No. 741,951. PATENTED OCT. 20, 1903.

W. H. BAKER & F. E. KIP.

WARP STOP MOTION FOR LOOMS.

APPLICATION FILED OCT. 18, 1901.

NO MODEL. 3 SHEETS—SHEET 1.

Fig. 1

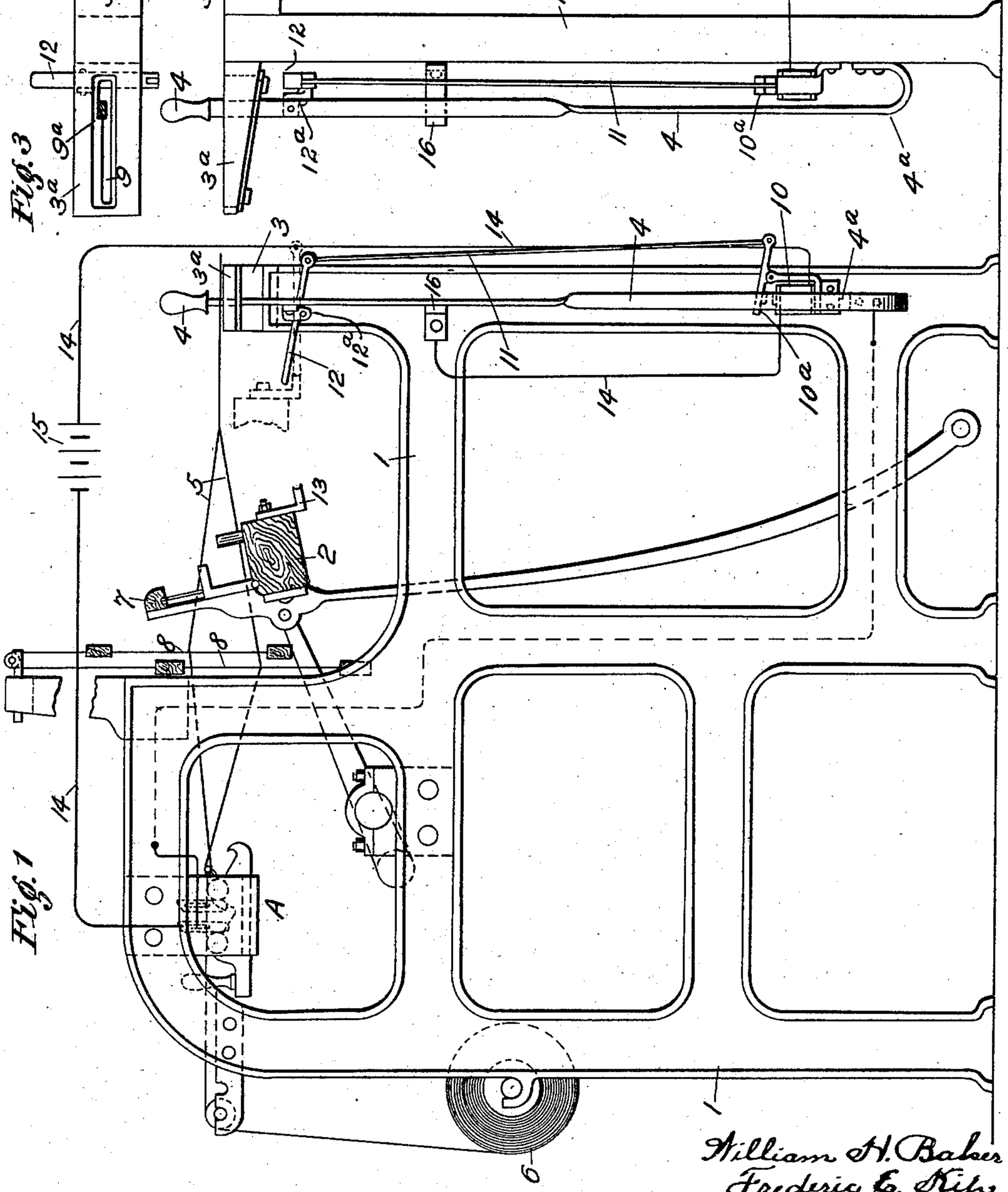

Fig. 2

Fig. 3

Witnesses
