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T. A. B. CARVER.

LET-OFF MECHANISM FOR LOOMS.

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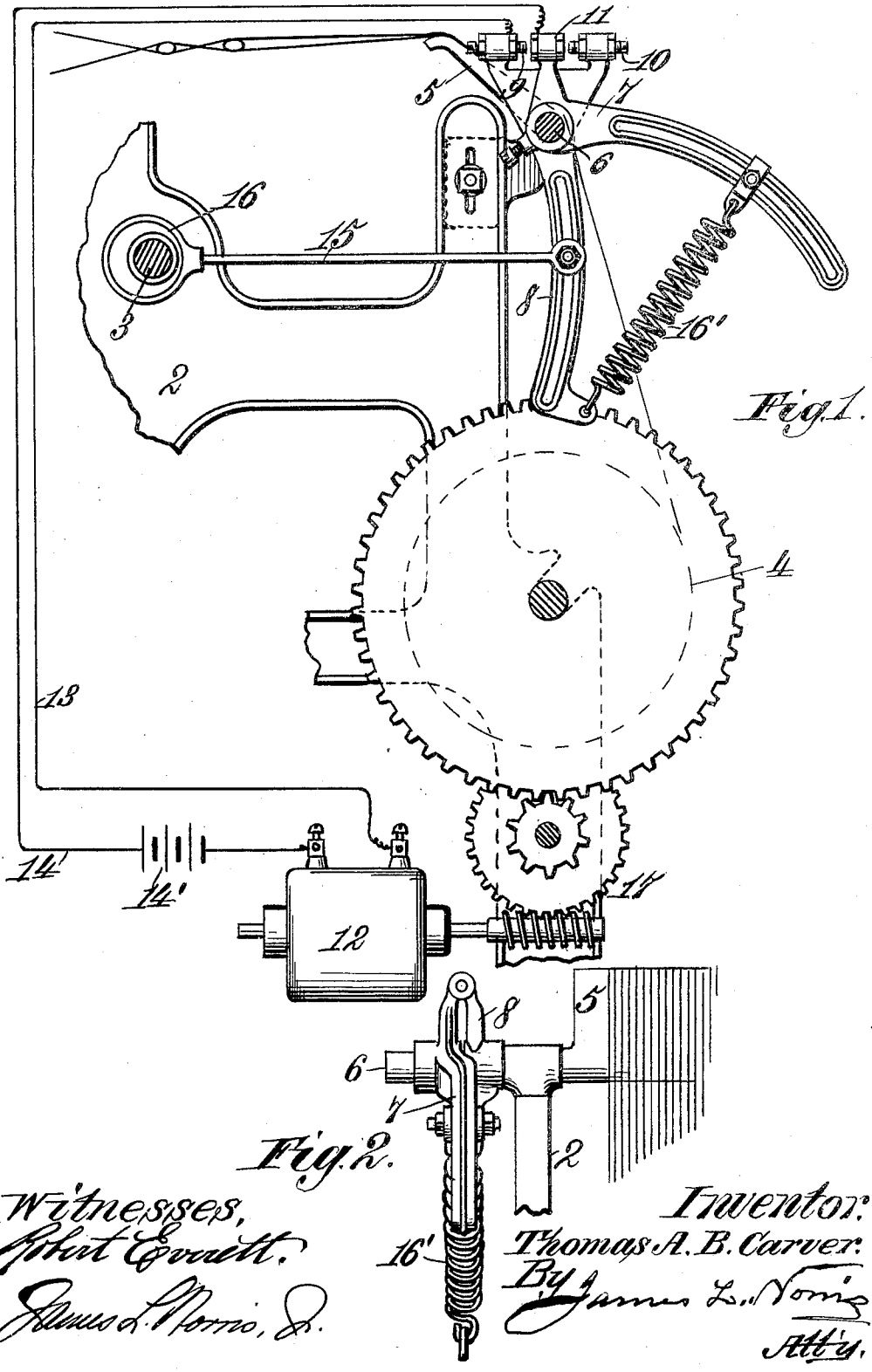


Fig. 1.

Fig. 2.

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UNITED STATES PATENT OFFICE.

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LET-OFF MECHANISM FOR LOOMS.

No. 807,721. Specification of Letters Patent. Patented Dec. 19, 1905.

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To all whom it may concern:

Be it known that I, THOMAS A. B. CARVER, a subject of the King of Great Britain, residing at Glasgow, Scotland, have invented new and useful Improvements in Let-Off Mechanism for Looms, of which the following is a specification.

