

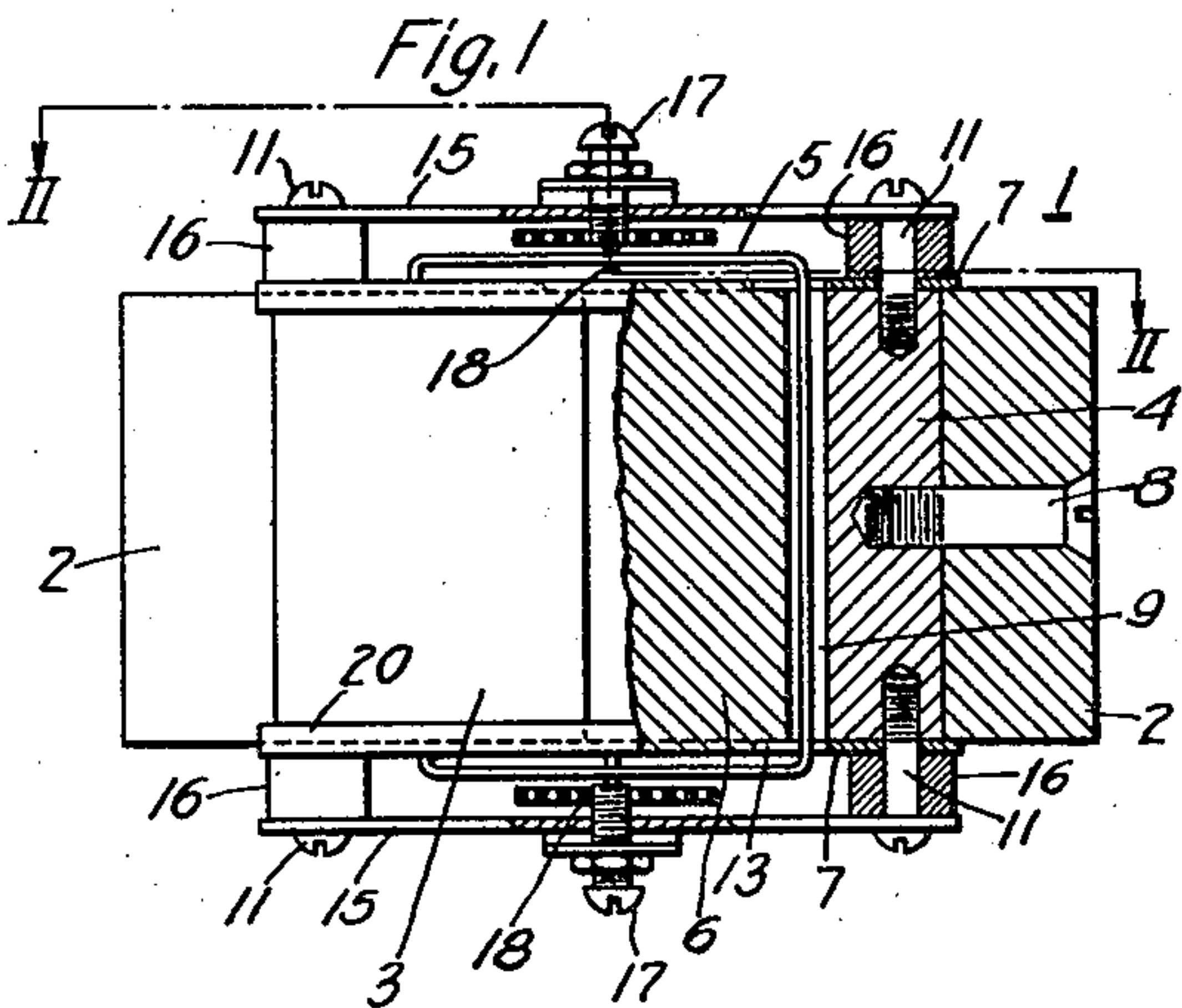
