(No Model.)

J. L. CHENEY.

DYNAMOMETER.

No. 328,650. Patented Oct. 20, 1885.

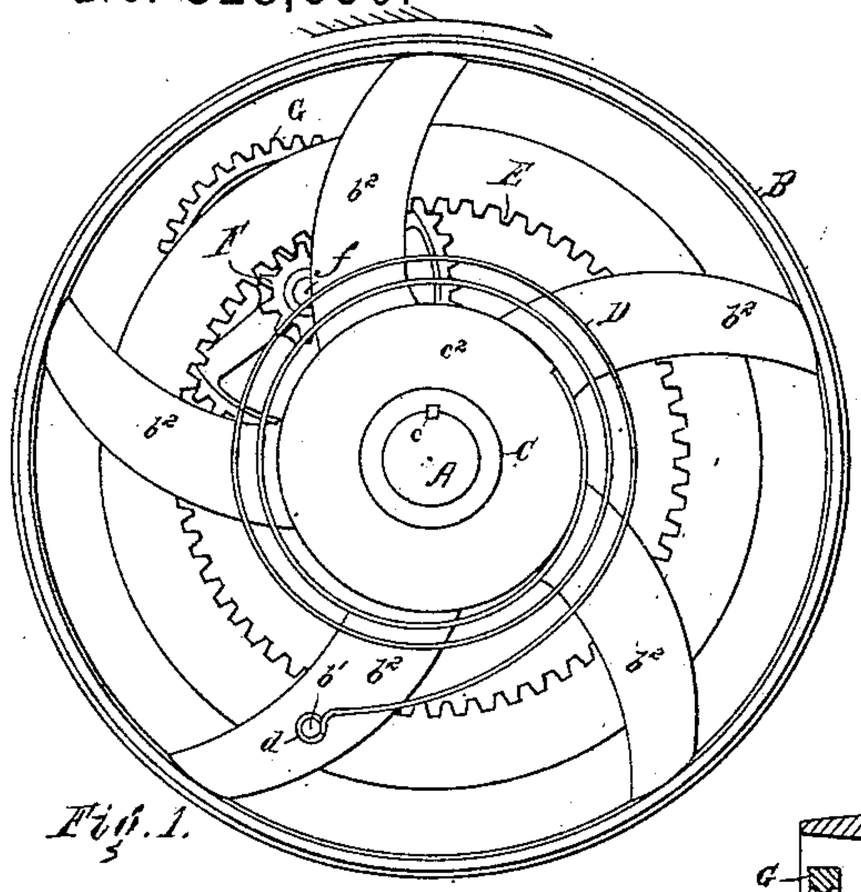

Fig. 1.

