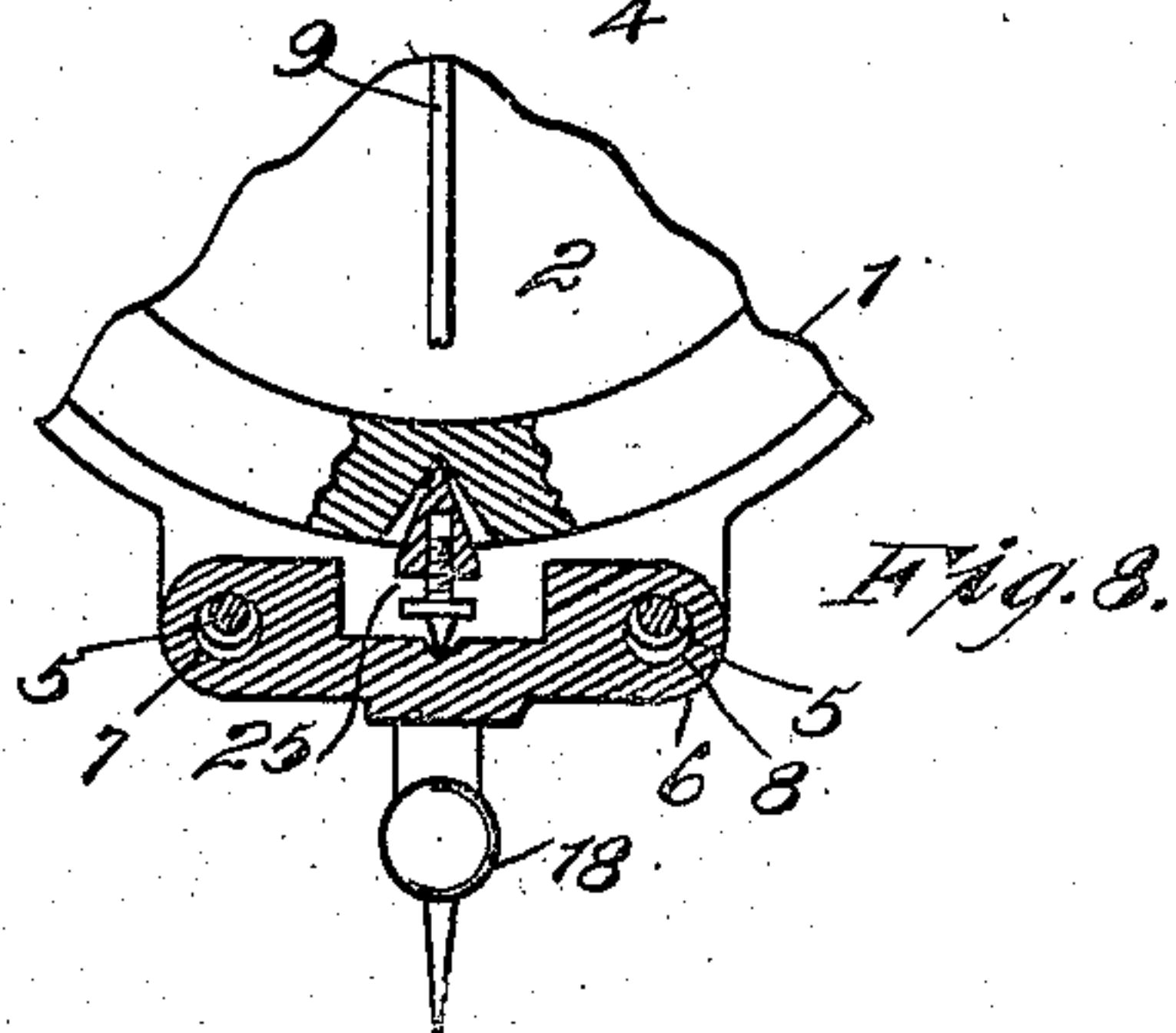
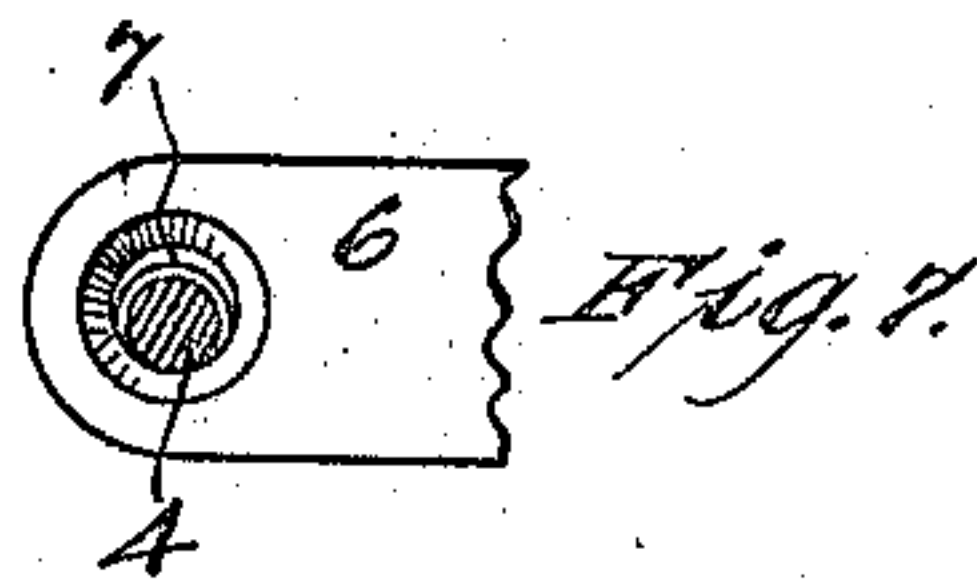
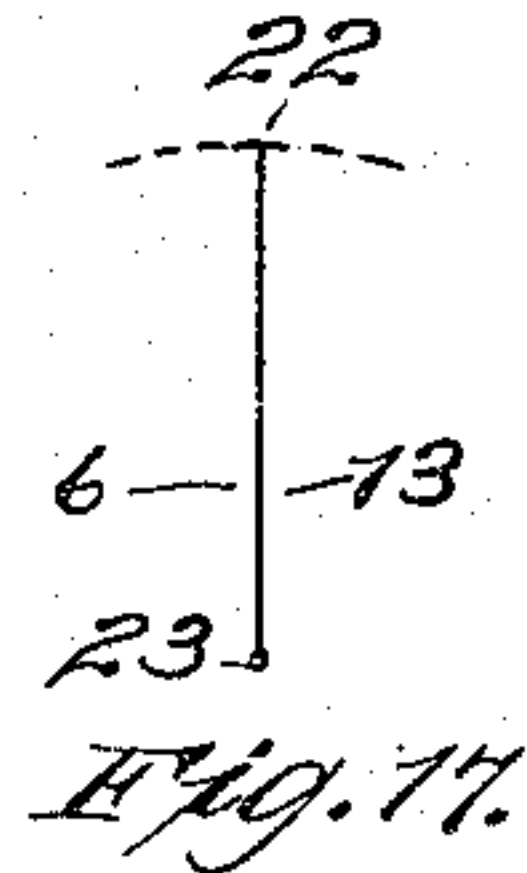
