

No. 632,004.

Patented Aug. 29, 1899.

W. H. BAKER & F. E. KIP.
ELECTRICAL WARP STOP MOTION.

(Application filed Oct. 25, 1898.)

(No Model.)

2 Sheets—Sheet 1.

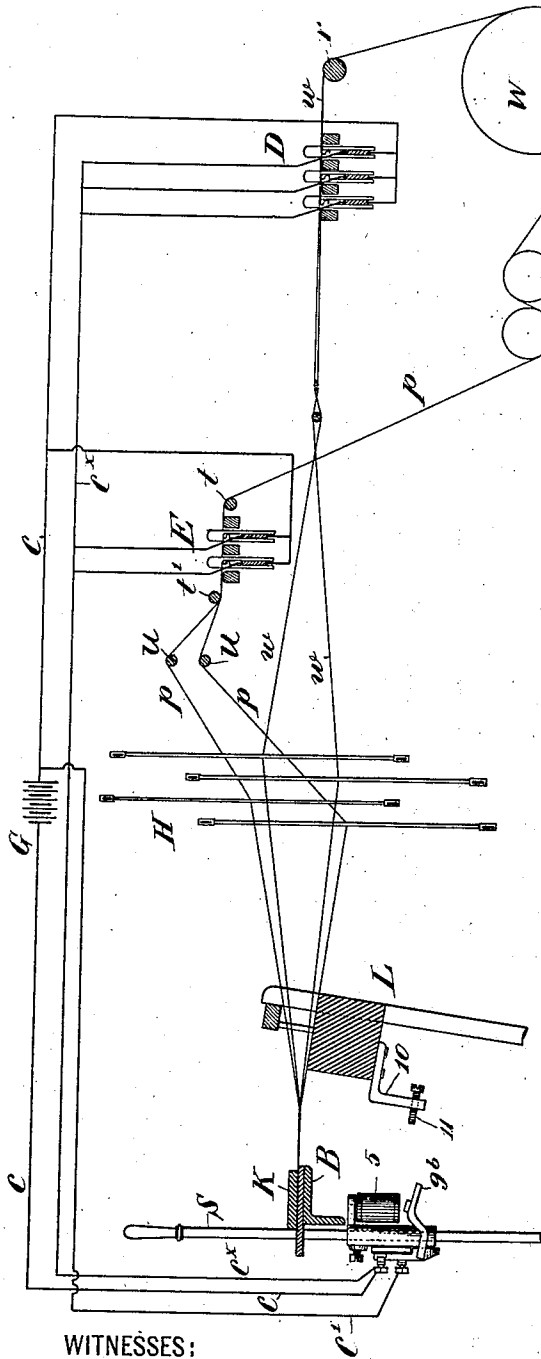


Fig. 3.

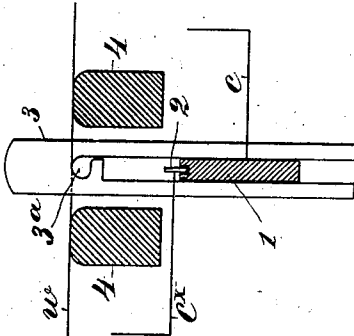
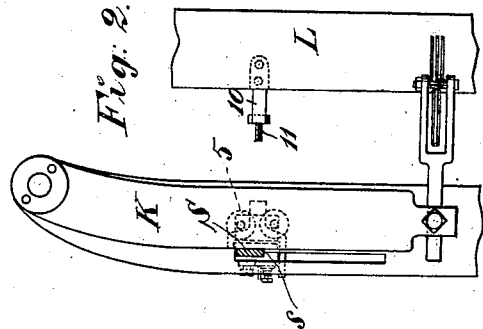


Fig. 2.



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Fig. 1.

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2 Sheets—Sheet 2.

