

No. 778,437.

PATENTED DEC. 27, 1904.

H. P. BALL.
MECHANICAL MUSICAL INSTRUMENT.

APPLICATION FILED APR. 11, 1903.

FIG. 1.

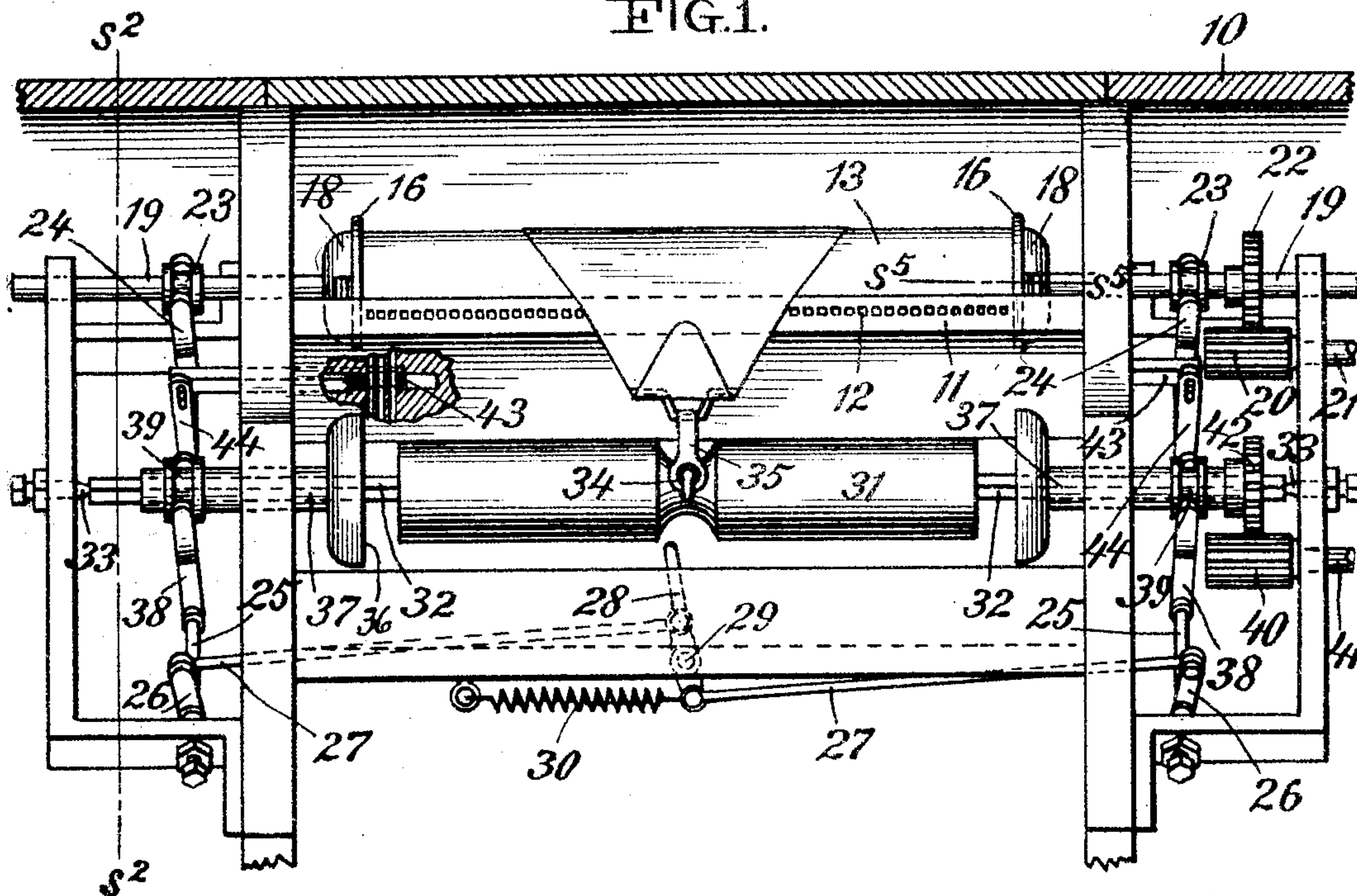


FIG. 2.