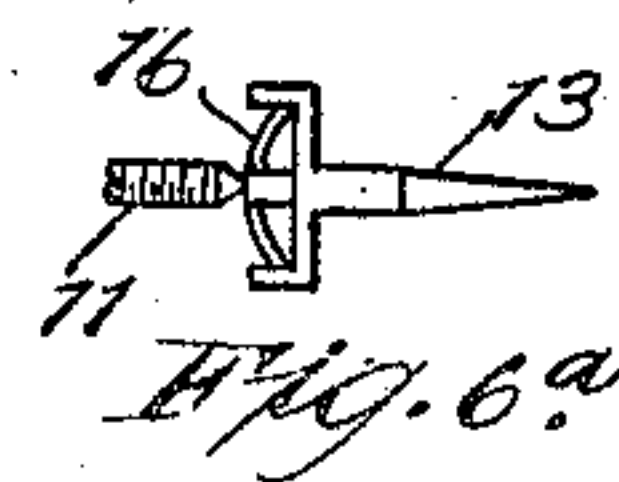
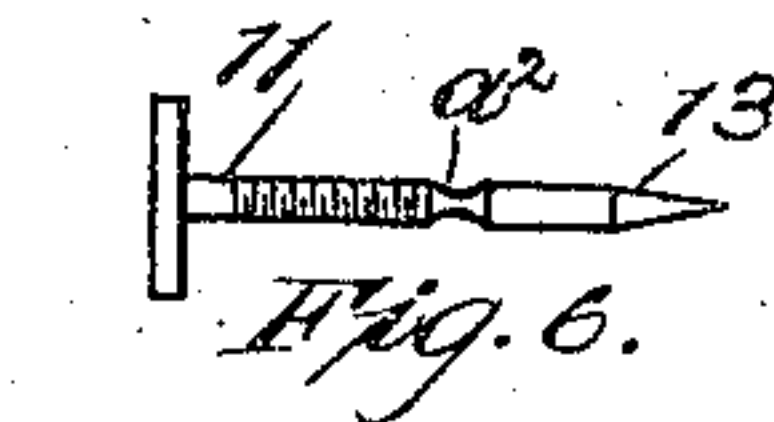
