2 Sheets—Sheet 1.

C. E. WILLIAMS & J. E. IRONS.

STOP-MOTION FOR KNITTING-MACHINES.

No. 180,404. Patented July 25, 1876.

Fig: 1.

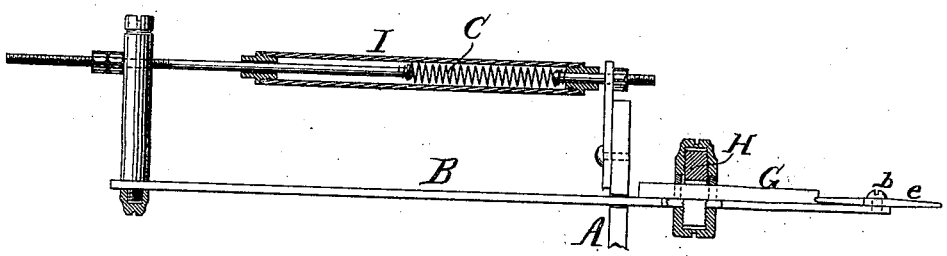
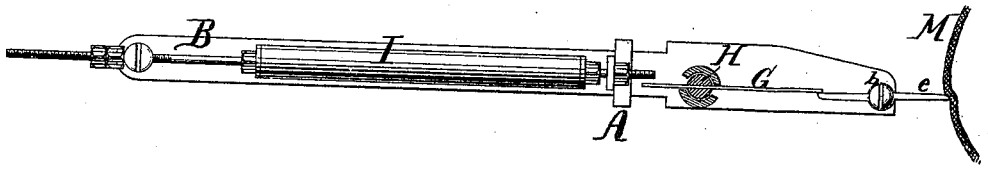


Fig: 2.



Witnesses:

C. C. Stetson

Henry Gontner

Inventors:

C. E. Williams

and John E. Irons

by their attorney

Thomas D. Stetson

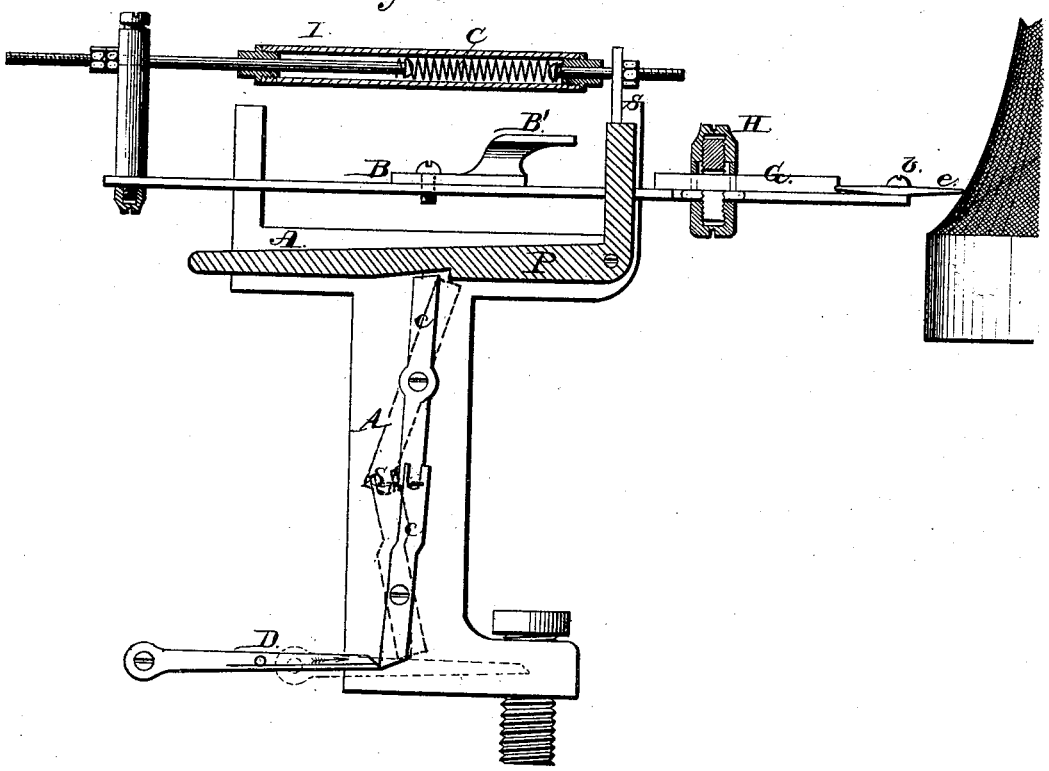
2 Sheets—Sheet 2.

C. E. WILLIAMS & J. E. IRONS.

STOP-MOTION FOR KNITTING-MACHINES.

No. 180,404. Patented July 25, 1876.

Fig. 5.



Witnesses
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Harry Gontner 2d

Inventors:
C. E. Williams
and John E. Irons
by their attorney
Thomas D. Stetson

UNITED STATES PATENT OFFICE.

CLARENCE E. WILLIAMS AND JOHN E. IRONS, OF UTICA, NEW YORK, ASSIGNORS TO CLARENCE E. WILLIAMS, OF SAME PLACE.

IMPROVEMENT IN STOP-MOTIONS FOR KNITTING-MACHINES.

Specification forming part of Letters Patent No. **180,404**, dated July 25, 1876; application filed November 18, 1875.