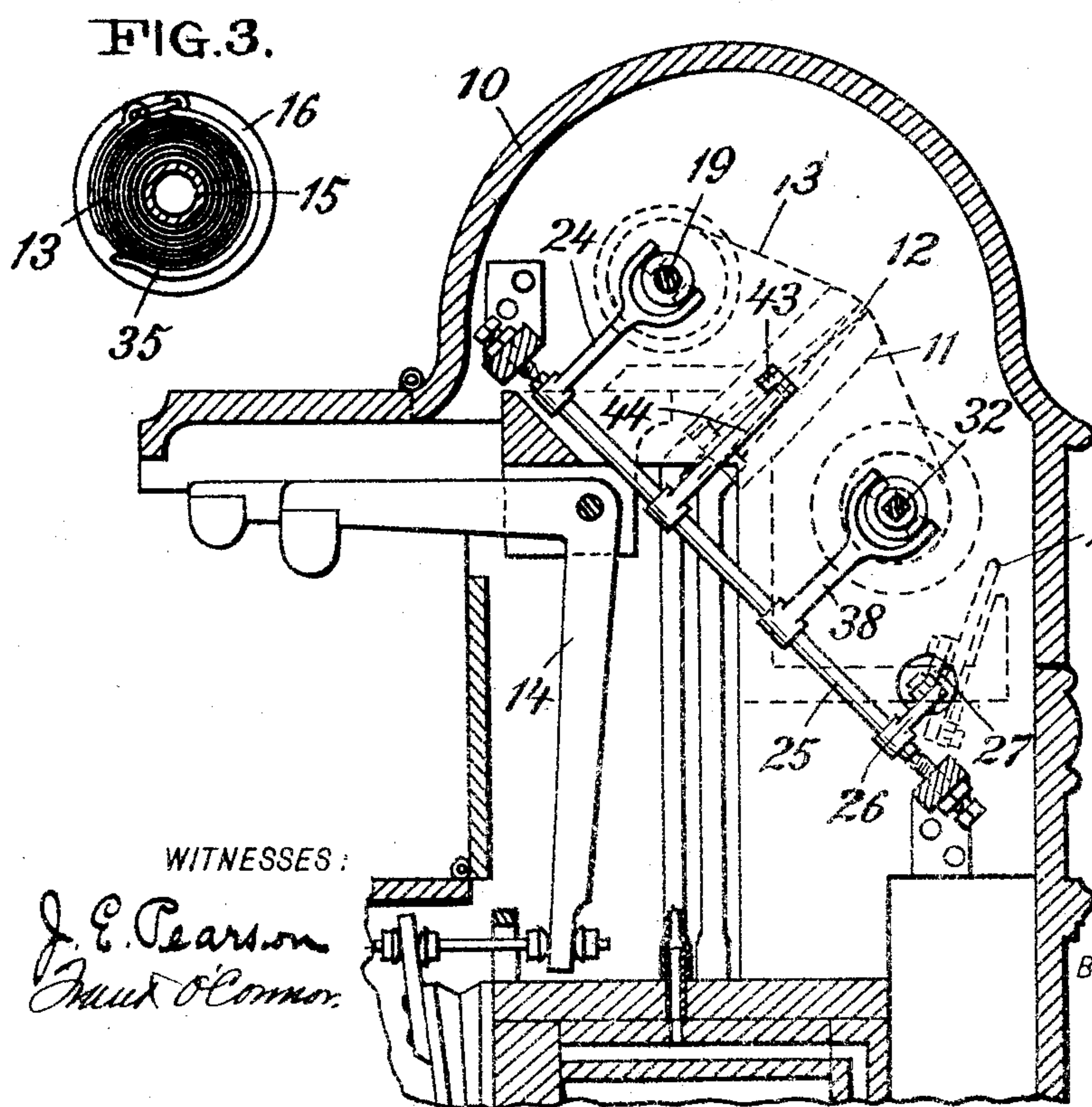


FIG. 3.