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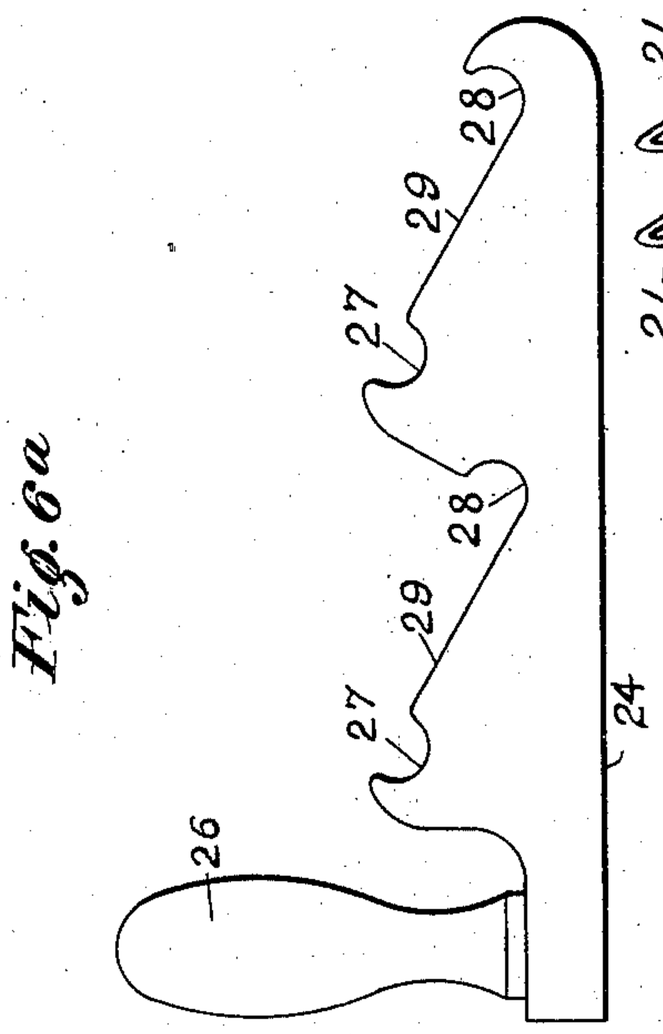
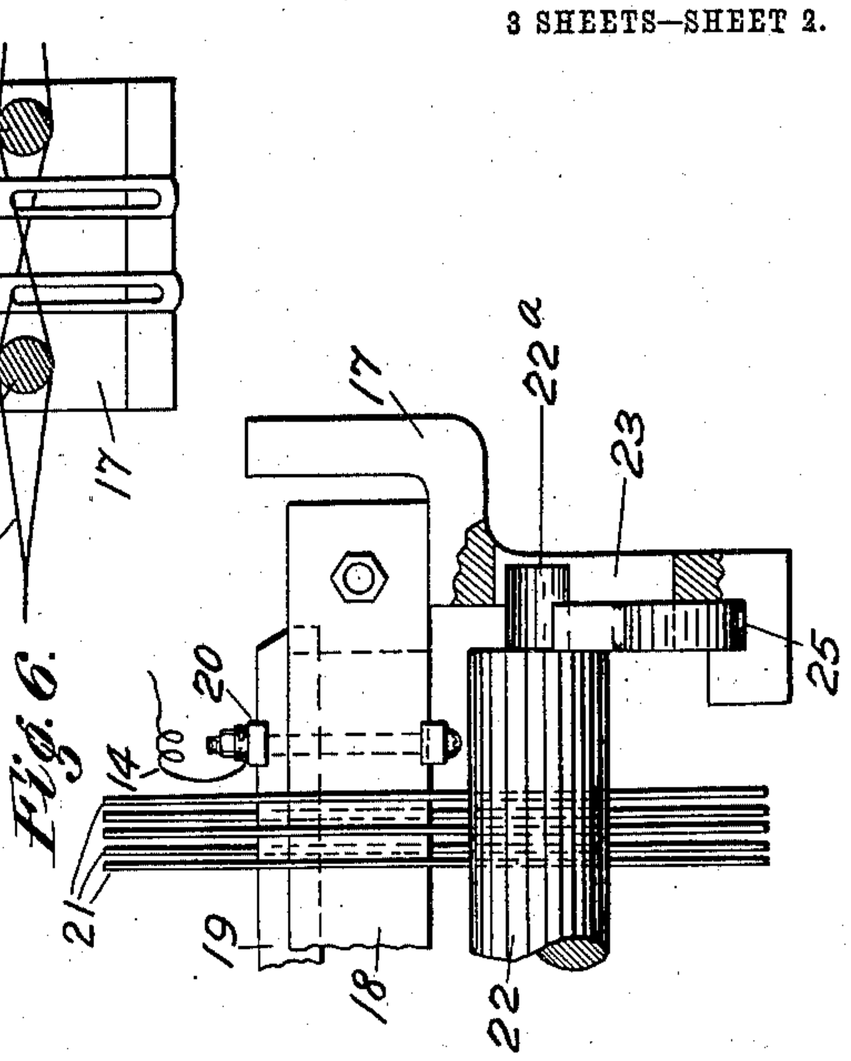
