(No Model.)

J. SHEW.

LET-OFF MECHANISM FOR LOOMS.

No. 297,019. Patented Apr. 15, 1884.

Fig. 1.

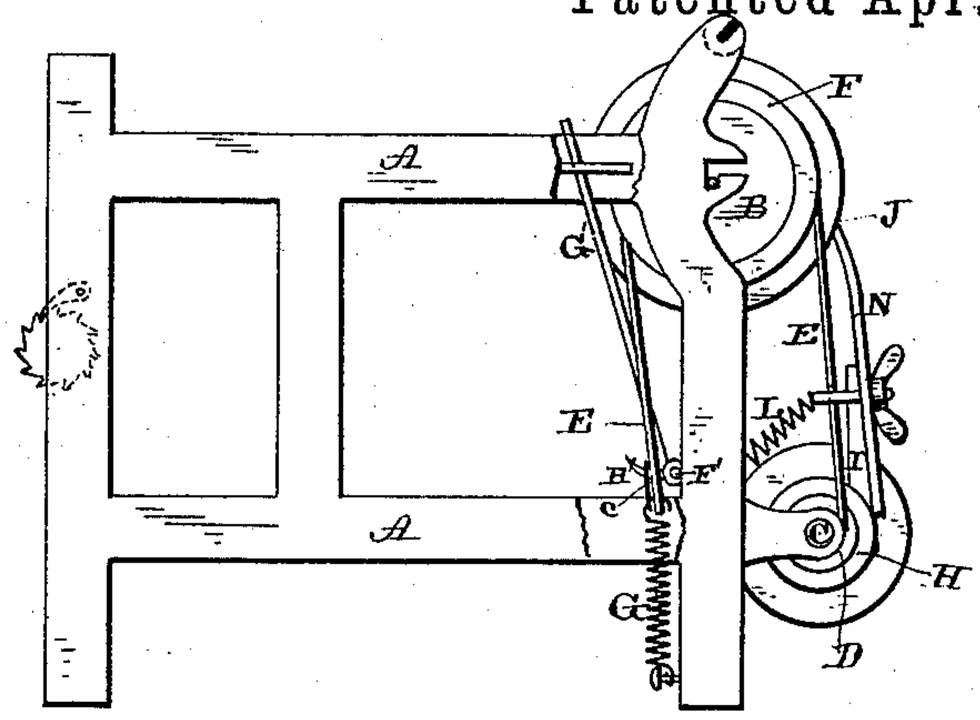


Fig. 2.

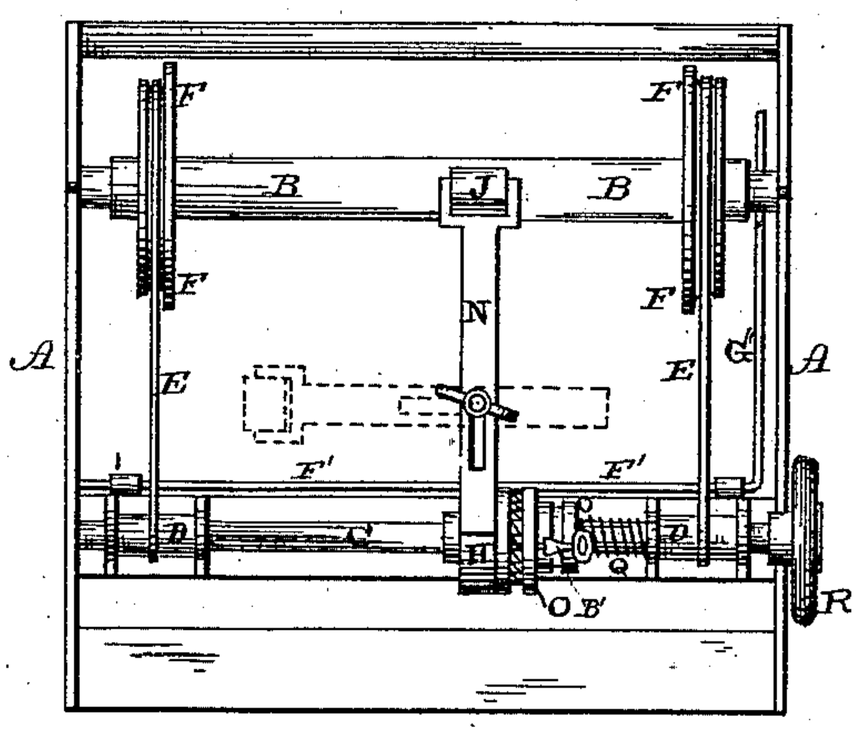


Fig. 4.

