

June 19, 1923.

1,459,577

A. A. DENNIS

SOUND BOX

Filed March 20, 1922

2 Sheets-Sheet 1

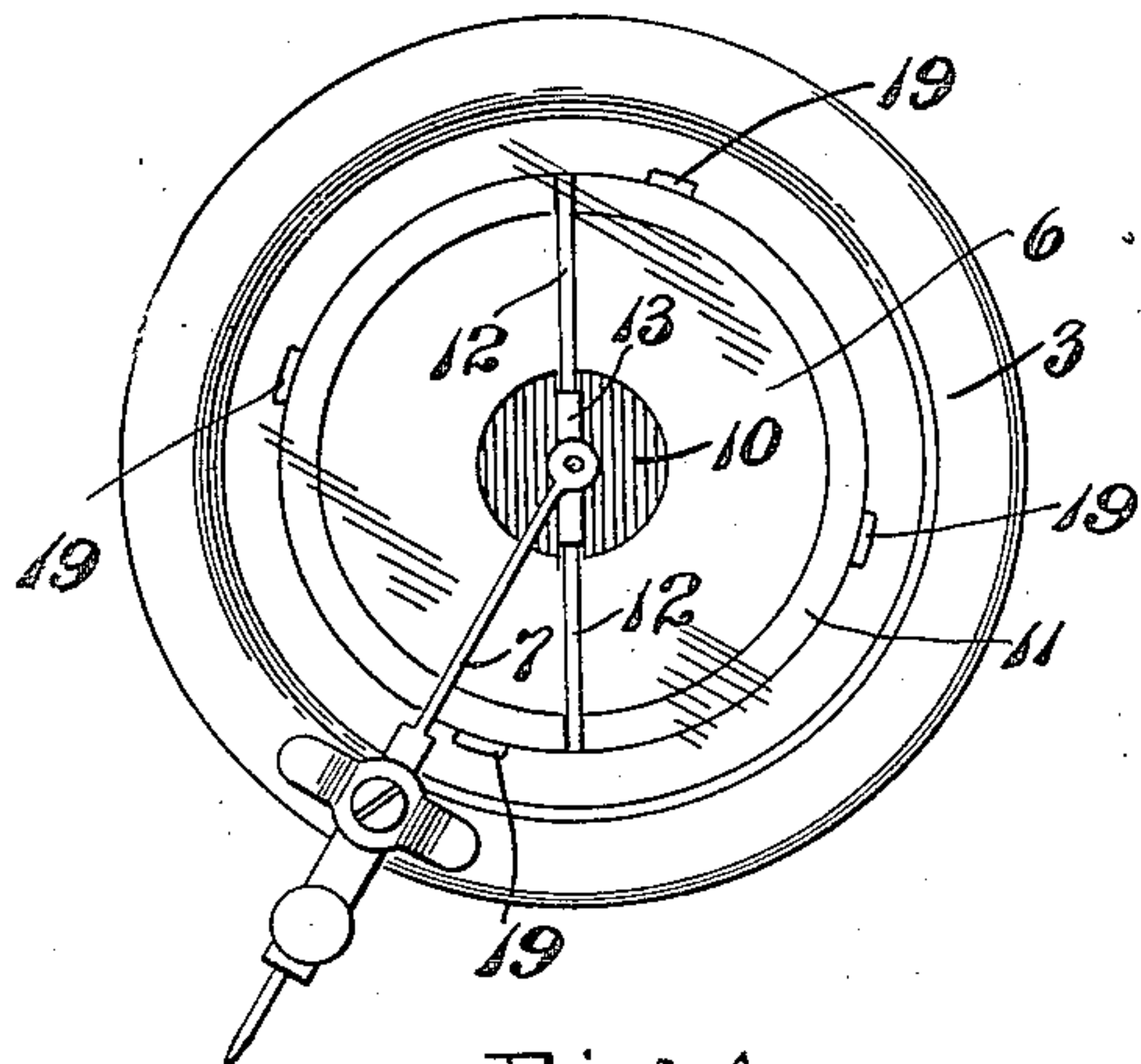


Fig. 1.