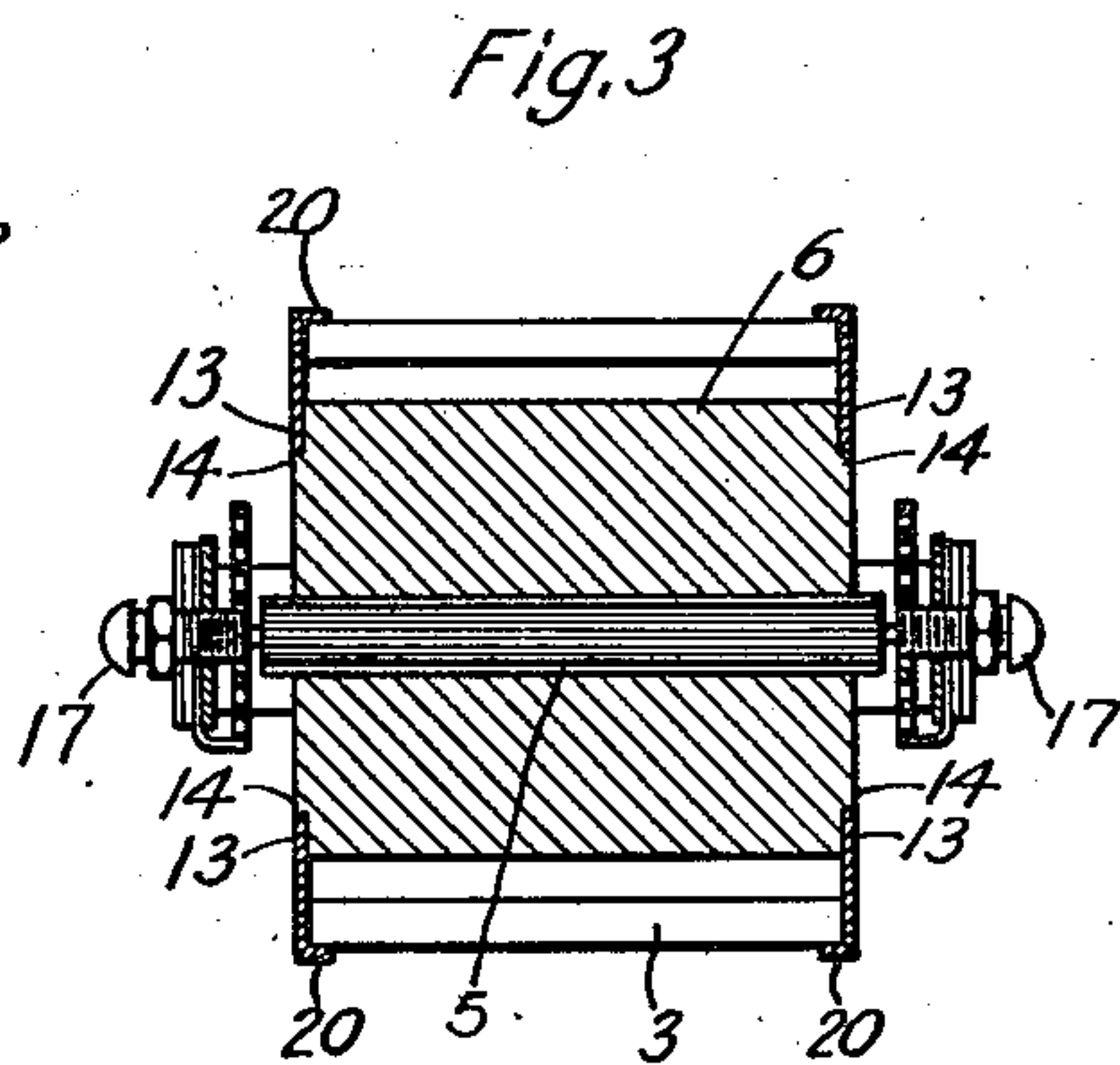
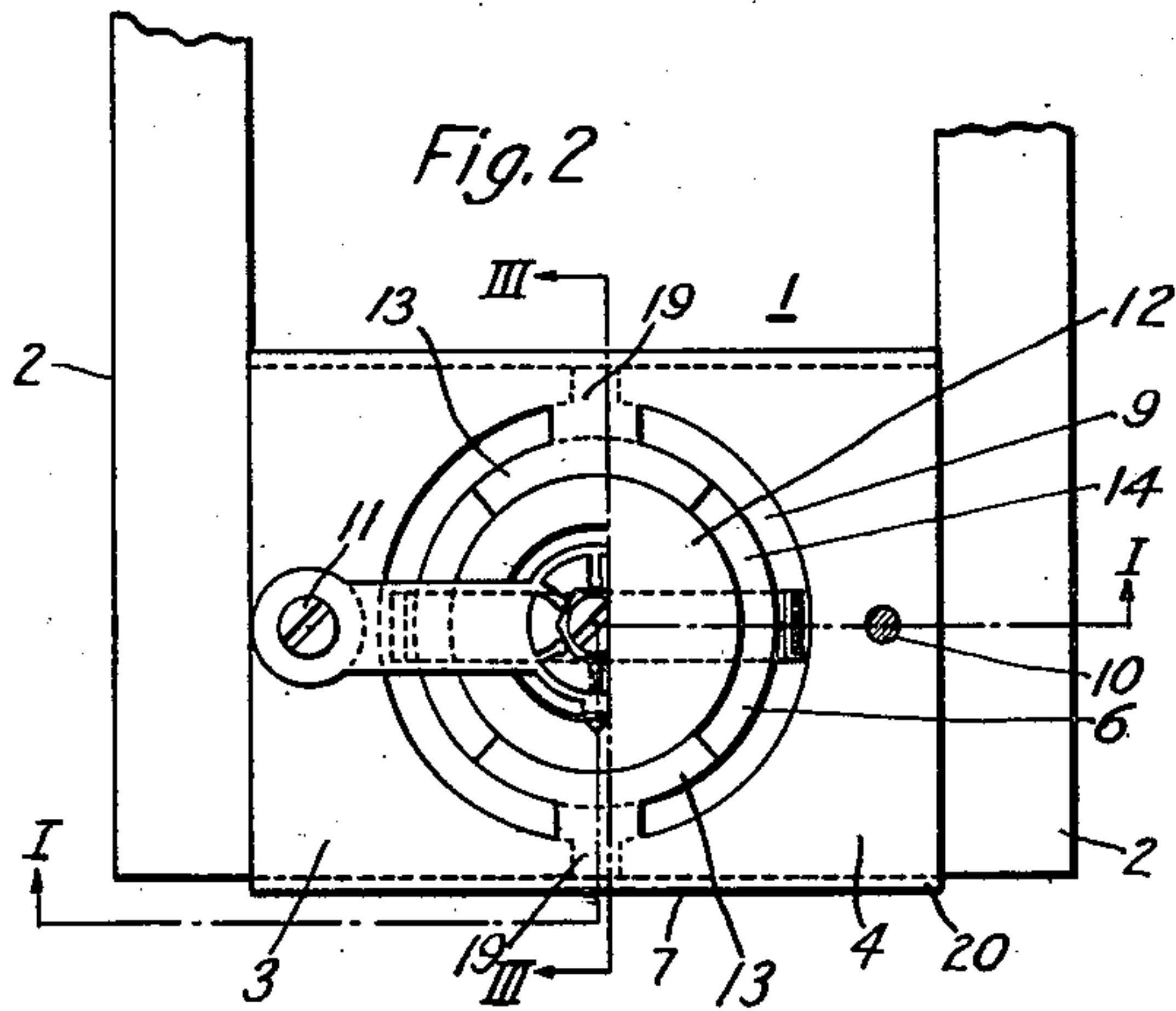
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1,458,947

