M. LEE.

Dynamometer for Testing the Strength of Yarn.

No. 201,802. Patented March 26, 1878.

Fig 1.

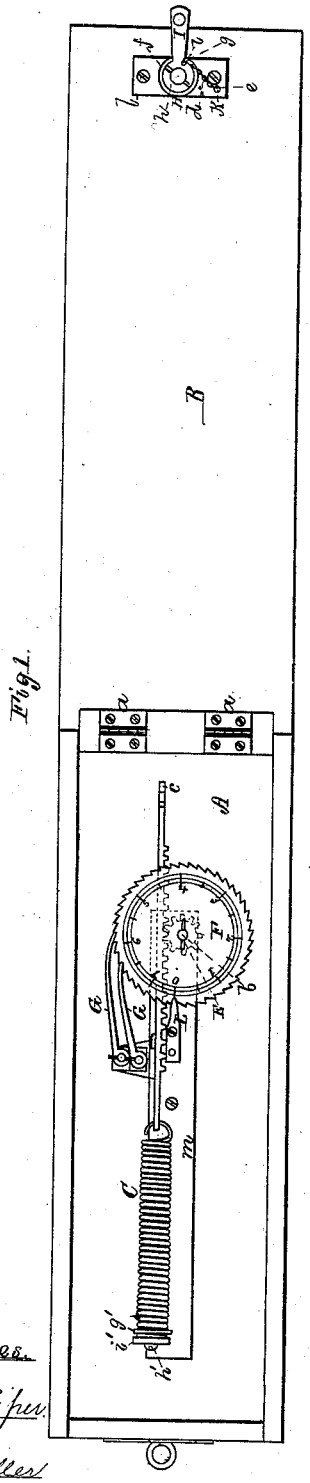


Fig 3.

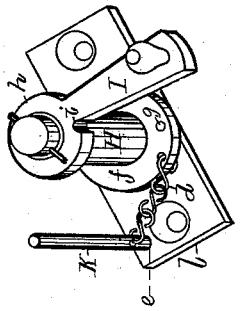
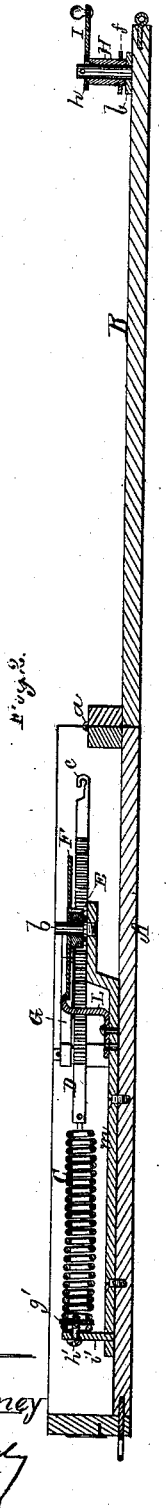


Fig 2.



Witnesses.

S. N. Piper.

L. W. Miller

Inventor

Mark Lee

by his attorney

R. H. Eddy

UNITED STATES PATENT OFFICE.

MARK LEE, OF HIGHLANDVILLE, MASSACHUSETTS.

IMPROVEMENT IN DYNAMOMETERS FOR TESTING THE STRENGTH OF YARN.

Specification forming part of Letters Patent No. **201,802**, dated March 26, 1878; application filed January 15, 1878.

To all whom it may concern:

Be it known that I, MARK LEE, of Highlandville, of the county of Norfolk and State of Massachusetts, have invented a new and useful Dynamometer for Measuring the Strength of Yarn; and do hereby declare the same to be described in the following specification and represented in the accompanying drawings, of which—

Figure 1 is a top view, and Fig. 2 a longitudinal section, of it as it appears when the case is open.

My invention consists, mainly, in the combination of a helical spring, a hooked rack-bar, a pinion, a ratchet-wheel, and one or more pawls, such being to operate with a rotary barrel or windlass, all being arranged and applied and to operate essentially as shown and described.

In such drawings, A denotes the body of the case, of which B is the cover, the two being hinged together at two of their ends, as shown at *a a*. Within the said body is a helical spring, C, whose upper end is provided with a disk, *g'*, through which a screw, *h'*, going through a standard, *i'*, is screwed. The lower end of the spring is attached to a toothed rack, D, whose teeth engage with a pinion, E, fixed on one and the same arbor *b* with a ratchet-wheel, F. One or two retaining-pawls, G G, arranged as shown, and pivoted to the body A, engage with the teeth of the ratchet-wheel.

The rack, at or near its lower end, is hooked or notched, as shown at *c*.

There is pivoted to the cover B a small windlass or barrel, H, provided with a crank, I. This barrel (shown in perspective in Fig. 3) has connected with it, by means of a chain, *d*, a pin, K, and there is in a plate, *l*, fixed to the case a hole, *e*, to receive the lower end of the pin. There is also in the lower flange *f* of the barrel a hole, *g*, to receive the pin, and over this hole there is in the upper flange *h* a notch or recess, *i*, to receive and support the pin when it is in the hole of the lower flange.

Furthermore, there is to the ratchet-wheel a stationary index-pointer, L, which is fixed to the case-body, or to a plate or bar, *m*, fastened thereto, and arranged with the said wheel in manner as shown. Suitable divisions and numbers are made on the face of the ratchet-wheel, to indicate the measure of the tension of the spring, according to the extent of movement lengthwise of the bar toward the barrel.

In order to use the dynamometer to test the strength of a piece of thread or yarn, the latter is to be fastened to the hook of the rack-bar, and next should be wound one or more times about the barrel and secured to the crank. After this the barrel, by the hand applied to the crank, should be revolved until the yarn may break. The measure of the breakage tension of the yarn will be indicated by the dial-division against the index, as the pawl or pawls will estop the ratchet-wheel and hold the spring extended, as it may be on breakage of the yarn.

In case it may be desirable to test the strength of two or more strands or portions of the yarn, the pin K should be first inserted in the hole *e*. Next, the yarn should be wound around the said pin and the hook of the rack-bar as many times as may be desirable. This having been accomplished, the pin with the yarn on it should be transferred to the hole *g* and recess *i*, the yarn being also wound about the crank. On revolving the barrel until breakage of the yarn may result, the force of resistance will be indicated by the index and the dial or divisions of the ratchet-wheel.

On closing the cover upon the body of the case the windlass and other operative parts will be incased, and the whole will be reduced in length.

The screw *h'* is to enable the spring to be properly adjusted to the zero-point or commencement of the divisions of the ratchet-wheel.

I claim—

1. The combination of the spring C, the hooked rack-bar D, the pinion E, the ratchet-wheel F, index L, and one or more pawls, G, such being to operate with a rotary barrel or windlass, H, all being arranged substantially as and for the purpose as set forth.

2. The box-body A and cover B, arranged and connected as described, in combination with the windlass or barrel H, the spring C,

hooked rack-bar D, pinion E, graduated ratchet-wheel F, index L, and one or more pawls, G, all being essentially as set forth.

3. The combination of the pin K with the cover or plate *l*, provided with the hole *e*, and with the windlass or barrel H, having the hole *g* and recess *i*, as set forth, and with the hooked rack-bar D, its spring C, pinion E, ratchet-wheel F, index L, and pawl or pawls G, all being substantially as specified.

MARK LEE.

Witnesses:
R. H. EDDY,
JOHN R. SNOW.