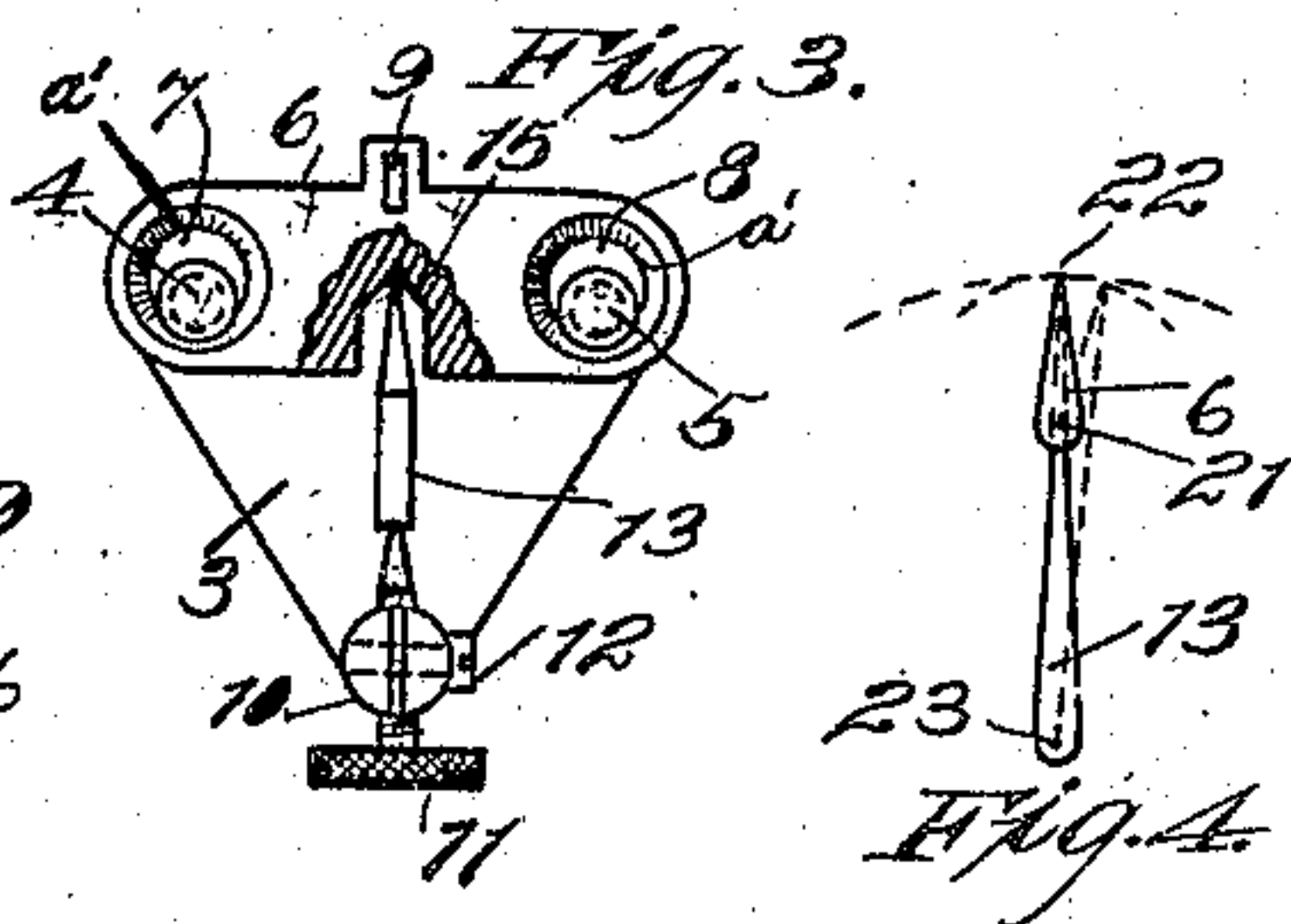
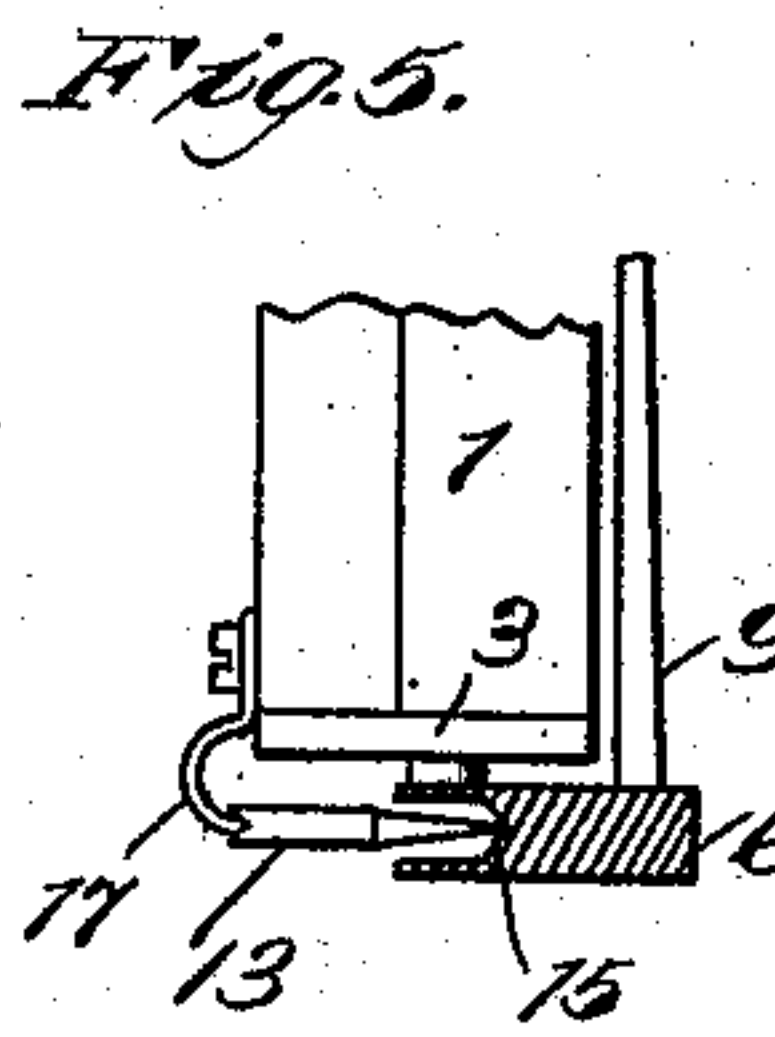
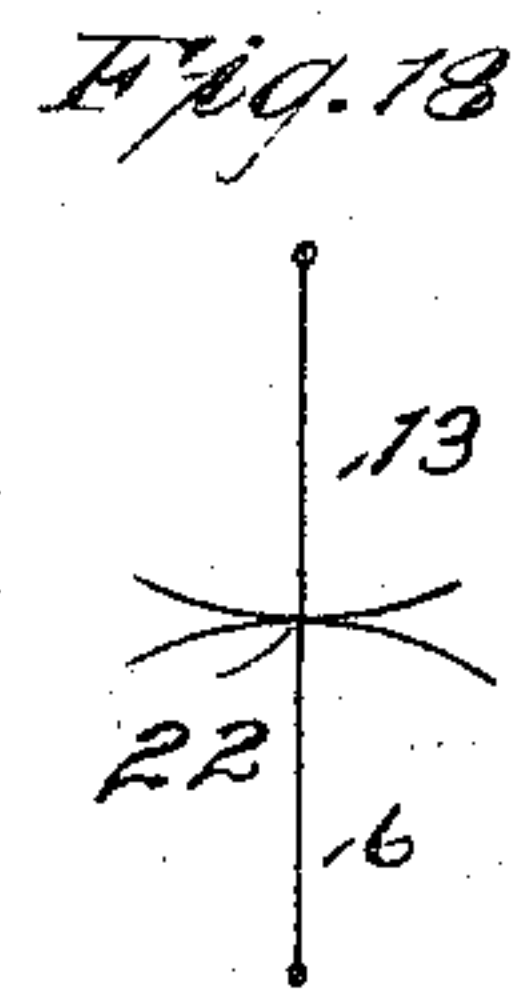