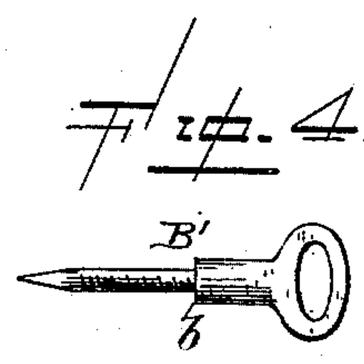


Fig. 3.

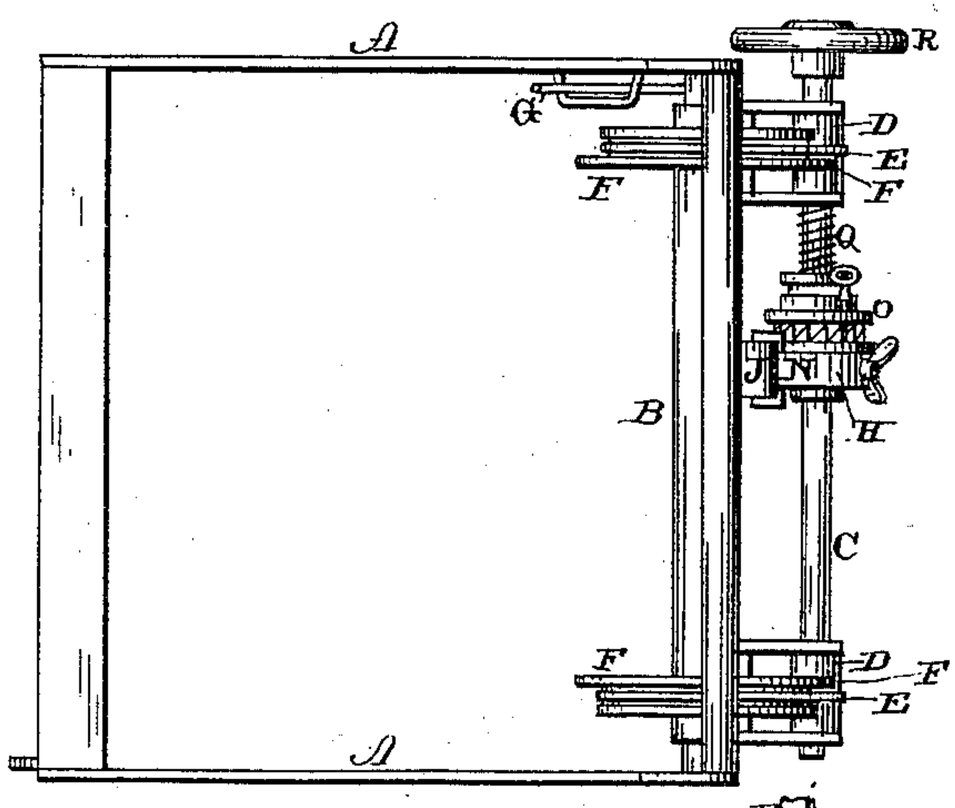


Fig. 5.

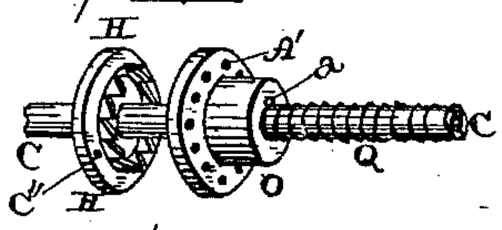


Fig. 6.