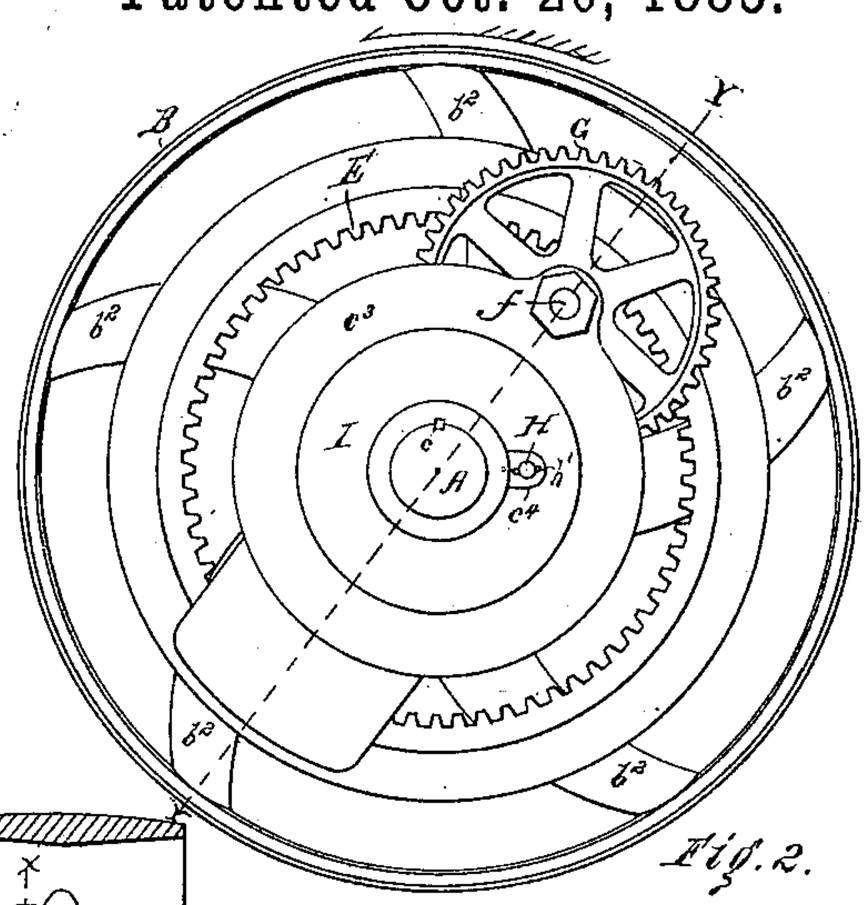

Fig. 2.

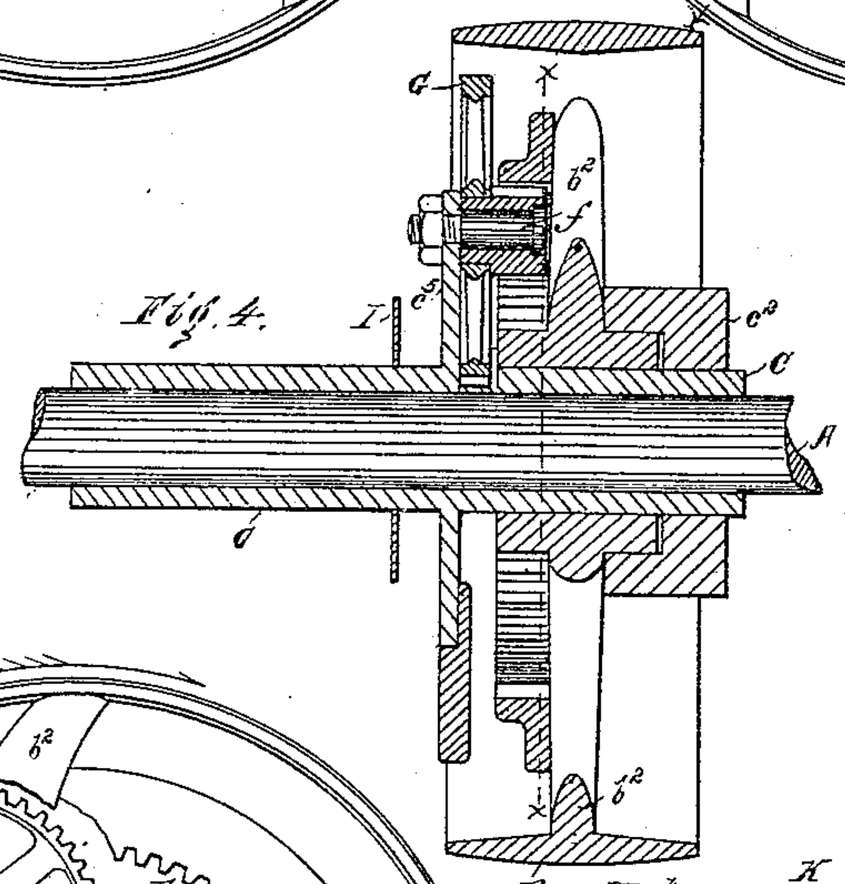

Fig. 4.

