

No. 890,754.

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S. BERENS.

REGULATING DEVICE FOR GRAPHOPHONE SOUND BOXES.

APPLICATION FILED JAN. 8, 1908.

Fig. 1

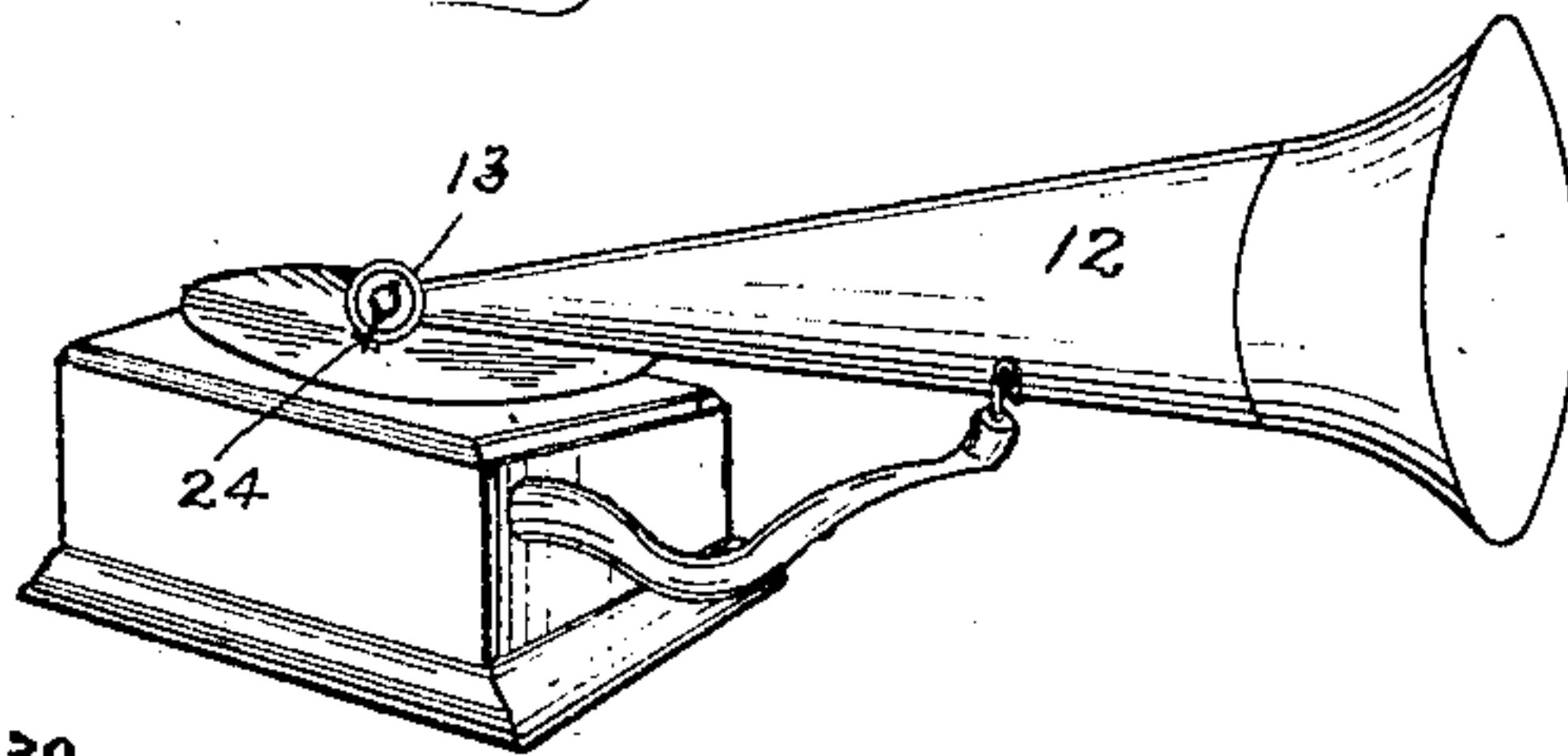


Fig. 5.

