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DEFLECTION DYNAMOMETER

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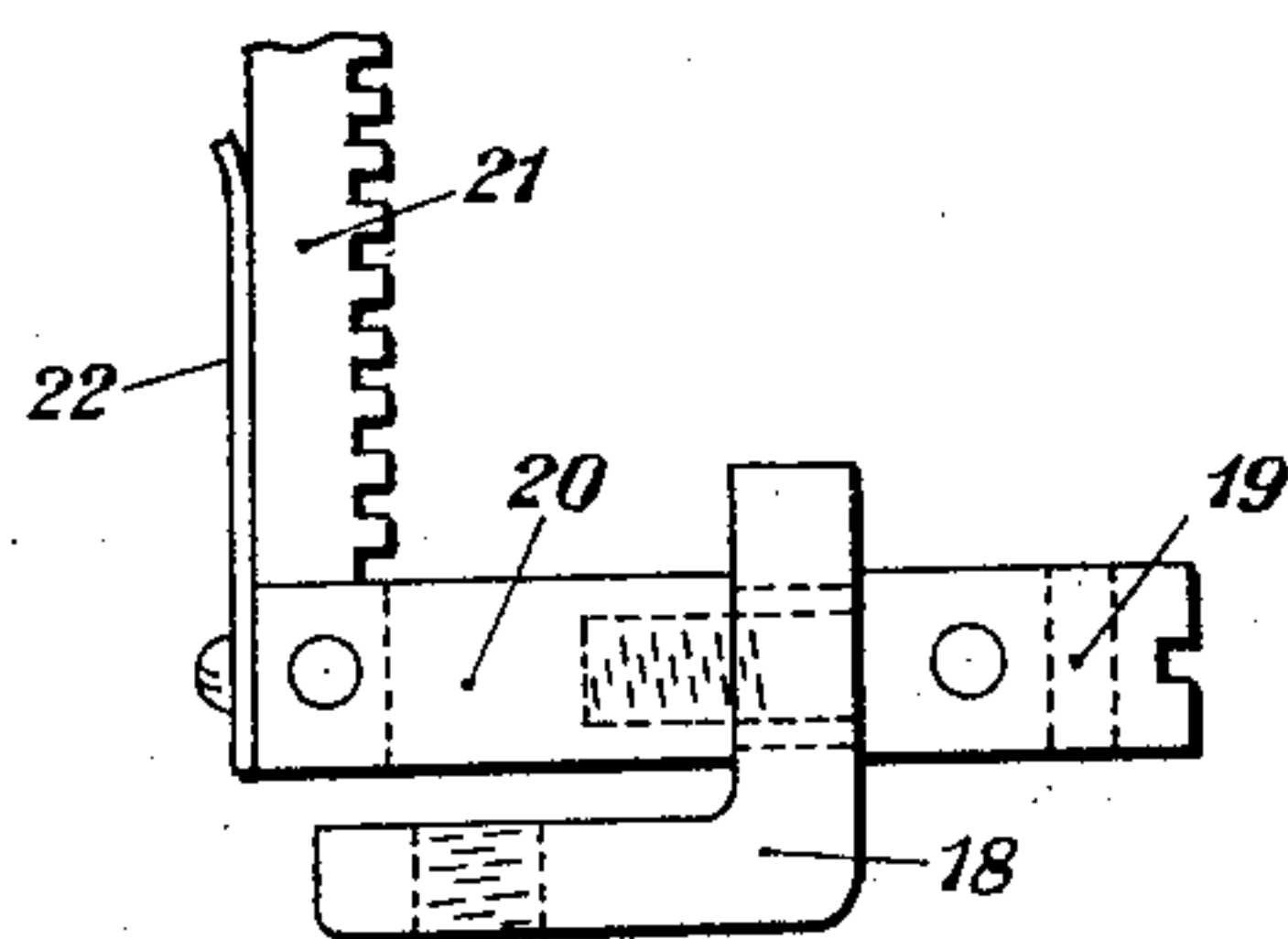
