

PATENTED JUN 27 1871

Fig. 1.

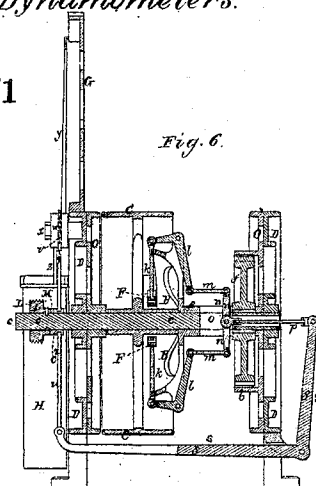


Fig. 6.

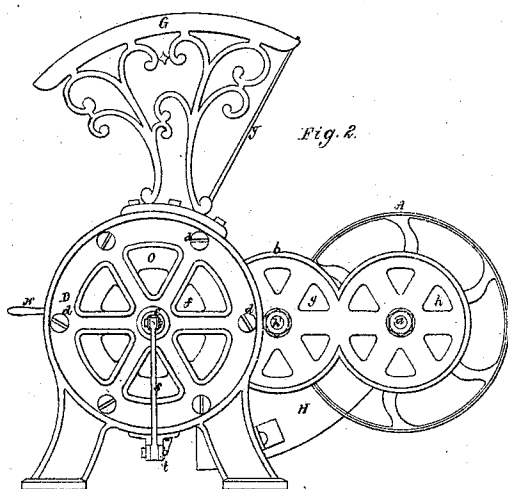


Fig. 2.

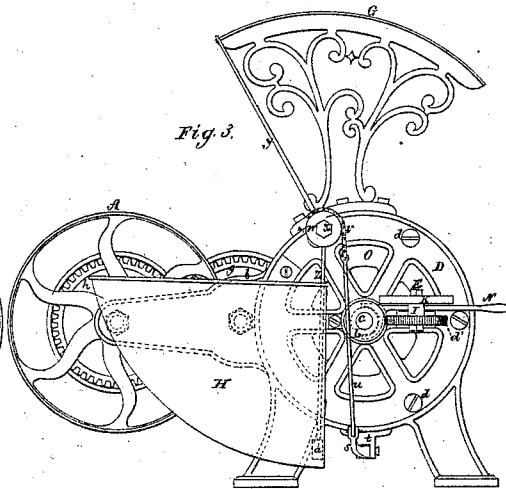


Fig. 3.

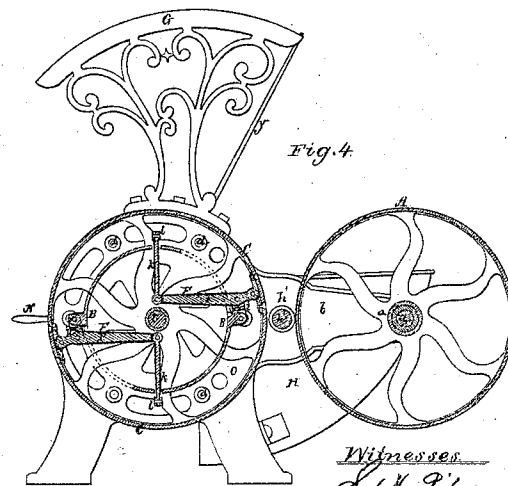


Fig. 4.

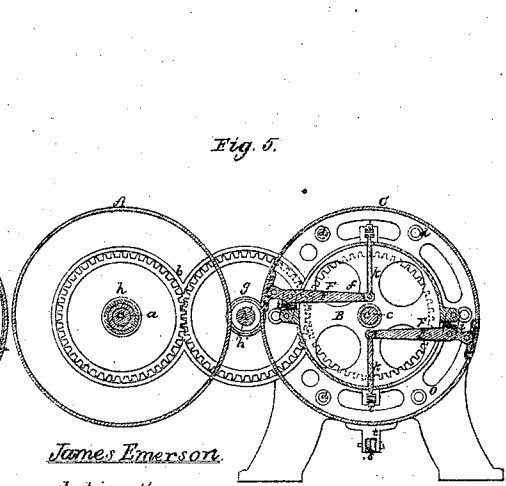


Fig. 5.

Witnesses
S. W. Piper
L. A. Moles

James Emerson.
by his attorney
R. M. Lacy

UNITED STATES PATENT OFFICE.

JAMES EMERSON, OF LOWELL, MASSACHUSETTS.

IMPROVEMENT IN DYNAMOMETERS.

Specification forming part of Letters Patent No. 116,285, dated June 27, 1871.

To all whom it may concern:

Be it known that I, JAMES EMERSON, of Lowell, of the county of Middlesex and State of Massachusetts, have made a new and useful invention of an Improvement in Dynamometers for measuring the power required for putting a machine or machinery in operation; and I do hereby declare the nature of the said invention, or the dynamometer as improved by me, and the manner in which such is to be performed or is to be made and applied, and to operate, to be fully described in the following specification, reference being had to the accompanying drawing making part thereof, and of which—

Figure 1 is a top view; Figs. 2 and 3, opposite side elevations. Figs. 4 and 5 are longitudinal sections, and Fig. 6 is a vertical and transverse section of the said improved dynamometer.