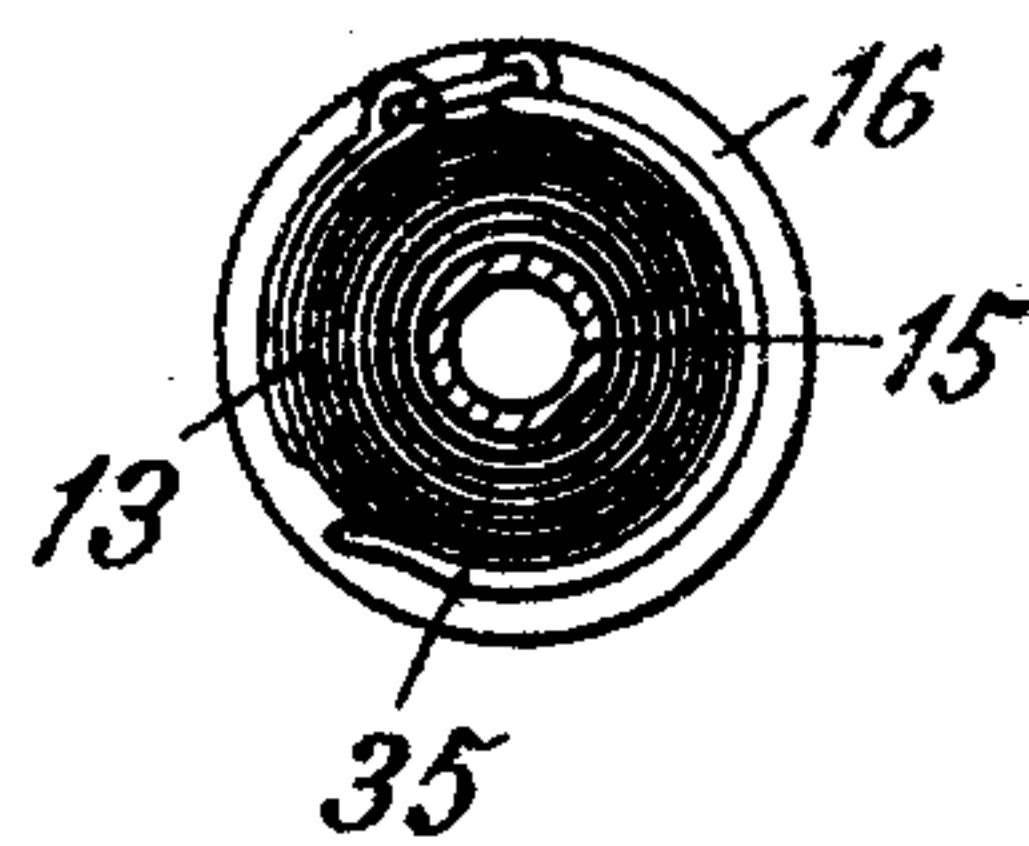


FIG. 4.