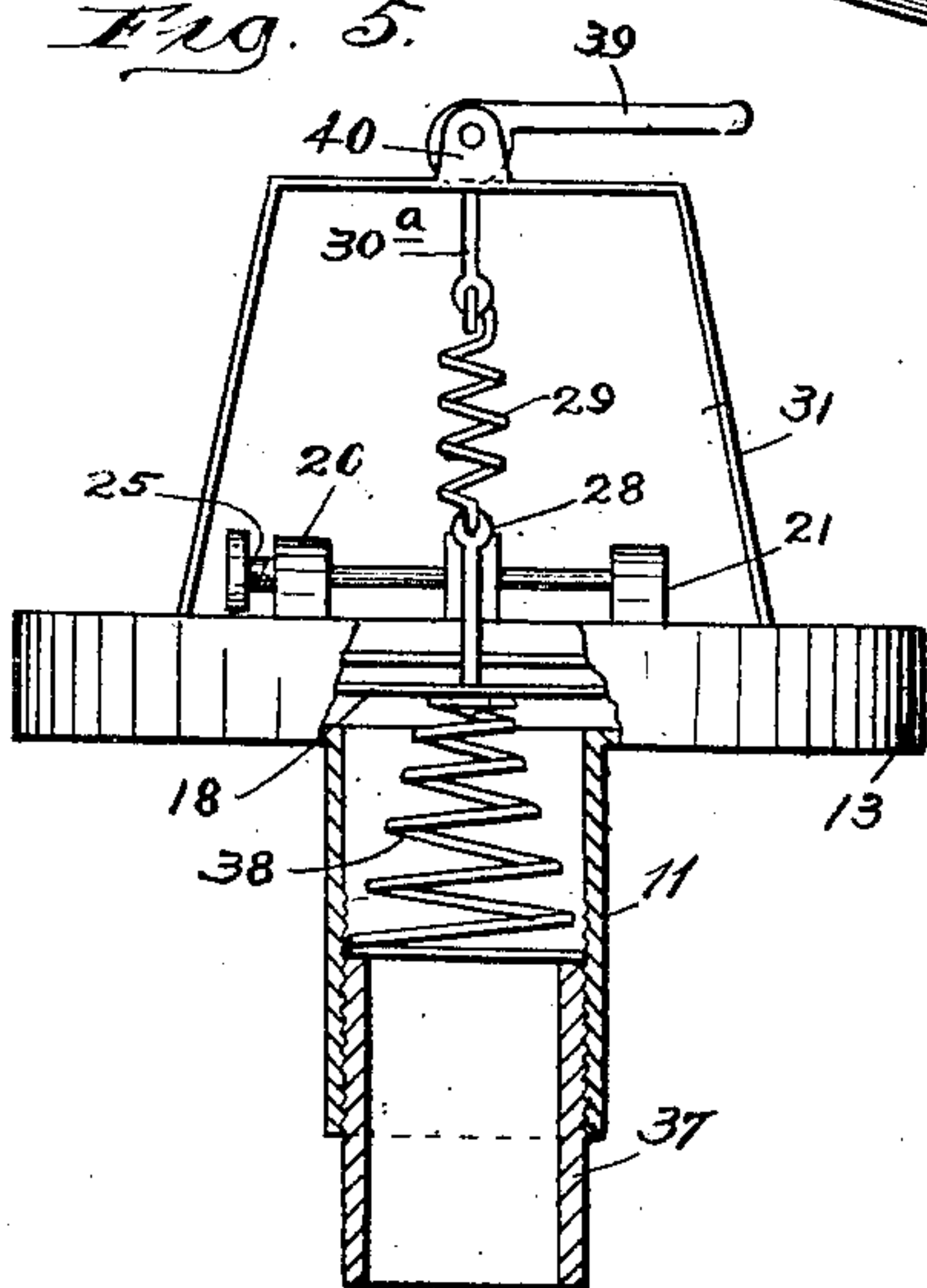


Fig. 2.

