No. 815,326. PATENTED MAR. 20, 1906.

D. BACON.

ELECTROMAGNETIC BEAM TENSION REGULATOR.

APPLICATION FILED MAY 10, 1905.

Fig. 1.

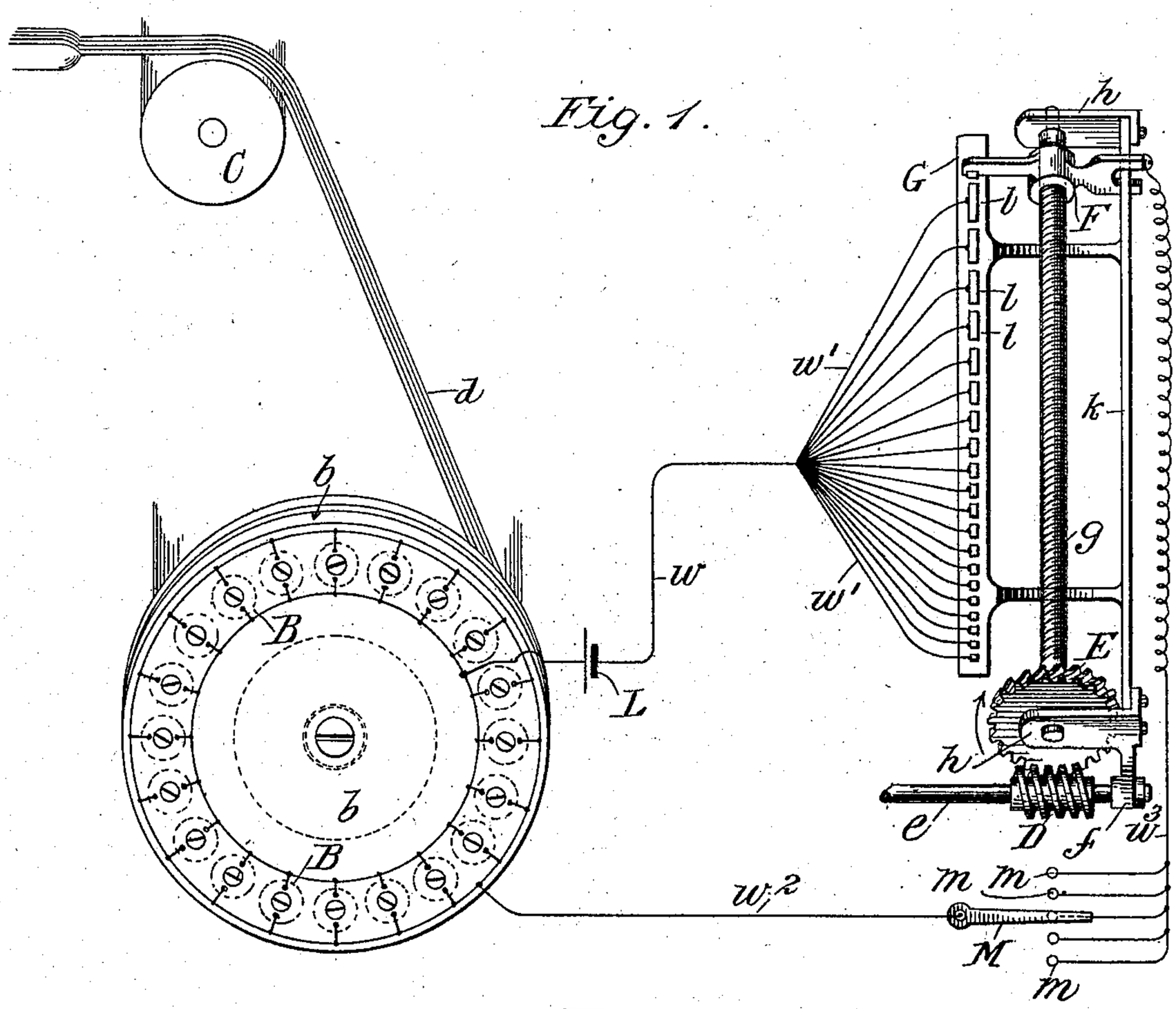
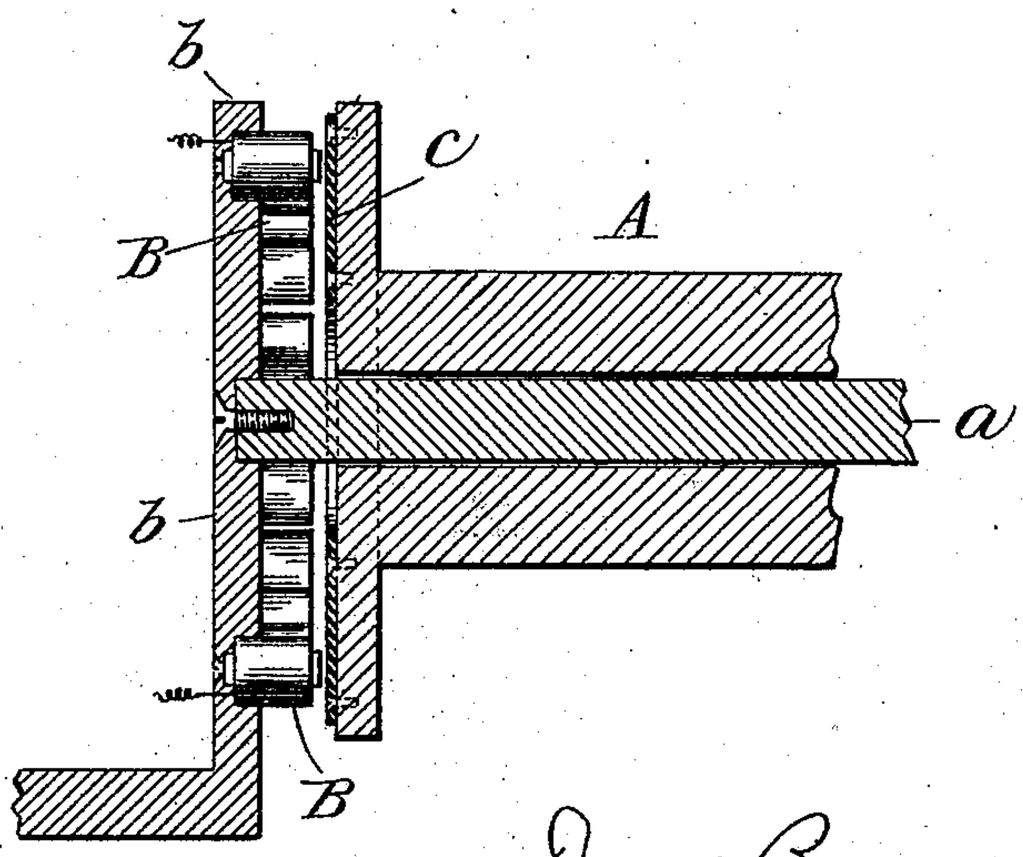