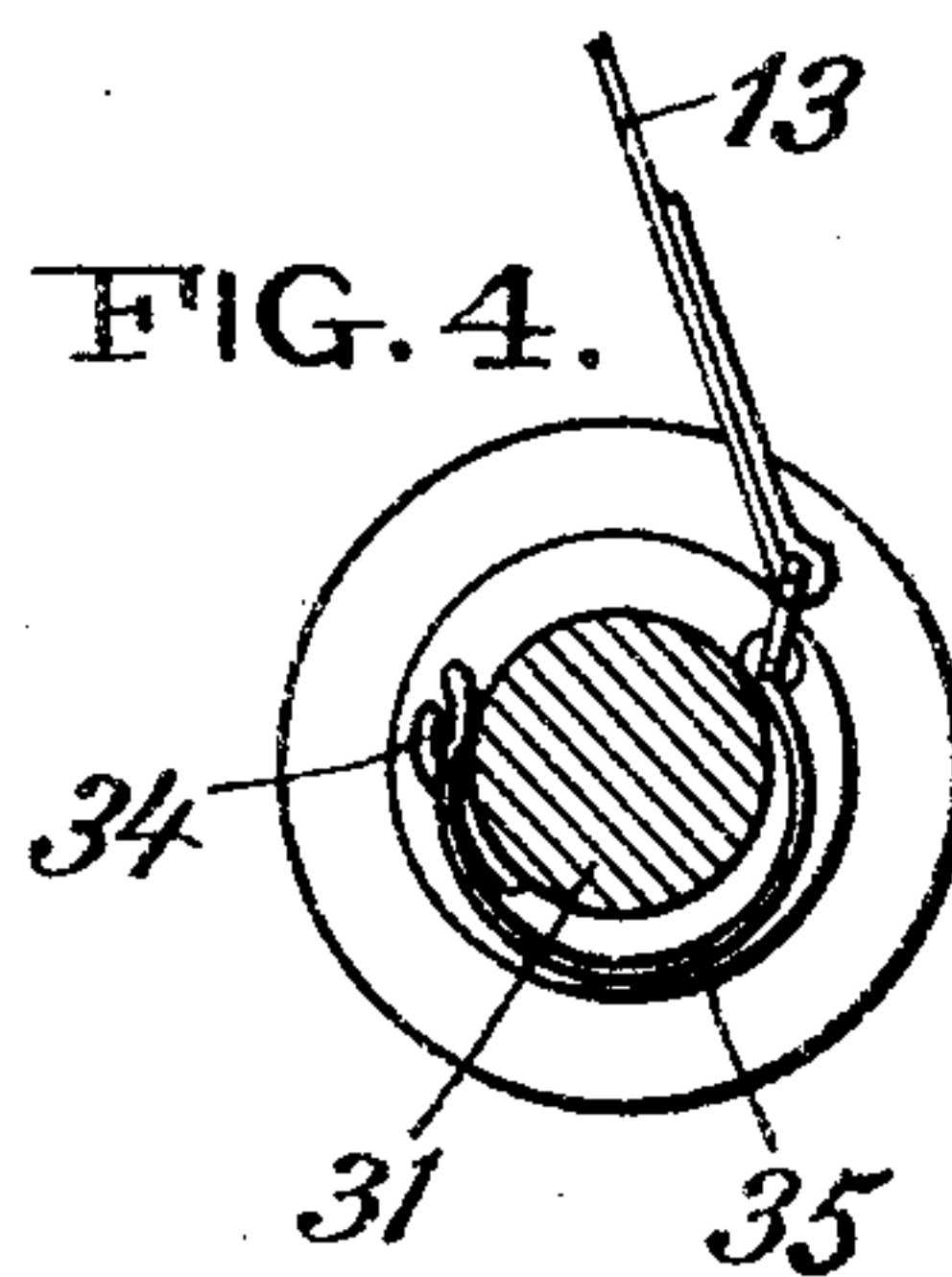
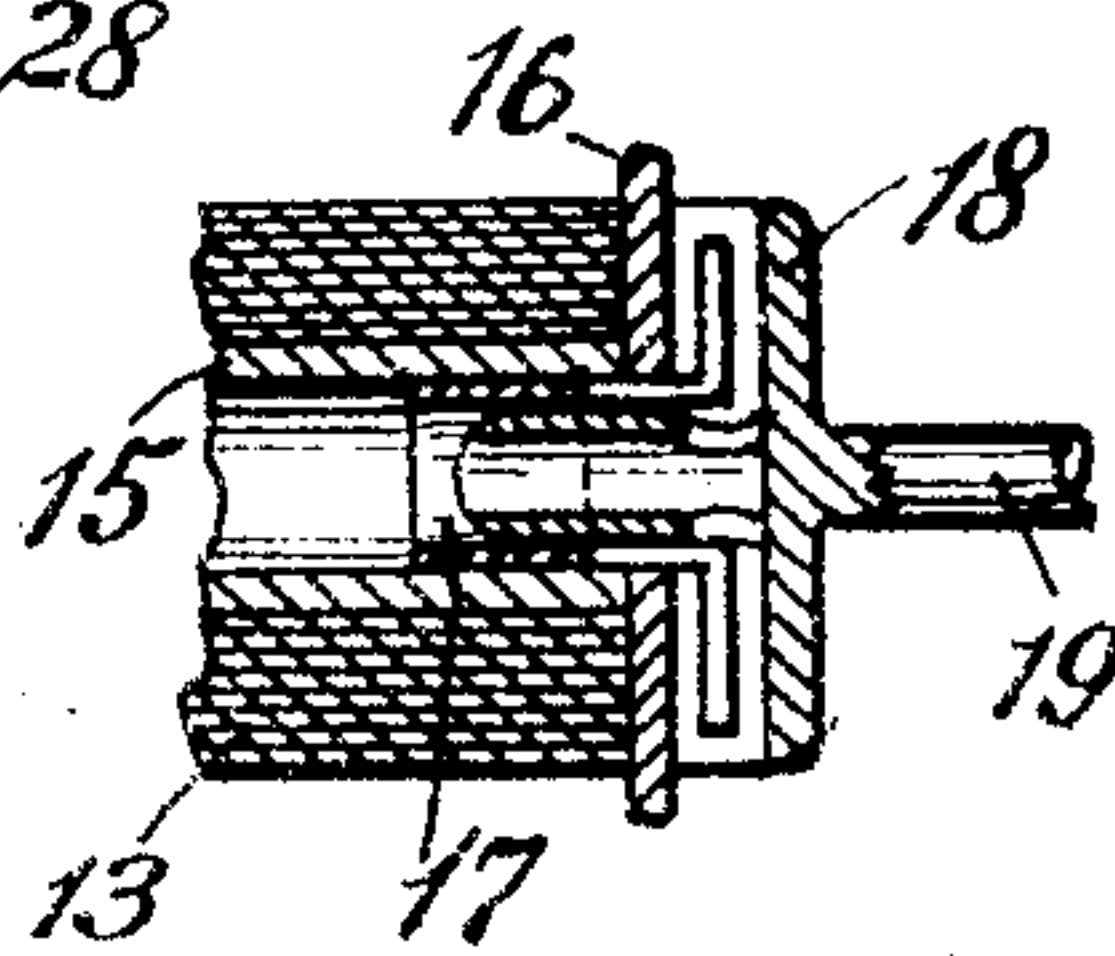