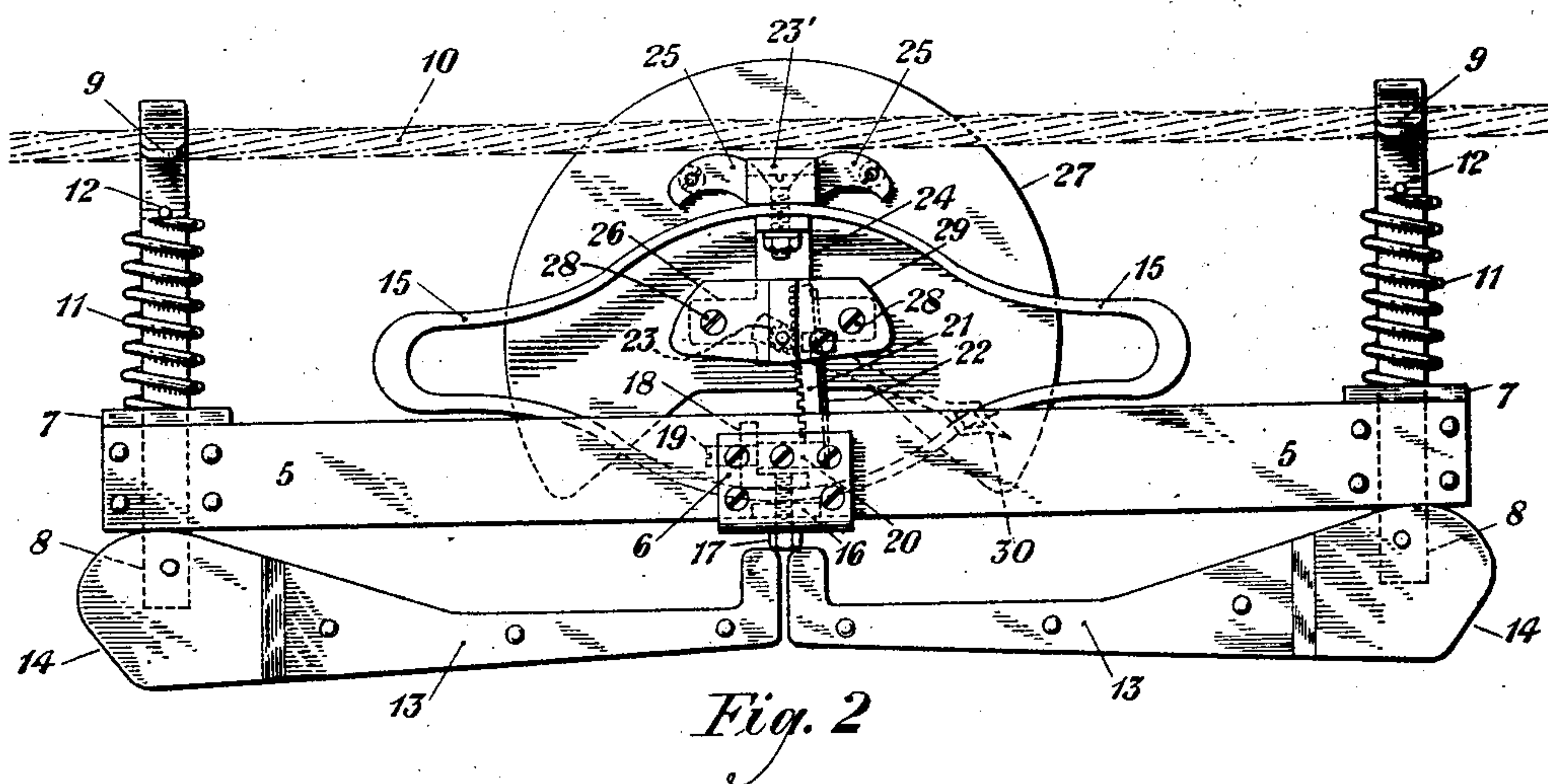
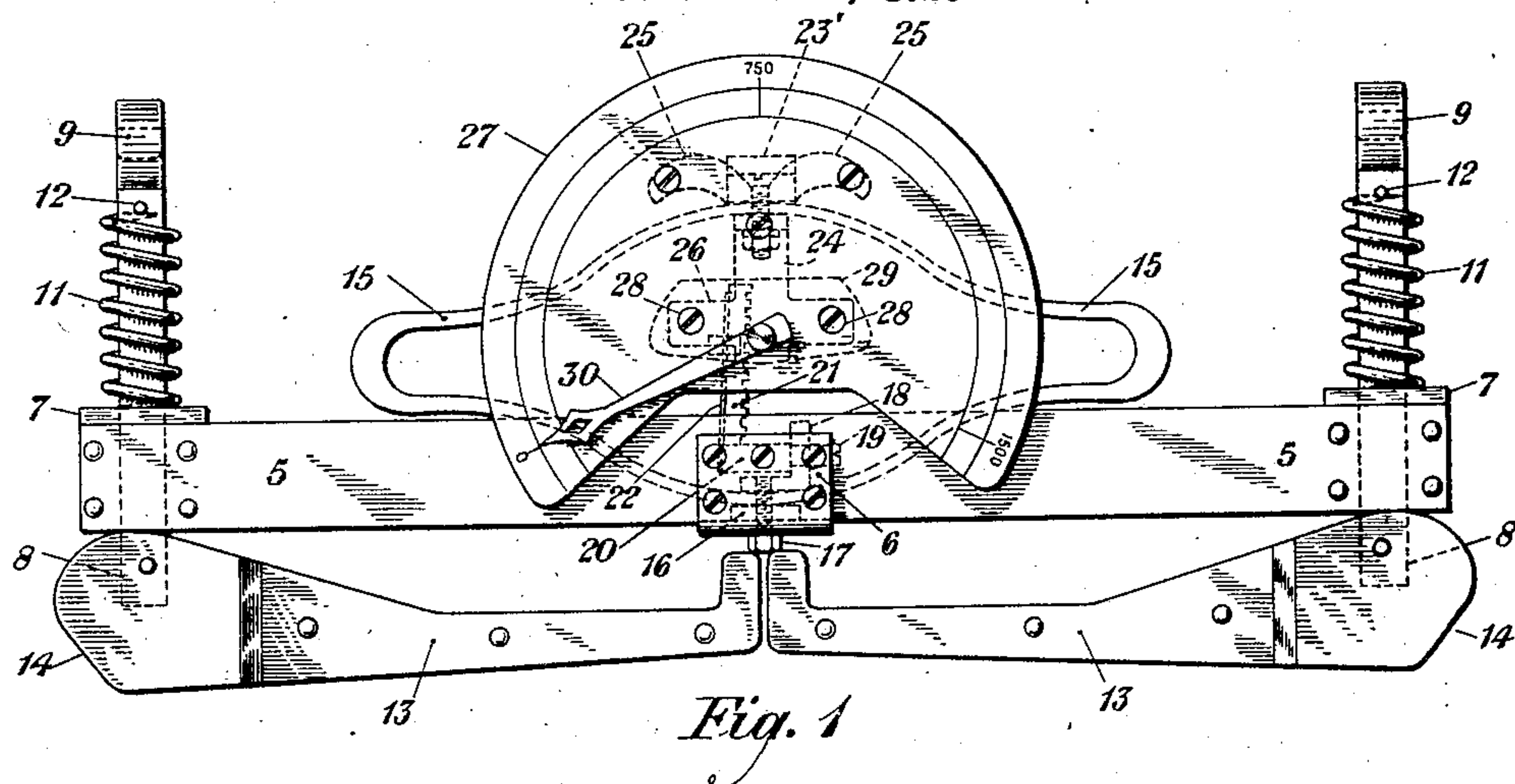