To all whom it may concern:

Be it known that we, CLARENCE E. WILLIAMS and JOHN E. IRONS, of Utica, Oneida county, New York, have invented certain Improvements in Stop-Motions for Knitting-Machines, of which the following is a specification:

There is a large class of knitting-machines in which the fabric is produced in tubular form, and is drawn upward from the needles, and is revolved around as it is produced. Our invention will apply to all of that class, as also to any analogous case, where, instead of revolving the fabric, the knitting mechanism, including the stop-motion, may revolve around the fabric.

A common plan of stop-motion is to press the smoothly-rounded end of a bar gently against the fabric immediately above the needles. A delicate trigger, connected with efficient means for stopping the machine, stands nearly touched by an arm from the same bar. When, in consequence of the breakage of the yarn, connection with the needles is severed, and a gap is presented, and the fabric is drawn up away from the needles, the tendency to end motion of the bar is no longer resisted by the fabric, the bar moves endwise toward the fabric, and detaches the trigger; but there are small holes occurring, for which such a construction of stop-motion is not sufficiently sensitive. If a single needle breaks or becomes defective, making a slight open place in the knitted tube, such opening, although it may be repeated at each round, and form what is technically known as a "ladder," is so small that, although the rounded end of the bar may be made quite narrow, the small opening in the fabric moves past too rapidly to allow the bar to move endwise.

We overcome this difficulty by providing a peculiar pivoted nose-piece, having both ends formed alike, which may be caught in such hole and drawn to one side.

The following is what we consider the best means of carrying out our invention.

In the drawings, Figure 1 is a side elevation, showing some parts in connection. Fig. 2 is a plan view of the same; and Fig. 3, a side elevation, showing the trigger and its attachments.

Referring to the drawings, A is a portion of the fixed frame-work. B is a sliding bar, drawn constantly endwise by the force of a spring, C. Mounted upon this bar B is a finger, B′, which is rigid therewith, and is designed to operate the trigger, as shown; but the trigger, in its construction and adaptation, may be varied without departing from the principle of our invention; and it may be operated by any other portion of the sliding bar. P is a sensitive trigger, mounted with ordinary mechanism, as represented, and it is adapted to release the piece D, connected with the belt-shipper, (not shown,) and arrest the motion of the machine as soon as the trigger is touched by a forward movement of the sliding bar B. M is the knitted fabric which is being rotated. *c c* represent levers pivoted to the frame A.

The trigger P is struck by the finger B′ when the bar B moves forward, allowing the levers *c c* to turn on their pivots. The resistance to the belt-shipper point D being thus removed, it (being impelled by the force of a strong spring) instantly shifts the belts, as shown by the dotted lines.

A bar, *e*, much smaller than the bar B, and having its two ends alike, is mounted so that it may revolve on the pivot *b* at or near the extreme forward end of the main sliding bar B. A spring, G, which is held by the screw H, and is capable of being delicately adjusted in position, is touched by the bar *e* at each revolution, and offers a considerable resistance to its moving past.

When the knitting-machine is working successfully the bar B does not touch the fabric, except through the medium of the pivoted bar *e*. One end of the latter presses against the fabric M, and, as the fabric rubs past it, the end of the bar *e* feels for a hole in the fabric in the same manner as the end of the main bar does in the ordinary stop-motion. When the yarn breaks the fabric leaves the needles altogether, so that the end of the bar *e* ceases to be acted on by the fabric, and the bar B and its attachments move forward by the force of the spring C, and the trigger P is liberated,

and the machine stopped by a consequent shifting of the belt or otherwise, in precisely the same manner as the ordinary stop-motion. Under such circumstances the peculiarities of our invention are not important; but when, instead of a breakage of the yarn, a defect is developed in a single needle, producing a very small hole, (the commencement of a ladder in the fabric,) the end of the bar *e* enters such hole, and is, by the lateral movement of the fabric, due to its rotation, drawn so forcibly in the direction in which the fabric is rotating that the bar *e* is rotated on its central pivot *b*, notwithstanding the resistance offered by the spring G. In other words, one end of the bar *e* is caught by the defect in the knitted fabric, and thus a greater force than usual is exerted, tending to turn the bar *e* about on its axis *b*. The spring having been suitably adjusted to resist the friction due to the turning motion of the perfect fabric, but not sufficient to resist the turning motion of imperfect goods, when a defect appears and catches the end of the bar *e*, the bar turns, snapping its opposite end past the spring G. Thus conditioned, the bar B is instantly free to move endwise, and it does so, impelled by the force of the spring C, as is obvious. When the defect is repaired the operator draws back the bar B, and, turning the bar *e* to its former position again, presents its ends, one to the fabric, and the other to the spring, when all is ready to work as before, until another defect is developed.

We have found much inconvenience from the clogging of the spring C with occasional fibers or yarns. It is also liable, owing to its situation, to catch in the dress or wiping-cloth of the attendant, and be thus displaced, or drawn out and strained, so as to lose its desired force. To obviate this we house the spring C within a tube, I, held up by the bolts which form the connection thereto, so that nothing can interfere.

We claim as our invention—

1. The combination, with the bar B, piece *e*, and spring G, of the spring C and frame A, substantially as described, whereby the said piece *e* is held in contact with the fabric, and when a defect in the same is presented to the piece *e* it is tripped, and the bar B moved toward the fabric, as and for the purpose set forth.

2. The combination, with the bar B, piece *e*, springs C and G, and lever P, of a shipper and mechanism, substantially as described, whereby when a defect in the fabric is presented to the piece *e* the same is tripped, and the machine thereby stopped, as and for the purpose set forth.

In testimony whereof we have hereunto set our hands this 13th day of November, 1875, in the presence of two subscribing witnesses.

C. E. WILLIAMS.
JOHN E. IRONS.

Witnesses:
JAMES L. WILLIAMS,
W. J. WALTERS.