FIG. 5.



WITNESSES:

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MECHANICAL MUSICAL INSTRUMENT.

SPECIFICATION forming part of Letters Patent No. 778,437, dated December 27, 1904.

Application filed April 11, 1903. Serial No. 152,280.

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 Mechanical Musical Instruments, of which the following is a specification.

My invention relates generally to mechanical musical instruments, and while not limited in its application it is designed as herein embodied for use in instruments of the piano and angelus type—that is to say, the class employing a perforated music-strip in connection with a tracker-board.

My invention consists in the means employed for automatically varying the effective length of the take-up roll or of the take-up roll and the tracker-board in accordance with the width of the music-strip used upon the instrument; further, for automatically varying the distance between the guiding-flanges of the music-roll and the take-up roll in accordance with variations in the width of the music-strip due to atmospheric changes, and, further, to automatically center the music-roll and take-up roll relative to the tracker-board and irrespective of the width of the music-strip.

The object of my invention is to permit the use upon an instrument of music-rolls of varying width and to compensate for atmospheric changes in the width of the music-roll used.

In my previous application, Serial No. 142,507, filed February 9, 1903, I have described a music-roll automatically adjustable to the width of the music-strip which is shown in my present application. I shall therefore describe this roll only in general terms, referring to such prior application for a full detailed description. I wish it understood, however, that I do not limit myself in any wise to the construction shown and described, as other constructions may obviously be employed.