Fig. 3

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DEFLECTION DYNAMOMETER.

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This invention relates to improvements in deflection dynamometers.

It is an object of this invention to provide a simple and accurate device for determining the tension in a span of wire at an intermediate point of the span without interrupting the continuity of the wire. This is accomplished by causing a portion of the wire or strand under test to be deflected from its normal position, and then ascertaining the force necessary to hold the strand thus deflected. Means are provided by this invention whereby in each measurement the distance through which the strand under test is deflected is inversely proportional to the tension in the strand so that the force necessary to hold the strand deflected is in like cases the same fractional part of the tension in the strand. In the preferred embodiment of the invention, the strand is held in its deflected position by means of cam levers, and a gauge is provided in connection with a spring to show the amount the spring is depressed by the tension in the strand. The gauge is calibrated preferably to indicate the tension in the strand.

Further objects will be apparent from the following description, when considered in connection with the accompanying drawing, in which one modification of the invention is illustrated.

Referring to the drawing, Figure 1 is a front elevation of a dynamometer embodying this invention, Fig. 2 is a rear view of Fig. 1, and Fig. 3 is a detail for adjusting the device. Similar characters of reference indicate similar parts in each of the views of the drawing.

In the drawing, a metal beam is shown comprising two parallel side members 5, which extend longitudinally of the dynamometer. Each of the side members 5 is connected at the center by a substantially U-shaped member 6, which passes beneath the side members and secures the two portions of the parallel members together. The side members 5 are secured to each other at their ends by interposed metal blocks 7. An opening is provided through the center of each of the blocks 7 in which rod-like members 8 are adapted to be reciprocally mounted. The upper ends of these rod-like members terminate in hooks 9, 9, by means of

which the instrument may be suspended from a strand 10, the tension of which is to be determined. Although a strand is shown in the drawing as a twisted cable, it is to be understood that this invention is not limited thereby, and the term "strand" is used herein to designate any flexible tension member. The upper portion of the blocks 7 are counter-sunk to seat helical springs 11 which are positioned on said rods. These springs serve to return the rods to normal position, and are kept from being longitudinally displaced by means of studs 12 affixed to said rods. The rods 8 extend downwardly beneath the block members 7, and are pivoted to lever members 13. The arms of these levers extend inwardly toward each other, so that their ends are adjacent. The rods 8 extend into a bifurcated portion provided on the ends of the levers, and the outer surfaces of these bifurcated portions are in the form of cams 14.

A spring 15 of substantially elliptical form with extended centers is positioned in the space between the parallel side members 5. The lower central part of the spring may be seated on a spacing block 16 which lies on the U-shaped member 6, and its ends extend outwardly toward the rod members 8. A stud 17 extends through the member 6, block 16 and spring 15 to engage an L-shaped bracket 18, and serves to keep the bracket positioned on the spring. The bracket 18 is provided with an opening through which an adjustable threaded block 19 extends in a horizontal position to engage an end of a rectangular member 20, as is more clearly shown in Fig. 3. The other end of the member 20 is provided with a bifurcated portion in which a vertically extending rack 21 is pivotally mounted. A vertical spring 22 is affixed to one end of the block 20 in such manner that it exerts tension against the rack 21 to cause the teeth of said rack to mesh with the teeth of a pinion 23 to be referred to later.

A saddle block 23' is positioned on the top of the elliptical spring 15 at its approximate central point. This saddle member is suitably grooved to receive an intermediate portion of a messenger wire extending between the hooks 9. A screw passes through aligned openings in the block 23' and top portion of the spring to engage an opening in an out-

wardly extending flange formed on bracket 24, and thus affix it to said spring. The bracket 24 is provided with upwardly extending arms 25 and also with a strap 26 at its lower portion. A dial 27, having an indicating scale on its front surface, is suitably affixed to the members 25 and 26, as more clearly appears in dotted lines in Fig. 1. The strap 26 has two rearwardly extending studs 28 attached to each of its ends. These horizontal studs are threaded to a substantially semi-circular plate 29 which is positioned at right angles thereto. The pinion 23, previously referred to in connection with the rack 21, is journaled at one end in the plate 29. The other end of the pinion 23 extends through the wall of the graduated indicating scale, and is suitably affixed to a pointer 30 which appears on the face of the scale. The movement of the rack causes the rotation of the pinion and the pointer.

To operate the deflection dynamometer, the instrument is placed on the strand in which the tension is to be determined, so that the strand passes through the two hooks and over the intermediate positioned saddle block. The hooks are then pulled down by means of the two cam levers which are pivotally connected to the ends of said hook members. The levers are pulled to such position that they lie at approximately right angles to the horizontal frame members, and cause the strand to be deflected out of line. The force of the deflected strand applies pressure to both sides of the elliptical spring and depresses the spring, and the amount of such depression is indicated on the dial.

The dial may be calibrated to read the tension in the strand, but in order to obtain the most accurate readings with the different sizes of strand, the dial may be graduated in an arbitrary scale and calibration curves provided for each size of strand.