P. MacGAHAN

MEASURING INSTRUMENT

Filed Sept. 16, 1918



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MEASURING INSTRUMENT.

Application filed September 16, 1918. Serial No. 254,210.

To all whom it may concern:

Be it known that I, PAUL MACGAHAN, a citizen of the United States, and a resident of Pittsburgh, in the county of Allegheny and State of Pennsylvania, have invented a new and useful Improvement in Measuring Instruments, of which the following is a specification.

My invention relates to electrical measuring instruments and particularly to direct-current instruments of the permanent-magnet, moving-coil type.

One object of my invention is to provide means for accurately centering the core member of a measuring instrument with relation to its pole pieces.

Another object of my invention is to provide a supporting and centering means, of the above-indicated character, that shall permit the armature to move over a relatively large arc.

A further object of my invention is to provide a device of the above indicated character that shall be simple and inexpensive to construct and effective in its operation.

Heretofore, it has generally been the practice in direct-current instruments to accurately machine the pole pieces, the core member and the supporting means therefor in order to ensure correct centering of the core member for the purpose of obtaining a uniform air gap. This is an expensive and complicated operation.

In view of the above, I provide two pole pieces, a pivoted moving-coil armature and a cylindrical magnetizable core member having shoulders at each end thereof. Non-magnetizable plates, having flanges at the edges thereof and openings therein, are disposed at the ends of the pole pieces to receive the shoulders of the cylindrical member in the openings. By this arrangement, the cylindrical core member may be supported and accurately centered with respect to the end plates without any complicated machine operation, and sufficient space is provided to permit free movement of the armature over a relatively large arc. The side flanges of the end plates are adapted to so engage the pole pieces as to accurately center the core member with respect to the pole pieces, and thus, ensure that the air gap between the pole pieces and the core member shall be uniform throughout.

In the accompanying drawings, Fig. 1 is an end elevational view, with parts broken away along the line I—I of Fig. 2, of a measuring instrument embodying my invention; Fig. 2 is a view taken along the line II—II of Fig. 1; and Fig. 3 is a view taken along the line III—III of Fig. 2.

The direct-current measuring instrument 1 comprises, in general, a permanent magnet 2, pole pieces 3 and 4, an armature 5, a stationary magnetizable core member 6 and non-magnetizable plates 7 for securing the core member 6 in position.

The pole pieces 3 and 4 are secured by screws 8 to the permanent magnet 2, and the core member 6 is disposed between the pole pieces 3 and 4 and is so supported thereon as to permit the armature 5 to move freely in the air gap 9 therebetween.

The plates 7, constituting the supporting and centering means, have openings 10 stamped therein to receive screws 11 for the purpose of securing the same to the pole pieces 3 and 4. The plates 7 are cut away at their central portions 12 in such manner as to form portions 13 of arc-shape that conform to, and register with, shoulders 14 which are formed at the ends of the cylindrical core member 6. The plates 7 are cut away behind the portions 13 of arc-shape to provide a free space to permit the armature 5 to turn through a relatively large arc.

The plates 7 are so bent at the edges thereof as to form flanges 20 that engage the pole pieces 3 and 4 and thus accurately position the same with respect to the pole pieces.

Supporting members 15 are secured to the pole pieces 3 and 4 by the screws 11 and are spaced apart therefrom by spacing member 16. Adjustable screws 17 are provided for the members 15, and the inner ends of the screws are adapted to receive the pivot points 18 of the armature 5.

In order to assemble the instrument, the plates 7 are placed in position, with the flange portions 20 engaging the edges of the pole pieces. When the plates are in this position, the openings therein register with the shoulders 14 on the core member 6, and thus, if the cutaway portions are properly positioned, the core member will be centered with respect to the pole pieces to provide a uniform air gap therebetween.

Since the relation of the flanges and openings in the plates 7, with respect to each other, may be maintained constant by pressing and punching the same in a single operation, the member 6 may be accurately centered without resorting to expensive and complicated machine operations. It will be seen that, since the neck portions 19 of the portions 13 are relatively small, substantially no obstruction is present to prevent the free movement of the armature 5 through a relatively large arc in the air gap 9.

My invention is not limited to the specific devices illustrated, as it may be variously modified without departing from the spirit and scope of the invention, as set forth in the appended claims.

I claim as my invention:

1. In a measuring instrument, the combination with field-magnet pole pieces and a cylindrical magnetizable member having a cut-away portion at one end thereof, of means secured to the ends of the pole pieces for so engaging the cut-away portion of the cylindrical member as to accurately center the same between the pole pieces.

2. In a measuring instrument, the combination with two pole pieces and a cylindrical magnetizable member, of means secured to the pole pieces and having portions thereof cut away to co-operate with the

cylindrical member to accurately center the same without obstructing the air gap of the instrument.

3. A measuring instrument comprising two pole pieces, a cylindrical magnetizable member having a shoulder at the end thereof, and a plate secured to the ends of the pole pieces and having portions thereof cut away to so receive the shoulder on the cylindrical member as to accurately center the same between the pole pieces.

4. A measuring instrument comprising an armature, two pole pieces, a cylindrical magnetizable member having a shoulder at each end thereof, and a plate having flanges thereon secured to the ends of the pole pieces and having portions thereof so cut away as to receive the shoulder portions of the cylindrical member and permit the armature to turn through a relatively large arc.

5. In a measuring instrument, the combination with field-magnet pole pieces and a cylindrical magnetizable member, of a plate having flanges thereon for positioning the same with respect to the pole pieces and openings therein for registering with the cylindrical member to accurately center the same with respect to the pole pieces.

In testimony whereof, I have hereunto subscribed my name this 31st day of Aug., 1918.

PAUL MacGAHAN.