The accompanying drawings will serve to illustrate such a device as may be employed to carry my invention into effect.

In the drawings, Figure 1 is a front elevation with the case in section, showing a portion of a mechanical musical instrument and

the perforated music-strip in position. Fig. 2 is a vertical section thereof, taken on the line $s^2 s^2$ of Fig. 1. Fig. 3 is a cross-section showing the music-strip wound upon the music-roll and secured by a spring-clip. Fig. 4 is a similar view of the take-up roll, showing a further use of the clip in connecting the free end of the music-strip thereto; and Fig. 5 is a sectional view of the music-roll, taken on the line $s^5 s^5$ of Fig. 1.

Referring now to the drawings, 10 indicates the inclosing case of the instrument, which may be given any suitable shape and construction.

A tracker-board 11, located in the usual position in the upper part of the instrument, is provided with one or more rows of tracker-ducts 12, which coöperate with the perforations in the music-strip 13 and through suitable responsive devices (not shown) actuate the bell-crank levers 14 and cause the cushioned ends thereof to strike the keys of the piano or organ.

As described in my previous application above referred to, the supporting-body for the music-strip may be in the form of a tube of paper or other material having substantially the same coefficient of expansion and contraction under atmospheric conditions as the substance of which the music-strip is made. A portion of such a tube is indicated at 15 in Figs. 3 and 5.

Disks 16, carried by and movable lengthwise on the nipples 17, are arranged at each end of the supporting-body, the disks serving as guiding-flanges for the music-strip and the nipples as a means for transmitting motion to the music-roll. The cylindrical portion of the nipples is secured within the supporting-body, so that these parts rotate together, the oppositely-bent extensions thereof serving to confine the flanges and limit their outward movement.

The music-roll as above described, together with the music-strip wound thereon, form what may be termed a "commercial" music-roll, such as would be sold for use with mechanical musical instruments.

The guiding-flanges are normally pressed

inward by disks 18, mounted on and secured to short shafts 19, so that the distance separating the flanges always equals the width of the music-strip. These shafts, journaled in the frame of the instrument, extend through the disks and are adapted to be introduced into the cylindrical portions of the nipples as supports for the roll. A driving connection is provided between the roll and the shafts supporting the same by grooving the disks across their inner faces, as shown in Fig. 5, to receive the oppositely-bent extensions of the nipples.

Motion is transmitted to the roll by means of the broad-faced gear 20 on shaft 21, in mesh with a narrow-faced gear 22 on shaft 19.

The inward adjustment of the guiding-flanges and the centering of the roll relative to the tracker-board are effected by means of grooved collars 23, mounted fast on the short shafts 19 and having pins of yoked levers 24 engaging the grooves thereof. At their lower ends these yoked levers are mounted on rock-shafts 25 and through the crank-arms 26 and links 27 are connected to a lever 28, pivoted at 29 to the frame of the instrument. This lever 28 is provided with a handle for convenience in adjusting the disks by hand when, for example, a music-roll is being placed in position or removed.

In order to exert a constant elastic tension on the disks, a spring 30 is employed, which tends to force the guiding-flanges inward in close contact with the music-strip.

The specific construction of the music-roll and its mounting as above described forms no part of the present invention, as the same is described and claimed in my prior application above referred to and is here employed merely for the purpose of completing an operative illustration. It will therefore be understood that other forms might be substituted and substantially the same results obtained.

The present invention, as heretofore stated, consists, essentially, in the means employed for automatically varying the effective length of the take-up roll or the take-up roll and the tracker-board in accordance with the width of the music-strip used for automatically varying the distance between the guiding-flanges of the music-roll and the take-up roll in accordance with variations in width of the music-strip due to atmospheric changes and for automatically centering the music-roll and take-up roll relative to the tracker-board and irrespective of the width of the music strip.