The longitudinal sections are taken in a plane passing through the levers by which the driven wheel is connected with the "spider," to be hereinafter described, one section exhibiting the mechanism to the right of and the other that to the left of such plane.

In the drawing the driving-wheel is shown at A, and the driven or measuring-wheel at C. The driving-wheel is to receive the driving-belt from the prime motor, the shaft *a* of such wheel A being supported in bearings in the cheeks *b b* of a rotary carrier or frame, O, which is arranged between and against two stationary standards, D D, and mounted on a tubular shaft, *c*, disposed in such standards in manner as represented. Screws *d d d*, arranged at equal distances apart, go through each standard and screw into the cheeks of the frame O, and serve to hold it in either a horizontal or inclined or upright position, as circumstances may require it to be placed in, as the said frame may be turned around through a semicircle or thereabout, or even more, if necessary. Within the wheel C is what is termed the spider B, which is a bell-shaped or concavo-convex wheel, fixed upon a tubular shaft, *e*, arranged concentrically with the shaft *c*, and provided with one of a train of three gears, *f g h*, arranged within the carrier O. The outer of such gears is fixed on the shaft *a*. The intermediate gear *g* turns on a cross-shaft, *h'*, arranged in the carrier, as shown. There are pivoted to the wheel C, at opposite parts of its inner periphery, two levers, F F, which, at their fulcrums, are con-

nected to the spider by links *i i*. Two rods, *k k*, jointed to the inner ends of the said levers, are also jointed to the shorter arms of two right-angular levers, *l l*, which are pivoted to or have their fulcrums in the spider. The longer arms of the levers *l l*, by means of rods *m m*, are connected with the opposite ends of the cross-head or bar *n*, going diametrically through the shaft *e* and *c*, and also through slots *o* cut in such shafts, as shown. The bar *n*, at its middle, is fixed to the end of a rod, *p*, arranged in the shaft *c*, projecting out one end thereof, and jointed to the shorter arm of a right-angular lever, *s*. The said lever *s* has its fulcrum in an arm, *t*, extended from one of the standards D D. The longer arm of the said lever goes underneath the said two standards, and is jointed to a vertical rod, *u*, which in turn is fastened at its upper end to a chain, *v*, that goes around and is fixed to the periphery of a wheel, *w*, arranged on a stationary pivot or fulcrum, *x*, all being as represented. An index-arm, *y*, extends upward from the wheel *w* to the circumference of a divided limb or sector, G, erected on the next adjacent standard D. There also extends down from the wheel and into a quadrant-shaped tank, H, an arm, *z*, provided at its lower end with a flat weight, *a'*. The tank is to hold a liquid for the purpose of steadying the motions of the index-arm or pointer. An arm, I, extended from the said standard D, supports a divided circular plate, K, and there extends up through such arm and plate a vertical shaft, *b'*, carrying on its upper end an index-pointer, *c'*, and on its lower end a worm-gear, *d'*. The said gear *d'* engages with a screw or worm, L, which revolves freely on the shaft *c*, and is to be thrown either into or out of engagement with such shaft by means of a clutch, M. The toothed part of the clutch projects from the worm L, the other part being arranged on the shaft and held to it by a feather connection, and provided with a lever, N, arranged as shown, such lever being for the purpose of sliding the movable part of the clutch either against or away from the part fixed to the worm. As the movable part *c'* of the clutch revolves with the shaft *c*, I have the means of determining the velocity of revolution of the wheel C, such being represented by the counter or divided plate K and its index-pointer.

In using the said dynamometer a driving-belt from the prime motor is to run around the wheel

A, while another is to go around the wheel C, and thence to and around the main driving-drum, pulley, or wheel of any machine the power to drive which it may be desirable to measure. As the spider will be revolved by the driving-wheel and the train of gears, the wheel C must derive its rotary motion through its connections with the spider; and consequently, as such connections are the levers F F and the links *i i*, arranged as shown, the force tending to revolve the wheel C, and the resistance of the latter to move, must cause the levers F F to move more or less, so as to set in motion the mechanism by which the chain *v* will be drawn down so as to revolve the wheel *w*.

By ascertaining the amount of power required to start the wheel C, which I can do by hanging weights on its circumference until it just commences to move, and by properly graduating the

upright limb so as to render it, with its index-arm, an indicator of the resistance met with from time to time by the wheel C, I can at any time determine by the dynamometer the power or force that may be in action to effect the operation of the machine.

I claim—

The combination and arrangement, substantially as described, of the carrier or frame O with the standards D D, the driving-wheel A and train, the wheel C, and the spider B combined with the wheel C, by means and provided with mechanism, substantially as described, for indicating the resistance of such wheel C, as set forth.

JAMES EMERSON.

Witnesses:

R. H. EDDY,

J. R. SNOW.