

No. 665,862.

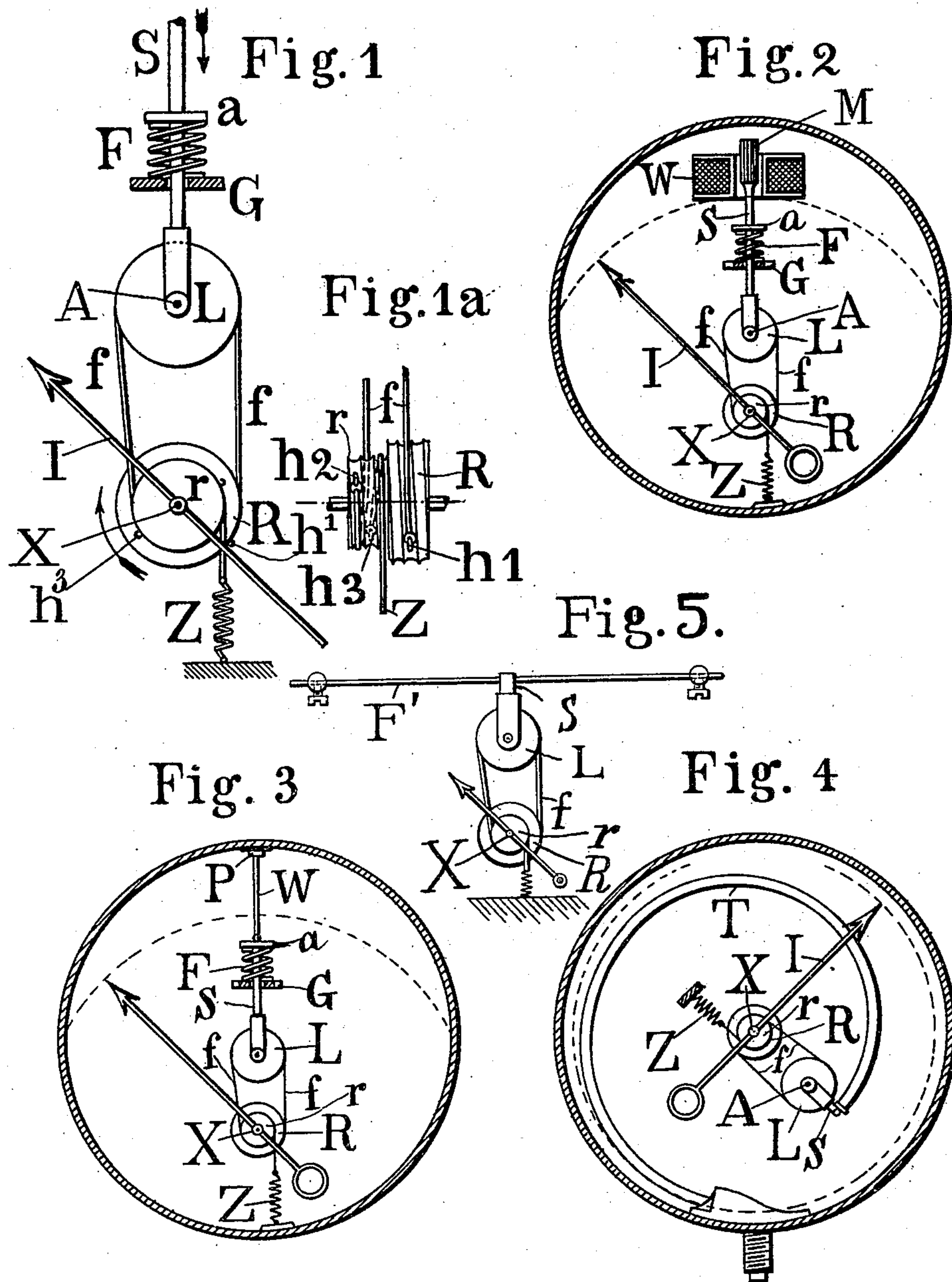
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A. ASCH.

INDICATING APPARATUS FOR MEASURING INSTRUMENTS.

(Application filed July 27, 1898.)

(No Model.)



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INDICATING APPARATUS FOR MEASURING INSTRUMENTS.

SPECIFICATION forming part of Letters Patent No. 665,862, dated January 15, 1901.

Application filed July 27, 1898. Serial No. 686,979. (No model.)

To all whom it may concern:

Be it known that I, ANTON ASCH, a subject of the Emperor of Germany, and a resident of Frankfort-on-the-Main, in the Empire of Germany, have invented certain new and useful Improvements in Indicating Apparatus for Measuring Instruments, of which the following is a specification.

The present invention has for its object to obtain from very small motion, corresponding to the finest of measurements, very much amplified and clearly-discernible movements in an indicator. This end is obtained by means of a member, to which is imparted the motion to be measured, working on a system of rollers which amplify the motion and transmit it to a suitable index.

