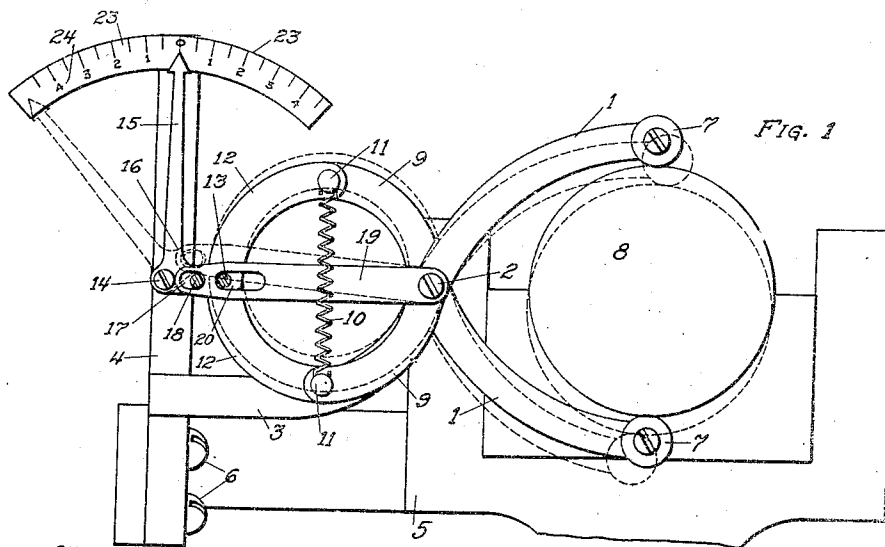
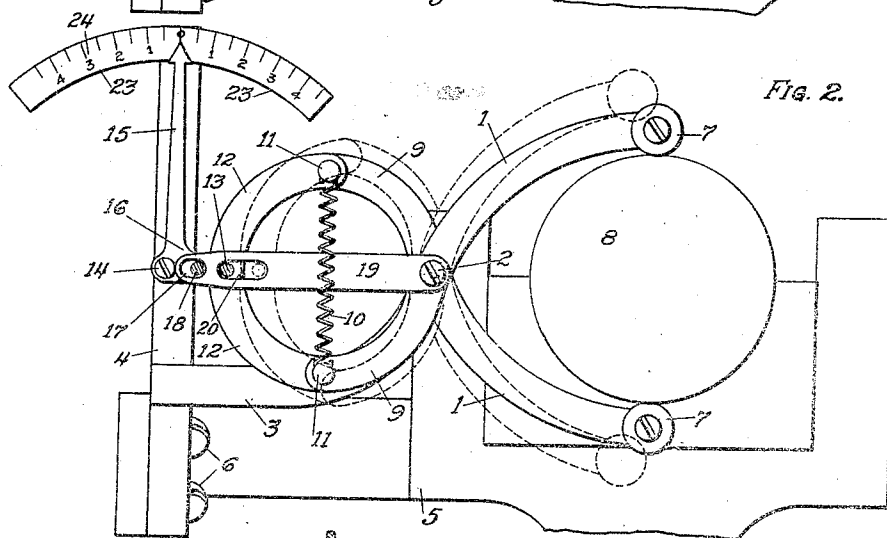
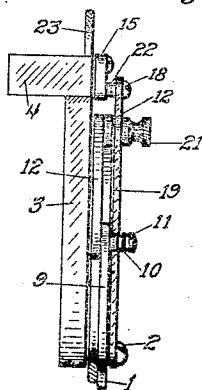


APPARATUS FOR INDICATING THE DISPLACEMENT OF ROTARY BODIES.
APPLICATION FILED MAR. 31, 1913.

Patented June 2, 1914.



WITNESSES.
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FIG. 3.

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APPARATUS FOR INDICATING THE DISPLACEMENT OF ROTARY BODIES.

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Specification of Letters Patent.

Patented June 2, 1914.

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To all whom it may concern:

Be it known that I, WILLIAM C. REED, a citizen of the United States of America, residing at Pittsfield, in the county of Berkshire and State of Massachusetts, have invented certain new and useful Improvements in Apparatus for Indicating the Displacement of Rotary Bodies, of which the following is a specification.

My present invention relates to apparatus for indicating the displacement of rotary bodies designed to move on a substantially fixed axis.

It particularly concerns those mechanical arts wherein a rotary element is adjusted with reference to a separate element and wherein it is essential to the operation and utility of the general mechanism that the rotary element be constantly maintained in true normal position without substantial variation or displacement. By means of my invention any such displacement is instantly indicated and by its aid the shaft or other rotary element may be accurately re-adjusted to its normal position.

Having referred to the general character and purpose of my invention, I will proceed to describe a specific useful form of embodiment thereof in connection with the accompanying drawings, wherein—

Figure 1 is a view in elevation of the device operatively mounted with relation to a rotary shaft, the relative position of the parts affected by downward displacement of the shaft being indicated in dotted lines; Fig. 2, a similar view of the same, the relative position of the parts affected by spreading the calipers being indicated in dotted lines, and Fig. 3, a detail inverted plan view of the invention, showing the calipers cut away terminally.

The invention essentially comprises a pair of caliper compasses pivotally mounted on a fixed support, and a movable indicating element for adjustment by the calipers with reference to a given mark.

As shown, the calipers 1, 1, are pivotally secured together by a fulcrum screw 2 attached to the outer end of a fixed arm 3 projecting laterally from a bar 4, which is secured in rigid upright position on the pillow block or shaft support 5, preferably by the screws 6, 6. The outer ends of the calipers 1, 1, are provided with runners 7, 7, which are adapted to engage opposite sides of the

shaft 8, or other rotary element, whose position is to be indicated.