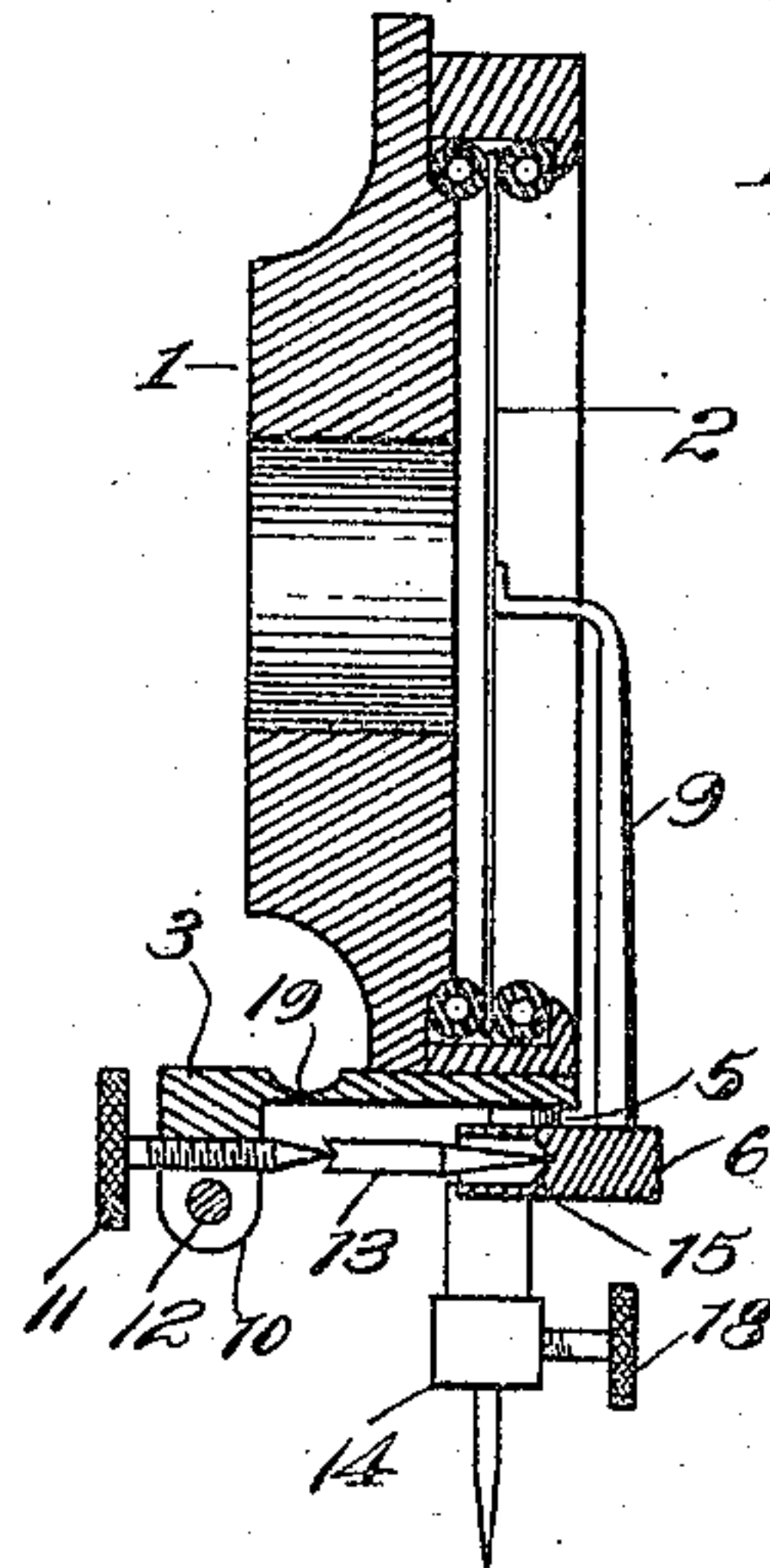
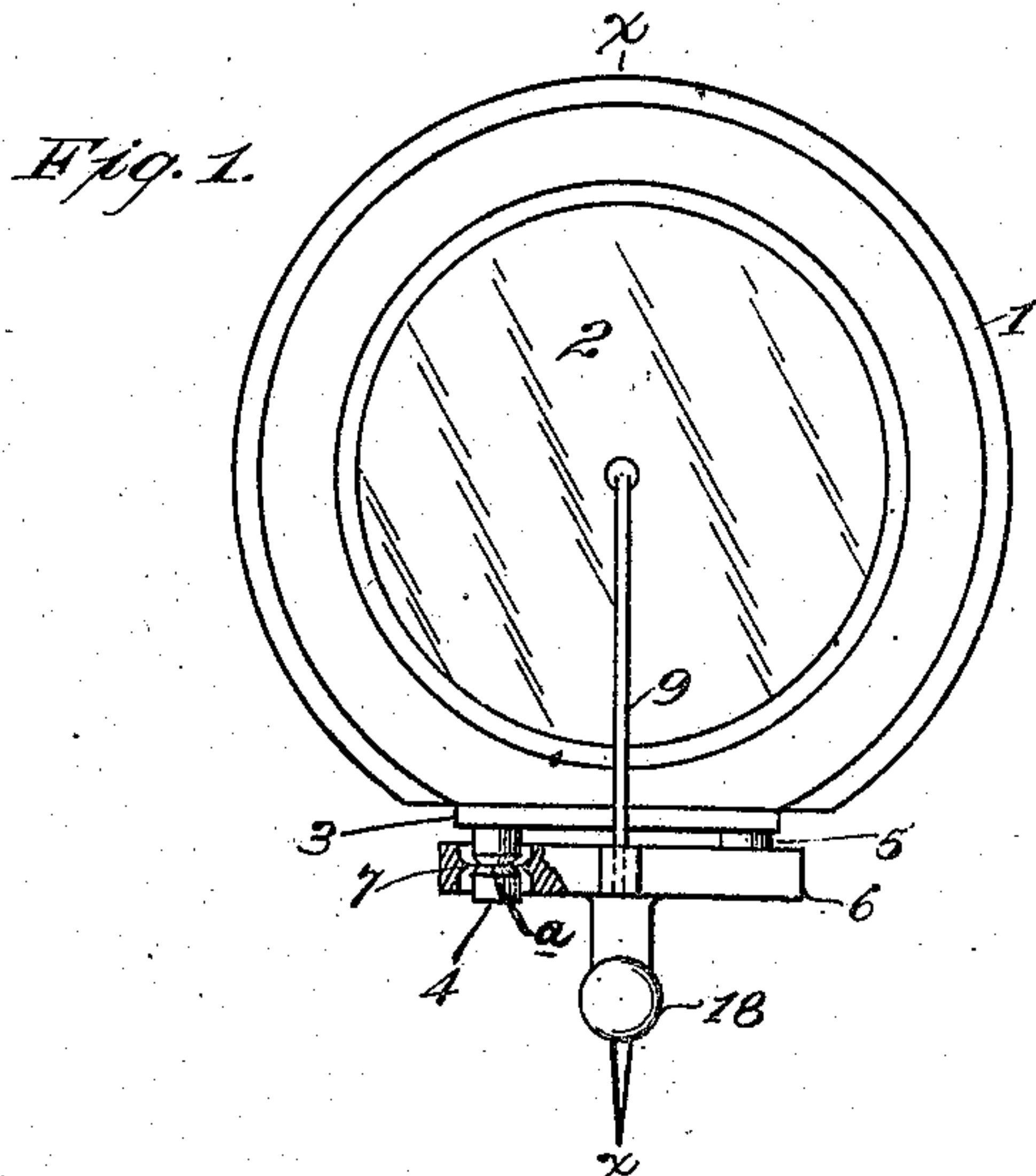


