B. W. NICHOLS.

LET-OFF MOTION FOR LOOMS.

No. 177,543. Patented May 16, 1876.

Fig. 1

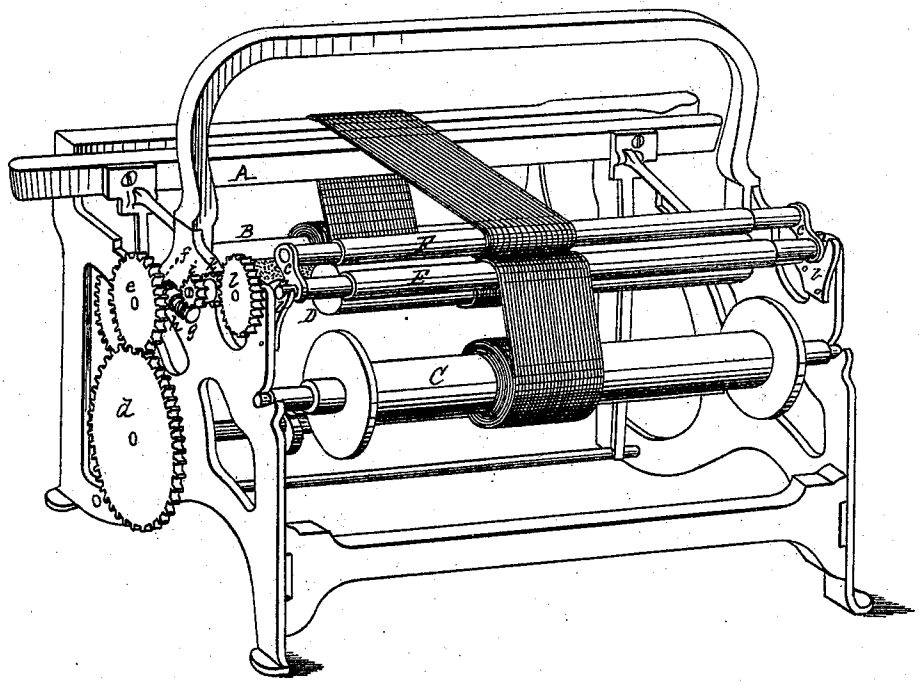


Fig. 2.

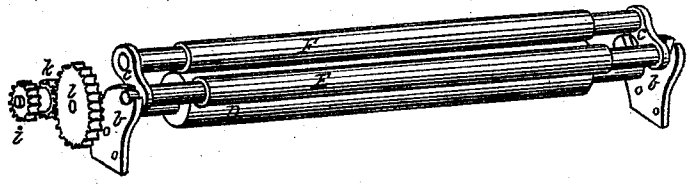
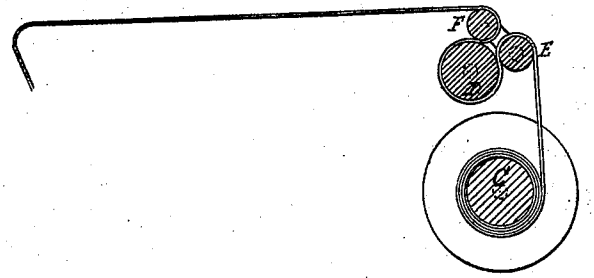


Fig. 3.



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UNITED STATES PATENT OFFICE.

BRADFORD W. NICHOLS, OF FALL RIVER, MASSACHUSETTS, ASSIGNOR OF ONE-HALF HIS RIGHT TO E. C. KILBURN, OF SAME PLACE.

IMPROVEMENT IN LET-OFF MOTIONS FOR LOOMS.

Specification forming part of Letters Patent No. **177,543**, dated May 16, 1876; application filed October 29, 1875.

To all whom it may concern:

Be it known that I, BRADFORD W. NICHOLS, of the city of Fall River, in the county of Bristol and State of Massachusetts, have invented certain new and useful Improvements in Let-Off Motions for Looms; and I do hereby declare that the following specification, taken in connection with the drawings furnished and forming a part of the same, is a clear, true, and complete description thereof.

My improvements relate to that class of let-off motions which control the delivery of warp from the beam by means of mechanism positively operated, instead of to that class which necessarily involve the use of frictional devices applied to the beam.

My invention consists in the combination of a positively-driven delivery-roll with a guiding-roll and a nipper-roll mounted in link-bearings, whereby the warp, when passed from the beam over the guiding-roll, under and partially around the delivery-roll, and over the nipper-roll, thence through the harnesses and reed to the cloth-beam, will be held with proper tension firmly between the nipper-roll and delivery-roll at every opening of the shed and at every beat of the lay.