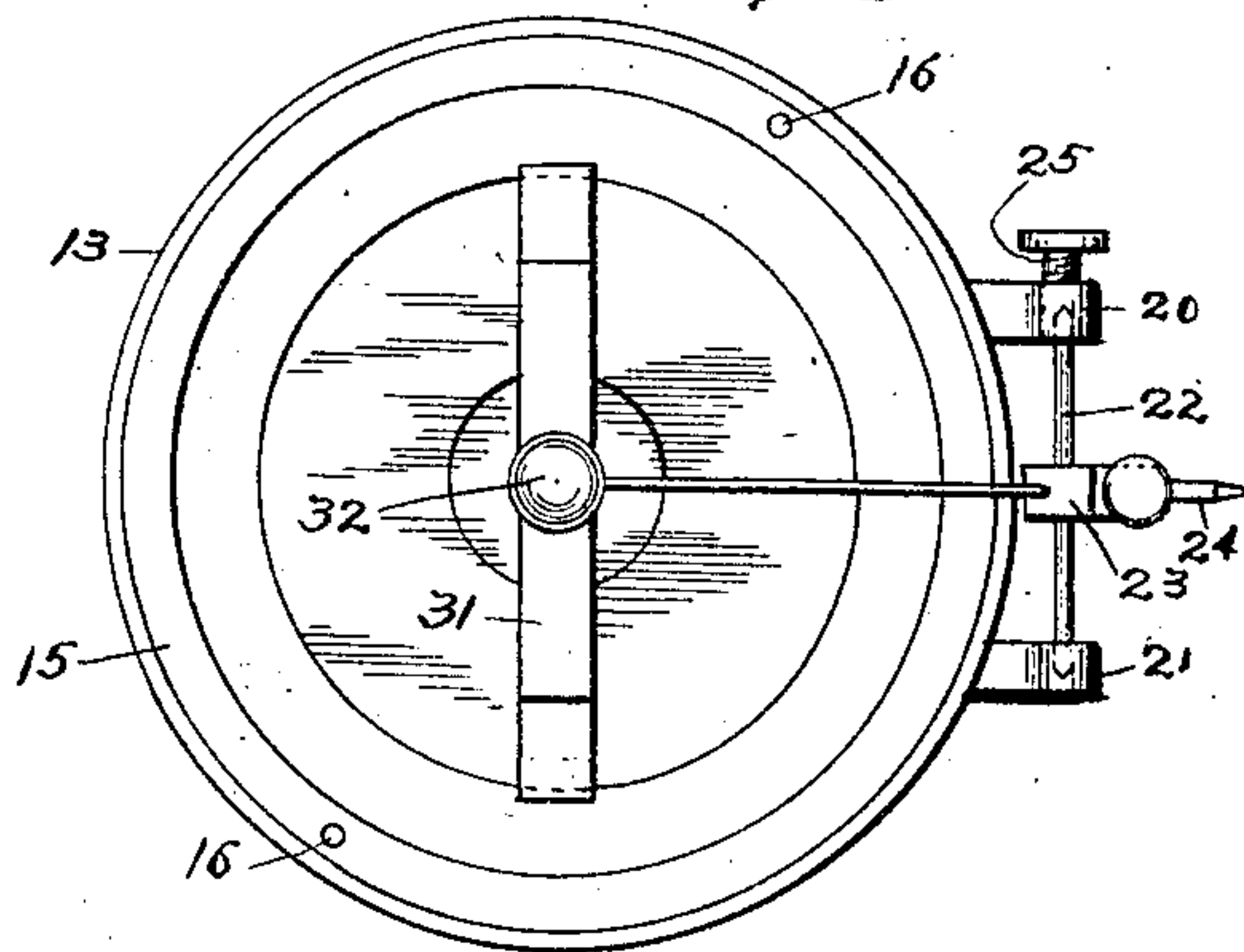
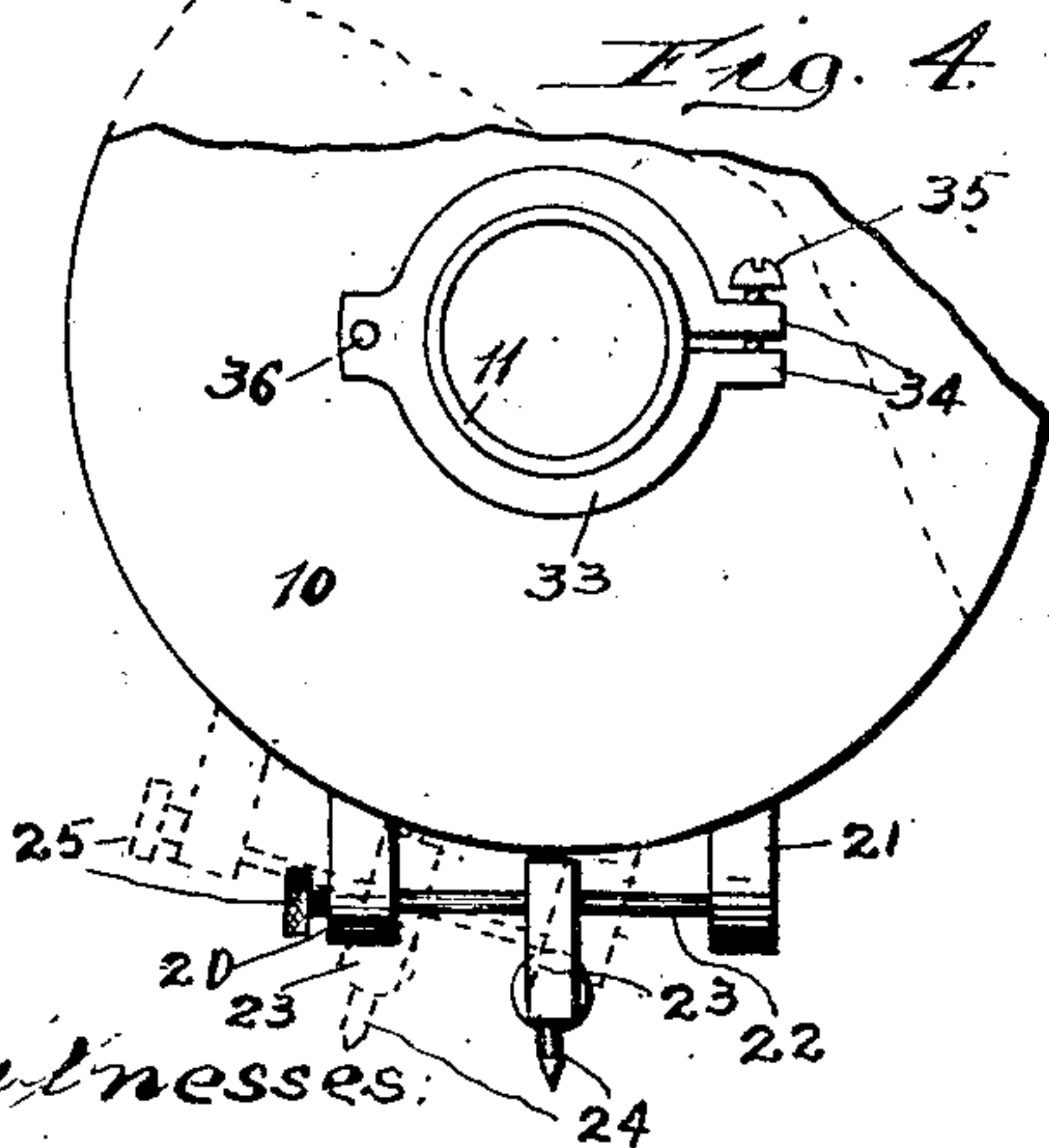
