S. B. CUTTING.

WARP STOP MOTION FOR LOOMS.

APPLICATION FILED NOV. 26, 1912.

1,133,366.

Patented Mar. 30, 1915.

3 SHEETS—SHEET 1.

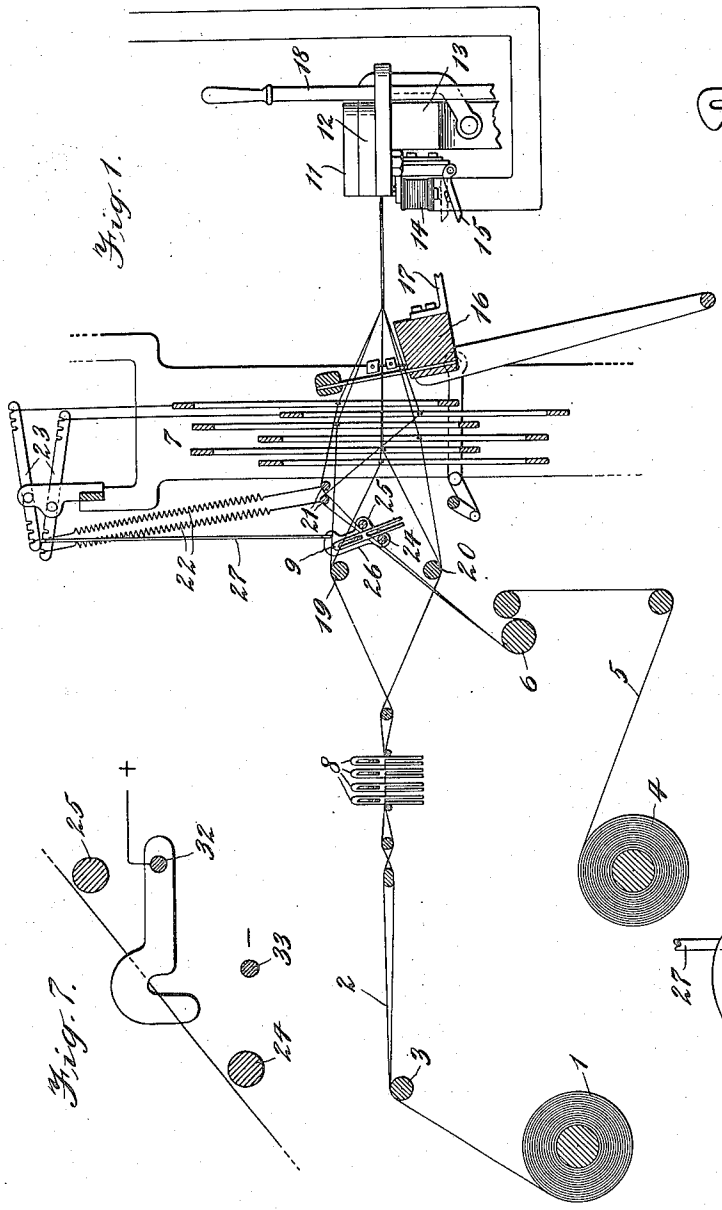

Fig. 1.

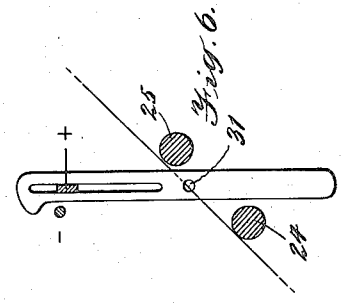

Fig. 6.

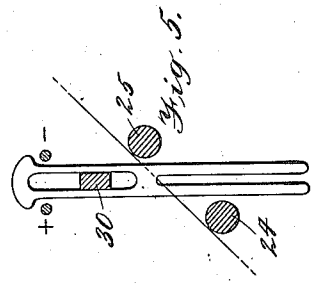

Fig. 5.

Fig. 7.

