

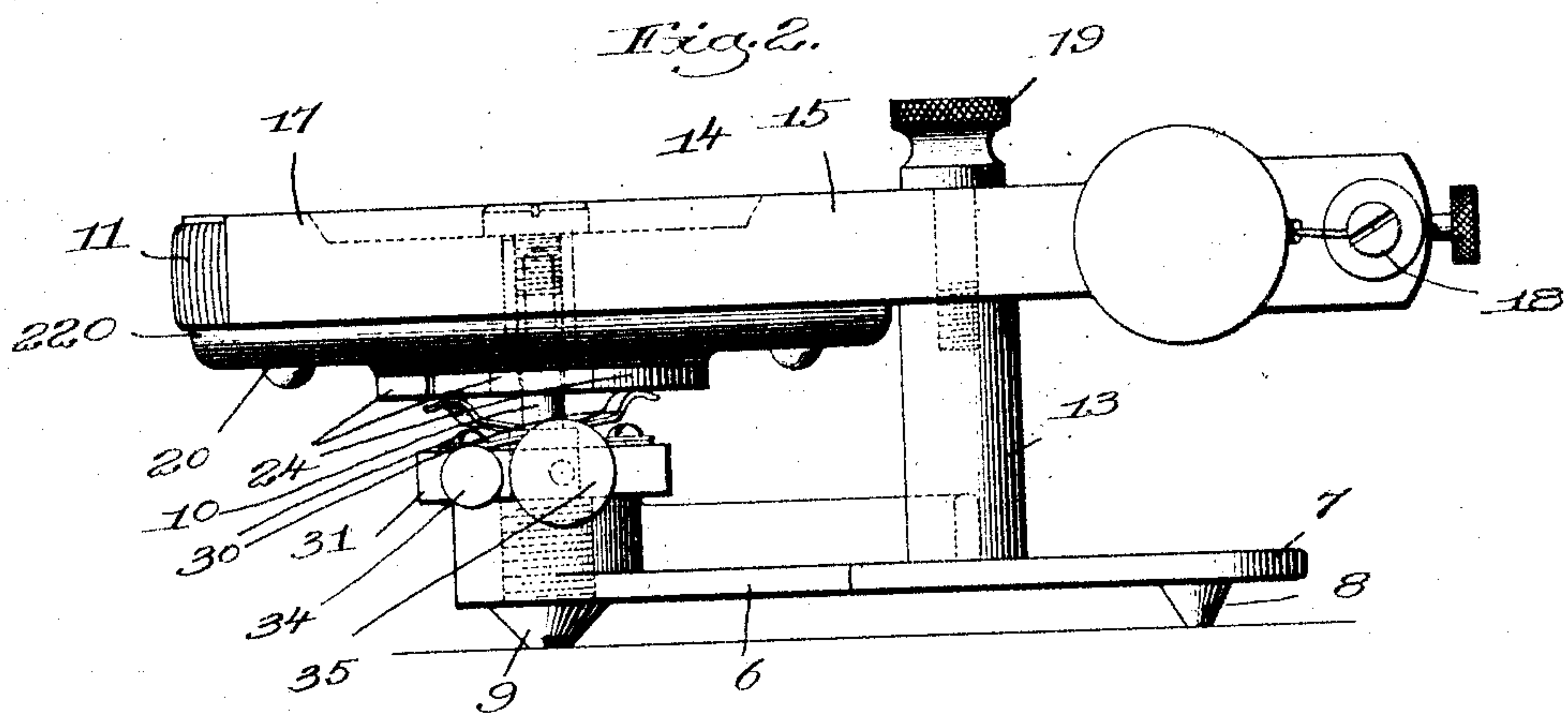