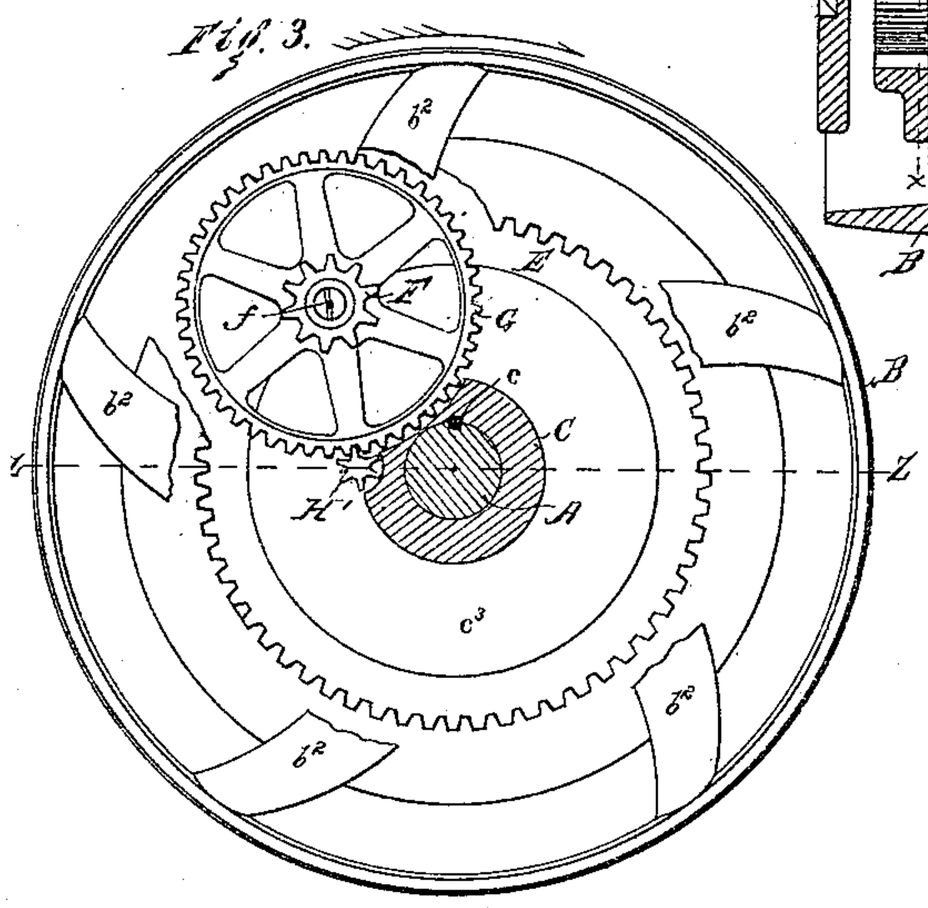

Fig. 3.