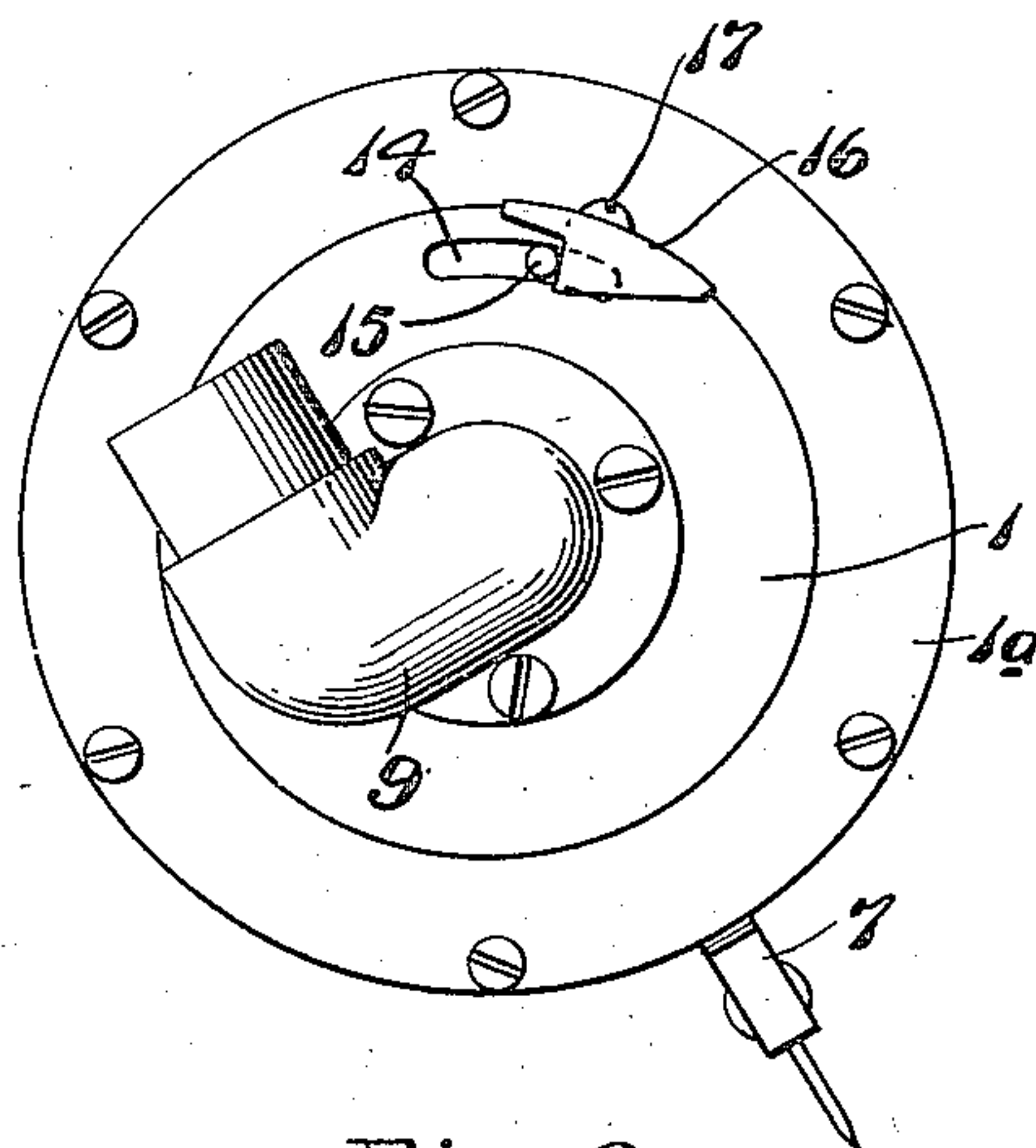


Fig. 2.

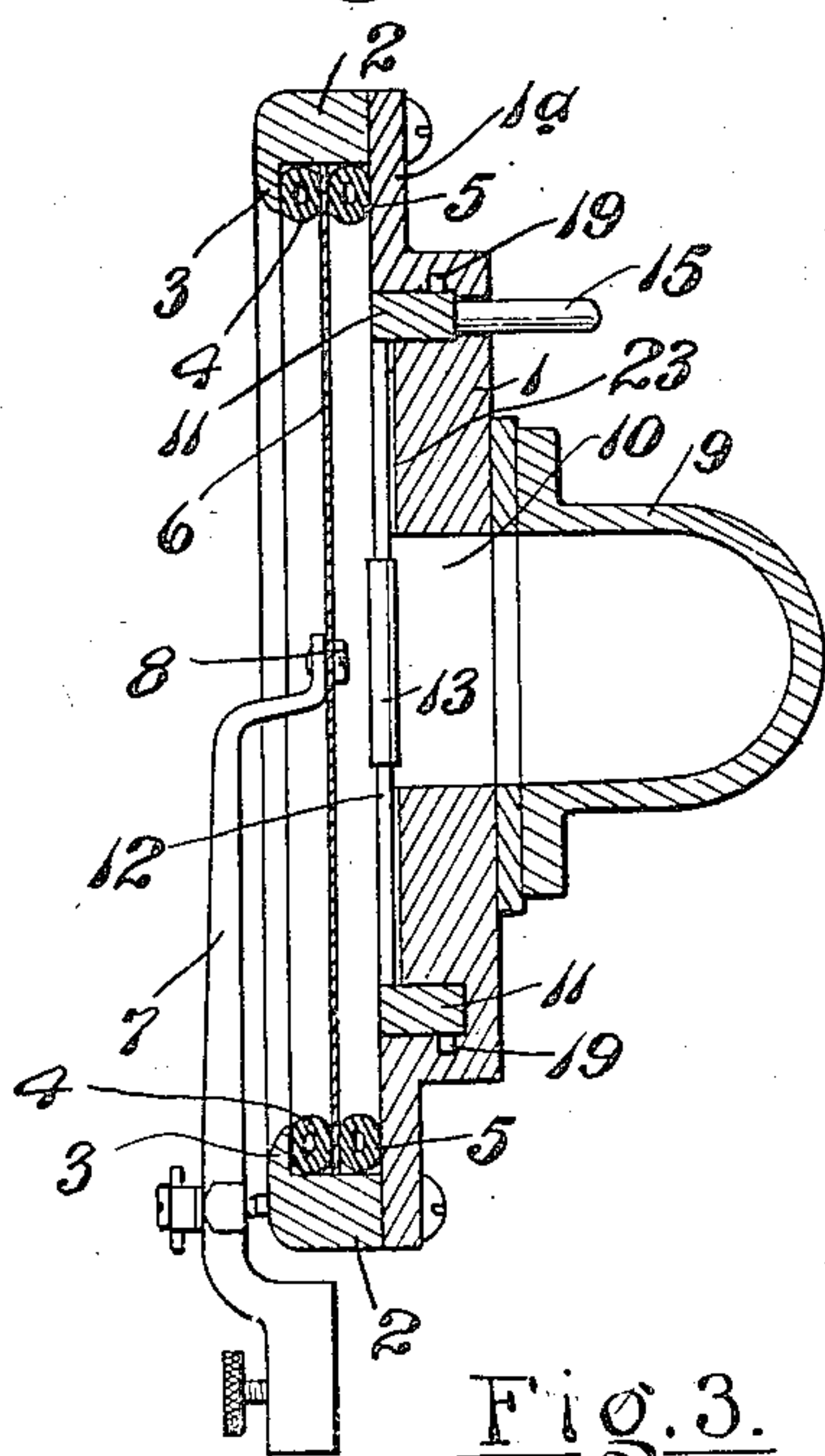


Fig. 3.

