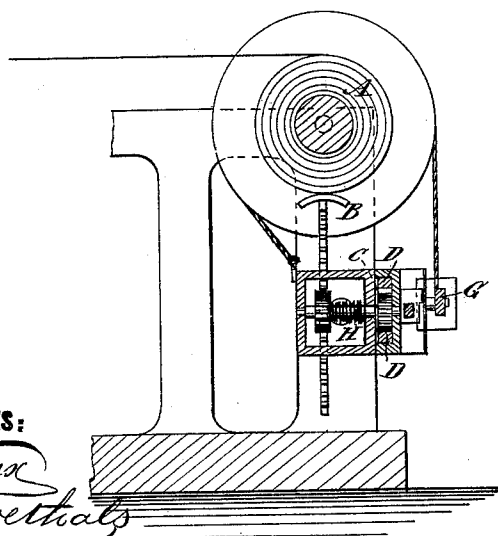
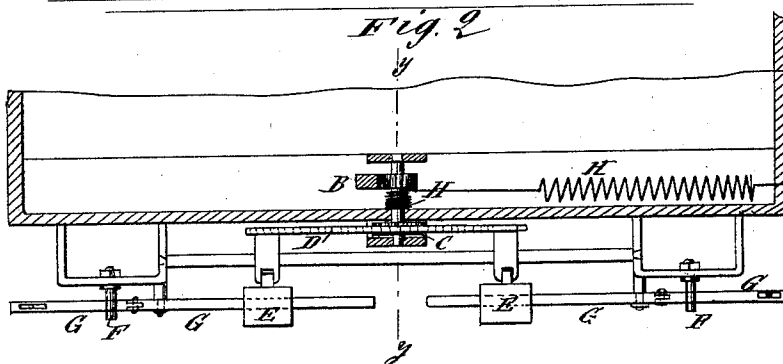
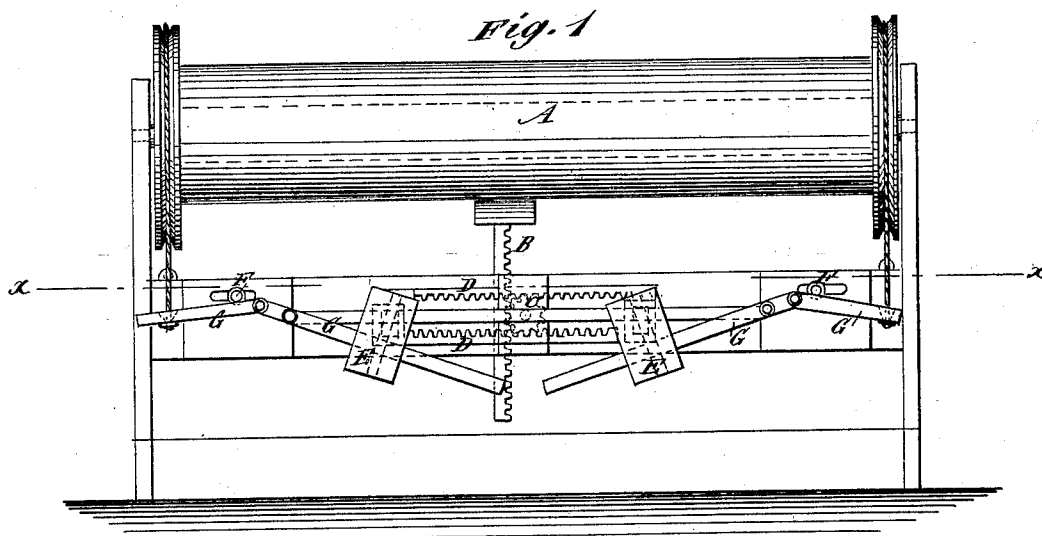


J. F. MORLEY.  
WARP TENSION REGULATOR.

No. 176,033.

Patented April 11, 1876.



WITNESSES:

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# UNITED STATES PATENT OFFICE.

JOHN F. MORLEY, OF WATERLOO, CANADA.

## IMPROVEMENT IN WARP-TENSION REGULATORS.

Specification forming part of Letters Patent No. **176,033**, dated April 11, 1876; application filed January 15, 1876.

*To all whom it may concern :*

Be it known that I, JOHN FIELD MORLEY, of Waterloo, in the county of Waterloo, Province of Ontario, and Dominion of Canada, have invented a new and Improved Warp-Tension Regulator, of which the following is a specification:

My invention consists of a contrivance of compound levers and an adjustable fulcrum, for adjusting the tension to warp of different sizes and strengths, and a novel contrivance for shifting the weights of the friction-strap levers as the size of the warp-roll diminishes, all as hereinafter described.

Figure 1 is an end elevation of a loom, showing the application of my improved tension. Fig. 2 is a horizontal section of Fig. 1 on the line *x x*; and Fig. 3 is a transverse sectional elevation on line *y y*, Fig. 2.

Similar letters of reference indicate corresponding parts.

The warp-beam, when full, requires more friction than when it is partially full, and as it is most essential for producing an equal weight of cloth that the tension of the warp shall be equal throughout, different friction arrangements are in use which have to be regulated by hand.

I have constructed an apparatus which regulates the tension automatically, and without change of weights, for cloth of different weights.

When the warp is wound on the beam A, the rack-bar B is depressed, and the cog-wheel C, which moves the toothed bars D, turns. To these bars D the weights E are connected, and slide along the compound levers G G', to follow the movement of the bars.

In this way the weights are farthest from the fulcrum when the warp is full and most tension is required. As the warp gets smaller and less friction is required, the weights move steadily toward the fulcrum, and the friction lessens.

To set the apparatus for different weights of cloth, it is only needed to move the fulcrum-bolt F to increase or diminish the length of the levers.

The advantages of this arrangement are obvious. Goods from nine ounces up to nineteen ounces can be woven with the same weights, and thirty pounds on these levers give as much tension as one hundred and twenty pounds on the old straight levers. The friction is much more steady. The jumps which occur with the common straight levers when the beam has been pulled back too far, and which occasion thin places in the cloth, are obviated. On heavy goods it is much easier to pull back the beam, as less weight is required. This is a great improvement where girls are employed.

The rack-bar is raised by the spring H, to be kept in contact with the beam.

Having thus described my invention, I claim as new and desire to secure by Letters Patent—

The combination of compound levers G G' and adjustable fulcrum F with weights E, operated by mechanism to graduate their position on the levers, substantially as and for the purpose specified.

JOHN F. MORLEY.

Witnesses:

J. M. MUIR,

FRED. COLQUHOUN.