

No. 813,324.

PATENTED FEB. 20, 1906.

H. RUDDICK, DEC'D.

W. H. RUDDICK, ADMINISTRATOR.

DYNAMOMETER.

APPLICATION FILED SEPT. 6, 1905.

2 SHEETS—SHEET 1.

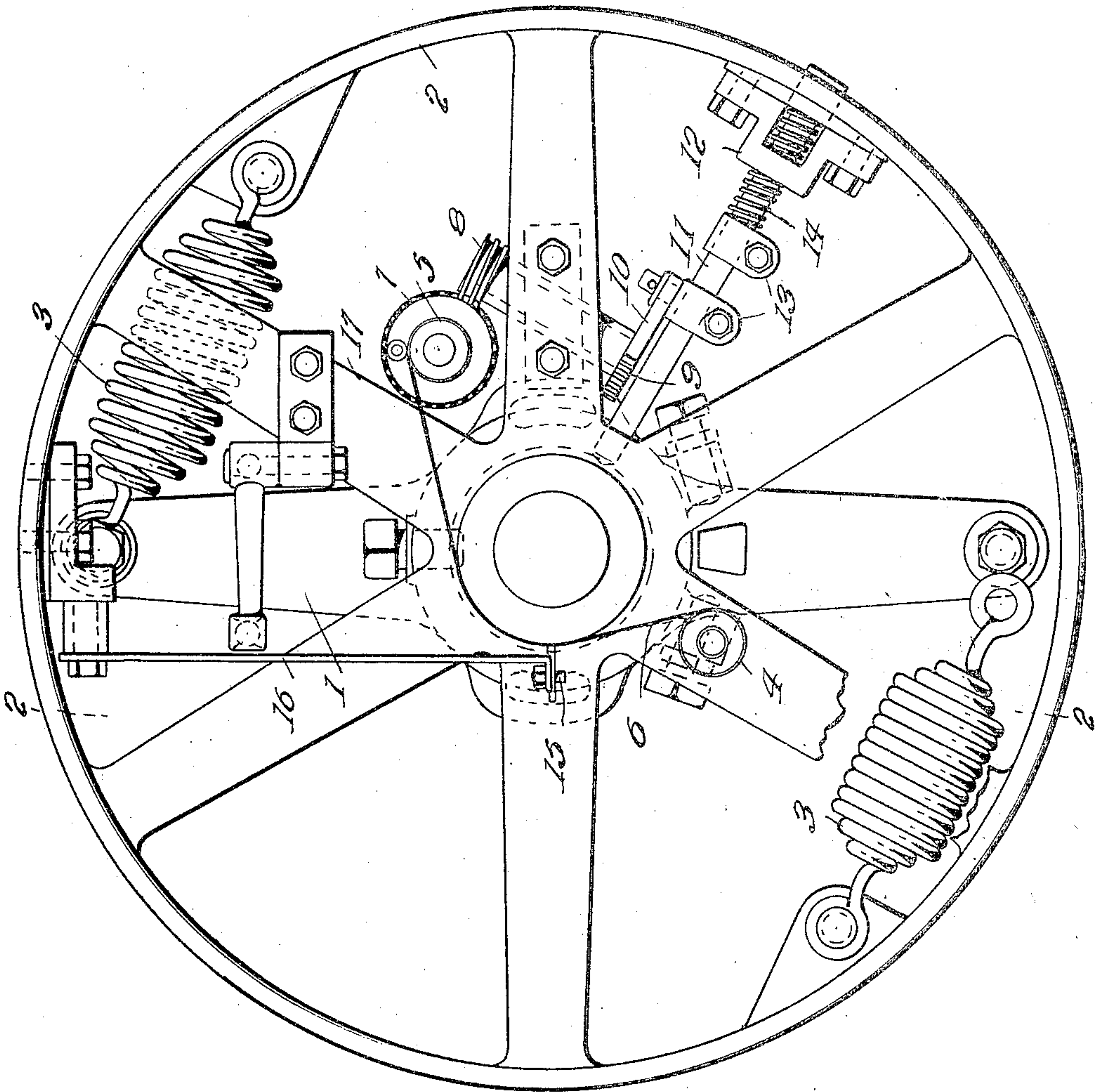


Fig. 1.