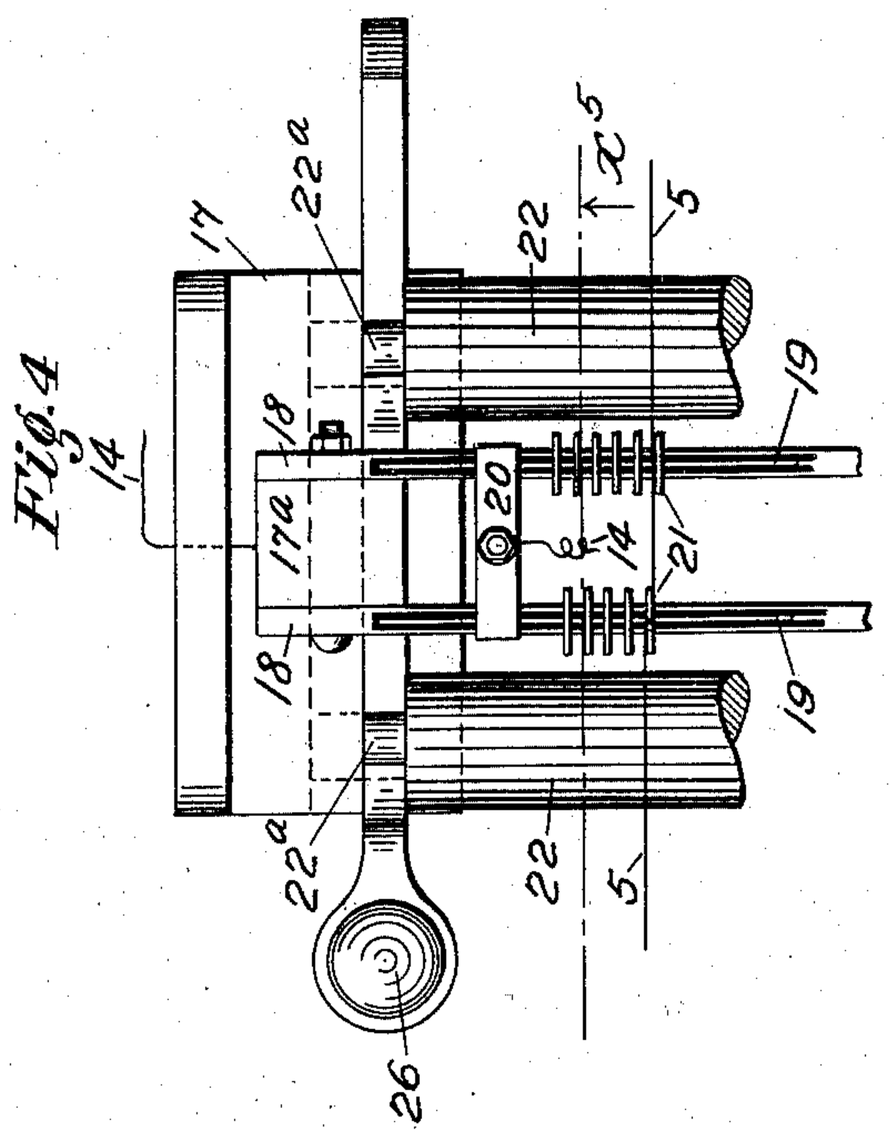
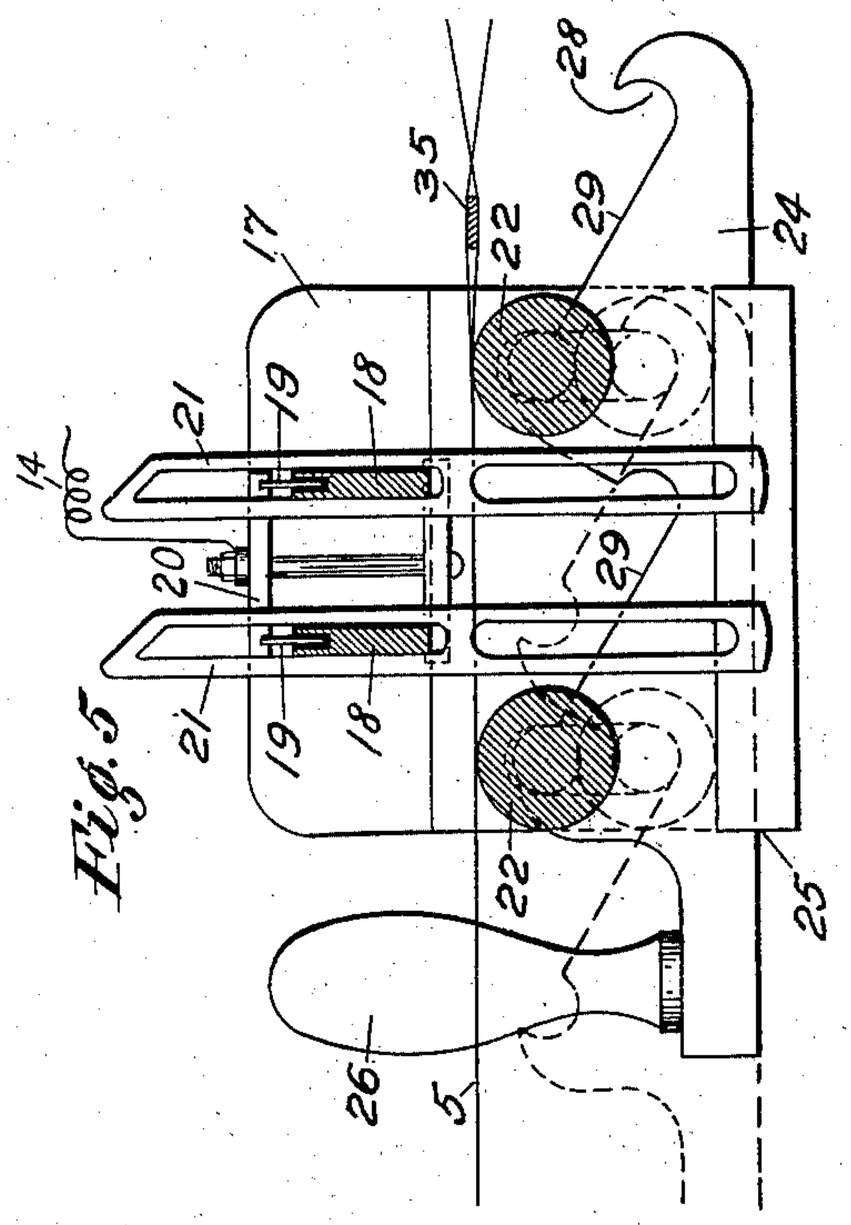
NO MODEL. 3 SHEETS—SHEET 2.