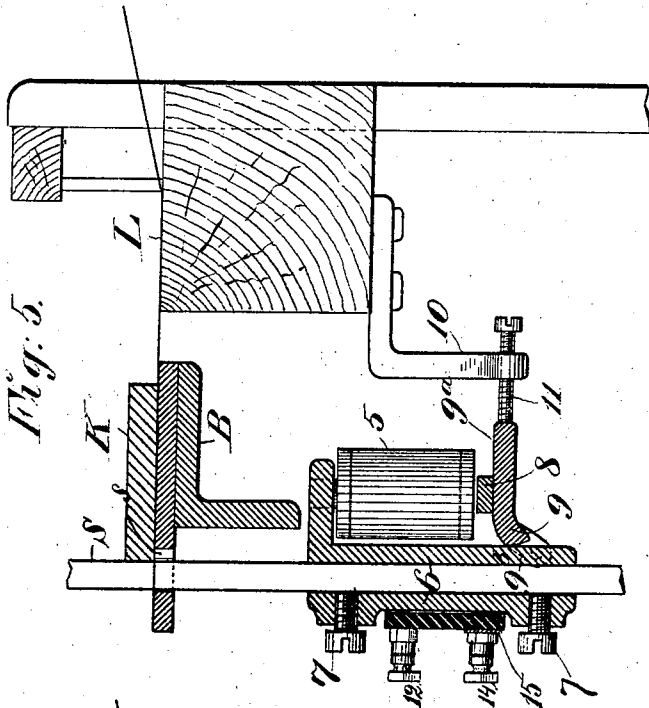


Fig. 5.

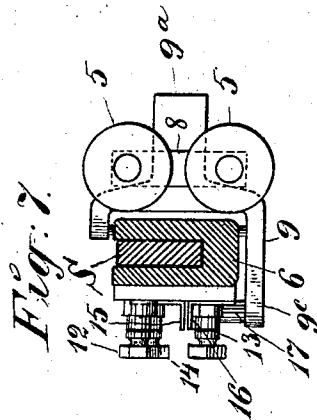


Fig. 7.

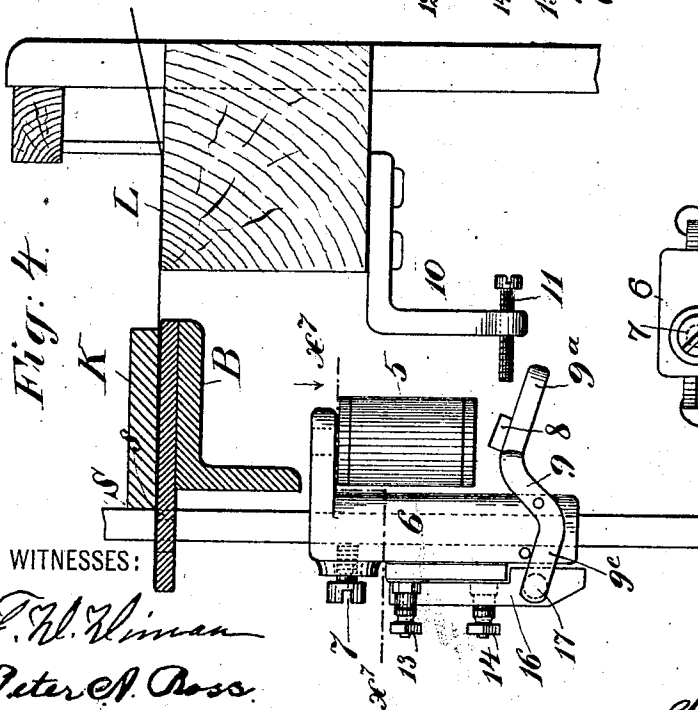


Fig. 4.

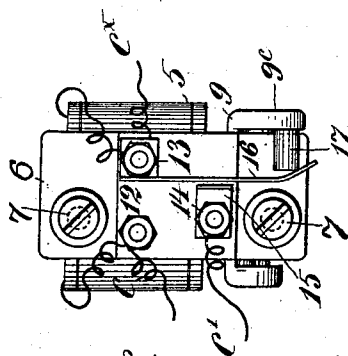


Fig. 6.