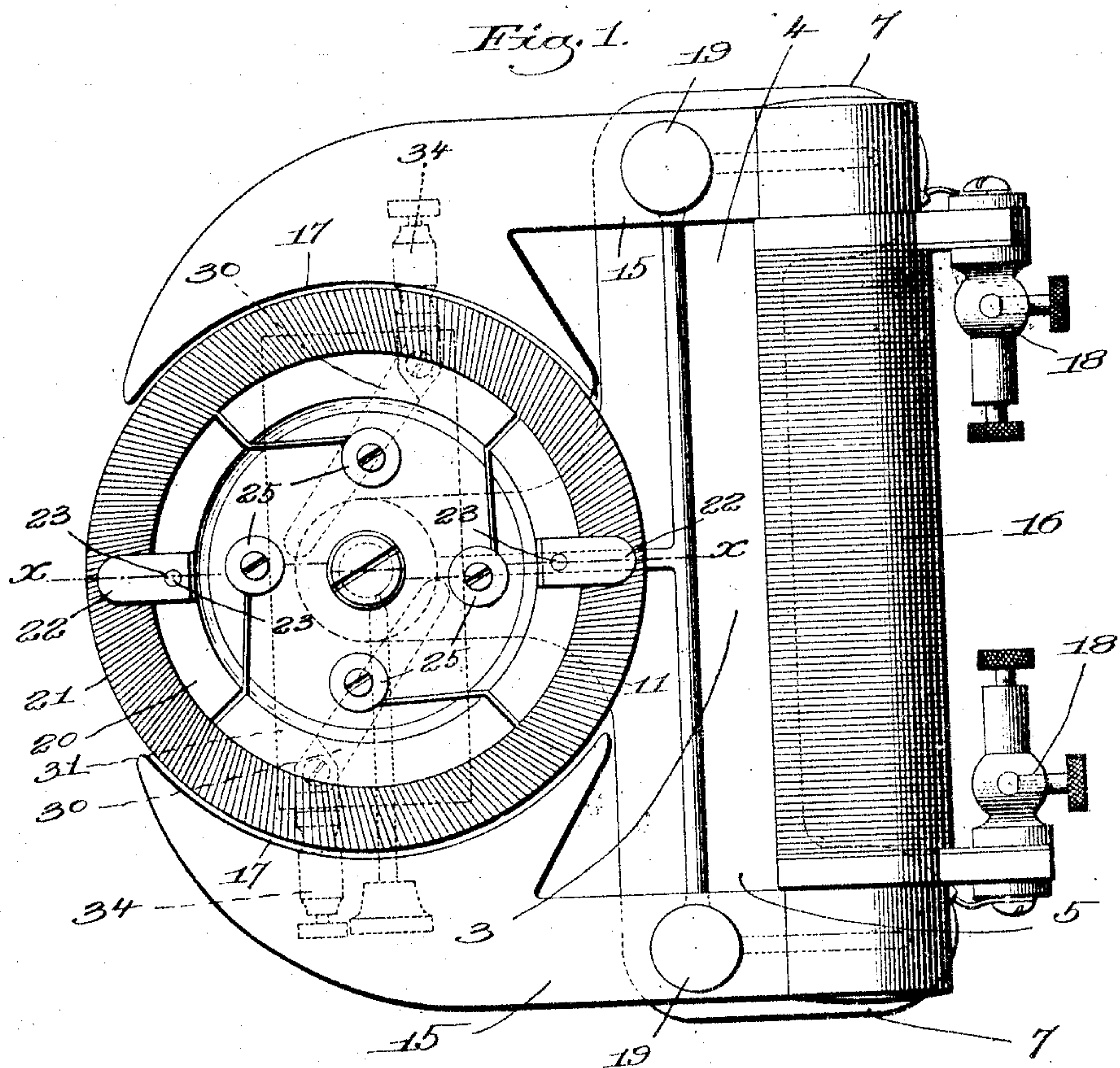
No. 885,763.