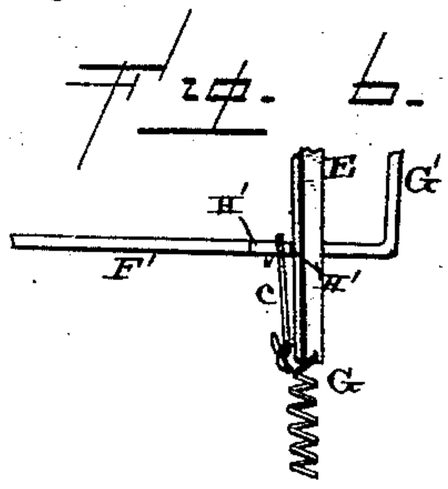
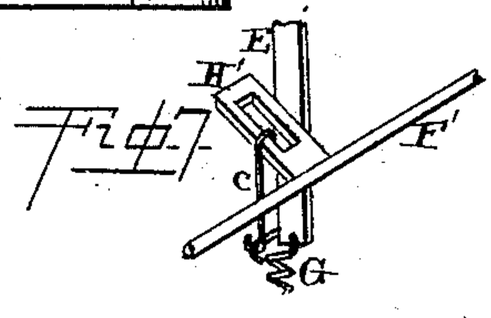


Fig. 7.



Witnesses.

Louis F. Gardner

J. W. Gaines

Inventor.

Jacob Shew

per

F. A. Lehmann, atty

UNITED STATES PATENT OFFICE.

JACOB SHEW, OF WILMINGTON, DELAWARE, ASSIGNOR OF ONE-HALF TO HENRY C. DOWNWARD, OF SAME PLACE.

LET-OFF MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 297,019, dated April 15, 1884.

Application filed May 3, 1883. (No model.)

To all whom it may concern:

Be it known that I, JACOB SHEW, of Wilmington, in the county of New Castle and State of Delaware, have invented certain new and useful Improvements in Let-off Mechanisms for Looms; and I do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it pertains to make and use it, reference being had to the accompanying drawings, which form part of this specification.

My invention is an improvement in let-off or tension-regulating mechanisms for the beams of looms; and it consists, first, in the combination of the beam, the frame, the springs, the cords or bands, which are attached at one end to the springs, and then passed up over the beam, the tightening-shaft to which the other ends of the cords or bands are fastened, a clutch placed upon the tightening-shaft, and an arm attached to a part of the clutch, for bearing against the yarn on the beam, the shaft being made to extend across the frame parallel to the beam; second, in the combination of the beam, suitable springs, and the cords, wires, or bands which are attached to the springs, which are passed up over the beam, to the shaft which is provided with pulleys for receiving the cords, wires, or bands, a clutch, and a friction-roller connected to this shaft, for bearing against the beam; third, in the combination of the beam with the bands or cords, the springs to which the bands or cords are attached, a shaft, a clutch, a spring on the same shaft with the clutch, a friction-roller attached to one of the parts of the clutch, and means for turning the shaft to adjust the tension of the springs and bands; fourth, in the combination of the beam with the cords or bands, the springs to which the cords or bands are attached at one end, a shaft for receiving the opposite ends of said bands, a clutch, a spring placed upon the shaft on which the clutch is placed, the friction-roller, a slotted support to which the said roller is attached, the slotted support being attached at its lower end to one part of the clutch; fifth, in the combination of the beam, the cords, wires, or bands, the springs to which one end of the cords or bands are attached, the shaft to which the other end of the cords or bands are fastened, a clutch, a spring located on the same shaft as the clutch, a friction-roller which is carried by one of the parts of the clutch, and which roller bears against the beam, and a pin which is passed through one part of the clutch into the other; sixth, in the combination of the beam, with the cords, bands, or straps, springs with which said cords are connected, the rod for controlling the tension of the springs, and which is provided with arms and a handle, the connecting-hooks which unite the springs and the arms together, and the shaft to which the bands are fastened at one end, all of which will be more fully described hereinafter.

The object of my invention is to provide a let-off or tension mechanism for the warp-beams of looms, so as to give an equal tension on both beam-heads at the same time, and regulate the amount of tension and friction as the loom may require in weaving, and to enable the tension to be equally adjusted and remain uniform, whereby the time of the weaver is saved, and he is enabled to weave a greater quantity and a better quality of cloth in a given time.