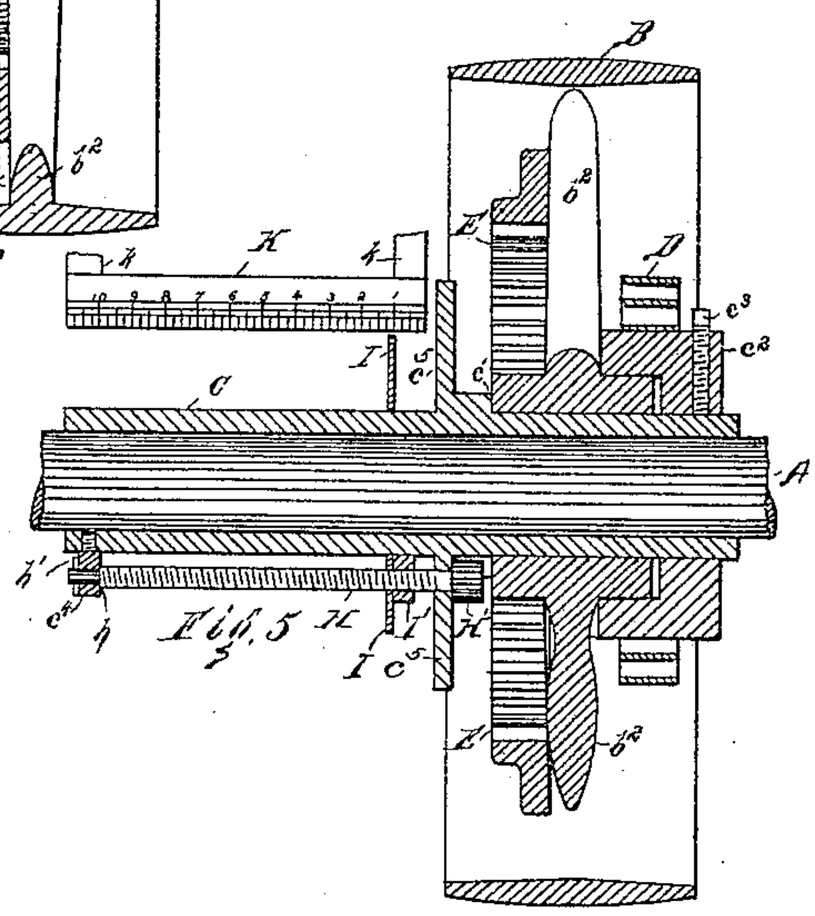

Fig. 5.

Witnesses—
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Inventor—
John L. Cheney,
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UNITED STATES PATENT OFFICE.

JOHN L. CHENEY, OF LOWELL, MASSACHUSETTS.

DYNAMOMETER.

SPECIFICATION forming part of Letters Patent No. 328,650, dated October 20, 1885.

Application filed February 5, 1885. Serial No. 154,973. (No model.)

To all whom it may concern:

Be it known that I, JOHN L. CHENEY, a citizen of the United States, residing at Lowell, in the county of Middlesex and Commonwealth of Massachusetts, have invented certain new and useful Improvements in Dynamometers, of which the following is a specification.

My invention relates to dynamometers; and it consists in the combinations, construction, and arrangements hereinafter described and claimed.

In the accompanying drawings, Figure 1 is a right side elevation of my improved dynamometer; Fig. 2, a left side elevation of the same; Fig. 3, a sectional elevation of the right side of the same on the line *x x* in Fig. 4; Fig. 4, a central section on the line *y y* in Fig. 2; Fig. 5, a central section on the line *z z* in Fig. 3.

A is the driven shaft, the power required to drive which is to be measured. B is a band-pulley of ordinary construction, to which a band from the steam-engine or other motor is applied to drive the shaft, the pulley of course not being secured directly to the shaft, but turning loosely on a sleeve, C, which is keyed to the shaft by the spline *c*. The pulley is prevented from sliding lengthwise of the sleeve by an annular shoulder, *c'*, formed on said sleeve, and by a loose collar, c^2, which surrounds said sleeve, and is secured thereto by a set-screw, c^3, turning radially in said collar and thrusting against said sleeve, the pulley turning freely on said sleeve between said shoulder and loose collar. A ribbon or spring, D, preferably of tempered steel, is connected at one end to the collar c^2, and after being wound several times in open coils about said collar is connected by a loop, *d*, formed in the other end of said spring, to a stud, *b'*, projecting from one of the arms b^2 of said pulley B, parallel with the axis of said sleeve.

It is evident that if the pulley be revolved in the direction indicated by its arrow the spring will be coiled about the collar c^2 until the tension of the spring and its tendency to uncoil is sufficient to overcome the inertia of the sleeve C, shaft A, and the mechanism driven by said shaft, and to cause said sleeve and shaft to rotate. It is of course necessary that the resistance of the spring to being coiled by the rotation of the pulley shall be great enough to overcome the inertia of the shaft and its "load" before the spring is wound tightly about the collar c^2.