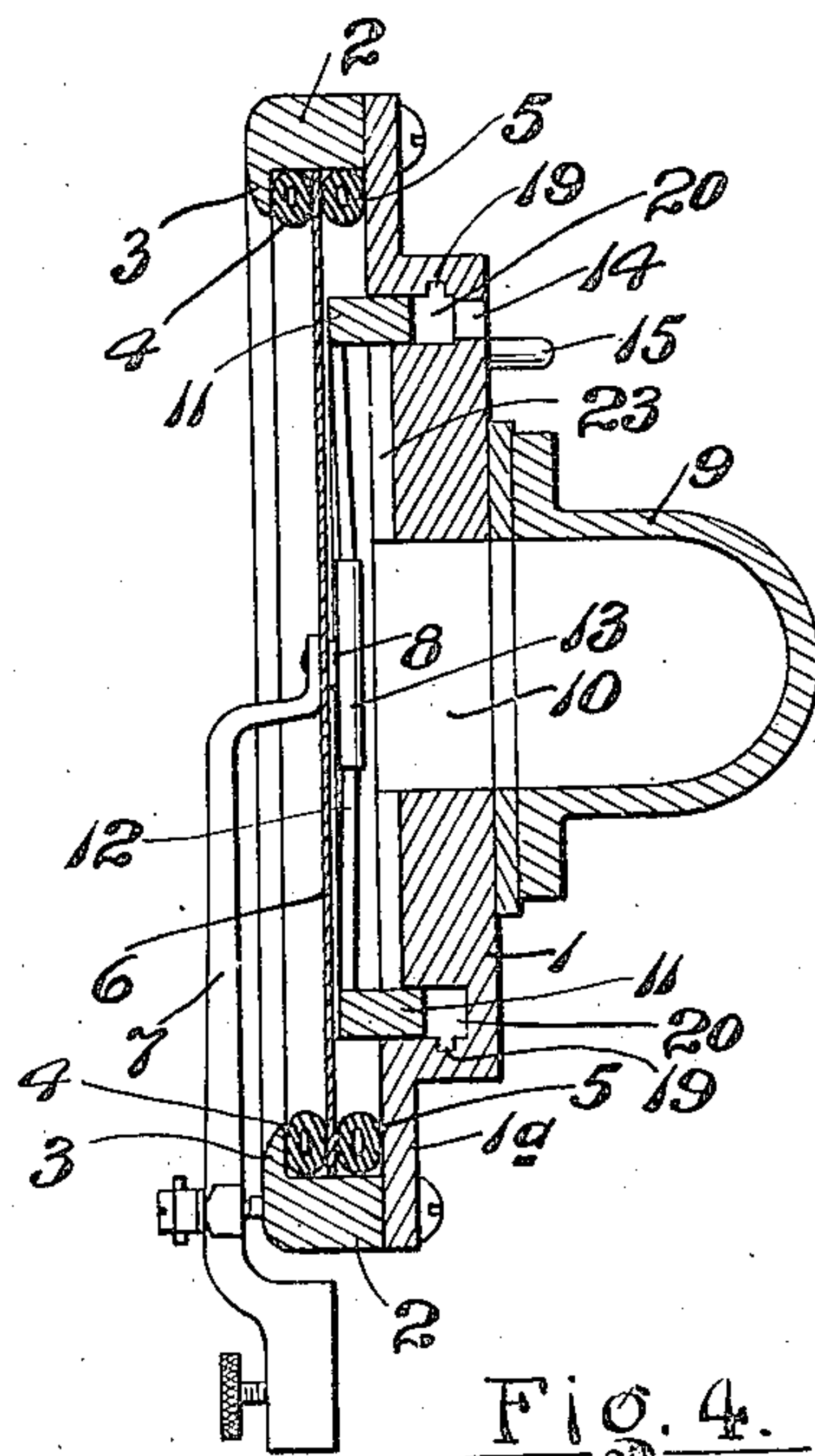


Fig. 4.