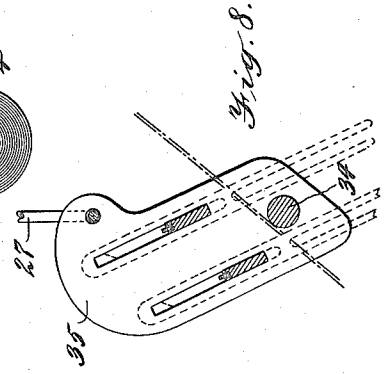

Fig. 8.

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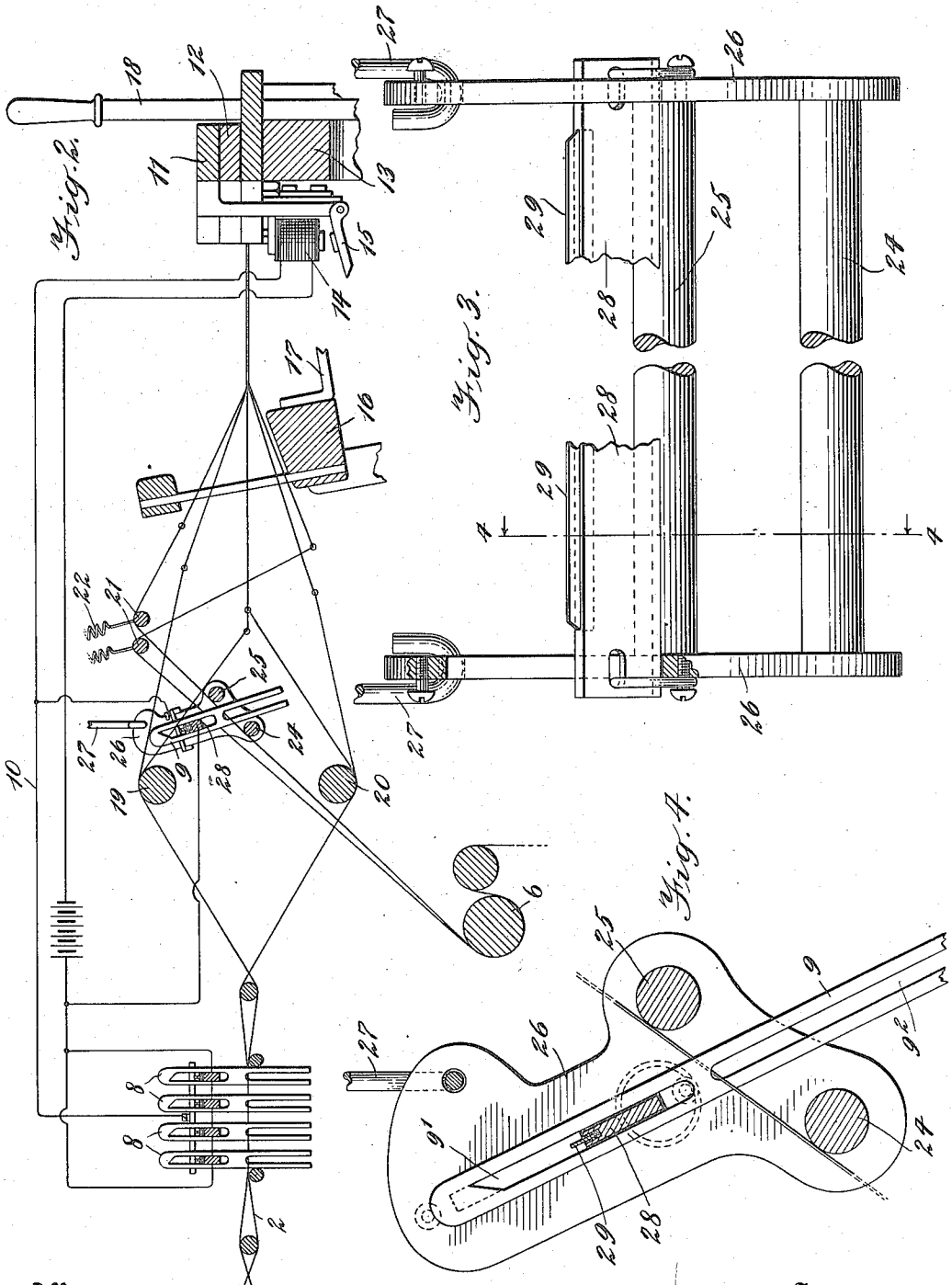
3 SHEETS—SHEET 2.