To more particularly describe my invention I will refer to the accompanying drawings, in which Figure 1 represents, in rear perspective, a loom embodying my invention. Fig. 2 represents, in perspective, the let-off rolls detached from the loom, with their hangers. Fig. 3 represents, in vertical section, the warp-beam and let-off rolls, with warp in proper position.

The frame of the loom is not materially unlike that of other common looms. The lay at A and cloth-beam at B, with its actuating mechanism, possess no novelty. The harnesses and reeds are not shown. The warp-beam at C is of usual construction. D denotes the warp-delivery roll; E, a guiding-roll, and F a nipper-roll.

When new looms are constructed with my improvements, the main frame will be provided with bearings for the axes of the delivery and guiding rolls. When applied to looms already built, hangers, as at *b*, will be attached to the old frame.

As here shown, the delivery-roll D is provided with bearings for its axis, in hangers attached to the frame of the loom. For securing a good frictional surface on said roll, I prefer that it be clad with paper, cloth, leather, or other suitable material. The guiding-roll E is also mounted on the same hangers, in open boxes, for facilitating its adjustment with relation to the warp and delivery roll. Its surface should be permitted to lie in close contact with the surface of the delivery-roll throughout its length. The nipper-roll F is mounted in links *c*, which have bearings on the axis of the guiding-roll adjacent to its ends. The nipper-roll axis is parallel with that of the delivery-roll, and is placed, preferably, slightly in the rear thereof, in order that the tensile strain on the warp may force the roll downward upon the warp interposed between it and the delivery-roll. By having the nipper-roll mounted in the links, as shown, all of the tensile strain on the warp operates to force the roll downward upon the warp, whereas if said nipper-roll journals were located in a vertical slot at each side of the loom, the nipping effect of the roll on the warp would be modified by the tendency of the roll to rise in its bearings, and by the lateral pressure of its journals against the front side of the slot. The guiding-roll and nipper-roll are placed with relation to each other and to the delivery-roll, in such a manner that the warp will be in frictional contact with as much of the surface of the delivery-roll as possible. The delivery-roll is revolved by positive mechanism, which, in this instance, consists of a chain of gearing, commencing with the gear *d* on the main shaft of the loom, (or other suitable driver,) the pinion *e*, mounted on a stud projecting from the low frame, a worm, *f*, connected to the pinion *e*, a shaft, *g*, mounted at right angles to the pinion-stud, and having at one end a gear for engaging with the worm *f*, and at the other end a worm, *h*, for engaging with a gear, *i*, (mounted on another stud, which also projects from the frame,) connected to a gear, *k*, which, in turn, meshes with the gear *l* on the delivery-roll D. The regular operation of the loom obviously induces a regular delivery of the warp.

It is to be understood that I do not claim the specific mechanism for thus operating the

delivery-roll, and that I am aware that link-gearing applied in a manner well known may be employed in this connection, which would render the use of change-gears practicable whenever it was desirable to vary the speed or delivering capacity of the let-off motion.

The guiding-roll is readily removed from its open boxes and the nipper-roll from its link-bearings, which facilitates the adjustment of rolls and warp. When the rolls and warp-beam are properly adjusted, the warp extends from its beam upward over the guiding-roll, thence downward under the delivery-roll, thence upward, backward, over, and partially around the nipper-roll, and thence forward through the harnesses and reed to the cloth-beam.

It will be seen that when the gearing is properly timed the warp will be regularly and evenly withdrawn from its beam, and that it will be always firmly compressed between the nipper-roll and the delivery-roll, and that this compression will be increased in proportion to the intermittent strain incident to the throw of the harnesses and the beat of the lay.

I am aware that it is not new to positively control the delivery of the warp from the beam, and also that a positively-driven delivery-roll has heretofore been employed in connection with a guiding-roll and a roll bearing on both the delivery and guiding roll. I know, however, of no pre-existing combination of a delivery-roll and a guiding-roll with a nipper-roll mounted in link-bearings, and so arranged with relation to the delivery-roll that the latter is almost wholly encircled by the warp, thereby securing an extensive frictional contact therewith, or so arranged that the strain on the warp will cause said nipper-roll to compress the warp wholly between it and the delivery-roll, as herein shown.

Having thus described my invention, I claim as new—

The combination, with a positively-driven delivery-roll and a guiding-roll, of a nipper-roll mounted in link-bearings, substantially as described, whereby the warp from the beam may be maintained in close contact with the greater portion of the peripherical surface of the delivery-roll, and firmly nipped between the surfaces of the delivery-roll and nipper-roll, as set forth.

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