Figure 1 is a partly sectional side elevation of the frame of a loom having my invention applied thereto. Fig. 2 is an end view of the same. Fig. 3 is a plan view thereof. Figs. 4, 5, and 6 are detail views. Fig. 7 is a detail view, showing a portion of the means for relieving the friction-bands from the strain of the springs.

A represents the frame of the loom, and B the beam at the rear end of the loom, around which the yarn is wrapped, in the usual manner. Journaled horizontally upon the rear end of the frame, at any desired distance below the beam, is the shaft C, which has rigidly secured to it the two pulleys D. Fastened to these pulleys are the cords, wires, bands, or belts E, which extend up over the flanges F upon the beam, then pass down inside of the frame, and have their lower ends attached to the spiral springs G. These cords, wires, or bands exert a frictional contact upon the beam in proportion to the extent that they are wound upon the pulleys and the tension of the springs is increased. Of course, the more these cords,

bands, or wires are wrapped upon the pulleys, and the more the springs are stretched, the greater is the tension of the springs, and hence the greater is the frictional contact upon the flanges of the beam. These cords, wires, or bands may be passed one or more times around the flanges of the beam, or simply passed up over their tops, as may be preferred. By passing these bands or cords upon the flanges of the beam a greater leverage and greater surface of contact can be secured than if the cords, wires, or bands were applied to the small part of the beam.

Loosely placed upon the horizontal shaft C is the part H of the clutch, which part H has secured to it the rigid part I of the support for the friction-roller J. The rigid part of the support being fastened to this part of the clutch, of course always moves with it. In order to exert a constant pressure upon the roller toward the beam, a spring, L, is used. This spring may either be secured to the cross-beam of the frame of the loom, or may be secured to the floor or any other suitable support. The upper part, N, of the support of the friction-roller is slotted and loosely attached to the rigid part, so that it, carrying the roller with it, can be turned to the inner side, as is shown by dotted lines in Fig. 2, so as to be out of the way when the beam is being placed in position with the yarn upon it or when the beam is being removed. This construction also enables the roller J to be adjusted vertically, according to the quantity of yarn upon the beam. This roller J rests against the yarn on the beam and moves forward as the yarn is woven, and thereby decreases the friction on the beam-heads by permitting the shaft C to turn, and thereby unwrap and slacken the ropes or bands that pass over the beam-heads from the pulleys D on the shaft C to the springs on the inside of the loom-frame. The tension of the springs and wires, cords, or bands, having been adjusted by winding the ropes or bands E upon the pulleys D, in proportion as the roller J moves forward as the yarn is unwrapped from the beam, the friction of the bands, wires, or cords upon the beam is decreased, as the shaft C revolves to allow the friction-roller to move forward toward the beam. The second part O of the clutch is attached to the shaft C by means of the spline *a*, and is made movable back and forth thereon by hand. Both parts H O of the clutch are provided with ratchet-teeth on their inner sides, so that when in contact both parts are locked to the shaft C when it is turned toward the frame; but when the shaft is turned away from the frame the part H of the clutch slips idly around. Between the inner end of the part O of the clutch and the pulley over which one of the cords, wires, or bands is made to wrap is placed the spiral spring Q, which serves to keep the sliding part of the clutch in contact with the other. When the two parts of the clutch are in contact the entire clutch is locked to the shaft, so as to compel both parts to move together. Whenever the sliding portion of the clutch is moved back out of contact with the other part, all tension is removed from the friction-roller, with the exception of what is exerted by its own spring L. In order to regulate the tension of the springs and friction of the cords upon the beam, there is made through the part O of the clutch a series of holes, A′, through one of which is passed a screw-threaded pin, B′. This pin is made screw-threaded, so that after it has been passed through one of the holes in the part O of the clutch it cannot become accidentally displaced. Through the part H of the clutch is made a single hole, C′, in which the inner end of this pin catches. The pin passes far enough through the part O of the clutch to hold the two parts of the clutch apart out of contact with each other when the part O is turned in such a position that the end of the pin will not enter the hole C′. In order to prevent the pin from being forced too far through the part O, it is provided with a shoulder, or stop, *b*, as shown in Fig. 4. After the proper degree of tension for the warp has been decided upon, the pin is passed through the proper hole in the part O, forward of the hole C′ in the part H, and then shaft C and part O of the clutch are turned, by means of the wheel R, rearwardly until the pin enters the hole C′. In this way the two parts of the clutch are caused to become locked together at the proper point, and the tension cannot be changed unless the pin is removed from the part O and inserted in another hole. While the teeth of the two parts of the clutch are held out of contact the shaft C can be turned freely around by hand by means of the wheel R, to adjust the tension of the bands E and springs G.