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3 SHEETS—SHEET 3.

Fig. 9.

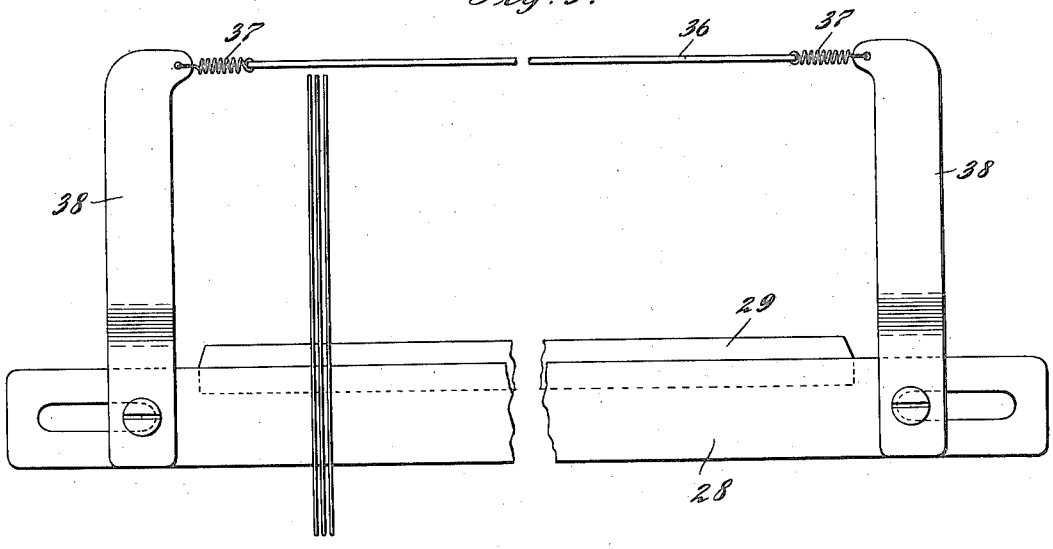


Fig. 10.

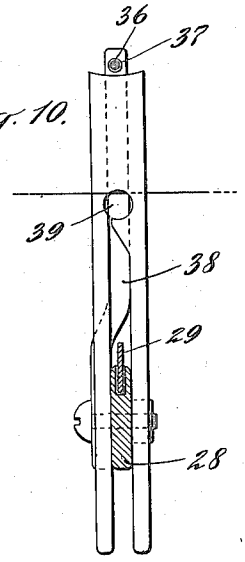
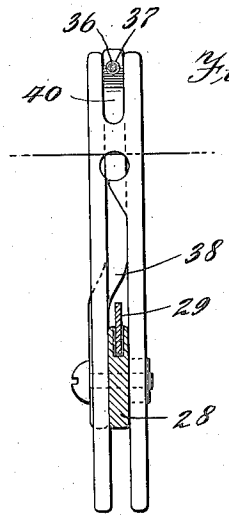


Fig. 11.



Witnesses:
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UNITED STATES PATENT OFFICE.

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WARP STOP-MOTION FOR LOOMS.

1,133,366. Specification of Letters Patent. Patented Mar. 30, 1915.

Application filed November 26, 1912. Serial No. 733,571.

