roll comprising a tubular body, a flange secured at each end thereof, and separable flanged members serving as supports and driving means for the spool.

38. A spool for a music roll comprising a tubular body, a flange secured at each end thereof, and separable members provided with clutching flanges serving as supports for the spool.

39. A spool for a music roll comprising a tubular body, flanges at the ends thereof, and spring pressed supports for the roll.

In testimony whereof, I affix my signature, in the presence of two witnesses.

HENRY PRICE BALL.

Witnesses:

LEWIS H. DAVENPORT,

NICOLAI AALL.