The take-up roll 31 is mounted on a square shaft 32, extending parallel with the music-roll and journaled in bearings 33 in the frame of the instrument. It is grooved or cut away centrally in the usual manner and provided in the groove with a pin or hook 34. The music-strip is connected with the take-up roll

by having an approximately C-shaped spring-clip 35 linked to its tapered free end and eyeleted for engagement with the pin or hook of the take-up roll, as shown in Figs. 1 and 4. By properly proportioning this clip it serves also as a binder or elastic fastening for the music-strip when wound upon the roll, as shown in Fig. 3. That portion of the take-up roll forming the supporting-body for the music-strip as it is unwound from the music-roll may be either tubular or solid and formed of wood, paper, or other suitable material. It is secured fast upon the shaft 32 and centered relatively to the tracker-board and the disks 18 of the music-roll by adjusting the bearings in which the shaft is mounted.

The length of the supporting-body is considerably less than the width of the music-strip to allow for the movement under adjustment of disks 36, arranged at opposite ends thereof. These disks, which serve as guiding-flanges for the take-up roll, are secured to or formed in part with sleeves 37, movable lengthwise of the shaft, and are adjusted to vary the effective length of the roll by means of yoked levers 38, similar to those described in connection with the music-roll, such levers being mounted on the rock-shaft 25 and provided with pins projecting into grooves 39, formed in the sleeves.

The inner faces of the disks of the take-up roll are alined with the inner faces of the guiding-flanges of the music-roll, and it follows, therefore, that the effective length of these rolls or the distance separating their flanges is the same, also that as the yoked levers of both rolls are mounted on the same rock-shafts any variation in the length of the music-roll, for example, will be followed by a corresponding variation in the length of the take-up roll, the adjustment being simultaneous.

Motion is transmitted to the take-up roll by means of gearing similar to that above described in connection with the music-roll, the same consisting of a broad-faced gear 40 on a shaft 41, in mesh with a narrow-faced gear 42, fast on the take-up-roll shaft 32.

In the use of music-strips of different width it is necessary when, for example, the length of the tracker-board exceeds the width of the music-strip to close the exposed tracker-ducts, and for this purpose I employ slide-valves 43, operated by crank-arms 44 of the rock-shaft 25 and arranged to control a suitable number of the passages leading from the tracker-ducts at opposite ends of the tracker-board.

The operation will be readily understood. In placing a music-roll in position the hand-lever 28 is first moved toward the left as viewed in Fig. 1, and through the connections described the disks of both the music and take-up rolls are separated and the slide-valves are drawn out, opening the passages which they control leading from the tracker-ducts

at opposite ends of the tracker-board. After the music-roll is properly centered the lever 28 is released, and under the action of the spring 30 the projecting ends of the short shafts are forced into the tubular nipples of the roll, and the disks in moving inward in opposite directions adjust the guiding-flanges to the width of the music-strip wound upon the roll. Simultaneously with the movement of the disks 18 there will be a similar adjustment of the disks or flanges of the take-up roll, the length of which latter is thus regulated to receive the strip as it is wound thereon.

If the width of the music-strip is less than the length of the tracker-board and one or more of the end tracker-ducts are exposed, the passages leading therefrom will be closed or cut off by the inward movement of the slide-valves as the disks become adjusted to the music-strip.

Assuming the music-roll to be in position, it only remains to connect the music-strip with the take-up roll and the instrument will be ready for operation. This is effected by hooking the end of the clip 35 attached to the free end of the strip on the pin 34 in the central groove of the take-up roll.

Having thus described my invention, I claim—

1. The combination of a music-roll, variable in length under atmospheric changes, a take-up roll and means for simultaneously increasing or decreasing the effective length of the take-up roll in accordance with variations in the length of the music-roll.

2. The combination of a music-roll and a take-up roll each provided with guiding-flanges and means for simultaneously moving the guiding-flanges of both rolls longitudinally in accordance with variations in width of the music-strip.

3. The combination of a music-roll, provided with means for compensating for variations in width of the music-strip, a take-up roll, and means for maintaining a point on the longitudinal axes of the rolls in the center of the tracker-board.