To all whom it may concern:

Be it known that I, SAMUEL B. CUTTING, a citizen of the United States, residing at Bridgeport, in the county of Fairfield, State of Connecticut, have invented certain new and useful Improvements in Warp Stop-Motions for Looms, of which the following is a specification.

My invention relates to a warp stop motion for looms and will be understood by reference to the accompanying drawings which illustrate the application thereof to a pile fabric loom, it being understood, however, that the invention is capable of application to looms generally and is not confined to the particular loom shown.

In the drawings Figure 1 is a sectional view, partly diagrammatic, of a pile fabric loom embodying the invention; Fig. 2, a similar view on an enlarged scale showing the circuit connections; Fig. 3, a rear elevation of the part on which the pile warps are supported at the point of location of the drop devices; Fig. 4, a section on the plane of the line 4—4 of Fig. 3; Figs. 5, 6, and 7, views of drop devices which may be employed; Fig. 8, a view of a modification which may be employed in the construction shown in Fig. 1; Fig. 9, a side view of means which may be used to prevent the drops jumping off; and Figs. 10 and 11, views of drops which may be employed with the preventing means of Fig. 9.

Similar reference numerals indicate similar parts in the several views.

Referring to the drawings, the numeral 1 designates the main warp beam; 2, the main or back warps which pass over the whip roll 3; 4, the pile warp beam; 5, the pile warps, and 6, the let-off rolls for the latter. Both sets of warp threads are led through the usual harness mechanism indicated at 7 for the formation of the sheds, the pile warps being carried up through the lower set of back warps and let off intermittently to float between the two back warps in the usual and well-known manner. The back warps carry metallic drops 8, and the pile warps carry drops 9, these drops being adapted, when a warp thread breaks, and by this is meant to include not only an actual severance of the warp, but any abnormal slackness thereof, to close a controlling circuit 10 for the loom stop mechanism. The stopping mechanism may be of any known type and, for the purpose of illustration, I have shown one comprising an auxiliary knock-off lever 11 which rests upon the main knock-off lever 12, both of said levers being pivoted on a bracket extending from the breast beam 13. Secured to lever 11 is a bracket which carries an electromagnet 14 included in circuit 10. The armature 15 of said magnet projects toward the lay 16 on which is fixed a bunter 17. The magnet 14 is normally deënergized so that its armature is out of the path of bunter 17 on the beat-up of the lay, but when a back warp or a pile warp breaks, the controlling circuit 10 will be closed, thereby energizing said magnet and positioning its armature in the path of the bunter on the next beat-up of the lay. When the bunter strikes armature 15, auxiliary lever 11 will be shifted and thus act on shipper lever 18 to release it from its retaining shoulder to stop the loom.

To effect the closing of circuit 10 to energize magnet 14 for the purpose above stated, I employ metallic drop devices adapted to contact with the circuit terminals. The form of drop shown in Figs. 1 and 2 on the pile warps is provided with a closed slot $9'$ in the upper part thereof, and an open-ended slot 9^2 in the lower part thereof, the latter serving as a thread aperture. Drops of similar form are shown supported upon the back warps 2. The back warps are crossed over the usual lease rods and the two sets are separated by the upper and lower dividing rolls 19 and 20, respectively. In the arrangement shown, the pile warps 5 are led over the lower dividing roll 20 through the space between the divided back warps and over the easing rods 21, which rods are connected by springs 22 to the head motion or harness levers 23.

One part of my invention relates to the manner of supporting the drops which, for convenience, I will explain in connection with the pile warp drops 9. In U. S. Patent No. 1,019,026, granted March 5, 1912, the drops are supported upon a short horizontal section of the pile warps formed by passing the latter over two rods placed in the same horizontal plane. This provision of a horizontal section of the pile warps, either in the arrangement shown in said patent or in U. S. Patent No. 635,637, dated October 24, 1899, produces friction sufficient