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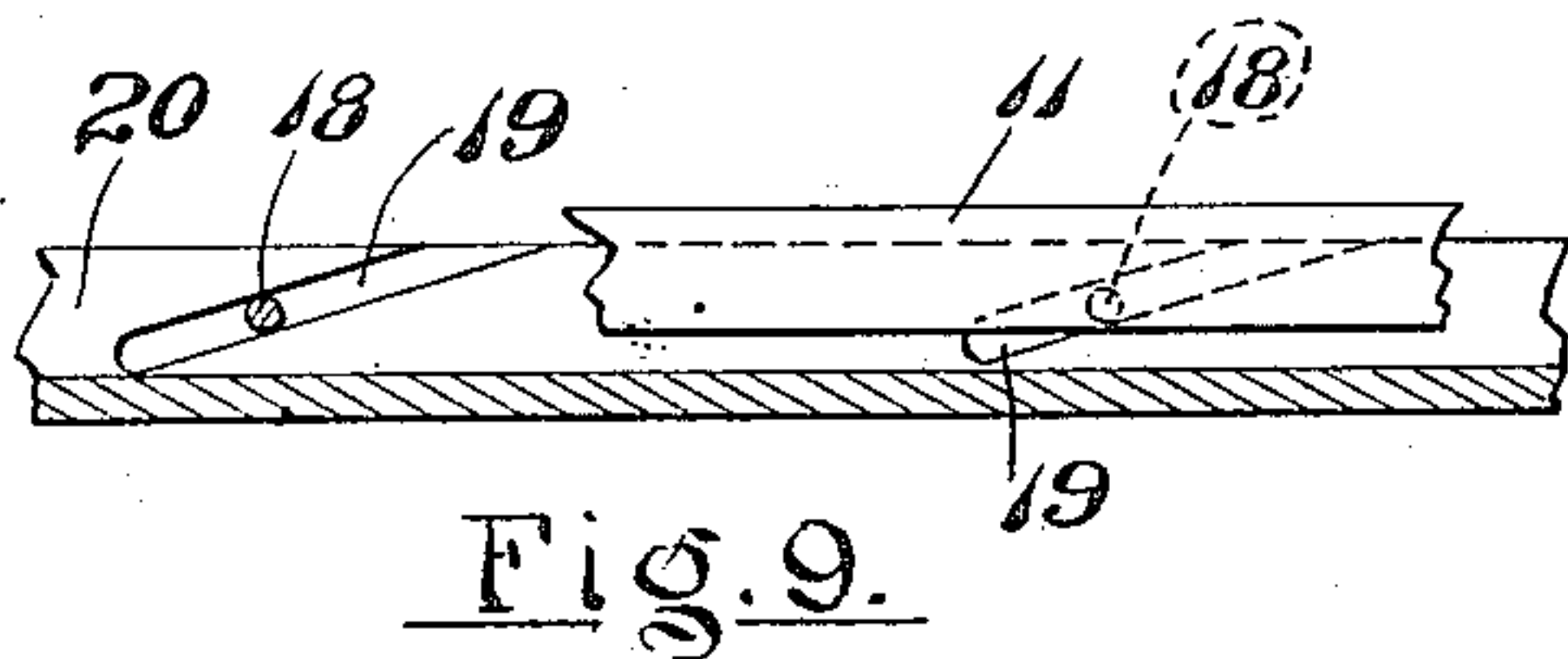