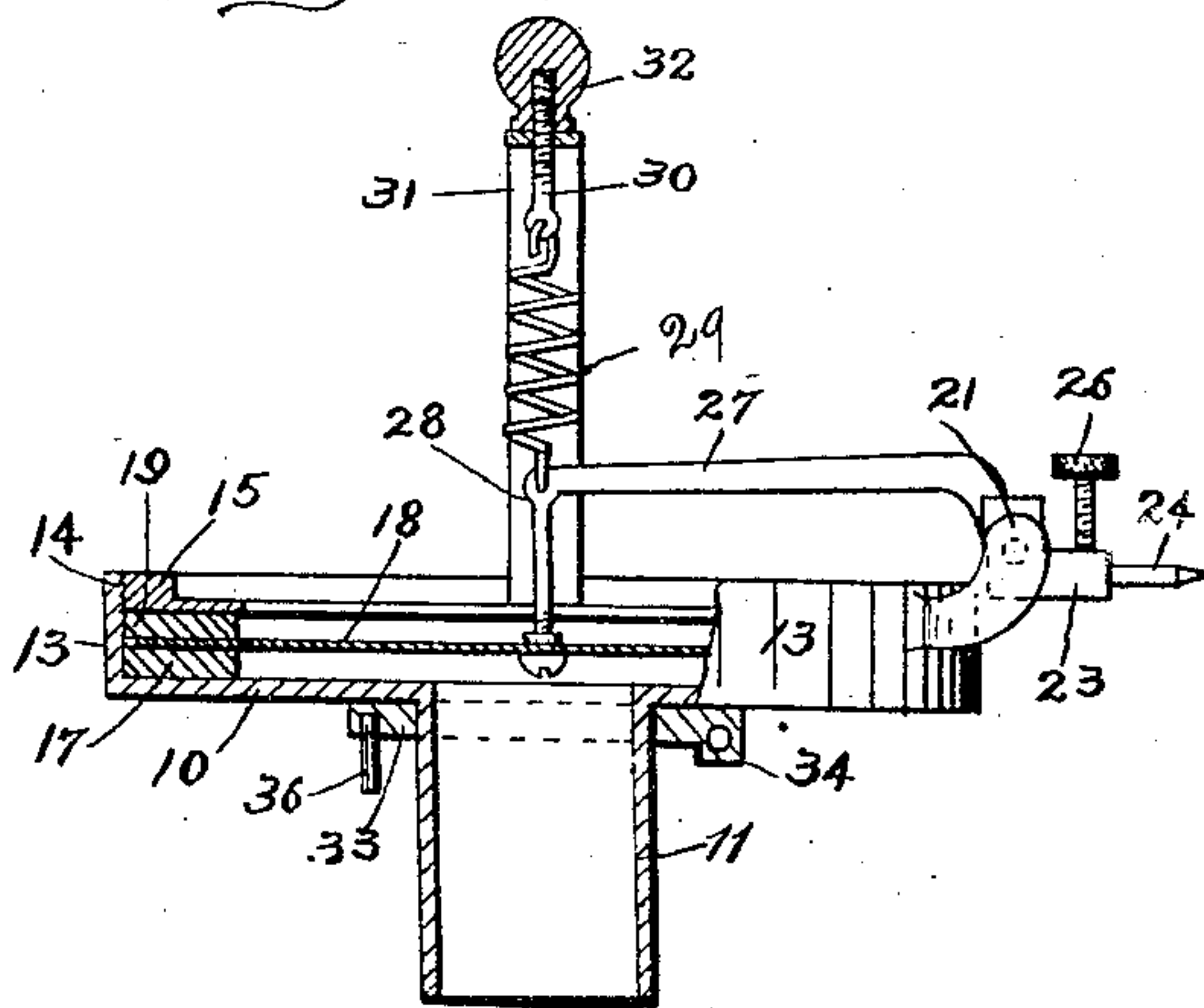