PATENTED APR. 28, 1908.

L. E. KNOTT.
PHYSICAL LABORATORY APPARATUS.

APPLICATION FILED NOV. 23, 1907.

3 SHEETS—SHEET 1.



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3 SHEETS—SHEET 2.

Fig. 3.

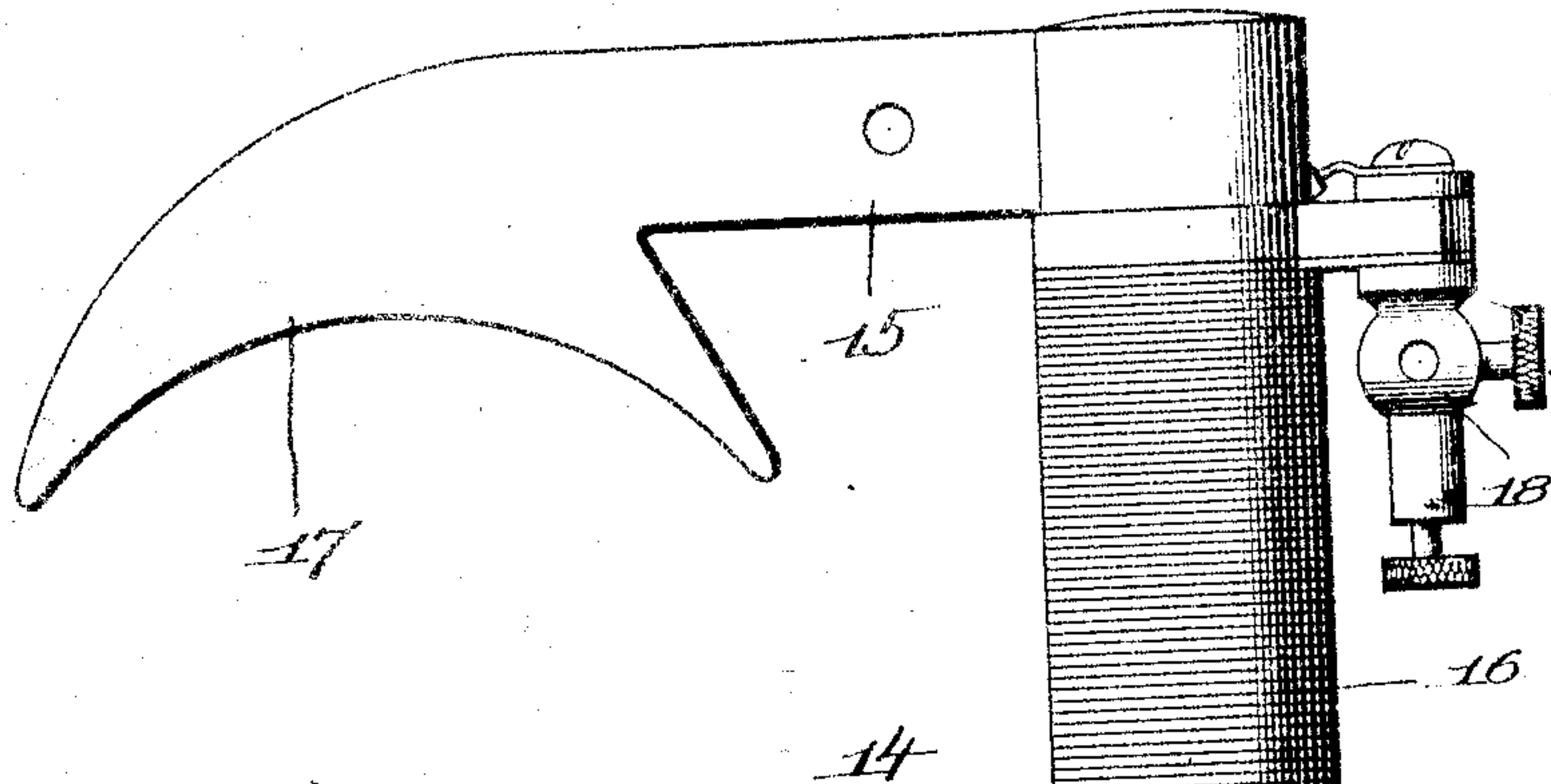
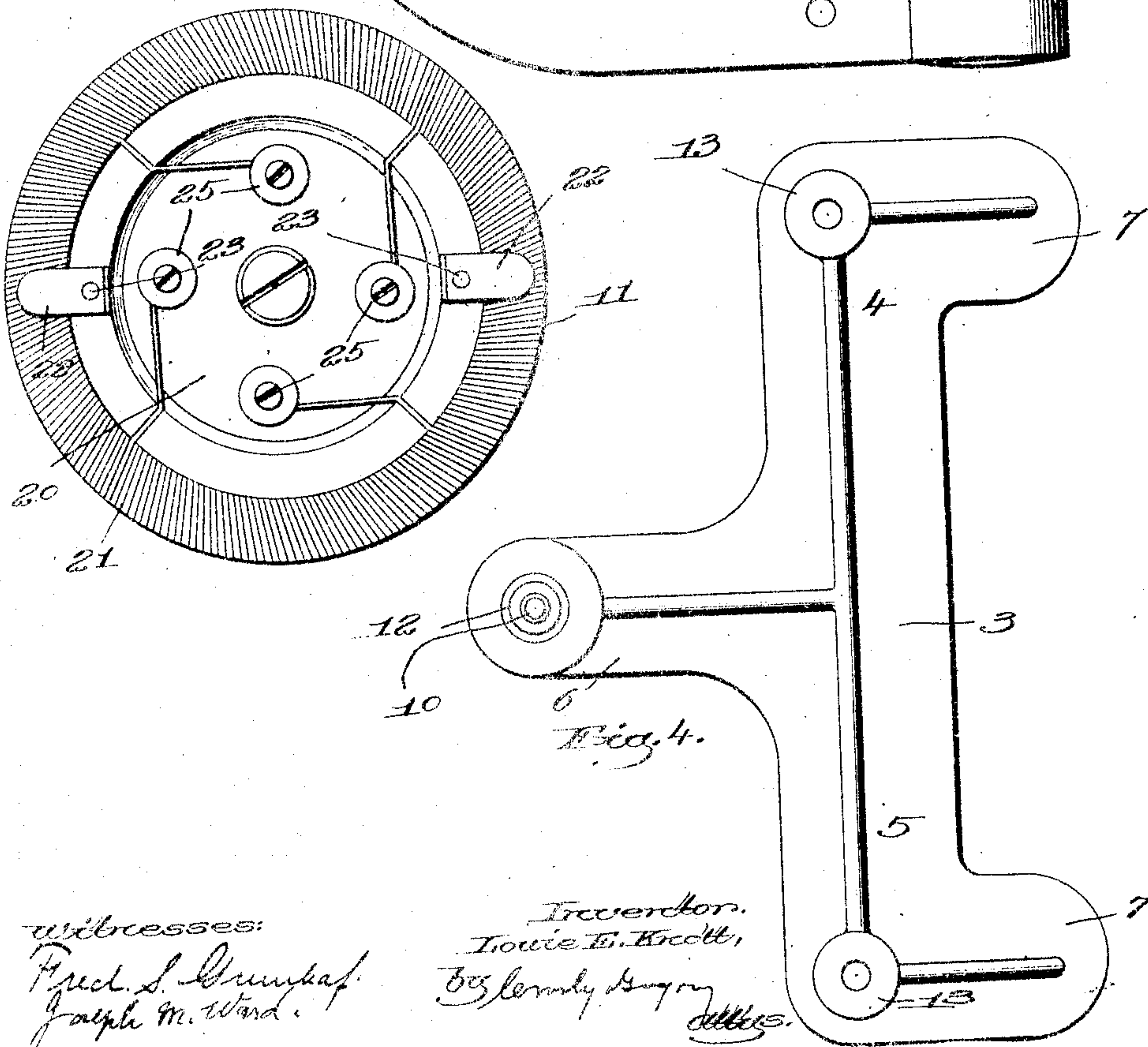
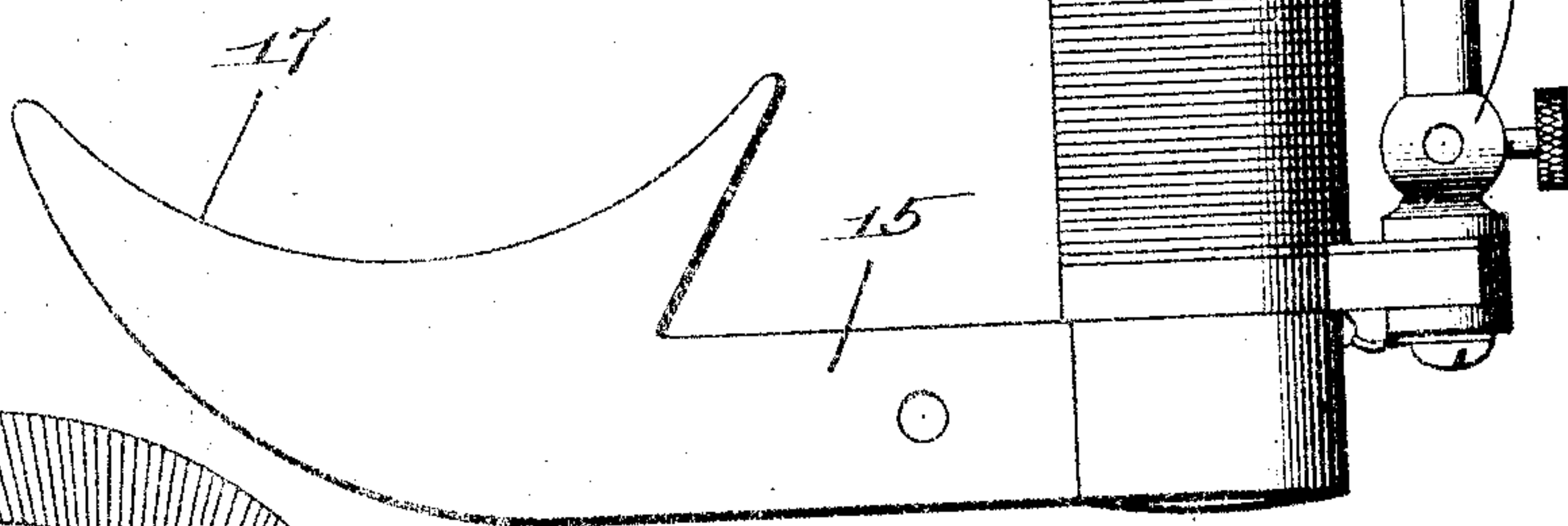