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905,082.

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2 SHEETS—SHEET 1.



WITNESSES

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2 SHEETS—SHEET 2.

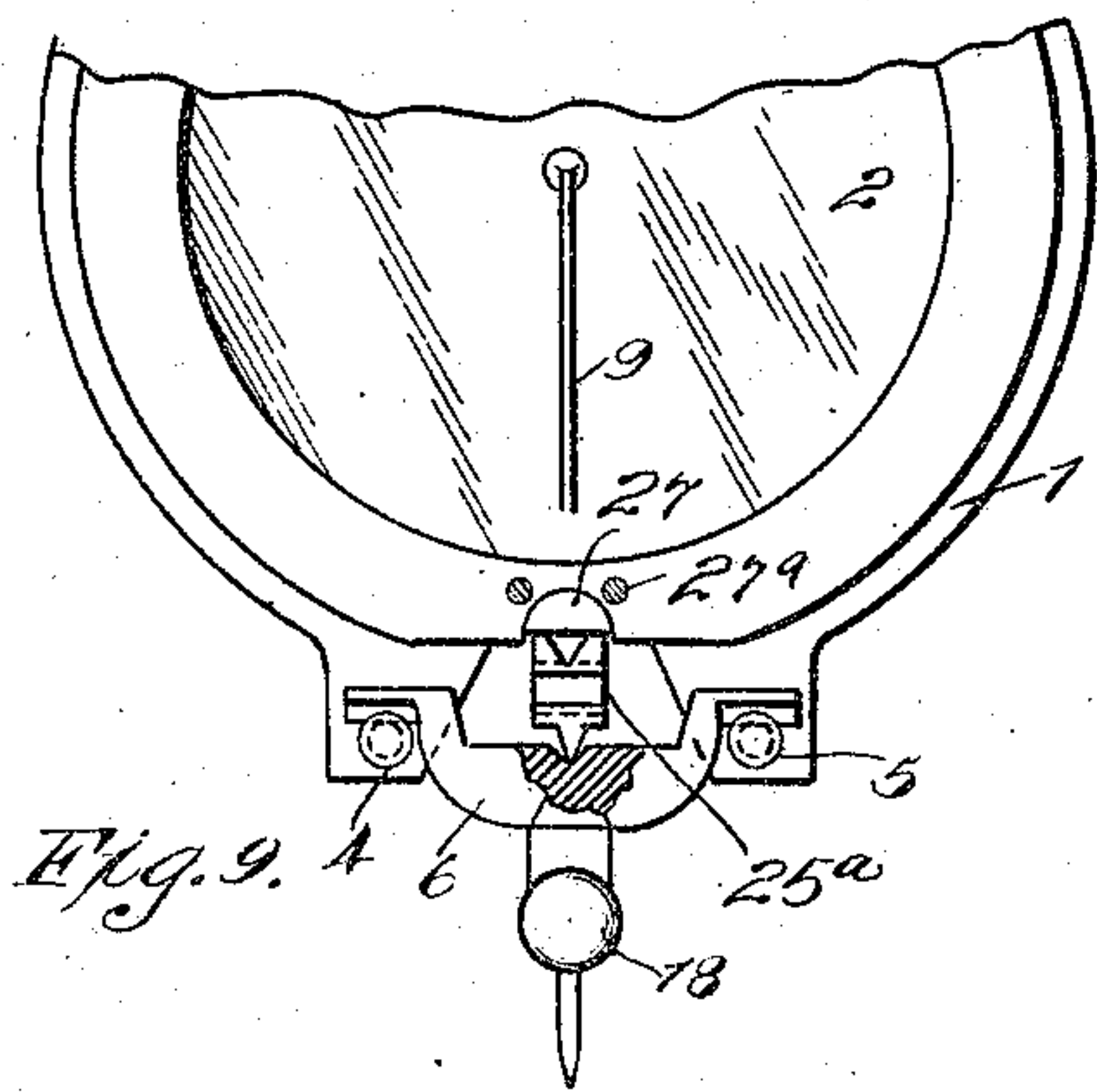


Fig. 9.

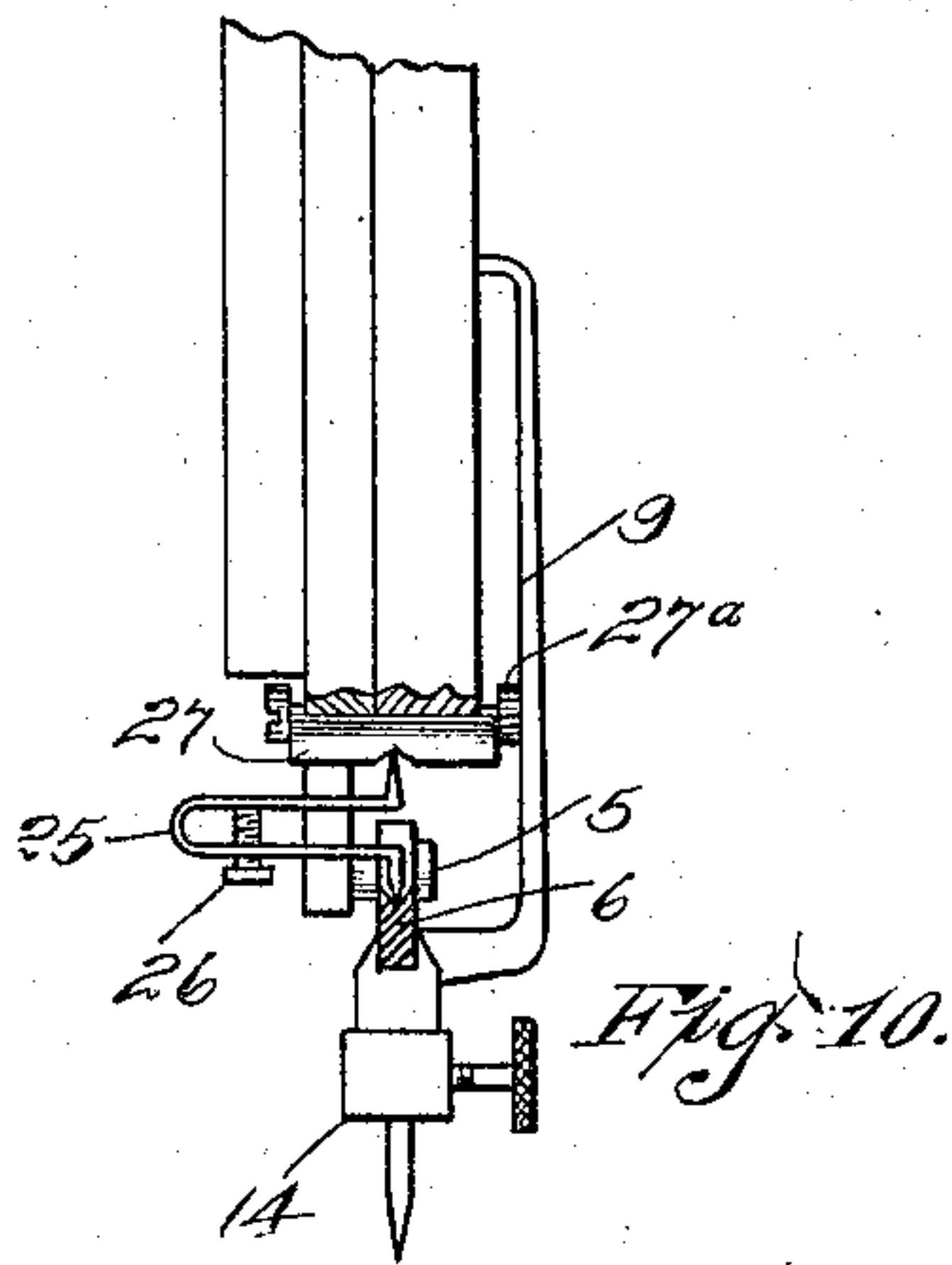


Fig. 10.