Fig. 3.



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# UNITED STATES PATENT OFFICE.

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## REGULATING DEVICE FOR GRAPHOPHONE SOUND-BOXES.

No. 890,754.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed January 8, 1908. Serial No. 409,868.

*To all whom it may concern:*

Be it known that I, STANISLAUS BERENS, a citizen of the United States, residing at La Grange, in the county of Cook and State of Illinois, have invented certain new and useful Improvements in a Regulating Device for Graphophone Sound-Boxes, of which the following is a specification.

This invention relates to improvements in means for regulating or modulating the sounds of graphophones and analogous instruments, and has especial relation to the reproducers or sound-boxes of the same, and it consists in certain peculiarities of the construction, novel arrangement, and operation of the various parts thereof, as will be hereinafter more fully set forth and specifically claimed.

The principal object of the invention is to provide simple and efficient means to be used in connection with a graphophone sound-box whereby the vibration of parts thereof may be adjusted or regulated to the greatest degree of nicety, so as to produce as nearly as possible the natural and distinct articulations of spoken sounds, and to afford more perfect results in the reproduction of musical notes, as well as to prevent harsh, grating and discordant sounds.

A further object of the invention is to afford a greater degree of flexibility of the diaphragm while maintaining the proper tension thereof, so that the sounds and notes may be modified or softened.

Another object of the invention is to provide means to permit of the proper adjustment of the sound-box and stylus which it carries with respect to the record without interfering with the movement of the sound magnifying horn.

Other objects and advantages of the invention will be disclosed in the subjoined description and explanation.

In order to enable others skilled in the art to which my invention pertains, to make and use the same, I will now proceed to describe it, referring to the accompanying drawing, in which—

Figure 1 is a perspective view of a graphophone, showing a sound-box embodying my invention thereon and in position ready for operation; Fig. 2 is a face view of the outer surface of the sound-box; Fig. 3 is a plan view partly in section and partly in elevation, showing the means for regulating the tension

of the diaphragm and also the means for securing the same in position within the sound-box; Fig. 4 is a fragmental inner face view of the sound-box, showing by dotted lines one of the positions to which it and the stylus may be adjusted with respect to the record;— and—Fig. 5 is a plan view partly in section of the sound-box, showing a modification in its construction.