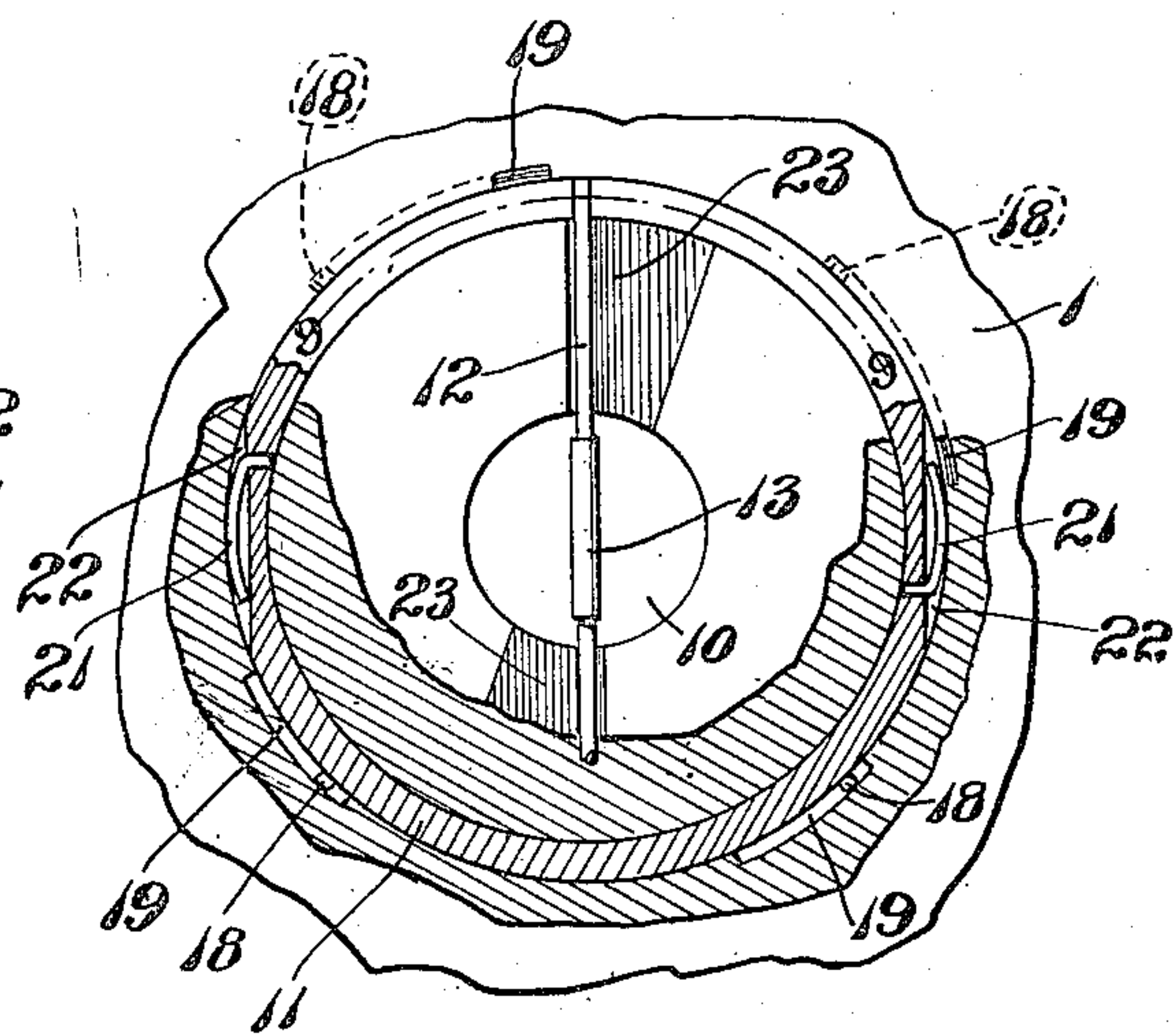
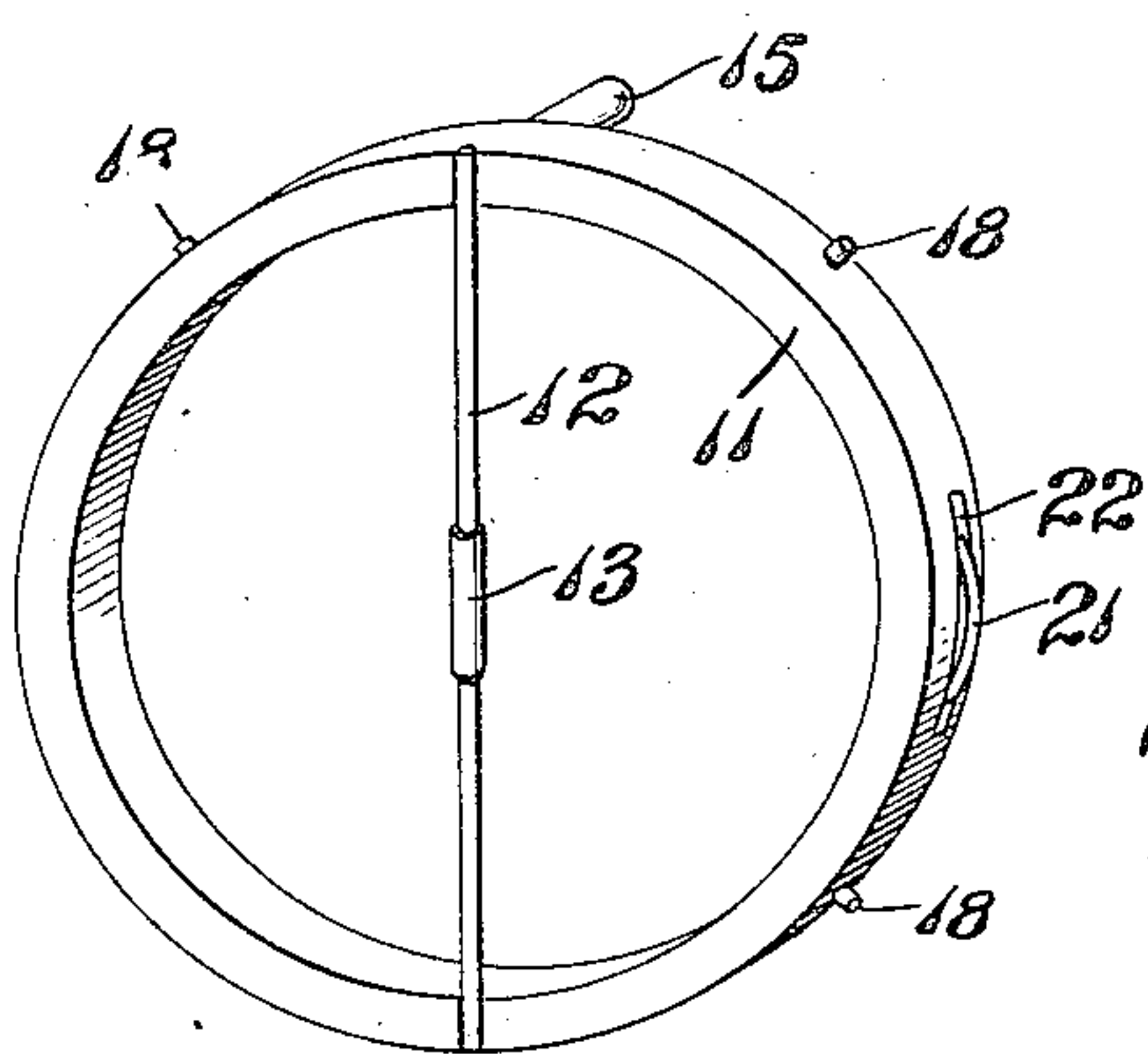
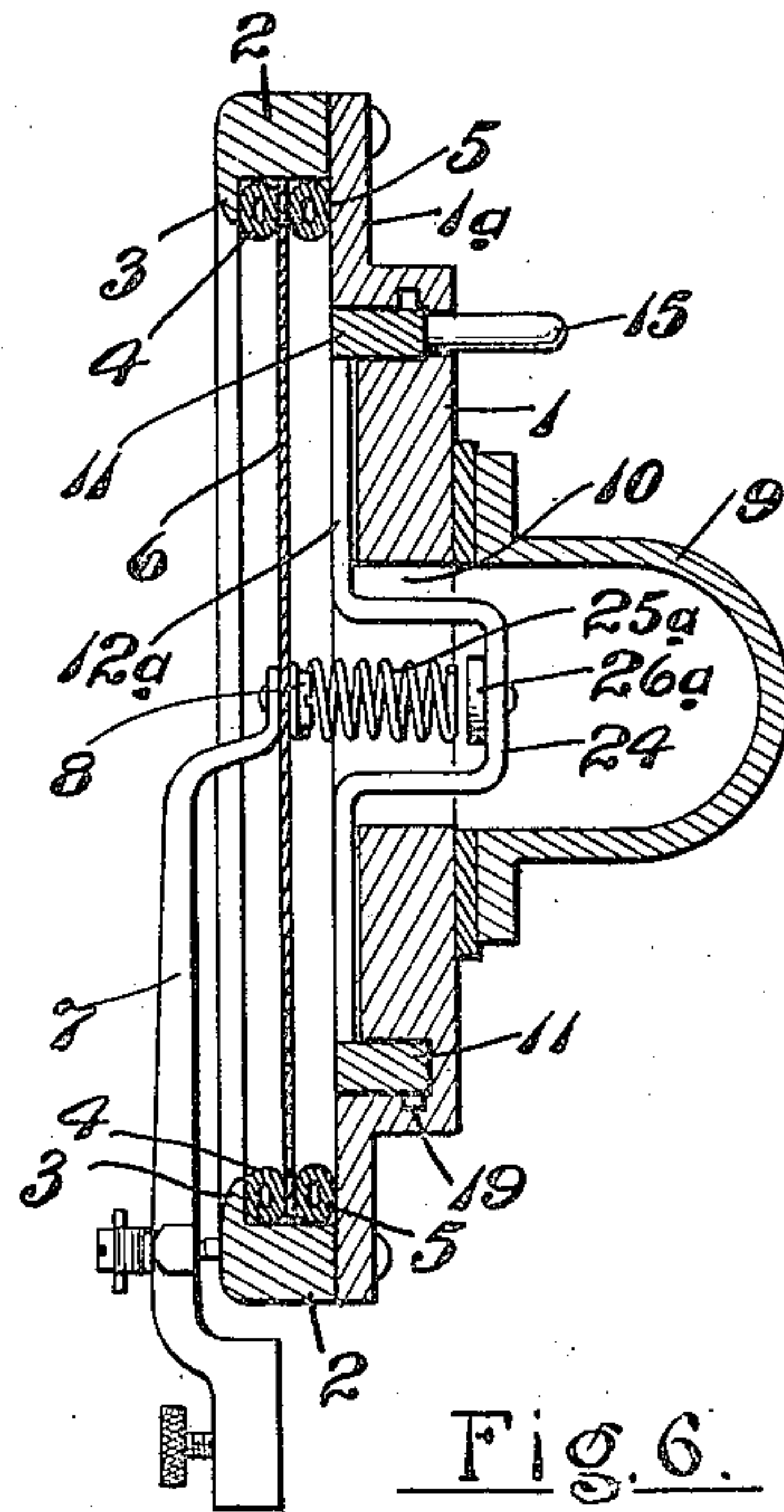