Fig. 5.



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3 SHEETS—SHEET 3.

Fig. 6.

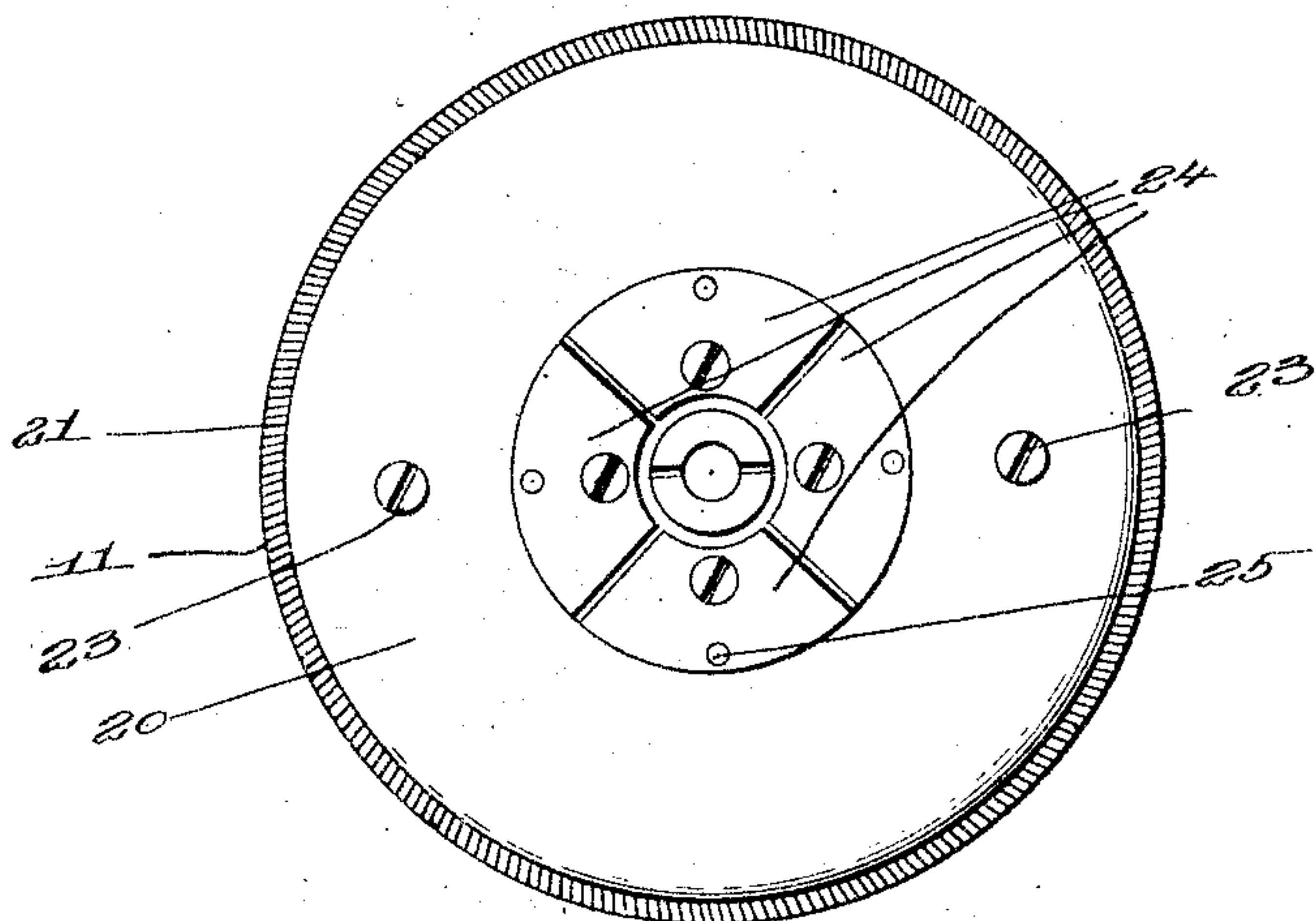


Fig. 7.