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UNITED STATES PATENT OFFICE.

WILLIAM H. BAKER, OF CENTRAL FALLS, RHODE ISLAND, AND FREDERIC E. KIP, OF MONTCLAIR, NEW JERSEY, ASSIGNORS TO THE KIP-ARMSTRONG COMPANY, OF NEW YORK.

ELECTRICAL WARP STOP-MOTION.

SPECIFICATION forming part of Letters Patent No. 632,004, dated August 29, 1899.

Application filed October 25, 1898. Serial No. 694,507. (No model.)

To all whom it may concern:

Be it known that we, WILLIAM H. BAKER, residing at Central Falls, Providence county, Rhode Island, and FREDERIC E. KIP, residing at Montclair, Essex county, New Jersey, citizens of the United States, have invented certain new and useful Improvements in Electrical Warp Stop-Motions, of which the following is a specification.

The present invention relates to stop-motions for warps, and notably for warps on looms, and also to such stop-motions as are controlled by electricity. In this class of warp stop-motions the electric circuit is closed when a warp-thread breaks by the falling of a drop or circuit-closing device normally supported by the unbroken warp-thread. This closing of the circuit excites an electromagnet therein, and the magnet acts through mechanical devices to stop the loom.

The object of the present invention is in the main to simplify the construction of the magneto-mechanical devices for stopping the loom and to provide for freeing the shipper-lever of the loom without disturbing the knock-off lever. The reason for this is that the weft stop-motion common on looms acts through the knock-off lever to arrest the take-up when a weft-thread breaks or fails, and this arrest is not desired when a warp-thread breaks.

In the accompanying drawings, which illustrate an embodiment of the invention, Figure 1 is a somewhat diagrammatical side view of a loom for weaving pile fabrics to which the invention has been applied. Fig. 2 is a fragmentary plan of the mechanism seen at the left in Fig. 1. Fig. 3 is a detail view of the preferred form of circuit-closing device. Figs. 4 and 5 are similar views, on a larger scale than the principal views, showing the devices for freeing the shipper-lever in two different positions, respectively. Fig. 6 is a rear view of the operating-magnet, showing the shunt device. Fig. 7 is a horizontal section taken in the plane indicated by line x' in Fig. 4.

Referring, primarily, to Fig. 1, which shows the parts of a loom merely in a diagrammatic manner, W is the main-warp beam, and w the

main or back warps. P is the pile-warp beam, and p the pile-warps. R are the let-off rolls or beams for the pile-warps. $u u$ are the take-up rolls or rods, (sometimes called "monkey-tails.") H indicates the usual heddles and harness for producing the shed. r is the whip-roll; L, the lay; S, the shipper-lever; B, the breast-beam, and K the knock-off lever. All of these parts are common in looms in some form, and they are indicated in Fig. 1 merely diagrammatically.

G represents any form of generator of electricity, and $c c'$ the conductors of a circuit supplied thereby. This is a normally-open circuit adapted to be closed when any warp-thread breaks by the falling of a metallic drop normally supported by the said warp-thread upon a terminal of said circuit. In Fig. 1 three sets or series of these drops are shown at D mounted on the threads of the main or back warps, and at E two sets of said drops are shown mounted upon the pile-warps at a point where these warps are brought to a horizontal position by transverse rods or rollers t and t' .

Fig. 3 illustrates the preferred form of contact-drop, terminals, and transverse warp-supports. 1 is a terminal bar connected with the conductor c , and 2 is a terminal strip mounted in the upper edge of the bar 1, but insulated therefrom. 3 is the drop, an elongated strip of thin metal, slotted to fit over or straddle the bar 1 and provided with an aperture 3^a to receive the warp-thread. When the thread breaks, the drop 3 falls by gravity into contact with the strip 2, and being normally in contact with the bar 1 it thus closes the circuit. The warp is supported adjacent to the drops by warp-supporting transverse bars 4. These have only a mechanical function.