to throw off considerable lint from the loosely twisted yarn of which the pile warp is made. This is because the pile warps are bent in their course, and to avoid this and thereby reduce the friction to a minimum, I pass the pile warps over two rods 24 and 25 lying in different horizontal planes directly under a straight inclined section of the pile warps, so that the latter may extend in a substantially straight line. For convenience I have shown the inclined section of the pile warp extending from the let-off roll to the easing rods. This, however, is not material to the invention as in some looms it will be desirable to use intermediately the let-off rolls and easing rods, rods for better guiding the pile warp. Rods 24 and 25 may be placed at any convenient point between the let-off rolls and the easing rods. I have shown them extending across the loom in the space between the back warps and as supported in end pieces 26 constituting a frame which is suspended by rods 27 from the head motion or harness levers 23. Supported in this frame is a compound terminal comprising a bar 28 and a blade 29 set in the upper edge thereof, said bar and blade being insulated from each other and connected to the respective terminals of circuit 10. The compound terminal and drops may be vertical or inclined; I have shown them as inclined, and placed above the rods 24 and 25. The drops 9 are supported on the short section of the pile warps between said rods, the bar 28 passing through the slots 9′ of the drops and serving as a guide for the drops.

The compound terminal for the drops 8 of the back warps is similar to that above described, but instead of mounting these terminals in a movable frame, they are secured in fixed supports on opposite sides of the loom frame.

During the normal running of the loom the drop devices on both the back warps and the pile warps will be supported on the warp threads out of contact with the corresponding blade 29 of the compound terminal. When, however, either a back or a pile warp breaks, the corresponding drop will be released and, falling upon the blade 29, will close circuit 10, it being understood that the drops are always in contact with bar 28 of the terminal. The magnet 14 being thus energized the knock-off mechanism will be set in operation to stop the loom.

I do not confine myself to the location of the drops on the pile warps in the space between the back warps a sufficient distance, as shown in said Patent No. 635,637, to permit the frame carrying the rods 24 and 25 and the compound terminal to be placed above the back warps. Also, I do not limit myself to the application of drop devices on an inclined section of pile warps as the drops on the back warps may be supported in a similar manner, that is, instead of placing the drops on a substantially horizontal section of the back warps they may be placed upon an inclined section.

By doing away with the supporting rods in substantially the same horizontal plane as in said Patent No. 635,637 and No. 1,019,026, and placing them in different horizontal planes as herein described, I reduce the friction of the warps to a minimum and at the same time provide a short section of the straight run of the warps upon which to support the drops. Also, the tension is better regulated, and furthermore, the slight up and down motion of the drop frame, because of its support from the head motion or other moving part of the loom, tends to throw off the lint and to prevent the accumulation of an undesirable quantity of lint.

As before stated, any suitable form of drop may be employed. Besides the form already described, I may use that shown in Fig. 5, having a closed slot in the upper part thereof, through which passes a guide 30, and laterally projecting portions adapted, when the drop falls, to contact with the circuit terminals placed outside of the body of the drop and in the path of a falling drop.

In Fig. 6, the drop is closed at its lower part and provided with a thread aperture 31. One of the circuit terminals, passing through the slot in the upper part of the drop, serves as a guide for the drop. The other terminal is outside of the body of the drop and is engaged, when the drop falls, by a lateral projection, as shown.

In Fig. 7, I have shown a form of drop which may be pivoted upon one of the terminals 32, the other terminal 33 lying in the path of a falling drop. As in the other forms, this drop will be supported upon an unbroken warp thread and will be permitted to contact with terminal 33, only when the warp breaks or becomes unduly slack.

As shown in Figs. 1–4, two points of support, namely, the rods 24 and 25, are shown for the warp threads. As the essential feature is to place the drops in proximity to a supported section of the warps I may employ the construction shown in Fig. 8 in which a rod 34 is employed extending between the end pieces 35, these latter also supporting two compound terminals placed on opposite sides of the rod 34, and inclined in substantially parallel planes to the plane of the warps.