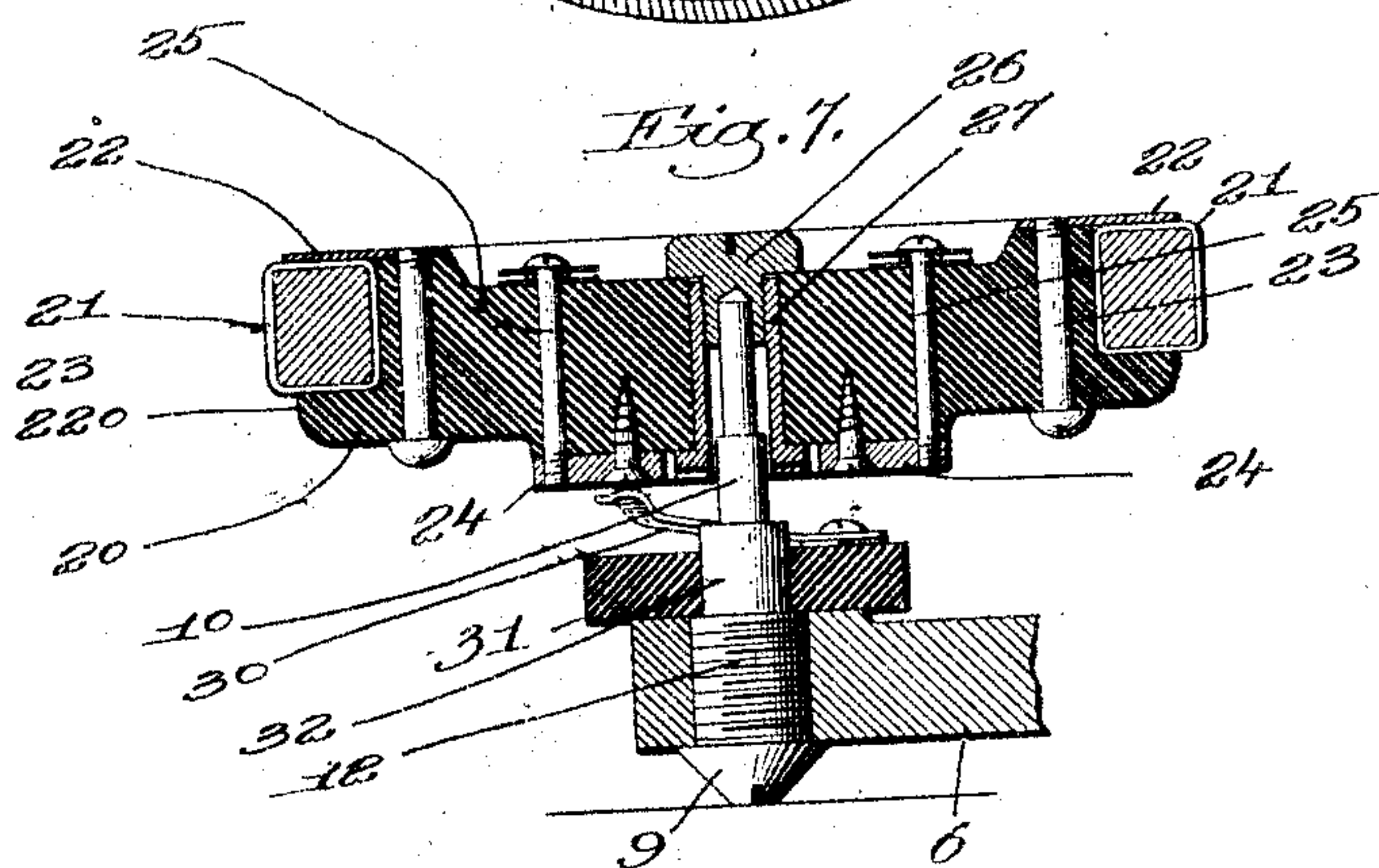
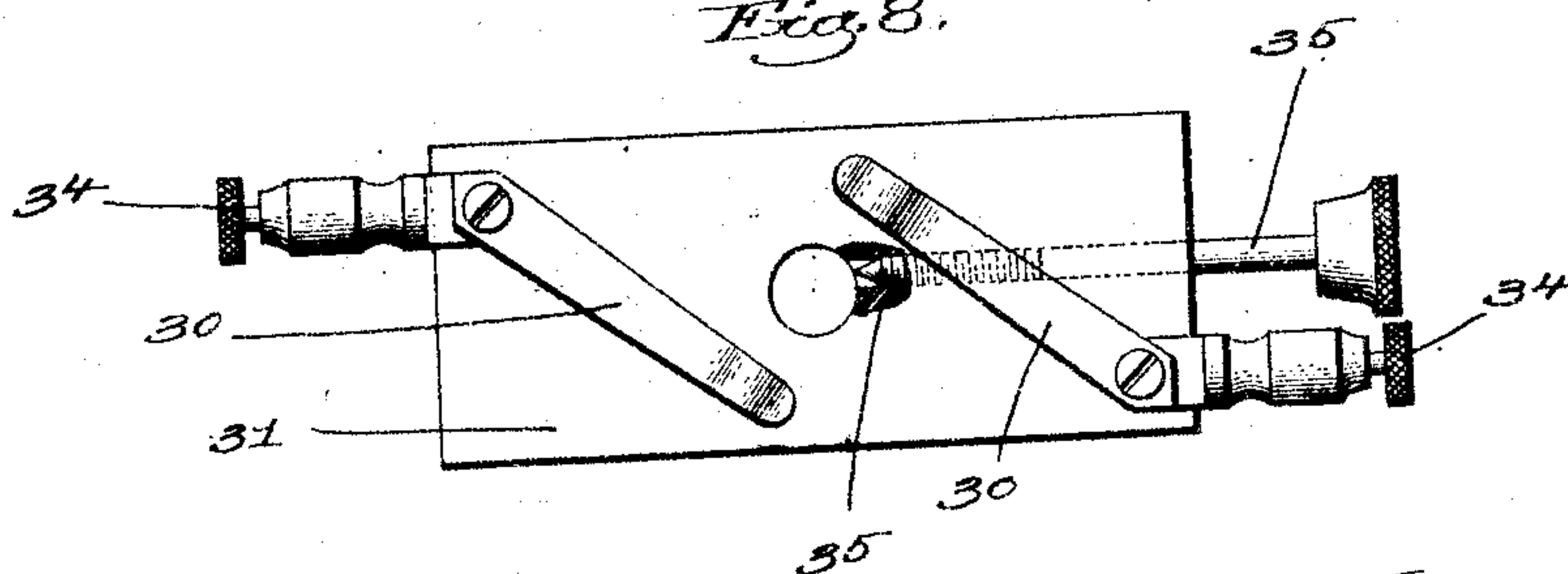


