No. 783,143. PATENTED FEB. 21, 1905.

A. SCHOULER.

WARP STOP MOTION FOR LOOMS.

APPLICATION FILED OCT. 9, 1903.

Fig: 1.

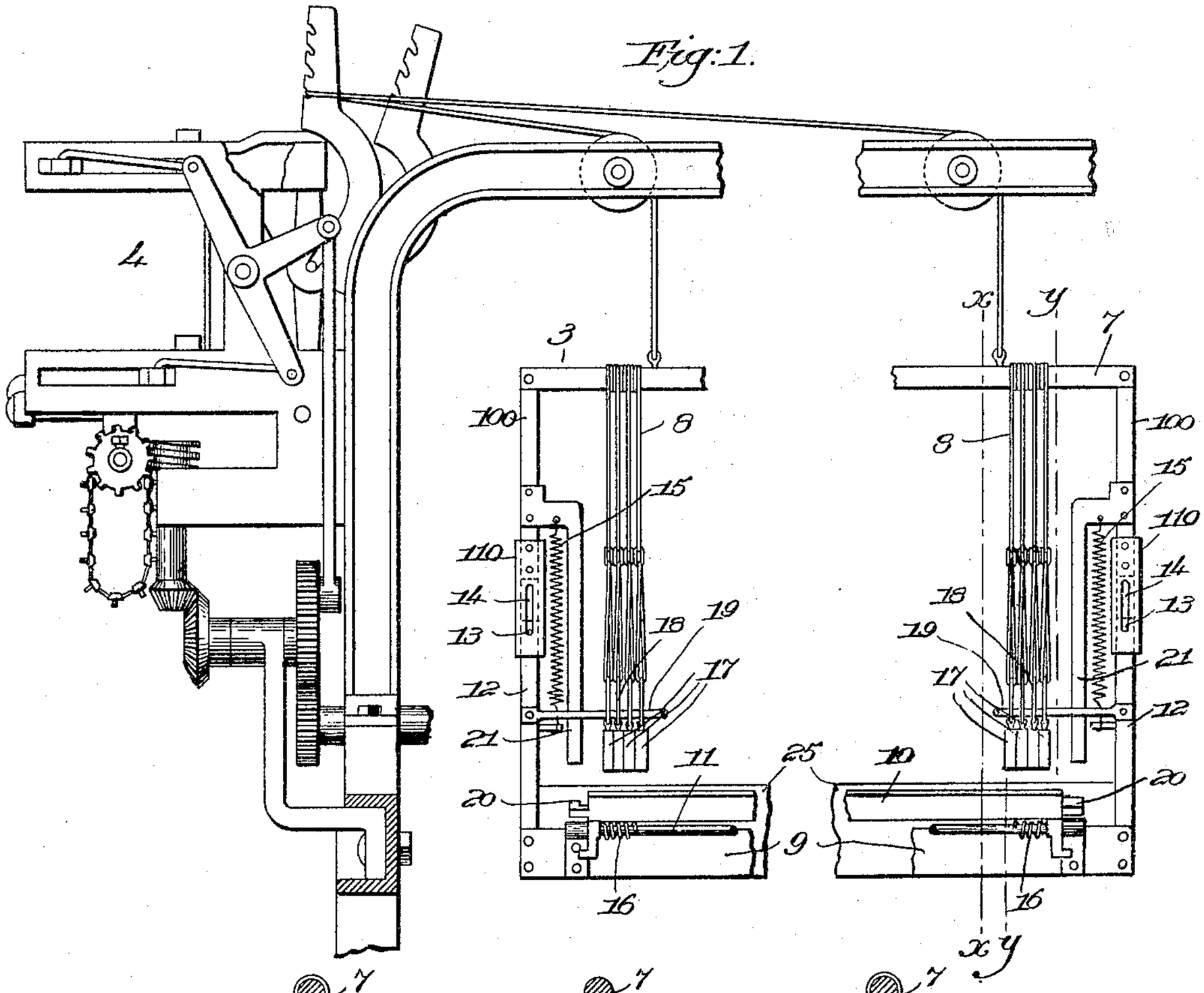


Fig: 2.