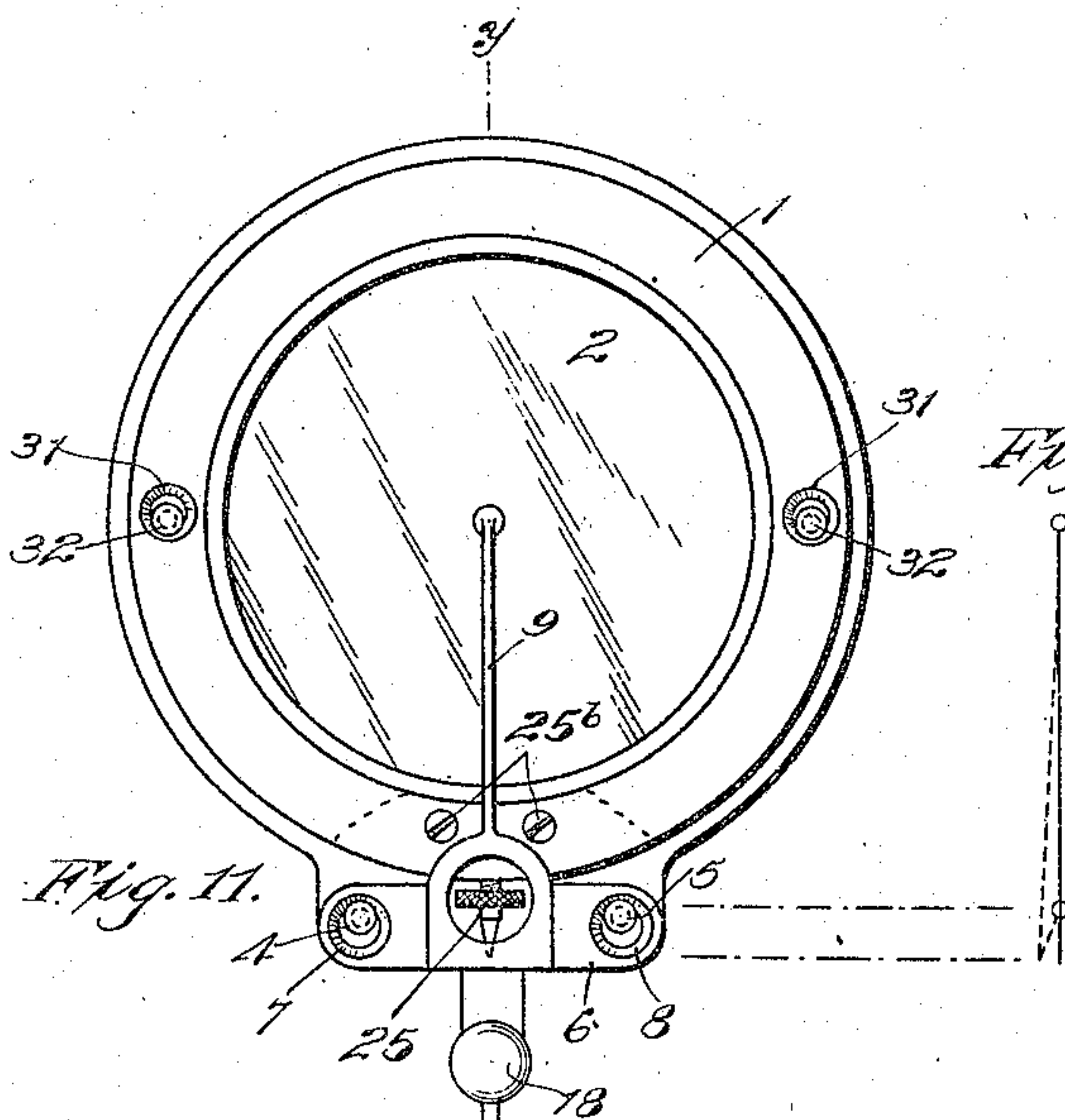


Fig. 11.

Fig. 13.

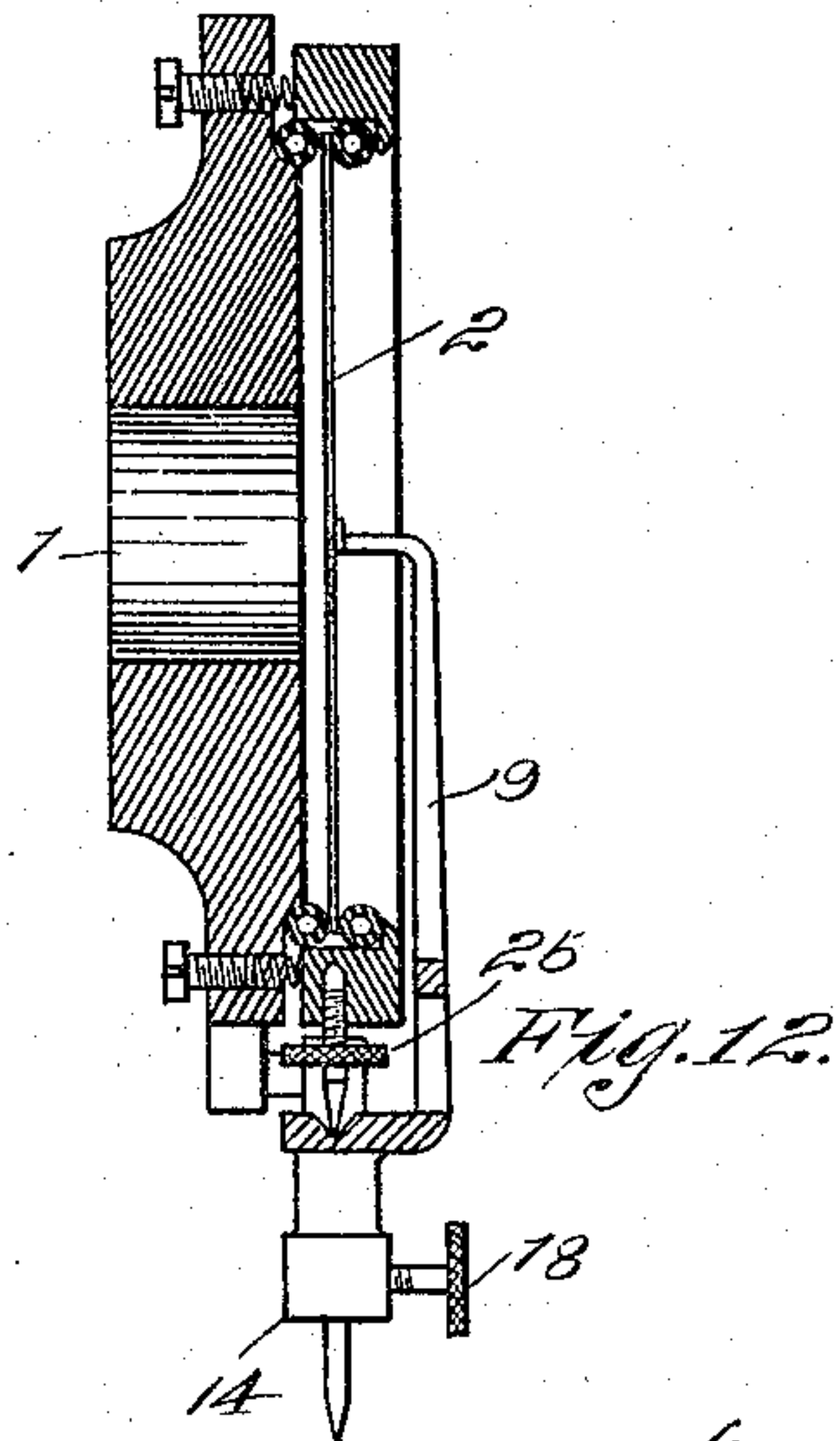


Fig. 12.

