(No Model.)

A. MIDDLETON, Jr.

TENSION REGULATOR FOR LET-OFF MOTIONS OF LOOMS.

No. 327,187. Patented Sept. 29, 1885.

Fig. 1.

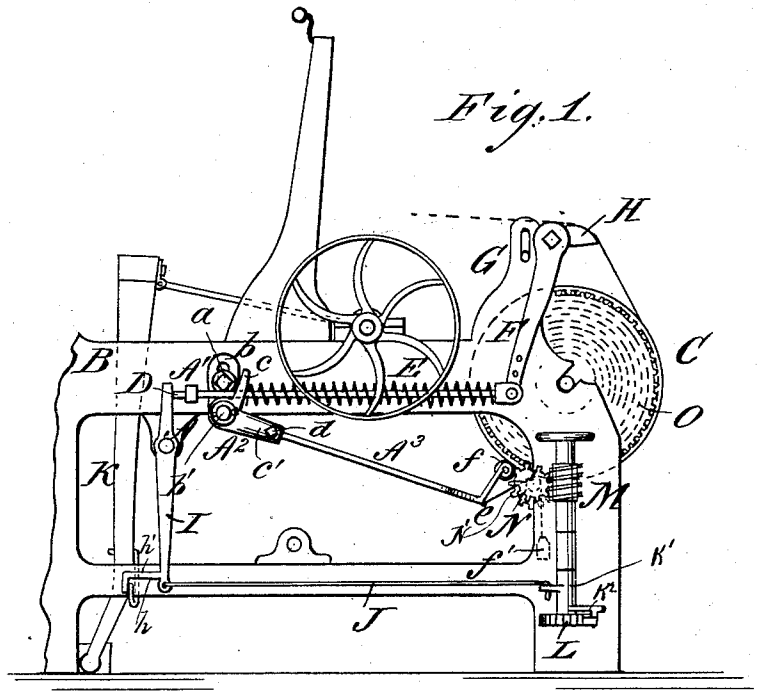
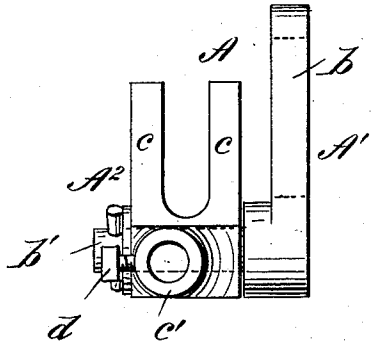


Fig. 2.



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UNITED STATES PATENT OFFICE.

ARTHUR MIDDLETON, JR., OF PELZER, SOUTH CAROLINA.

TENSION-REGULATOR FOR THE LET-OFF MOTIONS OF LOOMS.

SPECIFICATION forming part of Letters Patent No. 327,187, dated September 29, 1885.

Application filed May 28, 1884. (No model.)

To all whom it may concern:

Be it known that I, ARTHUR MIDDLETON, Jr., of Pelzer, in the county of Anderson and State of South Carolina, have invented a new and Improved Tension-Regulator for the Let-Off Motions of Looms, of which the following is a full, clear, and exact description.

My invention relates to automatic tension-regulating devices for let-off motions of looms; and the invention consists of the improved construction, arrangement, and combination of parts, all as hereinafter described and claimed.

Reference is to be had to the accompanying drawings, forming a part of this specification, in which similar letters of reference indicate corresponding parts in both the figures.

Figure 1 is a side elevation of part of a loom, showing my invention applied to a Bartlett let-off motion; and Fig. 2 is a front elevation of a part of the attachment.

The Bartlett warp let-off motion as now constructed requires the constant attention of a person to regulate the pressure of the tension-producing spring, which pressure has to be reduced at intervals as the diameter of the roll of warp on the warp-beam diminishes, so as to insure an approximate regularity in the cloth. By my invention the pressure of the tension-producing spring is regulated automatically and continuously and in exact proportion to the reduction of the size of the roll of warp on the beam, thus giving the warp the same tension from the beginning to the finish of the roll and without the service of an attendant.