The particular construction of drop, terminals, and warp-supports above described, and best illustrated in Fig. 3, are not herein specifically claimed, as they are described in another pending joint application made by us, Serial No. 690,398, filed September 7, 1898, nor is our present invention limited to this particular form of circuit-closing device.

When the circuit is closed by the breaking

of any one of the warp-threads, an operating electromagnet in the circuit is excited and acts through some going part of the loom, preferably the lay, to release the shipper-lever and allow it to stop the loom. This magnetomechanical mechanism will now be described, with especial reference to the enlarged detail views Figs. 4 to 7.

5 is an electro-magnet mounted on the shipper-lever S. To effect this mounting conveniently, the frame 6 of the magnet is constructed with a U shape or form, as best seen in Fig. 7, so as to take over and embrace the lever S, to which it is secured by screws 7. Below the magnet-bobbins is the armature 8, carried by a lever 9, fulcrumed on the frame 6. Normally the armature and its lever assume by gravity the position seen in Fig. 4. On the lay L or other vibrating part of the loom is secured a tappet, here shown as a bracket 10, and a screw 11, set in the bracket as shown. In Fig. 4 the lay is represented in its advanced position as when beating up the weft, and it will be noted that when in this position the end of the tappet-screw 11 will have advanced to a position above the extremity of the arm 9^a of the armature-lever 9; but when a warp-thread breaks and the circuit is closed through the magnet 5 the latter will instantly attract its armature 8, thus elevating the latter and the arm 9^a to the position seen in Fig. 5. Consequently at the next beating-up movement of the lay the tappet-screw 11 will strike the end of the lever-arm 9^a, and, acting through the lever 9 and the frame of the magnet, press back the shipper-lever S free from its retaining-shoulder s, thus setting said lever free, so that its spring is able to actuate it and stop the loom. In order that the blow on the end of the lever-arm 9^a imparted by the tappet on the lay may be transmitted directly to the frame 6 and the shipper-lever, the armature-lever is made to beat at 9^b on the face of the frame 6, when the armature is attracted, as seen in Fig. 5, where the lever 9 and frame 6 are represented in section. Fig. 7 shows the forked construction of the lever 9 very clearly.

In this class of device it is very desirable that the moment a drop falls and closes the circuit through the operating-magnet 5 the movement of the armature-lever 9 shall operate a shunt to shunt out the drops in order that the circuit may not be again broken at the drops by the vibration of the loom before the lay can have time to act. Such a shunt device is herein shown and will now be described.

The operating-magnet has at its back, Fig. 6, three binding-posts 12, 13, and 14. The coils of the magnet terminate, respectively, at the posts 12 and 13 and connect electrically at these posts with the conductors c and c', respectively. A shunt-conductor c', connected to the binding-post 14, is adapted to shunt out the drops and their terminals 1 and 2 when electrical communication is established

between the binding-posts 13 and 14. This shunting is effected when the circuit is closed through the magnet 5 by means that will now be described. Connected with the binding-post 14 is a contact-piece 15, and connected with the binding-post 13 is a spring contact piece or blade 16, which is normally nearly in contact with the piece 15. The blade 16 is curved outward toward its free end. On a rearwardly-extending arm 9^c on the armature-lever 9 is a stud 17, the end of which is adapted to wipe over the curved part of the blade-contact 16 when the armature of the magnet is attracted, and thus press this blade-contact against the contact 15, thereby shunting the circuit.