Witnesses

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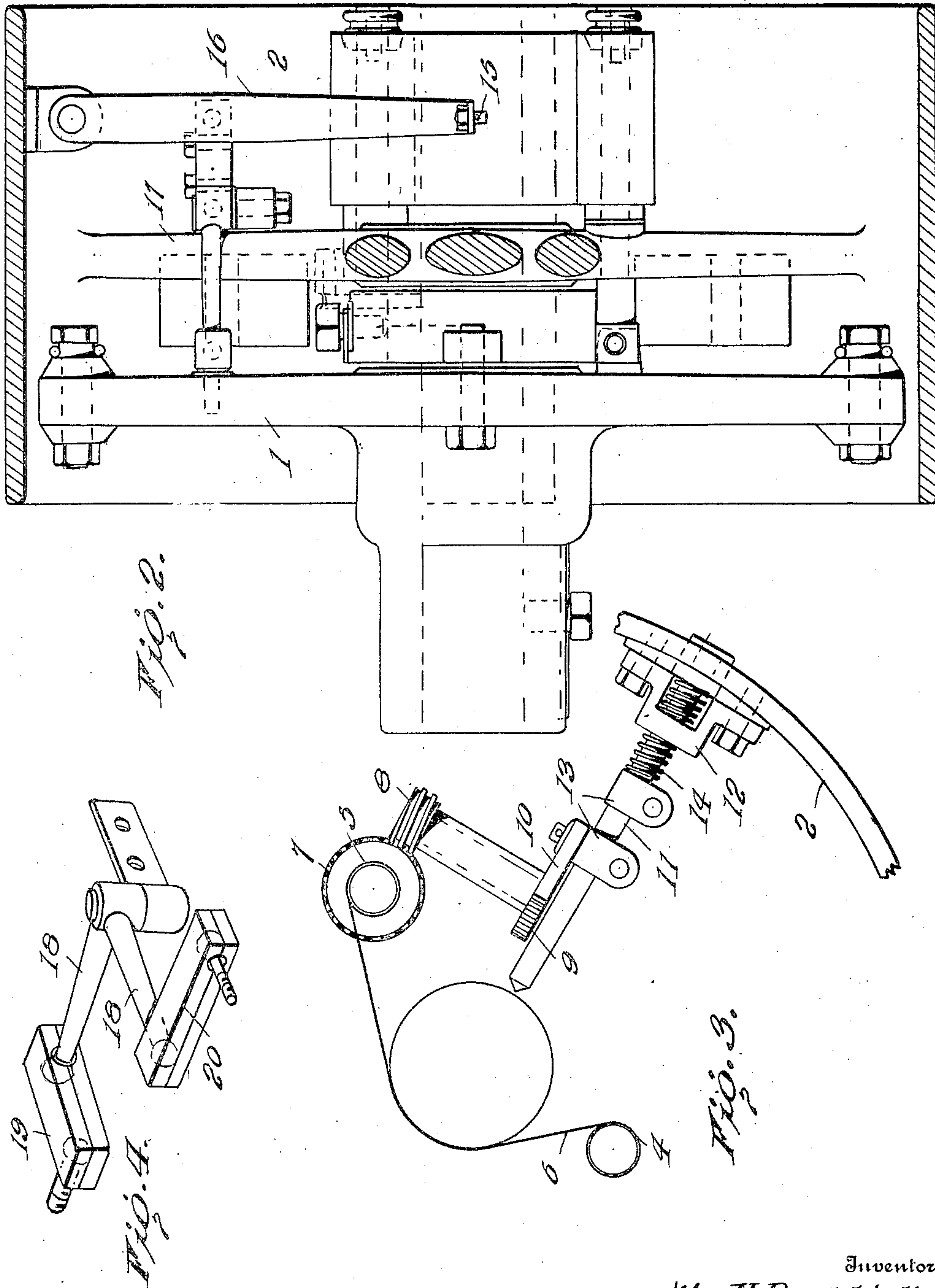
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# UNITED STATES PATENT OFFICE.

