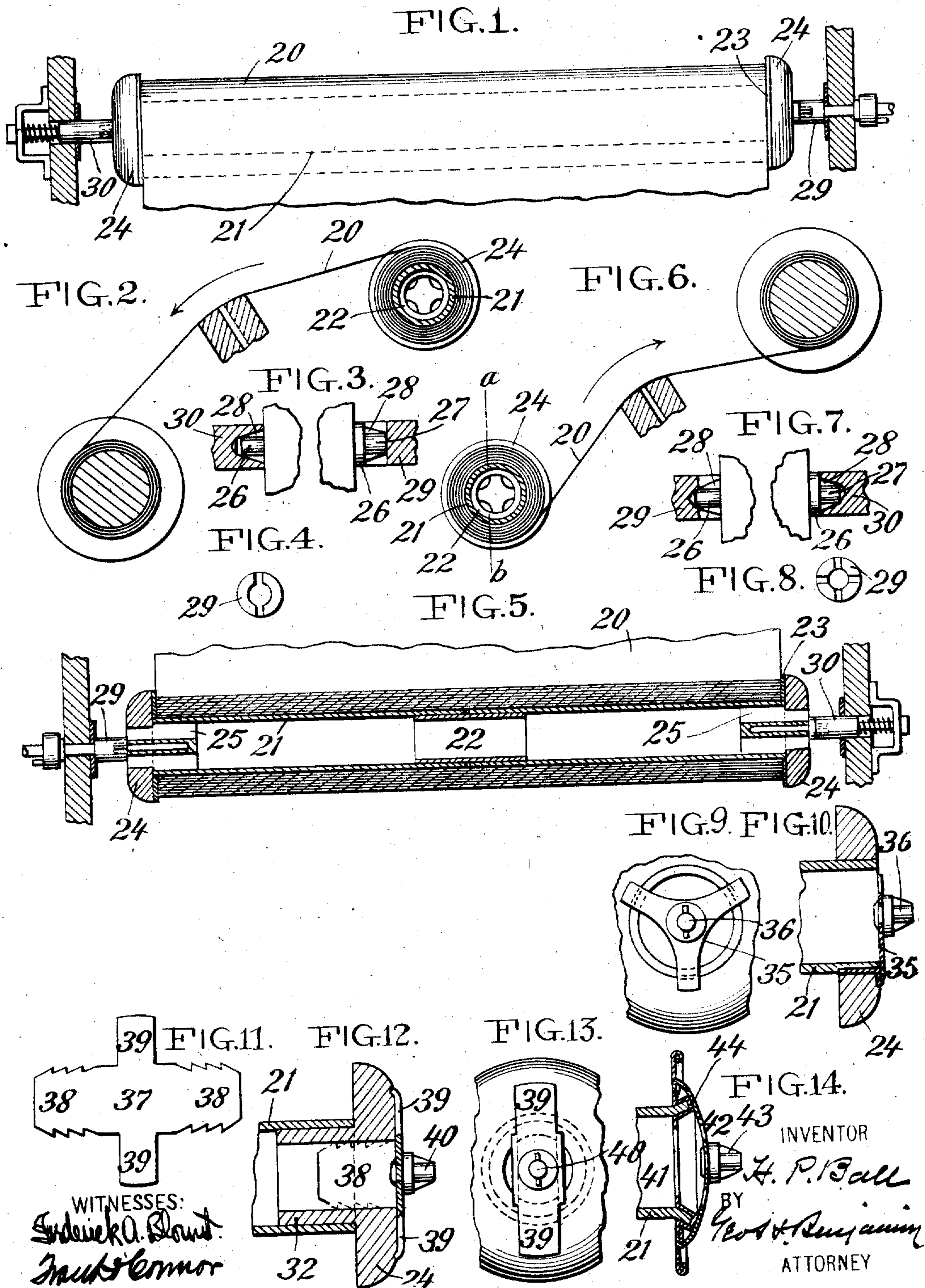


H. P. BALL.
MUSIC ROLL AND APPARATUS TO BE USED IN CONNECTION THEREWITH.
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UNITED STATES PATENT OFFICE.

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MUSIC-ROLL AND APPARATUS TO BE USED IN CONNECTION THEREWITH.

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Specification of Letters Patent.

Patented Oct. 13, 1908.

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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 and Apparatus to be Used in Connection Therewith, of which the following is a specification.

My invention relates to music rolls such as are adapted for use on mechanical musical instruments.