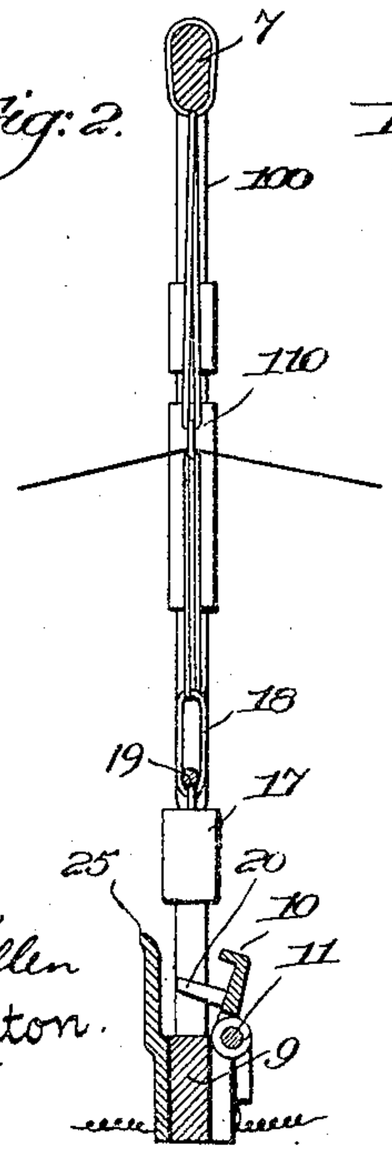


Fig: 4.

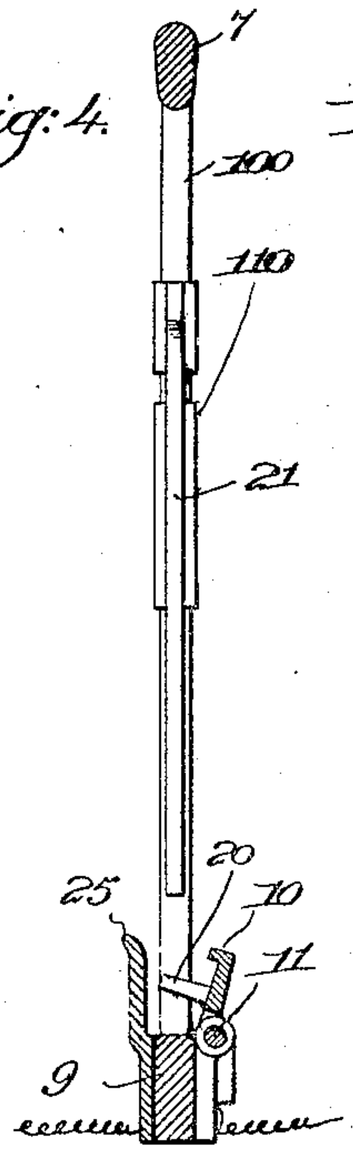
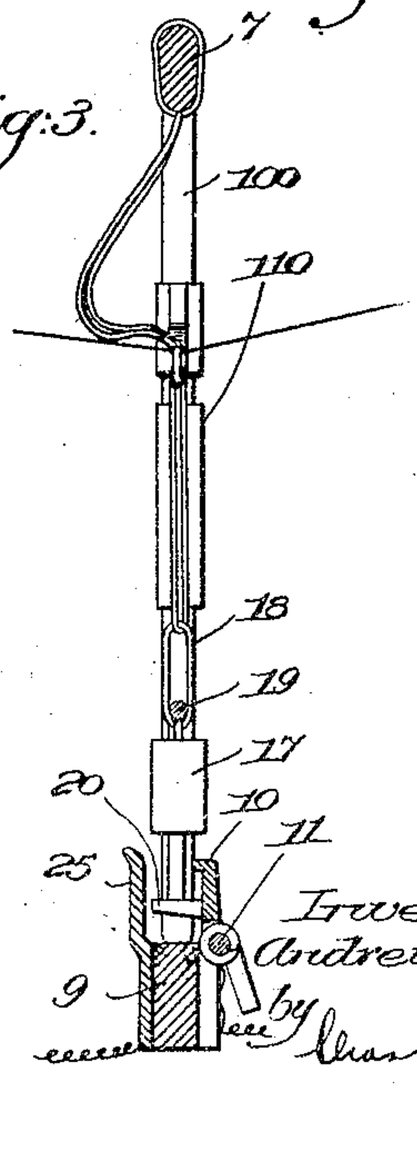


Fig: 3.



Witnesses,
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Att'ys.

No. 783,143. Patented February 21, 1905.

UNITED STATES PATENT OFFICE.

ANDREW SCHOULER, OF NEW YORK, N. Y., ASSIGNOR TO DRAPER COMPANY, OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 783,143, dated February 21, 1905.

Application filed October 9, 1903. Serial No. 176,353.

To all whom it may concern:

Be it known that I, ANDREW SCHOULER, a citizen of the United States, residing at New York, in the county of New York and State of New York, have invented an Improvement in Warp Stop-Motions for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like figures on the drawings representing like parts.