Referring to the drawings, A represents my new tension-regulating attachment secured by the bolt *a* to the side B of the loom. C represents the roll of warp. The attachment A is composed of the part A′, which is formed of the slotted upright plate *b* and horizontal gudgeon *b′*, the part A^2, formed with the prongs *c c* and socket *c′*, and the rod A^3, which is held in the socket *c′* by the set-screw *d*, and is bent at its outer end, as shown at *e*, and provided with the friction-roller *f*, which is held to constantly run against the roll of warp C by the weight *f′*. The part A^2 is journaled upon the gudgeon *b′*, and the prongs *c c* stand at right angles to the socket *c′*, and between the prongs *c c* passes loosely the rod D, pivoted to the lever F, on which rod the spiral tension-producing spring E is placed, which, abutting against prongs *c c*, tends to force back the lower end of the lever F, and thus tends to elevate the whip-roll H, over which the warp-threads pass.

The action is as follows: As the quantity of warp on the beam C decreases, the speed of the latter must, of course, be increased to permit the uniform feeding of the warp over the whip-roll H. The whip-roll H, which works in a socket on knife-edges, being by the pressure or action of the warp thereon swung downward and forward, accordingly affects its arm F, which in turn moves forwardly the rod D through the spring E against the upper end of the lever I, throwing the hooked lower end of the latter rearward. The hook *h* of the lever I is now engaged by the hook *h′* of the lay K in the forward movement of the lay and the lower end of the lever I, and rod J, connecting the lever I, and the pawl-carrier K′, carrying the pawl K^2, are drawn forward, thereby turning the pawl-carrier and ratchet L, whereby the worm-gear M is caused to turn the pinion N, upon whose shaft is also a second pinion, N′, gearing with the teeth or cogs O of the beam-head, thus driving the latter. When the warp-beam is full of warp, the roller *f* on the rear end of the arm A^3, running against the roll of warp upon the beam, is depressed to its lowest position and the prongs *c* are caused to stand at their most rearward position and to compress the spiral spring E, thus giving the maximum tension at the proper time—viz., when the warp-beam is full. As the diameter of the roll of warp on the warp-beam diminishes, the prongs *c* recede, owing to the more elevated position which the rear end of the arm A^3 is permitted to occupy, which gradually relieves the pressure of the spring E and permits the whip-roll H to be farther depressed by the pressure of the warp when the upper end of the lever I is permitted to move forward with the rod D, thus diminishing the tension upon the warp-threads, and the tension diminishes continually as the diameter of the roll of warp diminishes, since the weight *f′* acts to always keep the roller *f* in contact with the warp, so that the tension will diminish proportionately with the de-

crease in the diameter of the roll of warp. In this manner a constant, uniform, and perfectly automatic and reliable tension is provided, which accommodates itself to the gradual reduction in size of the roll of warp and causes the cloth to be woven of even weight throughout.

By means of the slotted plate *b* the attachment A may be adjusted upon the loom to any desired position.

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

1. The combination, with the rod D, the lever F, and the whip-roll, the warp-beam, and the tension-producing spring on said rod, of the tension-regulator having the arm provided with prongs resting against said spring and means, substantially as described, to hold the rear or free end of said regulator against the warp on said beam, substantially as and for the purpose set forth.

2. The combination, with the rod D, the lever F, the whip-roll, the warp-beam, and the tension-producing spring on said rod D, of the tension-regulator, comprising the part A′, the pivoted part A^2, having the prongs *c*, and the rod or arm A^3, having the roller *f*, bearing upon the warp on said beam, substantially as and for the purpose set forth.

3. The combination, with the rod D, the lever F, the whip-roll, the warp-beam, and the tension-producing spring on said rod D, of the part A′, having the plate *b* and gudgeon *b*′, the part A^2, the arm or rod A^3, the roll *f*, and the weight *f*′, connected to the arm or rod A^3 and holding the roll *f* against the warp on the beam, the part A^2 being pivoted upon the gudgeon *b*′ and having the prongs *c*, substantially as and for the purpose set forth.

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Witnesses:
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