WALTER H. RUDDICK, OF NEW YORK, N. Y., ADMINISTRATOR OF  
HAMILTON RUDDICK, DECEASED.

## DYNAMOMETER.

No. 813,324.

Specification of Letters Patent.

Patented Feb. 20, 1906.

Application filed September 8, 1905. Serial No. 277,255.

*To all whom it may concern:*

Be it known that HAMILTON RUDDICK, deceased, late a citizen of the United States, and a resident of Brooklyn, in the county of Kings and State of New York, did invent certain new and useful Improvements in Dynamometers, of which the following is a specification.

This invention relates to dynamometers for registering the force exerted upon or work done by a rotating part, such as a shaft.

The object of the invention is to provide a device of this character which will not only be accurate in its operation, but which will be constructed of comparatively few and simple parts and which will not be liable to get out of order.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction and the means for effecting the result reference is to be had to the following description and accompanying drawings, in which—

Figure 1 is a side elevation of the improved dynamometer. Fig. 2 is a transverse section thereof on the line 2 2 of Fig. 1. Fig. 3 is a detail view illustrating the mechanism for feeding the paper ribbon upon which the record is made, and Fig. 4 is a detail view illustrating the connection between the stylus-carrying arm and its actuating mechanism.

Corresponding and like parts are referred to in the following description and all the views of the drawings by the same reference characters.

Referring to the drawings, the numeral 1 designates a supporting-arm which is designed to be rigidly secured upon a shaft or the like, and 2 designates a pulley which is yieldingly connected to said arm by means of contractile springs 3, diametrically disposed, as indicated. It is understood that as power is applied to the pulley to drive the shaft, as by a belt or similar contrivance, the springs 3 are more or less extended, according to the work being done, or strain exerted, and consequently the relative positions of this stationary arm and the pulley are varied. It is this variation in relative position that is the object of this invention to visibly record, and to this end my invention comprehends two spools 4 and 5, mounted in suitable bearings, the spool 4 being designed to accommodate a paper-roll and feed the paper 6 therefrom and the spool

5 being designed to have the paper wound up on it after the record has been made. To effect the movement of the paper from one spool to the other, the spool 5 is formed with a gear-face 7, with which a worm 8 engages. The shaft of the worm 8 is mounted in a bearing carried by the pulley, and to that end of the shaft opposite the worm is secured a ratchet 9, with which a pawl 10 engages. The pawl 10 is carried on a reciprocating rod 11, which latter is mounted in bearings 12 and 13 to move back and forth longitudinally, and said rod is held, by means of a spring 14, with its outer end protruding slightly through the face of the pulley. By this means as the pulley rotates the belt will cause the rod to reciprocate and through the instrumentality of the pawl 10 and the ratchet 9 and the worm 8 and gear 7 will cause the spool 5 to revolve and wind the paper on the same from the spool 4.

It is of course understood that the paper or the record is graduated and ruled in lines of horse-power, and, as indicated in the drawings, the paper feeds from one spool to the other over the hub of the pulley, whereby there is provided a suitable writing-surface. This paper as it moves passes across the path of a stylus 15, which is actuated laterally, according to the strain placed upon the pulley, so as to register by oblique or zigzag lines, the case may be, to record the variation in the power exerted by the pulley.

The stylus 15 is carried in the free end of a holder 16, which is in the form of a bar suspended at its upper end from the inner face of the pulley 2, and said bar is designed to oscillate, as shown. To effect this oscillation, there is provided a connection between the bar or stylus-holder 16, the stationary arm 1, and some part of the pulley proper, such as a spoke 17. This connection consists of a bell-crank 18, carried by the said spoke 17, one arm of said bell-crank being connected by a link 19 with the stationary arm 1 and the other arm of said bell-crank being connected by link 20 with the stylus-holder 16. The two links 19 and 20 are preferably connected to their respective parts by ball-and-socket joints.