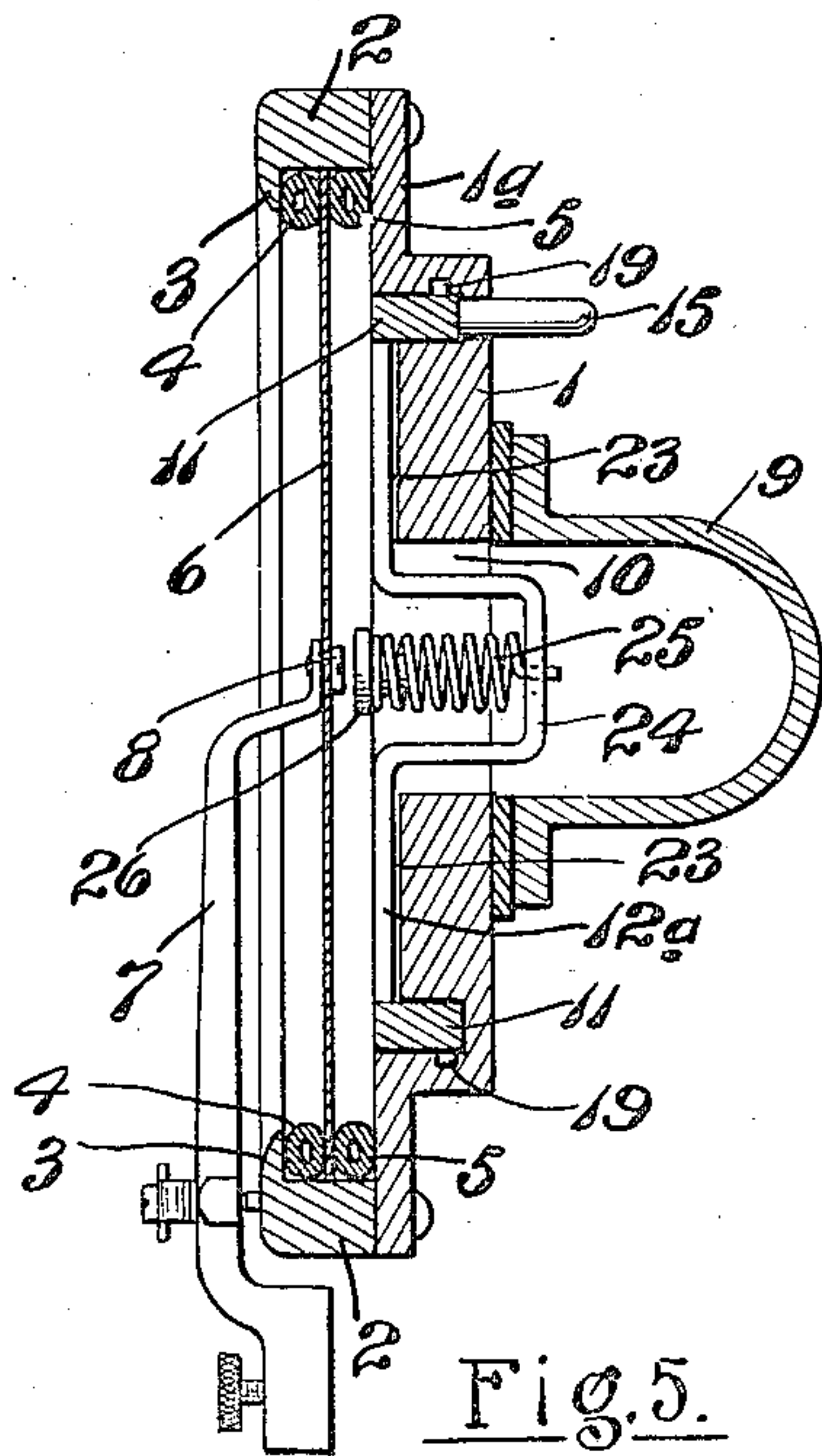
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A. A. DENNIS

