(No Model.)

S. WATSON.

LET-OFF MECHANISM FOR LOOMS.

No. 377,654. Patented Feb. 7, 1888.

Fig. 2.

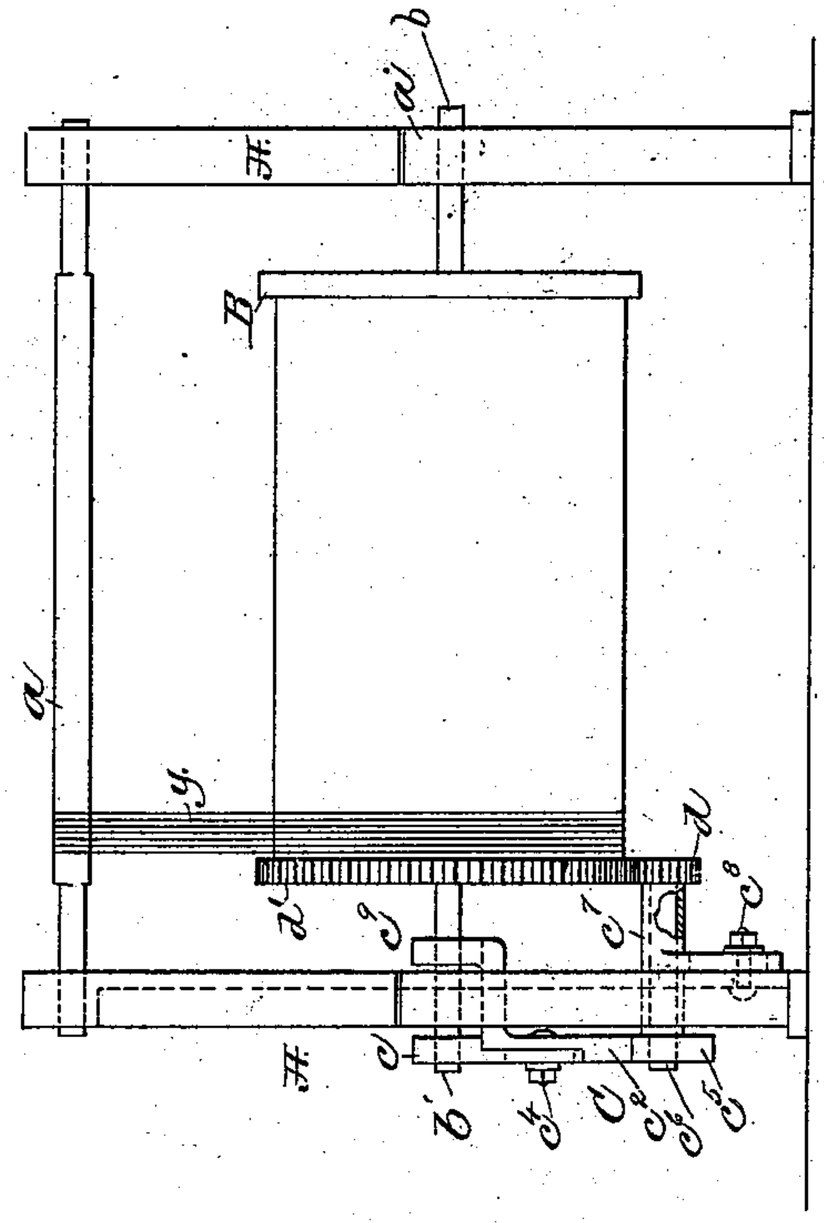
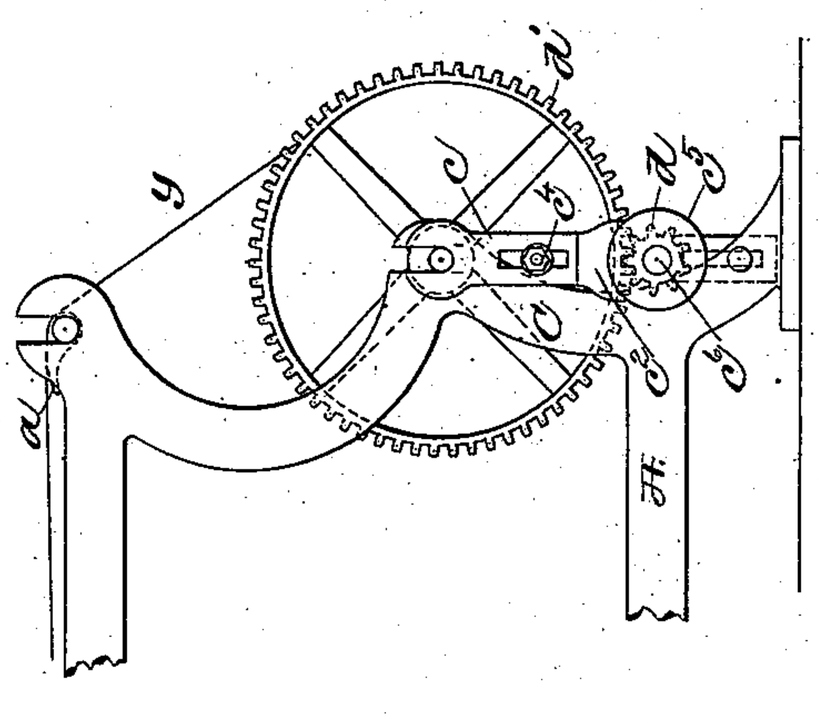