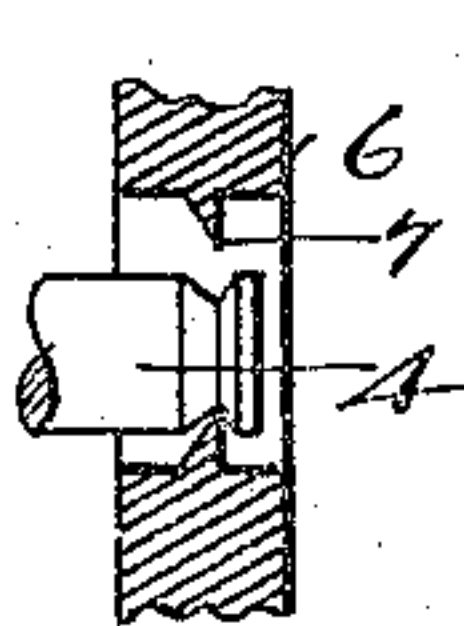


Fig. 14.

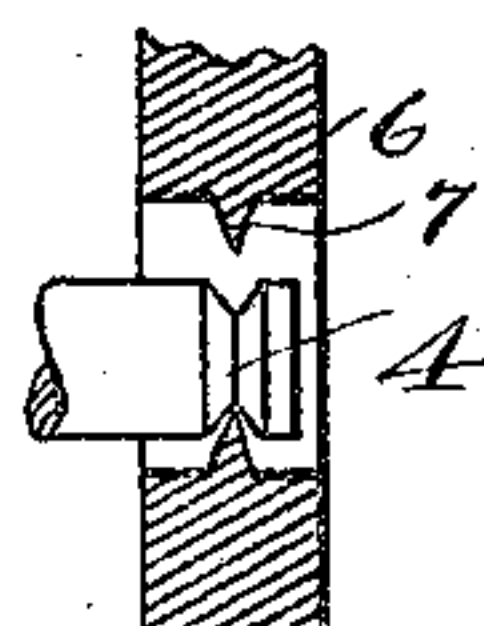


Fig. 15.

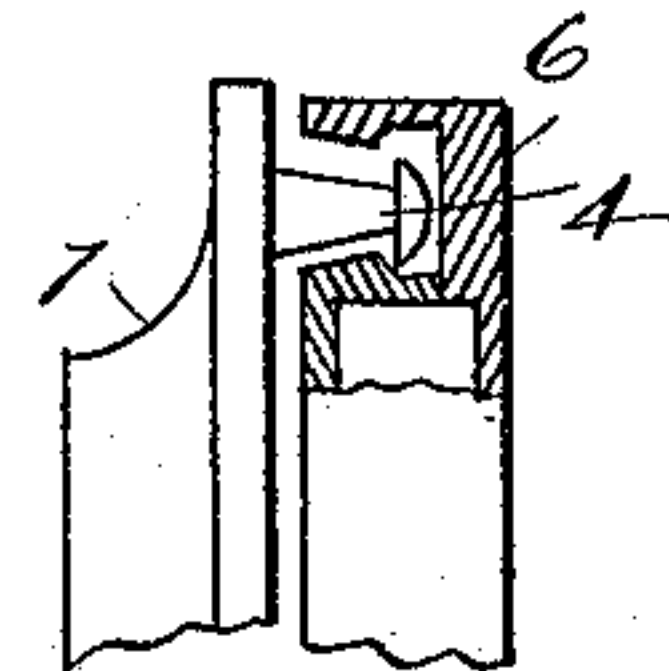


Fig. 16.

WITNESSES

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# UNITED STATES PATENT OFFICE.

ANDRÉ JUNOD, OF FRUITVALE, CALIFORNIA.

## TALKING-MACHINE SOUND-BOX.

No. 905,082.

Specification of Letters Patent.

Patented Nov. 24, 1908.

Application filed February 27, 1908. Serial No. 418,070.

*To all whom it may concern:*

Be it known that I, ANDRÉ JUNOD, citizen of the United States, residing at Fruitvale, in the county of Alameda and State of California, have invented new and useful Improvements in Talking-Machine Sound-Boxes, of which the following is a specification.

My invention relates to sound-boxes for talking machines and especially to novel means for mounting the stylus bar of such a sound-box in such a manner as to make the apparatus extremely sensitive, and to accurately reproduce the recorded vibrations.

It consists in the combination of parts, and in details of construction which will be more fully explained by reference to the accompanying drawings, in which—

Figure 1 is a plan view of the reproducer. Fig. 2 is a vertical section of the same, taken through  $x-x$  of Fig. 1. Fig. 3 is a view looking toward the side of the apparatus in line with the stylus bar. Fig. 4 is a diagrammatic view showing the position of the pins and their combination. Figs. 5, 6 and 6<sup>a</sup> are modifications of the tensioning means. Fig. 7 is a section transverse to the groove of one of the bearing studs. Fig. 8 is a sectional view through the bearing points. Fig. 9 is a similar view showing straight knife edges, and a U-shaped spring. Fig. 10 is a sectional elevation of the same through the center of the reproducer. Fig. 11 is a plan view showing the sound-box ring used as a tension lever. Fig. 12 is a sectional elevation of the same on lines  $y-y$  of Fig. 11. Fig. 13 is a diagrammatic view of the stylus bar. Figs. 14, 15, 16 and 17 are views showing modified forms of bearings for the ring.

Various devices have been made in connection with this class of apparatus for the proper tensioning of the stylus-bar, and to provide a construction which will prevent secondary vibrations; and it is the object of my invention to provide a compact construction to employ substantially rigid tensioning devices which are not subject to give way under pressure, or become loosened so as to put the stylus bar out of operation.

In my construction, the tensioning or engagement point on the stylus bar, is located at one side of the fulcrum, and the stationary point upon the opposite side.