The invention will be fully understood upon reference to the accompanying drawings, which represent the arrangements by which my invention is put into use, as will hereinafter be specifically set forth.

Figure 1 is a front view of my apparatus connected with a rod on which the force or movement to be measured works. Fig. 1^a is a detail side view of my apparatus. Fig. 2 is a front view of my apparatus connected with the magnet of a solenoid. Fig. 3 is a front view of my apparatus connected with a hot-wire instrument. Fig. 4 is a front view of my apparatus connected with a steam-pressure gage. Fig. 5 is a detail front view showing a substitute which may be employed for the spring.

The sliding rod S, on which the force or movement to be measured works, carries on its lower end a movable axis A, carrying a roller L, over which is wound a thin thread f , one of whose ends leads to and is attached to a metallic hook h' on the greater roller R of the two unequal rollers R and r , fastened to the fixed axis X of the indicator I, while its other end leads to and is attached to a metallic hook h'' of the smaller roller r of these rollers R and r . The axis X is fixed, as stated, and it is acted on by a tension-spring Z, fastened to a metallic hook h^3 on the smaller roller r , so as to rotate the indicator I, as shown by the arrow, Fig. 1. Between the collar a on the rod S and the fixed abutting piece G is arranged a coil-spring F, which serves as a counterforce.

The apparatus works in the following manner: If the rod S, for instance, is moved in the direction of the arrow, Fig. 1, the roller L will be carried inward and approach the rollers R and r , by which action the thread f will be made slack. Through the influence of the spring Z the axis X will wind up the slack thread f on the greater roller R of the rollers R and r and at the same time release that part of the thread running from the smaller roller r , which part runs out over the roller L and back to the greater roller R. As a greater length of thread will be wound on the greater roller R in consequence of the greater circumference of the same than can run off from the smaller roller, any given movement of the indicator I will maintain the original tension of the thread f . If the difference in the diameter of the two rollers R and r is small, then there runs off from the smaller roller r just as much thread as passes onto the greater roller R. In this manner there is produced an extremely-sensitive instrument showing plainly very small movements of the rod S. If the rod S suffers a pull, then the thread runs back from the greater roller R and onto the smaller roller r , by which the indicator I moves to the other side. If, therefore, for example, the rod S constitutes or is connected to a magnet M, Fig. 2, movements imparted to the said rod S by a current flowing through the solenoid W will be shown on the indicator I, and the latter may be made to measure the electric current. As the entering force works against the spring F, the tension of the spring Z for turning on the axis can be made so weak as to just insure the position of the indicator I, and thereby avoid objectionable overbalancing of the axis X.

In order to measure the lengthening of the measuring-wire W as a result of changes in temperature like a hot-wire instrument, an expansible body has one end connected to a fixed point P and the other end connected to the rod S, so that the spring F exerts tension on the body and the axis X remains free from overbalancing. (See Fig. 3.) A very thin stretched body F' , Fig. 5, may be connected directly with the rod S of the roller L, and thus dispense with the spring F. The spring F can also be dispensed with if the instrument is to measure the motion of a body

which needs no counter or tension force—as, for example, the spiral shifting tube T of a steam-pressure gage, Fig. 4.

As in the examples given, the transferring
5 indicating mechanism can find application to great advantage in all other apparatuses in which it is required to transfer motion to an indicator I.

The indicator I increases the same amount
10 for equal movements of the rod S or the roller L, so that a uniform division of the scale from zero to the farthest movement may be made. By eccentrically fastening the small roller r on the axis there could be obtained a greater
15 movement of the indicator I at either end of its movement as a result of the eccentricity of the diameter of the small roller r with the axis.

Having thus described my invention, the
20 following is what I claim as new therein and desire to secure by Letters Patent:—

1. An indicating apparatus for measuring instruments comprising a sliding rod carrying a movable axis, and a roller on the movable
25 axis, the fixed axis, the greater and smaller rollers and the indicator mounted on the fixed

axis, the tension-spring connected to the smaller roller, and the thread connected at one end to the greater roller, passing over the movable roller, and connected at its other end,
30 to the smaller roller; substantially as described.

2. An indicating apparatus for measuring instruments comprising a sliding rod having a collar carrying a movable axis and a roller
35 on the movable axis, a counterbalance-spring bearing against the collar, the fixed axis, the greater and smaller rollers and the indicator mounted on the fixed axis, the tension-spring connected to the smaller roller, and the thread
40 connected, at one end, to the greater roller, passing over the movable roller, and connected, at its other end, to the smaller roller; substantially as described.

The foregoing specification signed at Frank-
45 fort-on-the-Main, Germany, this 29th day of June, 1898.

ANTON ASCH.

In presence of—
EDUARD GIOLLET,
FRANK H. MASON.