In my copending application, Serial No. 176,352, filed October 9, 1903, I have illustrated and described a warp stop-motion for looms comprising detectors which are associated with the ordinary heddles of flexible material—such as twine, cord, wire, &c.—and a vibrating feeler coöperating with said detectors upon the breakage of any warp-thread to stop the loom. In said application the invention is illustrated as applied to a plain-loom. In this application I have illustrated a form of my invention which is adapted to be applied to a fancy-loom where a large number of harnesses are employed. In thus applying my invention to a fancy-loom I have made each of the harness-frames in two parts, which are movable relative to each other and which are moved away from each other or spread when carried into one extreme position and are moved toward each other or are closed together when carried into the other extreme position. The feeler is mounted upon one part of the frame, and the heddles are carried by the other part thereof, and a detector is secured to each of the heddles. When the two parts of the frame are closed together, the feeler is actuated by such relative movement of the parts and swung toward the detectors, which at this time are held out of the path of the feeler by the tension on the warp-threads. If any warp-thread is broken, the corresponding detector will obviously not be lifted out of the path of the feeler and by remaining therein will coöperate with the feeler to stop the loom.

In the drawings, Figure 1 is a view of a portion of a fancy loom, showing one harness-frame having my invention applied thereto. Fig. 2 is a vertical section on the line $x\,x$, Fig. 1, through the harness-frame, showing the position of the parts when the warps are in the upper plane of the shed. Fig. 3 is a similar view showing the position of the parts when the warps are in the lower plane of the shed; and Fig. 4 is a section on the line $y\,y$, Fig. 1.

3 designates a harness-frame, which is operated by any suitable or usual dobby mechanism 4, such as are commonly employed on fancy looms. As herein illustrated, the harness-frame is positively raised by the dobby mechanism and is pulled into its lower position by means of the usual springs. (Not shown.) Said frame is made in two parts, which are movable relative to each other. The harness-frame is divided horizontally—that is, the sides of said frame are divided—so that the frame may be extended or collapsed in a vertical direction. The upper portions 100 of the sides of the heddle-frame, which are rigidly secured to the upper rail 7 thereof, have rigidly secured thereto the sleeves or guides 110, in which the upper ends of the lower portions 12 of the sides telescope, said portions 12 each having the pin 13 playing in a slot 14 in the corresponding sleeve 110 for the purpose of limiting the extent of movement of the two parts. Springs 15 yieldingly hold the two parts of the frame together.

10 designates the feeler, which is mounted to turn about a rod or pivotal shaft 11, carried by the lower rail 9 of the heddle-frame. The feeler is normally held in its retracted position, or that shown in Figs. 2 and 4, by any suitable means, such as springs 16, which are fastened at one end to the feeler and at the other end to any suitable fixed support, as the rod 11.

Secured to the bottom of each heddle is a detector 17, which coöperates with the feeler to stop the loom upon the breakage of a warp-thread, as will be presently described. The lower end of each heddle is made with an elongated loop 18, through which passes a guide-bar 19, extending across the heddle-frame, said guide-bar operating to hold the bottom ends of the heddles in proper position

and the loop permitting the vertical movement of the heddles with relation to the heddle-frame.

The springs 15 are made weaker than the spring 6, and as a result when the harness-frame is lifted by the dobby mechanism the springs 15 will first be stretched and the harness-frame separated as much as the slots 14 will permit, and thereafter the springs 6 will be stretched, while the harness-frame as an entirety moves upward. During the lowering movement of the harness-frame the stronger spring 6 will first pull the frame as an entirety downward, and thereafter the springs 15 will contract and the two parts of the heddle-frame will close together. The detectors are so supported on the heddles that when the harness-frame is raised to carry the warp-thread into the upper plane of the shed and the two parts of said frame are separated, as shown in Figs. 1 and 2, the detectors 17 are above and out of the path of movement of the feeler 10, the tension on the warp-threads and the weight of the detectors at this time causing the heddles to hang vertically. When the harness-frame is moved into its lowered position to carry the warp-threads into the lower plane of the shed and the two parts of the harness-frame are closed together, as above described, the detectors 17 would naturally be lowered sufficiently to be brought into the path of the feeler 10 except for the tension on the warp-threads, which raises the heddles with relation to the harness-frame and holds the detectors elevated above the feeler, as seen in Fig. 3. So long as the warp-threads are intact, therefore, all of the detectors are held out of the path of the feeler. If, however, any warp-thread becomes broken, the corresponding heddle will fail to be raised when the harness-frame is depressed, and the corresponding detector will therefore be carried into the path of the feeler when the two parts of the harness-frame close together.