The parts above described being arranged and connected as hereinbefore stated, it only remains to provide means for indicating the tension of the spring under various loads. For this purpose I secure to the arms b^2 of the pulley B, concentrically with said pulley, an internally-toothed gear, E, into which takes an externally-toothed pinion F. The pinion F is secured to the same shaft, *f*, with another gear, G, and the last-named gear takes into a pinion, H', secured on the right-hand screw H, the shaft of the pinion F and gear G being supported and turning in a flange, c^5, which projects from said sleeve C. The screw H and its pinion H' are supported by said flange c^5, and by a stud, c^4, projecting from said sleeve, and are prevented from moving endwise by a shoulder, *h*, on said screw on one side of said stud c^4 and a pin, *h'*, inserted in said screw on the other side of said stud c^4. The indicator I is an annular sheet of metal which surrounds said shaft concentrically therewith, and has secured to it a nut, I', through which and through an opening in said indicator I the screw H is passed, the nut I' engaging with said screw so that when the screw is revolved the indicator will travel along said sleeve away from the pulley B, and thus indicate the tension of the spring on the scale K, which is supported by rods *k k* depending from the ceiling of the room in which the dynamometer is used.

The scale is graduated to pounds and fractions of pounds, or according to any other system of weights. That the tension of the spring will be shown on the indicator is apparent, for the indicator will be moved when the screw H revolves, and said screw will revolve only when the pinion H' is revolved by the gear G and pinion F, these in turn being revolved by the internally-toothed gear E, for the screw H and its pinion H'. The intermediate gear, G, and pinion F are all supported on the sleeve C, and have a motion with it about its axis, while the gear E is attached to and revolves with the pulley B, so that when said pulley rotates faster than said sleeve, or turns on said

sleeve, the screw must rotate and the indicator move, and the spring being connected, as above described, at one end to the pulley and at the other end to the sleeve, the tension of the spring necessary to cause the sleeve and shaft with its load to revolve will be indicated by the amount of the movement of said indicator.

From the number of revolutions of the shaft and the indications on the scale, the amount of power used is calculated in the usual manner.

The correctness of the dynamometer above described may be tested by suspending weights of known amount from a belt wound partly around the pulley while the shaft is prevented from revolving. When any such weight descends as far as the resistance of the spring will allow, the indicator should show on the scale the exact number of pounds in such weight.

The dynamometer above described, when properly constructed, is cheap, portable, and not likely to get out of order.

I claim as my invention—

1. The combination of a sleeve adapted to receive and to be secured to a shaft, a pulley turning loosely on said sleeve a collar secured to said sleeve, a coiled spring, one end of which is secured to said sleeve and the other end of which is secured to said pulley, a gear secured to said pulley, a screw supported on said sleeve and revolving with said sleeve above the axis of the same, and provided with a pinion, an indicator surrounding said sleeve and provided with a nut which engages with said screw and intermediate gears connecting the gear on said pulley with the pinion on said screw and a graduated scale, as and for the purpose specified.

2. The combination of the sleeve provided with an annular shoulder and with a flange, and adapted to receive and to be secured to a shaft, a collar surrounding said sleeve and provided with a set-screw which thrusts against said sleeve, the pulley turning loosely on said sleeve between said shoulder and collar, a spring attached at one end to said collar and at the other to said pulley and loosely coiled about said collar, a screw turning in said flange of said sleeve and in a stud projecting from said sleeve, an internally-toothed gear secured to said pulley, a pinion secured to said screw, an intermediate gear and an intermediate pinion secured to a common shaft and supported by said flange, said intermediate pinion engaging with said internally-toothed gear, and said intermediate gear engaging with the pinion on said screw, an annular indicator surrounding said sleeve and provided with a nut which engages with said screw, and a scale, as and for the purpose specified.

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