SOUND BOX

Filed March 20, 1922

2 Sheets-Sheet 2



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Alfred A. Dennis.
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Patented June 19, 1923.

1,459,577

UNITED STATES PATENT OFFICE.

ALFRED A. DENNIS, OF GRAND RAPIDS, MICHIGAN.

SOUND BOX.

Application filed March 20, 1922. Serial No. 545,304.

To all whom it may concern:

Be it known that I, ALFRED A. DENNIS, a citizen of the United States of America, residing at Grand Rapids, in the county of Kent and State of Michigan, have invented certain new and useful Improvements in Sound Boxes; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to a sound box for phonographs, being primarily directed to a novel construction of sound box in which the diaphragm thereof may be tensioned by application of an adjustable and yielding spring tension thereon, similar to and producing the same desirable results as does the construction shown in my Patent No. 1,393,434, granted October 11, 1921, without the more or less troublesome manufacturing and production faults thereof, the present construction being easily and readily manufactured without especially skilled and careful labor. A further object of the invention is to make the sound box also more or less productive of many of the desirable results coming from the structure shown in my pending application for patent Ser. No. 476,977, filed June 13, 1921, in so far as an adjustment of the air volume space under the diaphragm is concerned, but without changing the vibratory area of the diaphragm, this remaining the same at all times. The invention in fact combines all of the desirable characteristics of my two prior applications, with an elimination of the faults thereof, with the production of a structure which is in shape for practical manufacture to produce a sound box which may be applied to practically all of the common makes of tone arms used in phonographs.

For an understanding of the invention, reference may be had to the following description, taken in connection with the accompanying drawings, in which,

Fig. 1 is a front elevation of the sound box of my invention in its preferred form.

Fig. 2 is a rear elevation thereof.

Figs. 3 and 4 are vertical sections through the sound box, but with the parts in different positions in the two views.

Figs. 5 and 6 are sections like that shown in Fig. 3 of two slightly modified forms of structure of the invention.

Fig. 7 is a perspective view of the movably mounted ring which is used in the sound boxes for changing the air volume back of the diaphragm and for actuating the spring member toward or away from the same.

Fig. 8 is a fragmentary enlarged partial section and front elevation of the sound box, showing features of the interior construction, and

Fig. 9 is a fragmentary vertical section and development taken on the curved line 9—9, of Fig. 8.

Like reference characters refer to like parts in the several figures of the drawings.

In construction, a sound box back 1 of circular outline and having a relatively thin flange 1_a extending from the central thicker portion is used, to which flange at its outer edges, an enclosing ring 2 is securely attached by means of screws. The ring 2 is formed with a continuous annular lip 3 between which and the back, two rubber ring gaskets are clamped, receiving between them the edge portions of the diaphragm 6 which is thus spaced a short distance from the back 1. The usual stylus 7 is mounted on the ring 2 between its ends and is attached at one end to the diaphragm at its center, a screw 8 being used, the head of which is located under or back of the diaphragm. A neck 9 is permanently secured to the back 1 for connection of the sound box to a tone arm of a phonograph, the back 1 having a central opening 10 for the passage of the vibrations given off by the diaphragm through the neck to the tone arm with which it is connected. So far the construction is conventional and well known.

A ring 11 is mounted in a circular groove cut in the central thicker portion of back 1, concentric with the opening 10. A wire 12 of spring material is secured at its ends to opposite sides of the ring, the wire passing diametrically across the ring. Its central portion is covered by a short length of rubber in the form of a sleeve 13, as shown.

A curved slot 14 is cut in the bottom 1 for the passage of a pin or operating member 15 which is connected to ring 11 and extends through the slot so as to be in position for engagement by the fingers of the operator to turn the ring. The distance which the ring may be turned is governed by an adjustable stop member 16 of sheet metal connected by

a screw 17 to the bottom or back 1 of the sound box and which is adapted to be set in different positions. From the ring 11 at a number of spaced apart points, four being shown, short pins 18 radially project and are received in spiral slots 19 cut in the outer side of the groove 20 in which ring 11 is seated. These pins and slots 18 and 19 cause the ring 11 to be moved toward or away from the diaphragm when the ring is turned back and forth by operation of the member 15. In one position the ring lies entirely within the groove 20 with its side practically flush with the bottom of the sound box, and in another position, as shown in Fig. 4, the ring lies closely adjacent to the diaphragm but is not in contact therewith, the sleeve 13 bearing against the head of the screw 8. The ring is yieldingly held against accidental movement by a pair of small springs 21 which are attached at one end to the ring 11, lying in slots 22 therein and bearing with spring pressure against the side of the groove 20.