Like numerals of reference, refer to corresponding parts throughout the different views of the drawing.

The reference numeral 10 designates the frame-plate of the sound-box which is provided at its center with a sound receiving tube 11 on which the small end of the horn 12 may be fitted. The frame-plate 10 of the sound-box is provided at its periphery with an annular flange 13 which projects outwardly or in the opposite direction from the tube 11 and has its inner surface partly screw-threaded as at 14 (see Fig. 3) to engage the outer screw-threaded surface of an annular washer 15, which is provided with a number of openings 16 for a spanner or other instrument to be used in turning the washer 15 when it is desired to screw the same in place.

Located on the inner surface of the frame-plate 10 of the sound-box, and at or near the periphery thereof, is a ring 17, of rubber or other suitable cushioning material, on which the diaphragm 18 rests near its periphery. On the outer surface of the diaphragm and at or near the flange 13 of the sound-box is another ring 19, of rubber or other suitable material, which is pressed against the diaphragm by means of the washer 15, thus securely holding the diaphragm in position within the sound-box frame, and in such a manner as to afford a great vibratory portion or area thereof, for it will be seen and understood that the rings 17 and 19 between which the diaphragm is interposed will contact with only a small portion of the diaphragm near its periphery. The flange 13 of the sound-box frame is provided on its outer surface with two spaced apart and transversely apertured arms 20 and 21 to receive the ends of a rod 22 on which the head 23 which carries the stylus 24 is mounted. The ends of the rod 22 are pointed, as shown in Fig. 2, to fit in conical-shaped openings in the arm 21 and in the inner end of an adjusting screw 25, which is in screw engagement with a suitable



opening in the arm 20. The stylus 24 is fitted in a suitable opening in the head 23, and may be adjustably held therein by means of a screw 26 which engages a suitable opening in the head.

Extending inwardly from the head 23 to the center of the diaphragm is the stylus-arm 27, which may be secured at its inner end to the center of the diaphragm in any suitable manner. As shown in Fig. 3, the stylus-arm 27 is formed with an elbow 28 to which is secured one end of a spiral spring 29, the other end of which is secured to the inner end of a screw 30 which is extended through a suitable opening in the middle portion of a bracket, of any suitable shape and construction, 31 which has its ends secured diametrically opposite each other to the washer 15, as will be understood by reference to Figs. 2, 3 and 5 of the drawings. On the outer portion of the screw 30 is a nut 32 used for regulating the tension of the spring 29, and through it and the stylus-rod the tension and flexibility of the diaphragm. Surrounding the tube 11 is a broken ring 33 which has on its ends outwardly extended lugs 34 in which is transversely located a screw 35 to be used for clamping the lugs together when it is desired to firmly secure the ring in position on the tube, or to permit the parts of the ring to spring apart when it is desired to adjust the sound-box and stylus, so that the latter may be arranged at the proper angle with respect to the record.

The ring 33 is provided at a point opposite the lugs 34 with a pin 36, which is adapted to fit in a suitable opening in the small end of the horn 12, or arm which, as is well known, is usually deflected at said end towards the sound-box and is fitted over the tube 11. By this arrangement it is evident that by loosening the screw 35 in the lugs 34 the sound-box may be turned to any suitable angle, as the ring 33 will loosely support the horn on the tube 11, when it may be again rigidly fixed thereto by tightening said screw.

In Fig. 5 of the drawing I have shown a modification in the construction of the device, which consists in providing the tube 11 with internal screw-threads to engage an adjusting tube 37 which is externally screw-threaded and is employed to regulate the tension of a conical-shaped spiral-spring 38, which has one of its ends secured to the diaphragm 18 and its other end resting against or in contact with the inner end of the tube 37, as is clearly shown in Fig. 5 of the drawing. This modified form further consists in employing a cam-lever 39 which is fulcrumed between two projections 40 on the middle outer portion of the bracket 31 and engages a rod 30<sup>a</sup>, which is extended through an opening in the middle portion of the bracket 31 and has secured to its inner end one end of a spring 29, the other end of which is secured

to the elbow 28 of the stylus-arm as in the other construction.