Another feature of my invention which I have illustrated separately in Figs. 9–11, in order to avoid confusion, relates to means for preventing the drops jumping off or being thrown off the warps during the normal running of the loom. This means comprises a light wire 36 connected to springs

37 and held between arms 38 adjustably connected to the bar 28 of the compound terminal. The wire 36 is placed a sufficient distance above the upper ends of the drops as not to permit contact between the drops and said wire due to the normal up and down movement of the drops while the loom is running, but will prevent the jumping off of the drops should there be an abnormal movement of the drops. The drops may be of the form shown in Fig. 10, having an open lower end and a thread aperture 39, and a closed upper end. Or the form may be that shown in Fig. 11 of which the upper end of the drop is cut out at 40, as shown, so that the wire 36 will normally be at the upper end of the cut or slot. By this means any abnormal movement of the drops upward, which would tend to throw them completely off the warps, is prevented by the drops contacting with the wire 36.

The arrangement of the wire 36, above described, permits the operator to take off and put on drops by pressing the wire to one side. When the drops are replaced and pressure on the wire removed, the latter will return to its original position over the drops preventing them from jumping off. While I have shown a wire 36, any metal or other restraining device may be employed.

I believe myself to be the first to apply a warp stop motion to a loom having the drop devices supported on warp threads on an inclined section of said threads, and I therefore desire to claim the same broadly without reference to the specific means or arrangement shown.

What I claim and desire to secure by Letters Patent of the United States:—

1. In a warp stop motion for pile fabric looms, the combination of stopping mechanism and a controller therefor, a pile warp beam, easing rods over which the pile warps are led, drop devices carried by the pile warps, said drops being supported upon a straight inclined section of the pile warps between the beam and the easing rods and in the space between the back warps, and adapted to set in motion said controller when a pile warp thread breaks or becomes unduly slack.

2. In a warp stop motion for pile fabric looms, the combination of stopping mechanism and a controller therefor, a pile warp beam, easing rods over which the pile warps are led, drop devices carried by the pile warps, said drops being supported upon a straight inclined section of the pile warps between the beam and the easing rods and in the space between the back warps, and adapted to set in motion said controller when a pile warp thread breaks or becomes unduly slack, and means for moving the drop devices.

3. In a warp stop motion for looms the combination of stopping mechanism and a controller therefor, a pile warp beam, easing rods over which the pile warps are led, a frame between said beam and easing rods comprising rods placed in different horizontal planes and over which the pile warps are passed in substantially straight lines, drop devices carried by the pile warps, said drops being supported upon a straight inclined section of the pile warps and in the space between the back warps, and adapted to set in operation said controller when a warp thread breaks or becomes unduly slack.

4. In a warp stop motion for looms, the combination of stopping mechanism and a controller therefor, pile warp let-off rolls and easing rods, the said pile warps leading from said rolls to the easing rods in substantially straight lines, and drop devices supported on the pile warps at some part of said straight section thereof and in the space between the back warps, and adapted to set in operation said controller when a warp thread breaks or becomes unduly slack.

5. In a warp stop motion for looms the combination of stopping mechanism and a controlling circuit therefor, let-off rolls and easing rods, means for leading the pile warps from the let-off rolls in substantially straight lines to the easing rods, drop devices supported upon the pile warps at an inclined section thereof between the said rolls and the easing rods and in the space between the back warp, said drops being adapted to close the circuit when a pile warp breaks or becomes unduly slack.

6. In a warp stop motion for pile fabric looms, the combination of stopping mechanism and a controlling circuit therefor, a rod or rods for supporting the pile warps at a straight inclined section of the warps, means for supporting said rods from a moving part of the loom, drop devices supported by unbroken pile warps in proximity to said rod or rods, said drops being adapted to set in operation said controller when a warp thread breaks or becomes unduly slack.

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

SAMUEL B. CUTTING.

Witnesses:
ARTHUR G. MEDCALF,
ARTHUR OAKLEY.