As thus constructed, the ring may be readily moved to either of the positions shown in Fig. 3 or Fig. 4, in the first position the sound box being in effect a relatively large sound box which is desirable for instrumental selections. When moved to the second position, the diaphragm is left the same size but the effective volume of air under the same is diminished, being only that within the ring 11, and at the same time the diaphragm is affected by the pressure of the member 13 against the projecting head of the screw 8 which is used to attach the stylus to the diaphragm. The wire 12 carrying the sleeve is of spring material and yields but there is an exertion of pressure against the diaphragm through the screw. When thus positioned, the sound box is not only in effect a smaller box, but the diaphragm is affected so that the tone quality is changed considerably, making the sound box particularly available for vocal selections. The articulation, enunciation and tone is clearer and more distinct than with the larger box, and in every way the result is bettered. The larger box is better for instrumental selections for the production of more full and mellow tones which are not wanted for the vocal selections where the tones should be more sharp and distinct. Practically any variation in range of tones between those produced by the two positions of the ring and the spring carried thereby may be had, as the ring may be stopped at any intermediate point between the two extreme positions, as is evident. The inner side of the back 1, or bottom of the sound box is cut with a gradually deepening wide groove for the reception of the wire 12 when the ring is in the position shown in Fig. 3.

The same effect may be had with various

modifications in structure. In Fig. 5, the bar 12_a, replacing the spring wire 12 is stiff and rigid and has its central portion 24 bent into U-shape, a coiled spring 25 connected thereto projecting toward the center of the diaphragm 6 and having a rubber disk 26 secured at its free end which bears against the head of screw 8 when the ring 11 is moved toward the diaphragm, as is evident. In Fig. 6, the spring 25_a is secured to the diaphragm by the screw 8 and a rubber disk 26_a is attached to the U bend 24 of bar 12_a, the same effect being secured, there being actually a mere reversal of parts without change in action. However, the last structure is not as practical from a manufacturing standpoint owing to the difficulty of attaching the springs to the diaphragms without the use of great care, this not being as necessary in the other forms.

This invention as outlined is useful and practical, is readily manufactured and is subject to adjustment to take care of vocal or instrumental pieces without changing the boxes on the phonograph, and is also adjustable for a record having both vocal and instrumental parts thereon. No blasting of the diaphragm is possible, the tension applied to the spring and thence transmitted to the diaphragm may be controlled as desired, the space volume effective to receive the diaphragm vibrations may be adjusted, while at the same time, the relative proportions of the diaphragm diameter to the length of the stylus from its point of attachment to the diaphragm to the place where attached to the sound box remains constant, a very necessary feature in sound box construction. The ring 11 never comes against the diaphragm, thereby permitting vibration of the full diaphragm at all times. The invention is defined in the appended claims and is to be considered as comprehending all forms of construction coming within their scope.

I claim:

1. A sound box for phonographs, including the usual body, diaphragm mounted thereon and stylus connected to the center of the diaphragm, of a spring bar located under the diaphragm and across the center thereof, said bar being supported at both ends, and means for bringing the bar at its central portion into contact engagement with the diaphragm at the point of connection of the stylus thereto.

2. A sound box for phonographs, including the usual body, diaphragm mounted thereon and stylus connected to the center of the diaphragm, of an elongated bar of spring material of relatively small cross section located under the diaphragm substantially paralleling the same and passing across the center thereof, means for supporting the bar at both ends, and means for man-

usually moving the bar back and forth toward the diaphragm whereby the bar may be brought into contact engagement with the diaphragm at the point of connection of the stylus thereto, or moved to a position entirely out of contact with said diaphragm.

3. A sound box for phonographs, including the usual body, diaphragm mounted thereon and stylus connected to the center of the diaphragm, of an elongated bar of spring material of relatively small cross section located under the diaphragm and across the center thereof, means movably mounted on the body on which each end of the bar is connected, and means for manually moving said movably mounted means toward or away from the diaphragm to bring the bar at its central portion into contact with the diaphragm at the point of connection of the stylus thereto when said means is moved toward the diaphragm.

4. A sound box for phonographs, including the usual body, diaphragm mounted thereon and stylus connected to the diaphragm, of a relatively long and small cross section bar of spring material located under the diaphragm and passing under the point of connection of the stylus thereto, means for supporting the bar and means for manually moving said supporting means toward or away from the diaphragm to bring the bar into contact with the diaphragm at the point of connection of the stylus thereto, said supporting means for the bar being at a relatively long distance from the point of stylus connection to the diaphragm whereby the bar is subject to vibration in synchronism

with the diaphragm, substantially as described.

5. A sound box for phonographs, including the usual body, diaphragm mounted thereon and stylus connected to the diaphragm of a flexible spring member mounted under the diaphragm, means mounted on the body under the diaphragm for movement toward or away from the diaphragm, means for manually moving said means whereby the spring member is tensioned against the diaphragm at the point of connection of the stylus thereto, said movably mounted means comprising a ring having a diameter less than the diameter of the diaphragm, and means to stop movement of the ring toward the diaphragm before it contacts with the diaphragm.

6. A sound box for phonographs, including the usual body, diaphragm mounted thereon and stylus connected to the diaphragm, of a relatively long and flexible bar of spring material located under and paralleling the diaphragm and passing across the point of connection of the stylus thereto, a screw connecting the stylus to the diaphragm and having a head located against the under side of the diaphragm, means supporting the bar at both ends leaving the intermediate portion free, a rubber member connected to the bar directly under the head of said screw, and means for manually operating the bar to bring rubber member into contact with the head of said screw.

In testimony whereof I affix my signature.

ALFRED A. DENNIS.