While I have shown in Figs. 2 and 3 of the drawing a screw-rod 30 and nut 32 for regulating the tension of the spring 29, and have shown in Fig. 5 the rod 30<sup>a</sup> and cam-lever 39 for said purposes, yet it is evident that I may employ a screw-rod and nut on the construction shown in Fig. 5, or may employ a cam-lever and rod in the construction shown in Figs. 2 and 3, without departing from the spirit of the invention.

From the above description of my improvements it will be seen that the improved sound-box constructed according to my invention is of an extremely simple and inexpensive nature, and is especially well adapted for use by reason of the great accuracy or nicety with which the tension of the diaphragm may be regulated without deleteriously affecting its flexibility, and, of the fact that the sound-box and stylus may be easily adjusted to any desired position with respect to the record without interfering with or causing the movement of the horn. And, it will also be evident that the device is susceptible of considerable modification without material departure from the principles and spirit of the invention, and for this reason I do not desire to be understood as limiting myself to the precise form and arrangement of the several parts of the device as herein set forth in carrying out my invention in practice, for example, the adjusting tube 37 and spring 38 shown in Fig. 5 may or may not be used in conjunction with the spring 29 and adjusting means therefor shown in Figs. 2 and 3 of the drawing.

Having thus fully described my invention, what I claim as new, and desire to secure by Letters-Patent, is—

1. The combination with a graphophone sound-box, of a bracket mounted across one of its faces, a stylus-arm pivotally mounted on the box and in engagement with the diaphragm, a spiral-spring connected at one of its ends to the inner portion of the stylus-arm and movably connected at its other end to the bracket, and means to regulate the tension of the spring.

2. The combination with a graphophone sound-box, of a bracket mounted across one of its faces, a stylus-arm pivotally mounted on the box and in engagement with the diaphragm, a screw-rod extended through the bracket at about its middle, a spiral-spring connected at one of its ends to the inner portion of the stylus-arm and at its other end to one end of the screw-rod, and an adjusting nut on the other end of said rod.

3. The combination with a graphophone sound-box having a sound-receiving-tube on one of its faces and provided on its other face with a diametrically disposed bracket, of a stylus-arm pivotally mounted on the box



and in engagement with the diaphragm, a spiral-spring connected at one of its ends to the inner portion of the stylus-arm and movably connected at its other end to the bracket, a spiral-spring located in the tube and in engagement with the diaphragm, and means to regulate the tension of said springs.

4. The combination with a graphophone sound-box having a sound-receiving-tube on one of its faces and provided on its other face with a diametrically disposed bracket, of a stylus-arm pivotally mounted on the box and in engagement with the diaphragm, a spiral-spring connected at one of its ends to the inner portion of the stylus-arm and movably connected at its other end to the bracket, means to regulate the tension of said spring, a spiral-spring located in the tube and in engagement at one of its ends with the diaphragm, and another tube adjustably secured in the sound-receiving-tube to regulate the tension of the spring in said tube.

5. The combination with a graphophone sound-box having a sound-receiving-tube on one of its faces and provided on its other face with a diametrically disposed bracket, of a broken ring detachably secured on said tube and having a projection near its periphery, a stylus-arm pivotally mounted on the box and in engagement with the diaphragm, a spiral-spring connected at one of its ends to the inner portion of the stylus-arm, and means at the other end of said spring to adjust its tension.

6. The combination with a graphophone sound-box having a sound-receiving-tube on one of its faces, of a diaphragm secured in the box, means to regulate the flexibility of the diaphragm, and a broken ring detachably secured on the tube and provided with a projection near its periphery.

7. The combination with a graphophone sound-box having a sound-receiving-tube on one of its faces, of a diaphragm secured within the sound-box, a spiral-spring located within the tube and in engagement at one of its ends with the diaphragm, and an adjusting tube adjustably secured within the sound-receiving-tube to regulate the tension of said spring.

8. The combination with a graphophone sound-box consisting of a frame-plate provided with an internally screw-threaded annular flange, of a pair of rings located on the plate within the flange thereof, a diaphragm interposed between said rings, a washer in screw engagement with the flange of the frame-plate, a stylus-arm pivotally mounted on the box and in engagement with the diaphragm, a spiral-spring connected at one of its ends to the inner portion of the stylus-arm, and means at the other end of said spring to support the same and adjust its tension.

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