Fig. 8.



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UNITED STATES PATENT OFFICE.

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PHYSICAL LABORATORY APPARATUS.

No. 885,733.

Specification of Letters Patent.

Patented April 28, 1908.

Application filed November 23, 1907. Serial No. 403,513.

To all whom it may concern:

Be it known that I, LOUIE E. KNOTT, a citizen of the United States, residing at Boston, county of Suffolk, and State of Massachusetts, have invented an Improvement in Physical Laboratory Apparatus, of which the following description, in connection with the accompanying drawing, is a specification, like letters on the drawing representing like parts.

This invention relates to physical laboratory apparatus, and especially to a device designed to illustrate and demonstrate to a student the construction and operation of a motor or dynamo.

The invention is herein embodied in an improved type of the physical laboratory apparatus commonly known as the "Gilley Gramme machine", which is an apparatus in which the armature member rotates about a vertical axis and is supported on a step bearing between the field magnets in such a way that the armature member can be readily lifted from the bearing.

The object of my present invention is to improve a piece of apparatus of this type by simplifying the construction thereof in such a way as to cheapen the cost of manufacture and to make it easier to demonstrate to the student the construction and operation of a motor or dynamo.

The device as herein illustrated comprises a base piece, a field magnet detachably supported thereby, an armature member also supported by the base, and a brush holder for sustaining the brushes which engage the armature member. These four elements of the apparatus are separable from each other so that either the armature member, the field magnets or the brush holder can be separately removed from the base, thus making it possible for the students to separate or detach from the others any one of the four principal elements of the device and thus examine it in a way which could not be done if the parts were built into the machine so that they could not be separated from each other.

I will first describe one embodiment of my invention and then point out the novel features thereof in the appended claims.

In the drawings, Figure 1 is a top plan view of an apparatus embodying my invention; Fig. 2 is a side view thereof; Fig. 3 is a view of the field magnet element separated

from the other elements of the device; Fig. 4 is a plan view of the base; Fig. 5 is a plan view of the armature element; Fig. 6 is a bottom plan view of the armature element; Fig. 7 is a vertical section through the armature element and the pivotal pin on which it is supported on the line $x-x$, Fig. 1; Fig. 8 is a plan view of the brush holder with a portion thereof broken out.

The base of the apparatus is designated by 3 and I have herein shown it as substantially T-shaped, it having the two laterally-extending arms 4 and 5 and the centrally-situated arm 6. The laterally-extending arms 4 and 5 have the rearwardly-extending projections 7 at their ends which projections have the feet 8 extending therefrom. The forwardly-extending arm 6 also has the foot 9 on its under side which foot is preferably adjustably secured to the arm so as to permit the base to be leveled up. The arm 6 has extending upwardly from the end thereof a pivotal pin 10 on which the armature element 11 is rotatably mounted. In the present form of the invention this pivotal pin 10 is carried by the shank 12 of the foot or rest 9, the shank of the foot or rest being screw-threaded into the arm 6, as above described. The base 3 has also rising therefrom two posts 13 on which the field magnet element 14 is sustained. Said field magnet element may have any usual or suitable construction, and as shown, it comprises the two arms 15 having the usual pole pieces 17 shaped to partially embrace the armature element. Said arms are connected by a core which sustains the usual field winding 16.