The inner ends of the calipers 1, 1, are extended beyond the point of pivotal engagement at 2 to form inverted curved arms or quadrants 9, 9, which are movably secured together under tension by a coil spring 10 secured to studs provided on screws 11, 11, arranged at opposite points on the arm 9, 9, the object of the spring being to keep the outer ends of the calipers 1, 1, normally in engagement with the shaft 8. Pivotally attached to the arms 9, 9, by the screws 11, 11, are separate quadrant segments 12, 12, having their opposite ends pivotally secured together by a threaded pin 13 and forming a continuous ring with the arms 9, 9.

Mounted on one of the faces of the bar 4 is shown a vertically arranged index or pointer 15 adapted to swing on the screw pivot 14 which is provided on the bar preferably in the same horizontal plane with screw 2. Laterally provided on the pointer 15 at a point opposite the pin 13 is an arm or swell 16 extending toward the segments 12, 12, and movably connected by a screw 18 to the inner end of a bar 19, which extends across the ring formed by the segments 12, 12, and arms 9, 9, and is pivoted at its opposite end to the screw 2. The bar 19 is provided with a longitudinally extended slot 20 to receive the pin 13 carrying a knurl nut 21, the slot being adapted to allow play of the pin therein when the calipers 1, 1, are moved relatively to each other, while the nut 21 is employed to clamp the segments 12, 12, to the bar 19 to fix the relative positions of the calipers 1, 1. The bar 19 is further provided with a relatively smaller slot 17 to receive the screw 18, which carries a take-up in the form of a bushing or collar 22 interposed between the bar 19 and the arm 16 of the pointer 15. I further provide at the upper end of the bar 4 and on opposite sides thereof curved lateral extensions 23, 23, having impressed thereon suitable indicating marks 24 etc. graduated on either side of the bar 4 from a central point 0 and affording a scale for indicating the movements of the calipers 1, 1, which are actuated by any displacement of the shaft 8.

In operation, the outer ends of the calipers 1, 1, are spread apart to receive the shaft 8 (see Fig. 2) and then released under the tension of the spring 10, which causes

the runners 7, 7, to remain in engagement with the shaft. This operation causes the arms 9, 9, on the inner ends of the calipers to also spread proportionately, drawing the pin 13 forward in the slot 20 by means of the segments 12, 12, which are actuated in unison with the arms 9, 9, and when the runners 7, 7, come into engagement with the shaft 8 establishing the relative positions of the calipers 1, 1, the nut 21 is screwed down to clamp the segments 12, 12, into fixed engagement with the bar 19. Supposing the pointer 15 to be now at zero, indicating the normal position of the shaft 8, any downward displacement of the shaft will cause the calipers 1, 1, to oscillate slightly on the fulcrum screw 2 and tilt the bar 19, which in turn will cause the pointer 15 to swing away from zero over one side of the scale, 24, as indicated in dotted lines in Fig. 1, and register the extent of displacement of the shaft. The readjustment of the shaft to its true normal position may now be made with the aid of my device.

While I have described my invention as applied to one end of the rotary element or shaft, it will be understood that in practice a similar device is applied to the opposite end of the shaft.

I claim:—

1. Apparatus of the class described comprising a support, an index pivotally secured to the support and having a free end, compass arms movably secured to the support and having free ends adapted to engage opposite points of a rotary body for support with relation thereto, and means connecting the rear ends of the arm to the index for oscillating the free end of the index when the arms are actuated by the displacement of the rotary body.

2. Apparatus of the class described comprising a support, an index pivotally secured to the support, adjustable compass arms pivotally secured to the support and having their free ends adapted to engage opposite points on a rotary body for support with relation thereto, means for permanently but detachably securing said arms in fixed relation to each other, and means for oscillating the index when the compass arms are actuated by the displacement of the rotary body.

3. Apparatus of the class described including a support, a pair of compass arms pivotally secured to the support in angular relation to each other and having free ends

adapted to engage opposite points on a rotary body for support with relation thereto, means for permanently but adjustably fixing the relative angular position of the arms to move in synchronism in the same direction, and means in addition to the foregoing for indicating displacement of the rotary body from its true position.

4. A device of the class described comprising a fixed support, a pair of crossed compass arms pivoted together to the support, an index pivoted to the support and having a free end, a bar, means securing one end of the bar in fixed relation to the compass arms and separate means for pivotally connecting the opposite end of the bar to the index.

5. A device of the class described, comprising a support, a pair of crossed compass arms provided at their inner ends with inversely curved extensions, spring means for yieldingly connecting the extensions, a bar secured at one end to the pivotal point of the compass arms and extending between said extensions, adjustable means provided on the extensions for rotating the bar with the compass arms, and an index arm pivoted to the support and having a free end, said arm being pivotally connected to the bar.

6. The combination of a support, a ring pivoted to the support and comprising separate quadrant sections pivotally secured together in series, the pivotal point of the ring coinciding with one of the pivotal points of said sections, the adjacent ends of two of the sections having diverging arms projecting away from the pivotal point of the ring, an index arm pivoted at one end to a support adjacent the ring and having a free end, a diametric bar extending across the ring and having one end pivoted to the index arm and having its opposite end pivoted to the pivotal point of the ring, said bar having a slot, a pin provided on the ring at a point coincident with the point of connection of the ring sections, adjacent the index arm and passing through said slot of said bar, and a spring secured to opposite points of the ring transversely of the plane of the bar.

In testimony whereof I hereto affix my signature in presence of two witnesses.

WILLIAM C. REED.

Witnesses:

JNO. J. WHITTLESEY.

WILLIAM E. BACC.