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NO MODEL. 3 SHEETS—SHEET 3.

Fig. 7

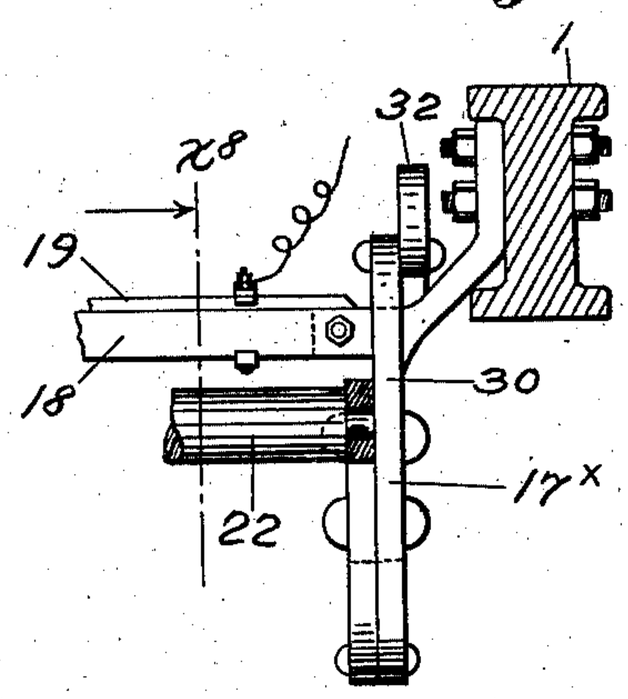


Fig. 8