Fig. 2.



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UNITED STATES PATENT OFFICE.

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ELECTROMAGNETIC BEAM-TENSION REGULATOR.

No. 815,326. Specification of Letters Patent. Patented March 20, 1906.

Application filed May 10, 1905. Serial No. 259,681.

To all whom it may concern:

Be it known that I, DANIEL BACON, a citizen of the United States, and a resident of Brooklyn borough, New York city, and State of New York, have invented certain new and useful Improvements in Electromagnetic Beam-Tension Regulators, of which the following is a specification.

My invention relates to reels or beams for looms, and has for its object the providing of an electromagnetic tension-regulator by means of which the proper tension of the reel or beam during the unwinding of the thread or yarn may be automatically adjusted to correspond with the constantly-diminishing quantity of yarn until the beam is exhausted, when a new supply of yarn will be furnished. In present practice it is usual to regulate this tension by purely mechanical means, which is apt to result in an unequal tension on the various warp-threads, which shows itself either in the breaking of individual warp-threads or in some defect of the quality of the goods even when the warp-threads remain intact.

By the use of my electromagnetic regulator greater regularity and delicacy of tension are brought about automatically by very simple and efficient means.

As is well known, the necessity for regulating the tension arises from the fact that when the beam carries its full amount of thread, which unwinds from its outer circumference, the beam has the benefit of its maximum leverage, and it has been found in the weaving of standard cotton cloths an approximate pull of about two pounds is necessary to turn the beam under these conditions. When, however, the beam is nearly unwound and the threads are drawing from a point near the center of the beam, the leverage is at its minimum, and it requires a pull of approximately fifteen pounds to turn the beam. As this increase of power required is gradual, corresponding to the decrease in leverage, the object of my invention is to provide an electromagnetic means for compensating for the loss of leverage in a gradual way, so that the tension remains constant.

One application of my invention is shown in the accompanying drawings, in which—

Figure 1 is the front view somewhat in perspective. Fig. 2 is a vertical section of the beam.

Same letters indicate similar parts in both drawings.

A is the beam or reel, loosely mounted on a stationary shaft *a*. This shaft is supported by the stationary frame *b*. On this frame facing the end of the beam are a number of electromagnets B B, arranged, preferably, in a circle and in series, and these magnets serve as an electric drag upon the beam A by the magnetic pull which they exert when energized upon a face-plate *c*, secured to the end of said beam within the field of said magnets. By energizing these magnets sufficiently to create a magnetic pull or drag equivalent to the difference in leverage between the maximum and minimum points of unwinding of the thread *d*, which unwinding from the reel or beam A passes over the bar C to the loom, (not shown,) and by causing this magnetic pull to diminish gradually as the leverage diminishes I enable a fixed power to produce a uniform effect of tension on the thread at all stages of the unwinding. To bring about this gradual reduction of magnetic pull, I provide an energizing mechanism, as shown at the right hand of Fig. 1.

D is an actuating-worm mounted on a worm-shaft *e*, journaled at *f* in a stationary framework and deriving its revolution from the loom by a connection (Not shown.) The worm D meshes with the worm-wheel E, mounted on a feed-screw *g*, which is journaled in the brackets *h h*, which form part of the fixed framework. On this feed-screw is threaded the contact-finger F, the rear end of which embraces a guide-rod *k*, attached to the stationary framework and serving to prevent the finger from rotating with the feed-screw, while the forward end of the finger makes contact with the successive plates *l l* on the rheostat-bar G, which is mounted upon the framework and communicates by means of the plates with a series of resistance-coils. (Not shown.)

Contact is made to close the circuit between a battery L and the finger G and electromagnets B B with the wires w, w', w^2, and w^3 by means of a switch M and the contact-plates *l l*, as follows: To allow the use of various degrees of full strength to the current energizing the electromagnetic drag, I have indicated at *m m* five independent sources of electric energy or of electric resistance, as may be desired, within the sweep of the switch M. For some kinds of work on controlling the beam a stronger full current is needed than for others, and the switch therefore should be connected with that current or

source of electric energy which is best adapted at full strength to perform the work required. In this way the action of the contact-finger becomes proportionate always to the specific current which may be in use at the time. Without this provision the finger and feed-screw would have to be so arranged that the amount of motion would vary with the variations in energy allowable for full strength, as will be readily understood. During the unwinding of a beam the finger F is expected to travel the entire length of the feed-screw *g* and pass successively over all of the plates *l l*, so that the length of this travel is made to correspond to the unwinding distance from the outer edge of the wound thread to the axle of the beam. As the outer coils of thread are successively longer than the inner, the outer contact-plates *l l* are successively longer than the inner. The spaces between successive plates are preferably of uniform width and of such a size that the forward edge of the contact-finger G reaches the next plate before the rear edge leaves the previous plate. In this way I secure an uninterrupted but constantly-decreasing current during the passage of the contact-finger from one end of the bar to the other.

I claim—.

An electromagnetic beam-tension regulator which consists of an electromagnetic drag adapted to retard the unwinding of the beam, when energized and a compensating mechanism adapted to energize said drag with an electric current automatically decreasing during the unwinding of the beam.

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Witnesses:
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