4. The combination of a music-roll provided with means for compensating for variations in width of the music-strip, a take-up roll, movable guiding-disks thereon, and means for automatically varying the distance between said disks in accordance with variations in the width of the music-strip.

5. The combination of a music-roll, and a take-up roll, each provided with a supporting-body and guiding-flanges longitudinally movable to vary the effective length thereof, and means for exerting an equal elastic inward tension upon the flanges of both rolls.

6. The combination with a tracker-board, of a take-up roll comprising in its construction a supporting-body centered relatively to the tracker-board and guiding-flanges longi-

tudinally movable to vary the effective length of the roll, a carrier common to both the supporting-body and the flanges and means for imparting rotary motion to the carrier.

7. The combination with a tracker-board, of a take-up roll, comprising in its construction a supporting-body centered relatively to the tracker-board and longitudinally-movable guiding-flanges, means for adjusting the flanges, 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 flanges, whereby the elastic tension exerted upon the lever will be transmitted to and equally exerted upon the flanges tending to force them inward and reduce the effective length of the roll.

8. The combination with a music-roll, a take-up roll and a tracker-board, of means for automatically varying the effective length of said rolls and tracker-board, without varying the distance between the ducts of the tracker-board in accordance with the width of the music-sheet.

9. The combination with a music-roll, a take-up roll and a tracker-board, of means for automatically varying the effective length of such parts in accordance with the width of the music-strip.

10. The combination with a music-roll, a take-up roll and a tracker-board, of means for automatically and simultaneously varying the effective length of such parts in accordance with the width of the music-strip.

11. In combination with a music-roll, a take-up roll and a tracker-board, of means controlled by the changes of length of the music-roll for automatically varying the effective length of such parts in accordance with the width of the music-strip.

12. In a mechanical musical instrument, the combination with a music-sheet-take-up roller, comprising opposed flanges adjustable toward and away from each other; of a bearing for a music-sheet spool; and, means operatively connecting said bearing with said flanges, arranged to adjust the latter in correspondence with the position of said bearing.

13. In a mechanical musical instrument, the combination with a music-sheet-take-up roller, comprising opposed relatively adjustable flanges; of a tracker-bar, comprising a series of apertures; means to control the air-ducts leading to the terminal apertures in said series; and, means operatively connecting said roller-flanges with said duct-controlling means, arranged to effect their operation in definite relation to each other.

14. In a mechanical musical instrument, the combination with a tracker-bar comprising a series of apertures; of means to control the air-ducts leading to the terminal apertures in said series, comprising a slide-valve; a take-

up roller provided with opposed relatively adjustable flanges; and, means operatively connecting said flanges with said slide-valve, arranged to open or close said air-ducts in accordance with the position of said flanges.

15. In a mechanical musical instrument, the combination with a take-up roller comprising opposed relatively adjustable flanges; of sleeves carrying said flanges; rock-shafts connected with the respective sleeves; and, means operatively connecting said rock-shafts, arranged to effect the movement of said flanges in definite relation to each other.

16. In a mechanical musical instrument, the combination with a tracker-bar comprising a series of apertures; of means arranged to control the air-ducts leading to the terminal apertures in said series, comprising a slide-valve; a take-up roller comprising opposed relatively adjustable flanges; rock-shafts engaged with the respective flanges; means operatively con-

necting said rock-shafts; opposed bearings for a music-spool; one bearing being arranged for longitudinal reciprocation; means operatively connecting said reciprocatory bearing with one of said rock-shafts; and, means operatively connecting said reciprocatory bearing with said slide-valve.

17. In a mechanical musical instrument, a take-up roller provided with a music-sheet-engaging hook; opposed flanges carried by sleeves mounted to slide; and, means operatively connecting said sleeves, arranged to effect their relative movement in definite relation, to each other.

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

HENRY PRICE BALL.

Witnesses:

C. H. VOM BAUR,
J. H. ROGERS.