Fig. 1.



Witnesses.
Fredd. Emery.
John F. C. Prinkhurst

Inventor.
Samuel Watson.
by Lerosby & Gregory Attys.

UNITED STATES PATENT OFFICE.

SAMUEL WATSON, OF FALL RIVER, MASSACHUSETTS, ASSIGNOR OF ONE-HALF TO ROBINSON WALMSLEY, OF SAME PLACE.

LET-OFF MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 377,654, dated February 7, 1888.

Application filed April 14, 1887. Serial No. 234,771. (No model.)

To all whom it may concern:

Be it known that I, SAMUEL WATSON, of Fall River, county of Bristol, and State of Massachusetts, have invented an Improvement in Let-Off Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

Much difficulty has been experienced in the operation of looms because of the unequal delivery or letting off of the yarn, this being due to variations in weight, as between a full and nearly-empty beam, and to differences in leverage, due to the approach of the yarns toward the center of the warp-beam. When the beam is full, the yarn is taken from near the periphery of the beam, giving great leverage and causing the beam to rotate too rapidly. When the beam is nearly empty, the yarn is drawn off at a point very near the axis of the beam, the leverage then being the smallest, and the tendency is to strain or rupture the yarn in the effort to turn the warp-beam. Many attempts to overcome this evil have been made, all of which have required more or less complicated mechanism, and have, so far as I am aware, acted but indifferently well.

In accordance with my invention I depend upon and make the variation in weight of the yarn on the beam available to regulate the friction on the warp-beam. To do this effectually, I mount one, or, it may be, each end journal of the beam in a stand having a friction-foot which rests upon the periphery of a friction-pulley secured to a shaft having a pinion which engages the teeth of a toothed gear attached to or so as to rotate with the warp-beam, the pressure between the friction-foot of the stand and the friction-pulley being decreased automatically as the mass of yarn on the beam decreases in weight, or vice versa, for the less the weight of the yarn on the beam and the diameter of the mass of yarn the less the friction required to prevent too rapid delivery of the yarn.

Figure 1 is a partial elevation of one side of a loom with my improvement applied to enable the same to be understood; and Fig. 2 is a right-hand side elevation of Fig. 1, the sheet of yarn between the beam and whip-roll being mostly omitted.

The frame-work A, of usual or suitable shape to sustain the working parts, is shown as provided with a slot or bearing for the journals of any suitable whip or other roll, *a*, the frame-work at *a'* having a bearing for the journal *b* of the warp-beam B, herein shown as substantially full of yarn, the yarn being led from the periphery of the wound mass of yarn, as at *y*, Fig. 1, over the whip-roll, and thence in practice to and through usual harnesses and reed.