This device is especially intended to prevent weavers and other persons changing the tension unnecessarily. Weavers while at work often have occasion to temporarily relieve the tension of the warp, and then when they wish to restore the tension seldom or never get just the same tension they had at first; and hence the cloth produced varies in width and thickness. By means of the construction above described the same tension can be always kept, because, after the clutch has been separated to allow the shaft to turn and the bands E and springs G to become relaxed, the shaft C must be turned around to its original position before the pin B′ will enter the hole C′, so as to allow the parts of the clutch to come together again; and hence the tension can only be held at the degree at which it was first set.

In order to enable the weaver to relax his tension without the trouble of throwing the two parts of the clutch out of gear, or of getting in under or behind the loom, a partially-rotating rod, F′, is made to extend across the frame, and upon one end of this rod is formed the operating lever or handle G′, which extends up to the top of the frame, within easy reach of the weaver. Projecting from this

partially-rotating rod, in any desired manner, are the two arms H′, which are slotted at their outer ends, so as to allow the hooks, which unite the upper ends of the springs and the arms together, to catch therein. The lower ends of the straps or bands E are fastened directly to the upper ends of the springs, and not to the arms H′, so that no movement of the rod F′ can tighten the straps upon the flanges. When the rod F′ is turned so that the arms H′ stretch the springs, the bands E are slackened. In proportion as the springs are stretched the bands, cords, or straps are slackened, and then the beam can be freely adjusted by hand, for there is nothing to hold it in position, except the contact of the friction-roller. By this means the weaver can instantly slacken the tension of the beam to any desired degree.

By means of the tension-regulating mechanism above described it will be seen that the beam has only the frictional contact with the cords and the friction-roller to overcome, and hence will never be held so rigidly in place as to cause the yarn to snap in weaving. Where weights are used in the usual manner they require to be frequently adjusted, and take up a great deal of time in handling them, and hence the weaver is compelled to lose considerable time. When the entire tension-regulating mechanism is made flexible and automatic, as is here shown, there will be an even tension upon both heads at the same time, and better quality of cloth can be woven.

Having thus described my invention, I claim—

1. The combination of the beam, the frame, the springs, the bands which are attached at one end to the springs, and then passed up over the beam, the tightening-shaft C, to which the other ends of the bands are fastened, a clutch placed upon the tightening-shaft, and an arm attached to a part of the clutch for bearing against the yarn on the beam, the shaft C being made to extend across the frame parallel to the beam, substantially as shown.

2. The combination of the beam, springs, and bands which are attached to the springs, and which pass up over the beam, with the shaft, which is provided with pulleys for receiving the bands, a clutch, and a friction-roller connected to the shaft for bearing against the beam, substantially as described.

3. The combination of the beam with the bands E, springs, to which the bands are attached, the shaft C, a clutch, H O, spring Q, the friction-roller, the arm attached to the part H of the clutch, and carrying the friction-roller, and means for turning the shaft to adjust the tension of the springs and bands, substantially as set forth.

4. The combination of the beam with the bands E, springs, to which the bands E are attached at one end, a shaft for receiving the opposite ends of said bands, a clutch, H O, a spring, Q, upon said shaft, the roller J, and the slotted support for said roller attached at its lower end to the part H of the clutch, substantially as specified.

5. The combination of the beam B with the bands E, springs G, shaft C, and clutch H O, spring Q, a friction-roller, which is carried by the part H of the clutch, and bears against the beam, and the pin B′, substantially as specified.

6. The combination of the beam with the bands E, springs G, rod F′, provided with the arms H′ and the handle G′, the connecting-hooks which unite the springs and the arms together, and the shaft C, to which the bands E are fastened at one end, substantially as set forth.

In testimony whereof I affix my signature in presence of two witnesses.

JACOB SHEW.

Witnesses:

F. A. LEHMANN,

J. W. GARNER.