This invention relates to let-off mechanism for looms, the object of the invention being to provide a simple mechanism for letting off the warp from the beam, so that a predetermined tension in the warp is uniformly maintained to assure the proper weaving of a fabric.

My loom involves, in connection with a warp-beam and a whip-roll, which may be of the usual character, an electric circuit, including a feed-controlling device for said warp-beam, and circuit-controlling means automatically operable when the tension of the warp exceeds a certain point, whereby, as will hereinafter appear, the warp-roll can be so operated as to relieve the excessive tension.

In the drawings accompanying and forming a part of this specification I illustrate an advantageous organization which can be very well employed for maintaining a uniform degree of tension of the warp, and I will describe in detail hereinafter the said organization.

Referring to the drawings, Figure 1 is a side elevation of part of a loom involving my invention. Fig. 2 is a rear view of the parts shown in the preceding figure.

Like characters refer to like parts throughout the views.

In the drawings I have represented by the numeral 2 the framework of a loom, upon which is mounted the main shaft 3, the warp-beam 4, and the whip-roll 5. These parts may be of the usual or ordinary construction. The warp passes from the warp-beam over the whip-roll 5, which, as will be understood, is mounted for free rocking motion upon the framing. The whip-roll is represented as having lateral trunnions or gudgeons, as 6, only one of which is illustrated and which extends freely through and beyond a hub on the framework of the loom. (See Fig. 2.)

Upon the trunnion 6 is a lever 7, which to distinguish it from another lever hereinafter described may be termed a "primary" lever. In the present instance the primary lever 7 is rigidly united with the trunnion 6, so as to constitute, in effect, a rigid part of the whip-roll. This relation may be secured in any desired way—for example, by a set-screw extending through the hub of the lever 7 at the junction of its two arms and bearing upon said trunnion. It will be seen that the lever 7 is of substantially angular form.

Loosely carried by the trunnion 6 is a secondary lever 8, having an enlarged or widened head of bifurcated form, the branches of which have screws 9 and 10 passing through sleeves thereon and adapted to be held in longitudinally-adjusted relation by means of check-nuts. The screw 9, as will hereinafter appear, constitutes part of an electric circuit, including a feed-controlling device for the warp-beam. Between what might be considered the points or opposite inner ends of the two screws 9 and 10 the upper end of the short arm or branch of the primary lever 7 is arranged for back-and-forth motion, the inner face of said short arm having an electric contact member 11. The screw 9 and the contact member 11 are insulated from the parts which directly carry them.

From the screw 9 to one terminal of the electric motor 12 a conductor, as 13, extends, a conductor, as 14, extending from the opposite terminal or pole of the motor to the contact 11, being intersected by a generator, as 14′, which may be an electric battery or some equivalent means.

A pitman, as 15, is driven continuously from the main shaft in some suitable manner, as by means of an eccentric 16 thereon, said pitman being adjustably connected to the lower branch of the secondary lever 8, the adjustable connection being shown as the familiar pin-and-slot one. To a projection or offset (represented as being at the extreme lower end of the lever 8) is connected one end of a spring 16′, the opposite end of said spring being adjustably connected to the longer and arcuate arm of the lever 7. It will be understood that the tension of the spring 16′ acts against that of the warp.

The action of the organization is as follows: So long as the tension of the warp is less than that of the spring 16′ the upper end of the lever 7 will be maintained against the screw 10, which, as will be obvious, forms no part of the electric circuit including the motor. When, however, the tension of the warp becomes greater than that of the spring, the whip-roll will be shifted, the lever 7 of course moving therewith, so as to carry the

contact 11 against the screw 9, thereby closing the circuit involving the electric motor 12. The shaft of the motor is illustrated as connected by worm-gearing (denoted in a general way by 17) with the warp-beam. When, therefore, the circuit is closed, the motor will be operated so as to turn the beam 4 in a direction to let off the warp, and consequently reduce the tension. When the tension of the warp is reduced, the spring 16′ will at once operate upon the lever 7 to return said lever and whip-roll to their original positions, during which motion the contact 11 is carried away from the screw 9 to break the motor-circuit, and therefore stop the motor and the consequent motion of the warp-beam. This relation will be maintained until the tension in the warp becomes sufficient to effect the closing, through the intervention of the agents described, of the motor-circuit, when the motor will again be operated to relieve the excessive tension of the warp.