The journal *b'* of the beam B is made to rest in the bottom of a bearing-slot of a part, *c*, of a friction-stand, C, the foot c^2 of the said stand being adjustably attached to the part *c* by a bolt, c^4, resting with its concaved face upon the periphery of a friction-pulley, c^5, secured to one end of a short shaft, c^6, extended through a bearing-stand, c^7, made adjustable vertically by a suitable bolt, as c^8. The shaft c^6 has attached to it a pinion, *d*, which engages a gear, *d'*, on the warp-beam.

The friction-stand C has its foot resting loosely on the friction-pulley, the bearing at the top of the friction-stand receiving upon it the entire weight of the beam and mass of yarn thereon as exerted at the journal *b'* of the beam, and to keep the friction-stand from tipping I have provided it with a guide portion, c^9, which is extended through a slot in the loom-frame, the upper end of the portion c^9 being forked to embrace the journal *b'*; but this guide portion does not at all support the weight of the beam or journal.

In weaving, as the reed strikes the weft at the fell of the cloth, it is a great desideratum that the strain on the warp-thread cause the warp-beam to be rotated just far enough to give up just enough warp for the requirements of the cloth. As the warp-threads going from the periphery of the beam act to turn the beam, the gear *d'*, in engagement with the pinion *d*, turns the shaft c^6 and its friction-wheel c^5; but the freedom of rotation of the friction-wheel is resisted by the pressure against it of the foot c^2 of the friction-stand. The extent or degree of this friction is, however, variable, as will be readily understood, the variations be-

ing dependent entirely upon the amount or weight of the mass of yarn upon the warp-beam, the weight of the yarn continually decreasing with the decreasing diameter of the mass of yarn on the warp-beam.

The diameter of the mass of yarn is greater when the beam is full, and so, also, its weight is greatest, and the friction of the foot c^2 will be greatest, as is necessary, for when the diameter of the mass of yarn is greatest the yarn extended over the whip-roll pulls on the beam at the greatest distance from the center of the beam, or, in other words, the leverage of the yarn on the beam is greatest and the beam is rotated very easily. As the yarn is gradually unwound toward the center of the beam, the leverage of the yarn, or the strain upon it to turn the beam, is gradually decreased.

In accordance with this invention the weight of the mass of yarn on the beam is made instrumental to automatically vary the friction which has to be overcome before the warp-beam can be rotated.

The greater the diameter and weight of the mass of yarn on the beam the greater the leverage of the yarn and the greater the friction; but as the mass of warp on the beam decreases and the leverage decreases, the weight of the yarn decreases and the friction between the foot and wheel c^5 is correspondingly decreased.

The position of the bearing-stand c^7 on the loom-frame and the length of the friction-stand are both made adjustable to adapt the improvement to warp-beams of different diameter or to different fineness of yarn, for at times the teeth of the pinion and gear d' will be of one or another degree of fineness or of different relative diameters than herein shown.

I do not desire to limit my invention to applying a variable friction device to but one side of the loom, for it is obvious that I might duplicate at the right side of the loom the devices shown at the left side in Fig. 2.

I claim—

The warp-beam, a toothed gear connected to or movable with it, and the two-part sliding friction-stand C, to support one end of the beam and the weight of yarn thereon, combined with the friction-pulley c^5, shaft, and pinion d, set in motion by the rotation of the warp-beam, the part c of the stand C slotted to receive the adjusting-bolt c^4 and supporting the journal of the warp-beam, the part c^2 provided with the guide portion c^9, forked at its upper end to embrace the journal b', the said part c^2 being adjustable vertically and having its foot shaped to partially embrace the said friction-pulley, the decreasing weight of the yarn on the beam effecting a decrease in the effective pressure of the friction-stand upon the friction-pulley, thus automatically decreasing the friction to be overcome by the beam in its rotation according to the decrease in the weight of the yarn on the beam, substantially as described.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

SAMUEL WATSON.

Witnesses:
ROBINSON WALMSLEY,
GEORGE E. BAMFORD.