My invention consists, first: In the construction of the supporting body for the roll, whereby the guiding flanges and supporting and driving spindles may be readily secured to the supporting body and the supporting body adjusted to the width of the music strip to be wound thereon. Second: In the construction of the supporting and driving spindles for the music roll, whereby the roll may be used on any type of mechanical musical instrument, and irrespective of the position, in such instrument, of the driving mechanism for the rolls and may be driven from either or both ends according to the type of instrument.

The objects of my invention broadly stated, are: To provide a music roll which may be used on any mechanical musical instrument, and irrespective of the position, in such instrument, of the driving mechanism for the roll or the direction of movement of the music strip whether to or from the performer. In other words,—it is one object of my invention to provide a universal music roll which may be used on any mechanical musical instrument employing a roll of a given length. To provide a simple and easy method of constructing and assembling the parts of the music roll and adjusting the supporting body to the varying widths of the music strip at the time when the parts forming the complete roll are assembled.

The accompanying drawings will serve to illustrate my invention.

Figure 1 is a front elevation of a music roll and the supporting and driving members of a "pianola", the cheek pieces of the instrument being shown in section. Fig. 2 is a transverse section taken through the music roll, tracker-board, and take-up roll of a "pianola", the arrow indicating the direction of movement of the music strip, which is towards the performer. Fig. 3 is a view showing in elevation and section

the supporting and driving members of a "pianola" and the corresponding supporting and driving spindles of a music roll as modified according to my invention, this view showing the relation of said parts. Fig. 4 is a front view of the clutch of the driving member of a "pianola", looking from the left of Fig. 1. Fig. 5 is a longitudinal section of a music roll and its supporting and driving spindles, with the driving members situated at the left as used in the "angelus". This figure further illustrates the means employed for connecting the two portions of the supporting body upon which the music strip is wound. Fig. 6 is a section taken through the music roll, tracker-board, and take-up roll of an "angelus", the arrow indicating the direction of motion of the music strip, which is from the performer. Fig. 7 is a view corresponding to Fig. 3, with the driving members at the left instead of at the right as in Fig. 3. Fig. 8 is a front view of the clutch of the driving member of an "angelus", looking from the right. Figs. 9 and 10 are respectively an end view and vertical section of a modified form of clutch member. Figs. 11, 12, and 13 are respectively a plan view, a vertical section, and an end view of another modified form of clutch member. Fig. 14 is a vertical section of another modified form of clutch member.

In the drawings: 20 indicates a perforated and marked music strip, 21 supporting body therefor. Such supporting body may consist of a solid cylinder of wood or other material, or may be formed as a tube of paper made by rolling up a wide sheet of paper, one layer upon another, or of a narrow strip wound spirally in the manner usual in constructing mailing tubes. Instead of paper other material may be used which will expand and contract in accordance with the expansion and contraction of the music strip thereon. I prefer to make the supporting body in two sections or tubes and connect them together telescopically at the center by means of a short tube 22. At one end or both ends of the supporting body I locate washers 23, whose purpose will hereafter be explained. My reason for making the spool in two sections and joining them is to provide for inequalities in the width of the music strip, as in practice I have found that the music strip is variable in width, and, further, that the supporting body should

preferably be adjusted to the width of the music strip after the flanges 24 have been secured to the ends of the supporting body. By securing the flanges to the ends of the supporting body before securing the two parts of the supporting body together, I am enabled to more readily attach the flanges and adjust them so as to be vertical relative to the horizontal axis.

In order that the music roll may be driven from either end or from both ends, there are located at each end driving pins, spindles, or clutch members, and these may vary in form. In Figs. 3 and 7 the driving spindles 26 are shown as having a special shape, that is—they consist of a cylindrical pin 27 having peculiarly shaped lateral wings 28. These wings are thin radial extensions from the sides of the pins. There may be two wings or four wings, as desired. The wings as pairs are V-shaped, with the point of the wing beginning at the end of the pin and gradually extending in width to the flanges 24. Instead of making the wings collectively V-shaped in pairs, I may curve the outer edges of the wings, and, further, I may carry the wings either to the forward end of the pin or back to the flanges. As before stated, there may be two wings adapted to co-act with the driving member 29 of the "pianola", as shown in Fig. 4, in which case both ends of the music roll would be alike, or four wings adapted to co-act with the driving member 29 of the "angelus", as shown in Fig. 8, in which case the end clutches would have a different number of wings, which is of advantage as such construction would prevent the insertion of the music roll in a wrong position in the instrument.