The lever 8, which carries at its head the two screws 9 and 10, will be operated from the main shaft in such a way as to preserve a uniform tension in the warp during the cycle of the loom—that is to say, while the tension in the warp is being increased by the movement of the heddles or reeds the lever 8 is moved in a direction to permit the lever 7, and therefore the whip-roll 5, to rock toward the heddles, and vice versa.

Although I prefer to operate the lever 8 in the manner described, I may in some instances accomplish the same results without such movement by mounting the two screws 9 and 10 and connecting the spring 16′ with the frame of the machine.

Although I have described the beam as being revolved by a motor when the tension in the warp becomes greater than that previously determined upon, I may use other means for causing the closing or opening of an electric circuit to govern the action of the beam. For instance, the circuit might include a solenoid or electromagnet, the attraction set up in which may release a band-brake of any well-known form, or I may pass the current through an electromagnetic clutch of any well-known form geared to the warp-beam in such a way that the breakage of the current will release the clutch and allow the beam to revolve. In the latter case the screw 10 would be included in the circuit instead of the screw 9, for the reason that the clutch must be held as long as the tension is low enough to allow the upper part of the lever 7 to rest against the screw 9. As soon, however, as the tension becomes sufficient to break it from such contact the magnetic clutch will be released and the warp-beam will revolve until the tension becomes low enough to again allow the upper end of the lever 7 to contact with the screw 10.

I have described my preferred means for securing the novel results set forth and have suggested certain other modifications. Other ways of obtaining the functions desired can be readily made.

Instead of employing a spring, as 16′, hereinbefore described, I might use its equivalent—a weight suspended from the long arm of the lever 7.

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

1. In a let-off mechanism for looms, the combination of a warp-beam, a whip-roll, an electric circuit including a feed-controlling device for said warp-beam, and means for controlling the circuit and automatically operable, when the pressure on the warp exceeds a certain point.

2. In a let-off mechanism for looms, the combination of a warp-beam, a whip-roll, an electric circuit including a feed-controlling device for said warp-beam, and circuit-controlling means operative with the whip-roll.

3. In a let-off mechanism for looms the combination of a warp-beam, a whip-roll, an electric circuit, including a motor, operatively connected with the warp-beam, and circuit-controlling means operative with the whip-roll.

4. In a let-off mechanism for looms, the combination of a warp-beam, a whip-roll, an electric circuit, including a feed-controlling device, for said warp-beam, circuit-controlling means, automatically operable when the tension of the warp exceeds a certain point, and tensioning means acting against the whip-roll in opposition to the tension of the warp applied to said roll.

5. In a let-off mechanism for looms, the combination of a warp-beam, a whip-roll, an electric circuit, including a feed-controlling device, for said warp-beam, means for closing the circuit when the tension of the warp exceeds a certain point, and a spring, operatively associated with the whip-roll and serving to apply a tension to said roll in opposition to that of the warp.

6. In a let-off mechanism for looms, the combination of a warp-beam, a whip-roll, an electric circuit, including a feed-controlling device, for said warp-beam, a lever rigidly associated with and movable with the whip-roll, said lever having a circuit-closing device, and a spring connected with the lever and arranged to apply its tension to the whip-roll in opposition to that of the warp.

7. In a let-off mechanism for looms, the combination of a warp-beam, a whip-roll, an electric circuit, including a feed-controlling device, for said warp-beam, a lever rigidly associated with the whip-roll and having a circuit-closing device, a second lever movable independently of the first lever and having a part of said circuit arranged for contact

by said circuit-closer, means for vibrating the second lever from the main shaft of the loom, and tensioning means acting against the first lever, and thereby the whip-roll, in opposition to the tension of the warp.

8. In a let-off mechanism for looms, the combination of a warp-beam, a whip-roll, an electric circuit, including a feed-controlling device, for said warp-beam, a lever rigidly associated with the whip-roll and having a circuit-closing device, a second lever provided with screws, between which said circuit-closing device is arranged to operate, one of the screws constituting part of said circuit, and said second lever being movable independently of the first lever, a spring connecting the two levers and serving to apply a tension to the whip-roll in opposition to that of the warp thereon, and mechanism operable from the main shaft of the loom, for imparting a vibratory motion to the second lever.

9. In a let-off mechanism for looms, the combination of a warp-beam, a whip-roll, an electric circuit having a motor, means for closing the circuit when the tension of the warp exceeds a certain point, and driving connections between the motor and the warp-beam.

In testimony whereof I have hereunto set my hand in presence of two subscribing witnesses.

THOMAS A. B. CARVER.

Witnesses:
ARTHUR W. JOYCE,
CLAUDE C. BALL.