18 are binding posts of any appropriate construction for connecting the field winding to the circuit. The field element 14 is arranged to be sustained on the posts 13, the arms 15 of said field element resting on top of the posts, as shown in Fig. 2, and said element being detachably held in position on the posts by suitable clamping screws 19 which extend through the arms 15 and screw into the posts 13.

The armature element comprises a holder 20 of wood or any other suitable insulating material on which holder the armature winding 21 of any suitable character is supported. In the present embodiment the armature shown is a Gramme ring armature, and the holder 20 is provided with a suitable flange 220 on which the ring 21 is sustained, said

ring being held in place on the flange by suitable clips 22 which are secured in position by screws 23. The commutator segments of the armature are designated 24 and are secured to the under side of the holder or plate 20, as seen in Figs. 2 and 6, and these armature segments are connected to the coil of the Gramme ring through screws or binding posts 25.

10 The armature member is sustained on the pivotal pin 10 in such a way that said armature member can be readily lifted from the pin and separated from the other elements of the apparatus. For thus sustaining it, I provide the armature element with the bushing 27 which extends into a central aperture in the holder 20 and which has screw-threaded to its upper end the bearing member 26, which bearing member rests on the upper end of the pivotal pin 10. With this construction the center of gravity of the armature member is below the point of support between the bearing member 26 and the pivotal pin 10, and therefore the armature member will rest steadily on the pivotal pin and be capable of turning freely thereabout. The bushing 27 acts also as a sort of steadying bearing to assist in maintaining the armature in its correct position. This bearing member is insulated from the commutator segments 24 by the holder 20 and an air gap.

30 designate the brushes which are adapted to have engagement with the commutator segments. These brushes are sustained by a brush holder 31 of insulating material which is loosely mounted on the shank portion 32 of the pivotal pin. Said brush holder is provided with usual binding posts 34 to which the wires of the main circuit are connected, and it is also provided with the clamping screw 35 which is adapted to clamp the holder in any adjusted position on the shank portion 32.

It will be observed from the above description that the armature element is so constructed that it can be readily lifted from the pivotal pin and examined by the student without disturbing any of the other parts of the apparatus, and moreover the manner of supporting the Gramme ring on the holder 20 is such that the construction and working of of the apparatus can be readily observed.

The manner of supporting the field element on the base is such that it can be removed from the base without in any way disturbing the armature element or other parts of the apparatus. The brush holder can also be readily detached from the pivotal pin after the armature member has been removed. All the parts of the apparatus can be easily examined by the student either in their connection with the other parts of the apparatus or separately.

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

1. In a device of the class described, the combination with a base having two posts and a pivotal pin rising therefrom, of a field element and its winding resting on said posts and detachably connected thereto, and an armature rotatably sustained by said pivotal pin and removable therefrom independently of the field element.

2. In a device of the class described, the combination with a T-shaped base having two posts rising from the end of the transverse arms and a pivotal pin rising from the end of the central arm, of an armature member rotatably mounted on said pivotal pin, and a field member resting on said posts and detachably connected thereto by screws.

3. In an apparatus of the class described, the combination with a base having two posts and a pivotal pin rising therefrom, of an armature element having a pin-receiving bushing provided at its upper end with a bearing to rest on the end of the pin, a brush holder loosely surrounding said pin, and a field member resting on the posts and detachably secured thereto by screws.

4. In an apparatus of the class described, the combination with a base having two posts and a pivotal pin rising therefrom, of a brush holder loosely surrounding said pin, an armature member rotatably sustained by said pin, and a field member resting on the posts and secured thereto by screws.

5. In an apparatus of the class described, the combination with a base having two posts rising therefrom, a field member resting on said posts and detachably secured thereto, a pivotal pin member provided with a screw-threaded shank screw-threaded to said base, said pivotal pin member extending above the base and provided with portions of different diameters, a brush holder loosely surrounding the portion of said pin of larger diameter, and an armature member sustained by the upper end of said pin.

6. In an apparatus of the class described, the combination with a base having two posts and a pivotal pin rising therefrom, of an armature member rotatably sustained by said pin, and a field member resting on the posts and detachably secured thereto, said field member and armature member each being removable from the apparatus without disturbing the other.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

LOUIE E. KNOTT.

Witnesses:

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