It will be seen by reference to Figs. 3 and 7, (at the right of Fig. 3, at the left of Fig. 7) that the driving spindle 26, at one end of the music roll, as the case may be, engages with, fits in, and is rotated by the driving member 29 of the mechanical musical instrument, and that when rotation is imparted to the music roll by the driving spindle 26 and the driving member 29 at one end of the music roll, the opposite driving spindle 26 at the other end of the music roll turns freely in the cavity of the supporting member 30. This cavity is tapered in all forms of commercial mechanical musical instruments using music rolls to allow the ordinary supporting pin to be easily removed after the music spool has been moved to one side, as otherwise it would bind in being removed. I take advantage of this taper in the member 30 to allow the wings 28 to enter the cavity, but it is not essential that they enter to the bottom of the cavity, for in practice I have found that my spool is operative if only the extreme end of the spindle 26 enters and thus forms a bearing

for the end of the music roll opposite to its driving end.

In Figs. 1 and 5 the spindles 26 are driven into the flanges 24. In these figures, the flanges 24 have a central projection 25 fitting into the ends of the supporting body 21 and have openings therein to allow free access of air to the inside of the supporting body, as I find it necessary to allow air to enter in order that the music roll will properly adjust itself.

Figs. 9 and 10 show a modified form of driving spindle, which consists of a flat body portion or punching 35 provided with three arms which are turned back upon themselves and over the supporting body 21 and between it and the flange 24. The clutching portion 36 corresponds to the form shown in 1, 3, 5, and 7.

Figs. 11, 12, and 13 show another form of driving spindle, which consists of a body portion or punching 37 provided with four arms, two of which, 38, are serrated along both edges, and two, 39, plain, and the clutching portion 40 corresponding to Figs. 1, 3, 5, and 7. The arms 38 are bent backward in any suitable manner until parallel and then inserted within the tubular portion 32 of the flange 24. The upper ends of the arms 39 are turned backward at their ends and forced into the face of the flange 24 for additional stability and finish.

Fig. 14 shows another form of driving spindle, which consists of a portion having two members 41 and 42, and a clutch member 43 connected to the portion 42. The portion 41 is provided with a concentric capped annular recess 44, which receives the end of the supporting body 21 and is held securely therein by spinning or expanding the recessed portion 44 so as to hold the supporting body in such recess. The portion 42 is bent over and riveted to the portion 41. The portions 41 and 42 allow free access of air to the center of the supporting body 21.

In all of the constructions shown provision is made that air shall find ready access to the interior of the supporting body 21, and for the purpose which has heretofore been stated.

In assembling my improved music roll, the music sheet is first perforated and marked and the flanges 24 secured at the end of the tube. A thin washer 23, of paper or similar material is then slipped over each end of the tube and against the back of the flanges 24. The end of the music strip is now glued to the two portions of the tube 21 and wound between the washers 23. After this has been done, wholly or in part, the two sections of the supporting body 21 are pressed together with the part 22 between them covered with glue and the glue allowed to harden. It will be seen that the clearance between the music strip and the

flanges is governed entirely by the thickness of the washer 23, and thus may be, after assembling the parts, removed if desired, or, if a close fit is wanted without clearance it may be left in place. In using my improved spool upon a "pianola" I may place a washer, not shown, at the right hand end of the spool, and in front of the flange 24 to produce the right distance between the driving spindle and the driving member of the instrument.

I wish it understood that I do not limit myself in any wise to the construction of the music roll as described, provided that it be such that it may be used on any type of mechanical musical instrument, and irrespective of the position, in the instrument, of the driving mechanism as I claim to be the first to have devised what may be termed "a universal music roll" capable of use in any mechanical musical instrument. Of course it will be understood that notwithstanding I have described a music roll as applicable for use with instruments taking a definite width of roll, it is equally applicable for use with music rolls of any length.

Having thus described my invention, I claim:

1. A music roll having a clutch member at each end. 30
2. A music roll having a winged driving spindle at each end.
3. A music roll spool having a wing pin at each end.
4. A music spool having a pin at each end and wings on said pins which gradually taper off to nothing at the end of the pin. 35
5. A bearing for a music roll consisting of a member having a tapered recess, and another member having a wing pin with tapered wings. 40
6. A bearing for a music roll consisting of a non-rotating member having a circular recess, and a rotating member having wings bearing in the recess. 45

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

HENRY PRICE BALL.

Witnesses:

FRANK O'CONNOR,
HARRY W. PUGH.