By means of the present invention, the strand for each measurement is deflected an amount which is inversely proportional to the tension in it. A definite fraction of the tension in the strand is transmitted to the spring in each measurement. Consequently, the depression of the spring is proportional to the tension in the strand, and the graduations on the scale or dial may be marked directly in terms of strand tension.

The use of the instrument is readily understood from the above description thereof. For each measurement, it is necessary merely to suspend the instrument from the strand under test by means of hooks 9, 9, and to actuate the lever arms 13 until the cam surfaces 14 thereof are in such position that they rest on the bottoms of the blocks 7. The actuation of the lever arms causes the strand to be deflected, and the extent of such deflection is translated to the elliptical spring. The extent of depression of the

spring causes the amount of such deflection to be transmitted to the pointer on the dial by means of the rack and its associated pinion. The tension in the strand may be then read from the dial by noting the position of the pointer. To remove the instrument from the strand, the levers are moved inwardly toward each other, relieving the spring of the stress and permitting the instrument to be readily removed from the strand.

Although only one form of the invention is shown herein, it will be understood that various changes and modifications may be made therein within the scope of the following claims without departing from the spirit of the invention.

What is claimed is:

1. A deflection dynamometer comprising a beam, a spring longitudinally associated with said beam hook members at each end of the beam for engaging a strand, means associated with the hook members to cause said strand to be deflected out of line, and means controlled by said spring for indicating the amount of such deflection.

2. A deflection dynamometer comprising a beam, a spring longitudinally associated with said beam, hook members at each end of the beam for engaging a strand, a member associated with said spring for engaging the strand at a point intermediate said hook members, means for actuating said hook members to cause said strand to be deflected out of line, and means controlled by said spring for indicating the amount of said deflection.

3. A dynamometer comprising a beam, hook members reciprocally mounted at each end thereof and adapted to engage a strand, an elongated spring positioned longitudinally of said beam, a block associated with said spring for engaging the strand at a point intermediate the hook members, means associated with said hook members for causing said strand to be deflected by said block and hook members, and a dial associated with said spring for indicating the pressure applied to said spring by the deflection of the strand.

4. A dynamometer comprising a beam, hook members reciprocally mounted at each end thereof and adapted to engage a strand, a spring positioned longitudinally of said beam, a block associated with said spring for engaging the strand at a point intermediate the hook members, levers pivotally associated with the hook members for causing said strand to be deflected between said block and hook members to determine the tension of the strand, and a dial associated with said spring for indicating the pressure applied to said spring by the deflection of the strand.

5. A deflection dynamometer comprising a beam, a spring affixed to the center of beam and extending longitudinally thereof, hook

members at each end of the beam for engaging a strand, a block affixed to the spring for engaging the strand at a point intermediate the hook members, levers pivotally associated with the hook members for causing the strand to be deflected between said block and hook members for determining the tension of the strand, and a dial associated with the spring for indicating the pressure applied to said spring by the deflection of the strand.

6. A deflection dynamometer comprising a beam, a spring longitudinally associated with said beam, hook members at each end of the beam for engaging a strand, means associated with the hook members to cause said strand to be deflected out of line, means for depressing said spring in accordance with such deflection, and means controlled by said spring for indicating the amount of such deflection and depression.

7. A deflection dynamometer comprising a beam, a spring longitudinally associated with said beam, hook members at each end of the beam for engaging a strand, a member associated with said spring for engaging the strand at a point intermediate said hook members, means for engaging said

hook members to cause said strand to be deflected out of line, and means controlled by said spring for indicating the depression thereof to an extent proportional to the deflection of the strand.

8. A deflection dynamometer comprising a beam, a spring affixed to the center of beam and extending longitudinally thereof, hook members at each end of the beam for engaging a strand, a block affixed to the spring for engaging the strand at a point intermediate the hook members, levers pivotally associated with the hook members for exerting a pull on the hook members to cause the strand to be deflected between said block and hook members to determine the tension of the strand, and a dial associated with the spring for indicating the pressure applied to said spring by the deflection of the strand, said pressure being proportional to the deflection of said strand.

In testimony whereof, we have signed our names to this specification this 5th day of November, 1926.

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