Referring to Fig. 1, 1 is a sound-box casing in which the diaphragm 2 is clamped. The plate 3 secured to the casing 1 is pro-

vided with bearing-studs 4 and 5 having on their cylindrical surfaces V-shaped grooves  $a$  which serve as bearings for the circular knife edges  $a'$  formed in the holes 7 and 8, of the transverse bar 6, as shown in Fig. 3. The stylus bar 9 is connected with the center of the diaphragm 2 in the usual or any suitable method, and the needle or stylus is clamped to the outer end of the bar by means of a thumb screw 18 in the boss 14 of the transverse bar 6. The diameter of the circular knife edges  $a'$  and  $a'$  of the bar 6 is slightly larger than the diameter of the studs 4 and 5, so that the bar can be easily removed from its bearings. The transverse bar 6 is provided in its center, and in the same plane with the knife edges  $a'$  and  $a'$  with a conical recess 15, located on the rear and outside the bearing points of the knife edges  $a'$  and  $a'$  and the studs 4 and 5, as plainly shown in Fig. 3. The compression pin 13 is pressed or forced against the bottom of the recess 15, by means of an adjusting-screw 11, and this is retained in position by means of a set screw 12 adjusted in the split stud 10 of the plate 3. There are no springs provided in this construction as it is intended that the mounting of the stylus bar and adjusting screw, and the studs 4, 5 and 10 on the thin plate 3, will be sufficiently yielding to assure an accurate adjustment for an indefinite length of time. The plate 3 may preferably be made thinner at an intermediate portion, as plainly shown at 19 Fig. 2, and this will increase the yielding effect.

In Fig. 5 I have shown a spring 17 which may be used in place of the stud 10 and adjusting screw 11. This spring is simply screwed on the side of the sound-box casing, and its projecting end bears upon the compression pin 13.

In Fig. 6 I have shown the adjusting screw 11, and the compression pin 13 made in a single piece, and made elastic at the point  $a^2$ .

In Fig. 6<sup>a</sup> I have shown the parts 11 and 13 made separate and connected by means of a small star or other shaped spring 16; these modifications all serving to produce the required elasticity. The relative position of the pins 13, and the lever formed by the transverse bar 6 are plainly shown in Fig. 4, in which 21 is the fulcrum or bearing point of the stylus bar. 22 is the compression or tension point of the two combined



elements 6 and 13; this tension point being located on one side of the fulcrum of the bar, and the stationary point 23 upon the other side of the fulcrum 21. The arc described by the pin 13 tilting about the fixed point 23 being of larger radius than the arc described by the lever or stylus bar 6 tilting on the other fixed point 21, and the two parts being connected at the point 22, it will be evident that by each half oscillation of the stylus bar or lever 6, there will be a pressure exerted on the point 23, and the two parts will have a tendency to come into a position in which the three points 21, 22 and 23 will lie in a straight line; and an elastic mounting for each half oscillation of the diaphragm is thus provided.

In Fig. 17 I have shown in a diagrammatic view a further illustration of the operation of this device. Supposing the stylus bar lever 6 and the compression or tension pin 13 to be of the same length, the stationary point 23, and the fulcrum point 21 will coincide, and the arcs described by the movement of the two parts will also coincide, so that there will be no tension at all on the diaphragm for each half oscillation. This differs from devices in which the tension points are both on the same side of the fulcrum, since in that case the oscillations of the parts take place in arcs which are tangent to each other, and the curves thus diverging from the common point there will be an increased tension on each side during the oscillations of the diaphragm.

By reason of the arc described by the stylus bar in my device being upon the inside of the arc described by the compression member, it will be seen that the pressure will be very little increased during each half oscillation, and the stylus bar will vibrate more freely, and with a greater amplitude of vibration of the diaphragm, thus giving a louder and clearer tone. Another advantage of my device is that great sensibility can be obtained by the use of members of nearly the same length, and the apparatus thus provides a very sensitive and elastic mounting for the stylus bar responsive to minutest sound wave movement, and a greater amplitude of vibrations of the diaphragm, with a corresponding loud, distinct and natural tone.

In the modification shown in Fig. 8, the stylus bar and the tension means are placed in the plane of the diaphragm. The stylus bar is pressed upon its seats by means of an adjusting screw and nut as at 25, between the stationary sound-box casing and the stylus bar. In Fig. 9 I have shown this adjusting screw and nut as replaced by a U-shaped spring 25<sup>a</sup> having a point pressing on the stylus bar, and two other points on a small slide 27 which can be adjusted by means of screws 27<sup>a</sup>. The tension of the

spring may be adjusted by means of a screw 26.

In Figs. 11 to 16 inclusive the sound-box ring is not itself employed as a compression member, being adjusted on studs 32 upon knife edges 31.

The adjusting screw 25 which engages the stylus bar can be set in position by means of screws 25<sup>b</sup>, the ring being split so as to loosen the adjusting screws.

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

1: In a sound reproducing machine, the combination with a sound-box casing, a diaphragm, a stylus bar and a bearing located exterior to the sound-box casing, of a tensioning device having an engagement point on the stylus bar located on one side of the fulcrum of said bar and a stationary point located upon the other side of said fulcrum.

2. In a sound reproducing machine, a sound-box casing, a diaphragm and stylus bar, a bearing therefor located exterior to the sound-box, a tensioning or engagement point located on the stylus bar at one side of the fulcrum of said bar, and a stationary point of support upon the opposite side.

3. In a sound reproducing machine, a sound-box casing, diaphragm and stylus bar, a bearing or fulcrum for said bar, a contact point formed at one side of said fulcrum, a compression device having one end in engagement with said contact point, and a fixed stationary point with which the other end of the compression device is in contact.

4. In a sound reproducing machine, a sound-box casing, a diaphragm, a stylus bar, bearings therefor, said bearings consisting of cylindrical studs, and corresponding holes of larger diameter, said studs and holes having co-acting grooves and knife edges, and a tensioning device consisting of a compression arm having bearings upon opposite sides of the stylus bar bearings.

5. In a sound reproducing machine, the sound-box casing, a diaphragm, a stylus bar, a plate fixed to the sound-box casing, cylindrical knife edge and V-shaped groove bearings for the stylus bar, said bearings being carried upon the plate, a contact point in the stylus bar at one side of the bearings, a fixed point carried upon the opposite edge of the plate and exterior to the bearings, and a tensioning bar having its ends engaging respectively the contact points.

6. In a sound reproducing device of the character described, a sound-box having a plate fixed transversely to one side and projecting therefrom, a diaphragm, a stylus bar having one end fixed to the diaphragm, a transverse bar to which the other end is fixed, circular co-acting groove and knife edge bearings carried by the plate, and upon which the transverse bar is capable of



oscillation, a bearing point upon said bar at  
one side of the fulcrum point, an adjustable  
point and a support therefor carried upon  
the outer edge of the plate and upon the  
5 opposite side of the fulcrum, and a tension-  
ing bar having its opposite ends engaging  
the two contact points.

In testimony whereof I have hereunto set  
my hand in presence of two subscribing wit-  
nesses.

ANDRÉ JUNOD.

Witnesses:

GEO. H. STRONG,

CHARLES A. PENFIELD.