In looms of the character herein illustrated the pile-warps p are carried up from the rolls R on a steep incline to the take-up rods or rolls u u, and the pile-warps are let off intermittently to an extent sufficient to provide enough of the warp to float between the two back webs of the fabric. Hence special means must be provided in order to apply to these pile-warps the drops 3. The means herein employed for this purpose consists of the two transverse rods or rollers t and t', the former below the warps and the latter above the same. These rollers are so disposed as to keep a portion of the pile-warps substantially horizontal, and beneath these warps and on the same level as the roller t are the warp-supporting bars 4, which are placed between the series of drops 3 and also between the drops and the respective rollers t and t'. These supports serve to uphold such a large proportion of the length of the warps when they sag on being let off that the drops do not descend low enough to come in contact with the terminal 2, Fig. 3.

Having thus described our invention, we claim—

1. In a warp stop-motion for looms for weaving pile fabrics, the combination with the let-off rolls and take-up rods for the pile-warps, the former situated below and the latter above the main or back warps, means situated above the main warps for bending the pile-warps, for a portion of their length, into a substantially horizontal position, and a plurality of transversely-extending supports under this horizontal portion of the pile-warps, of circuit-closing drops arranged in series on the pile-warp threads between said supports, a loom-stopping mechanism, an electric circuit adapted to be completed by the falling of any one of said drops, a generator supplying said circuit, an electromagnet in said circuit, and means between said magnet and loom-stopping mechanism whereby the latter is freed for operation by the excitation of said magnet, substantially as set forth.

2. In a warp stop-motion for looms for weaving pile fabrics, the combination with a series of circuit-closing drops on the threads of the main or back warps, of means for bending the pile-warps into a substantially hori-

zontal position, above the back warps, for a portion of their length, a plurality of transversely-extending warp-supports under the whole of the pile-warps at this horizontal portion thereof, circuit-closing drops on the threads of the pile-warps and between said warp-supports, a normally open electric circuit adapted to be closed by the falling of any one of the above-named drops when its supporting-thread breaks, a generator which supplies said circuit, an electromagnet in said circuit, the loom-stopping mechanism, and means between said magnet and loom-stopping mechanism whereby the latter is freed for operation by the excitation of said magnet, substantially as set forth.

3. In a loom for weaving pile fabrics, the combination with the let-off rolls and take-up rods of the pile-warps, and means, situated above the main or back warps, for bending the pile-warps, for a portion of their length, into a substantially horizontal position, of a series of circuit-closing drops D, on the back warps, a series of circuit-closing drops E, on the pile-warps, at said horizontal portion of same, a plurality of supports extending under the pile-warps at the drops E, a normally open electric circuit including a generator and an electromagnet, said circuit being adapted to be closed by the falling of any one of the several drops D and E, a loom-stopping mechanism, and means between said electromagnet and said loom-stopping mechanism whereby the latter is freed for operation by the excitation of said magnet, substantially as set forth.

4. In an electric warp stop-motion for looms,

the combination with a normally open electric circuit, a generator which feeds said circuit, circuit-closers which close the circuit when a warp-thread breaks, the shipper-lever and a going part of the loom, of an electromagnet carried by the shipper-lever and in said circuit, the armature of said magnet, the lever 9, having an arm 9^a carrying said armature and an arm 9^c provided with a stud 17, the shunt-circuit terminating with the contact-piece 15, and the curved contact-blade 16 in position to be acted on by the stud 17 to close the shunt-circuit, substantially as set forth.

5. In a warp stop-motion for looms, the combination of the following instrumentalities; namely: a series of metallic drops each having a thread-aperture, an elongated guide-slot, and a contact projection between said thread-aperture and slot, an electric circuit having two terminals which extend through said guide-slots in the series of drops, an electromagnet mounted on the shipper-lever and in said circuit, said shipper-lever, the lay, and means whereby the shipper-lever is shifted to stop the loom by said lay, when the circuit is closed by the falling of one of said drops onto the upper circuit-terminal, substantially as set forth.

In witness whereof we have hereunto signed our names, this 22d day of October, 1898, in the presence of two subscribing witnesses.

WILLIAM H. BAKER.
FREDERIC E. KIP.

Witnesses:

HENRY CONNETT,
PETER A. ROSS.