In the operation of the device it will be assumed that the shaft carrying the arm 1 and the pulley 2 is in rotation and that force is being exerted upon the pulley. As the pro-



truding end of the rod 11 passes in its revolutions into contact with the belt the rod will be forced inwardly to effect an intermittent rotation of the worm-shaft and a consequent feeding of the paper-roll from the spool 4 to the spool 5 across the hub of the pulley. Now if the force exerted upon the pulley is such that it will cause the pulley to advance in relation to the arm 1 against the tension of the contractile springs this movement by means of the bell-crank 18 and the connection of its arms with the stationary arm 1 and stylus-holder 16 will impart to the latter a movement laterally to one side or the other, and thus make the desired record.

Having thus described this invention, what is claimed as new is—

1. A dynamometer comprising an arm designed to be secured to a shaft or the like, a pulley yieldingly connected to said arm, a stylus-holder and stylus mounted to oscillate within the pulley, a bell-crank lever carried by the pulley, links having a universal-joint connection with the arms of said lever and with said first-named arm and stylus-holder respectively, whereby the variation in the position of the first-named arm and the pulley will effect a movement of the stylus-holder, and means for feeding a record-sheet across the stylus in a direction at right angles to the line of movement of the stylus-holder.

2. A dynamometer comprising an arm designed to be secured to a shaft or the like, a pulley designed to assume different positions with relation to said arm, an oscillating stylus-holder mounted within the pulley, a bell-crank lever carried by the pulley, links connected to the arms of said lever, the first-named arm and stylus-holder respectively, whereby a change in the relative position of the pulley and the first-named arm will rock said lever and effect an oscillation of the stylus-holder, and means for intermittently feeding a record-sheet across the stylus in a direction at right angles to the line of oscillation.

3. A dynamometer comprising an arm designed to be secured to a shaft or the like, a pulley yieldingly connected to said arm, a stylus-holding bar pivotally suspended within the pulley, a bell-crank lever fulcrumed to a spoke of the pulley and provided with two angularly-projecting arms, links pivotally

connecting the arms of said lever with the first-named arm and stylus-holding bar respectively, and means for feeding a record-sheet across the path of said stylus-holding bar in a direction at right angles to the line of oscillation thereof.

4. A dynamometer comprising an arm designed to be secured to a shaft or the like, a pulley encircling said arm, contractile springs yieldingly connecting the ends of said arm with the pulley at diametrically opposite points of the latter, a pivotally-suspended stylus-holding bar mounted in the pulley, a bell-crank lever fulcrumed on the pulley and having a link connection with the first-named arm and bar respectively, spools carried by the pulley at opposite sides of the hub thereof, a paper strip designed to extend from one spool to the other and bear upon the face of said hub, and means for intermittently feeding said paper over said hub, for the purpose set forth.

5. A dynamometer comprising an arm designed to be secured to a shaft or the like, a pulley yieldingly connected to said arm and designed to assume different advanced positions with relation thereto, an oscillating stylus-holding bar mounted on said pulley, a bell-crank carried by said pulley, links connecting said bell-crank with the first-named arm and stylus-holding bar respectively, spools carried by said pulley and designed to receive a record-strip, one of said spools being provided with a gear, a worm-shaft mounted in a bearing on the pulley and provided at one end with a worm meshing with said gear and at its opposite end with a ratchet, and a longitudinally-movable rod 11 mounted in bearings on the pulley with its end protruding through the rim thereof, said rod carrying a pawl 10 meshing with said ratchet, as and for the purpose set forth.

In testimony whereof I, WALTER H. RUDDICK, administrator of the estate of HAMILTON RUDDICK, deceased, affix my signature in presence of two witnesses.

[L. s.] WALTER H. RUDDICK,  
Administrator of estate of Hamilton Ruddick,  
deceased.

Witnesses:

C. L. WINKLER,  
WILLIAM GORDEN.