I have herein shown means for vibrating the feeler by or through the movements of the two parts of the frame relative to each other, and for this purpose the feeler is provided at each end with an arm 20, which is acted upon by pendent arms 21, secured to the upper portions 100 of the harness-frame sides. As stated above, the spring 16 normally holds the feeler retracted, as shown in Figs. 2 and 4. During the time when the two parts of the harness-frame move toward each other the pendent arms 21 are brought against the arms 20, and the feeler is rocked toward the detector and carried into the position shown in Fig. 3. So long as the warp-threads are all intact the feeler has perfect freedom of movement; but if any warp-thread breaks the feeler upon its forward movement strikes the corresponding detector and crowds the same against the stop-guard 25, extending across the harness-frame, and through some suitable mechanism operates to stop the loom. As herein shown, the stop-guard 25 and the feeler 10 are both insulated from the harness-frame and are in an electric circuit which includes any suitable stop mechanism for the loom. So long as the detectors are held above the feeler the electric circuit including the loom-stopping mechanism will be maintained open and the loom will continue to run; but as soon as any warp-thread breaks and the corresponding detector is struck by the feeler and brought into contact with the guard 25 the circuit is closed and the loom-stopping mechanism set in operation to stop the loom.

It will be noted that the feeler mechanism employed for each harness-frame occupies a minimum space, and the feeler mechanism on any one harness-frame does not interfere at all with the operation of the other harness-frame. Consequently this form of the invention can be used on a loom having a large number of harnesses—such, for instance, as a loom for weaving fancy goods.

While I have herein shown my warp stop-motion as adapted for use in connection with an electric loom-stopping mechanism, it will be obvious that with suitable modifications this invention may be adapted for use with mechanical loom-stopping mechanism, and I desire the claims to cover the invention broadly, regardless of the particular form of loom-stopping mechanism employed. It will be obvious, therefore, that many changes may be made in the construction of the parts without departing from the invention described in the appended claims.

I have not herein claimed, broadly, a warp stop-motion comprising a vibrating feeler which coöperates with means associated with each of the ordinary heddles of flexible material—such as twine, cord, &c.—to stop the loom upon the breakage of a warp-thread, as this is illustrated and claimed in my copending application, above referred to. In the present application the feeler is operated entirely by the relative movement of different parts of the harness-frame without the interposition of any outside agency—such as stationary racks, levers, &c.—and as I believe I am the first to devise such a construction I desire to claim it broadly.

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

1. In a loom, a harness-frame comprising two parts movable with relation to each other as the shed is formed, a plurality of heddles carried by one part, a feeler carried by the other part, and a detector associated with each heddle and coöperating with the feeler to stop the loom when any warp-thread breaks.

2. In a loom, a harness-frame comprising two parts movable with relation to each other

as the shed is formed, a plurality of heddles carried by one part, a feeler carried by the other part, means to vibrate the feeler by movement of one part of the frame relative to the other, and a detector associated with each heddle and coöperating with the feeler to stop the loom when the corresponding warp-thread breaks.

3. In a loom, a harness-frame comprising two parts movable with relation to each other as the shed is formed, a plurality of heddles carried by one part, a feeler carried by the other part, means to vibrate the feeler by movement of one part of the frame relative to the other, and a detector associated with each heddle and coöperating with the feeler to stop the loom when the corresponding warp-thread breaks, said detectors normally being held out of the path of the feeler.

4. In a loom, a harness-frame comprising two parts movable with relation to each other and yieldingly connected together, a plurality of heddles carried by one part of said frame, a feeler carried by the other part thereof, a detector connected to each heddle, and means to actuate the feeler by relative movement of the two parts of the frame, said detectors being held out of the path of the feeler by the tension of the warp-threads.

5. In a loom, a harness-frame comprising two parts movable with relation to each other and yieldingly connected together, a plurality of heddles carried by one part of said frame, a feeler carried by the other part thereof, a detector connected to each heddle, and means whereby said feeler is moved toward the detectors when the two parts of the frame move toward each other, said detectors at this time normally being held out of the path of the feeler by the tension of the warp-threads.

6. In a fancy-loom, three or more harness-frames each having a plurality of heddles of flexible material, a feeler coöperating with each harness-frame, means to vibrate the feeler and independent means associated with each heddle to coöperate with the corresponding feeler to stop the loom upon the breakage of the corresponding warp-thread.

7. In a fancy-loom, three or more harness-frames each having a plurality of heddles of flexible material, a feeler coöperating with each harness-frame, means to vibrate each feeler by or through the movements of the corresponding harness-frame, and independent means associated with each heddle to cooperate with the corresponding feeler to stop the loom when the warp-thread corresponding to said heddle is broken.

8. In a loom, a harness-frame having a plurality of heddles, a feeler, independent detectors associated with the heddles, and means to operate the feeler entirely by the movements of the harness-frame.

9. In a loom, a harness-frame having a plurality of heddles, independent detectors associated with the heddles, a feeler carried by the harness-frame, and means whereby the feeler derives its movements solely from the harness-frame.

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

ANDREW SCHOULER.

Witnesses:
LOUIS C. SMITH,
JOHN C. EDWARDS.