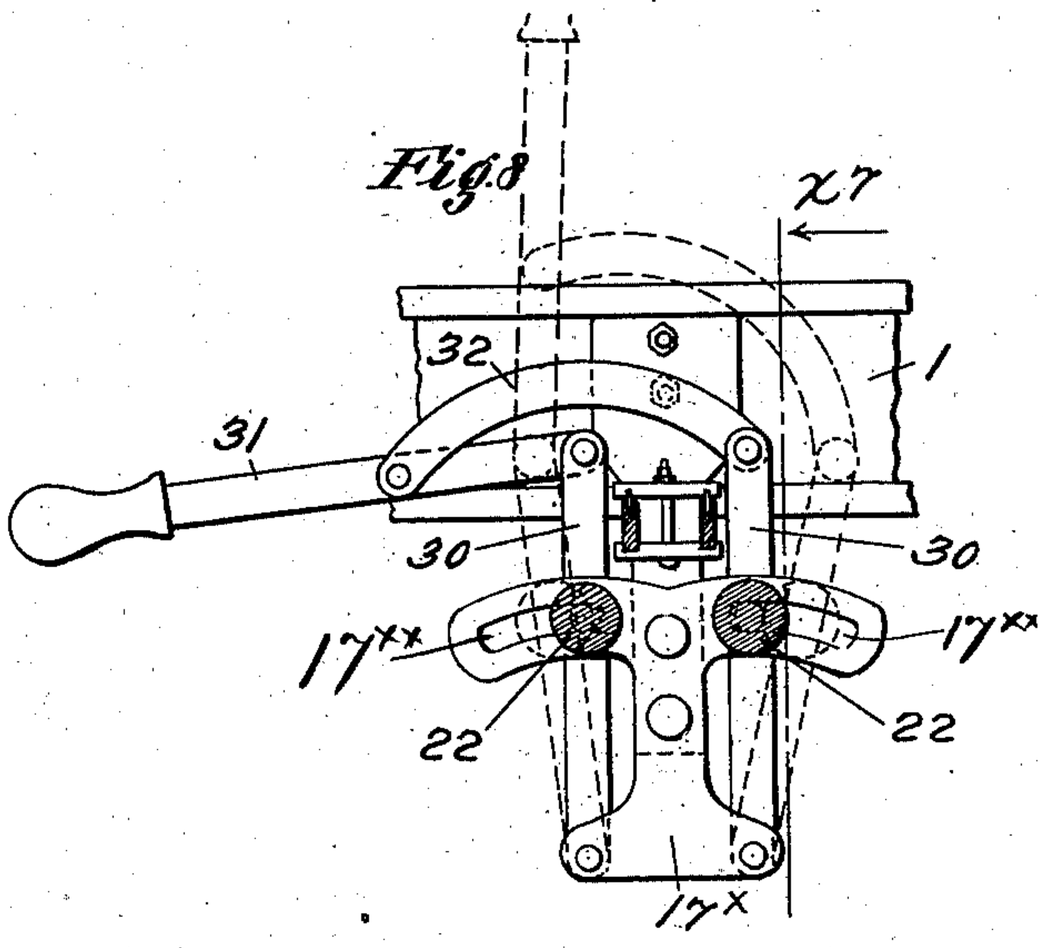


Fig. 9

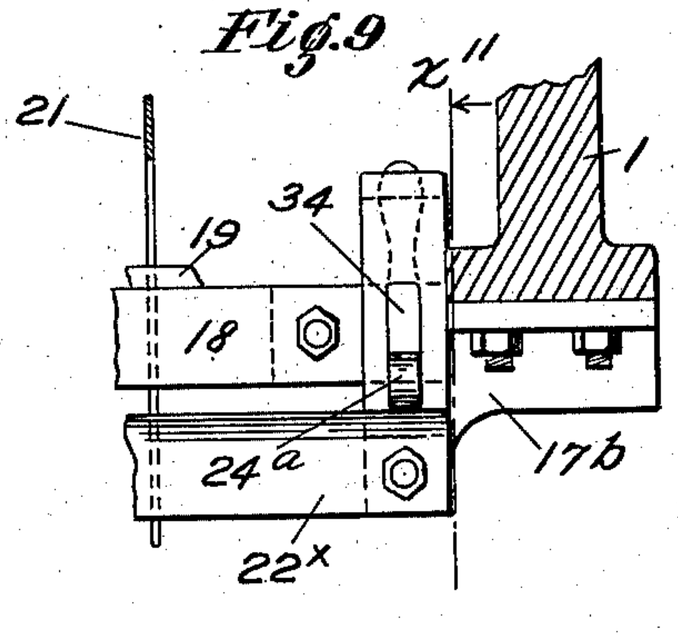


Fig. 10

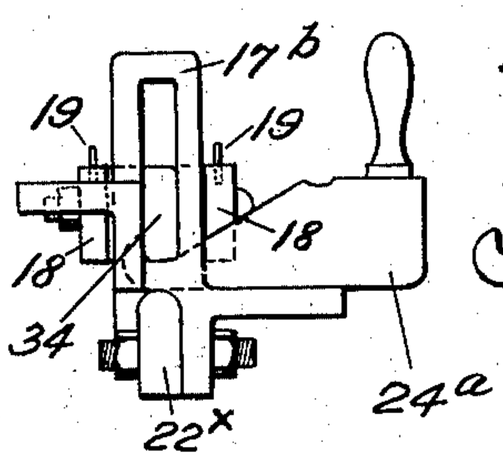


Fig. 11

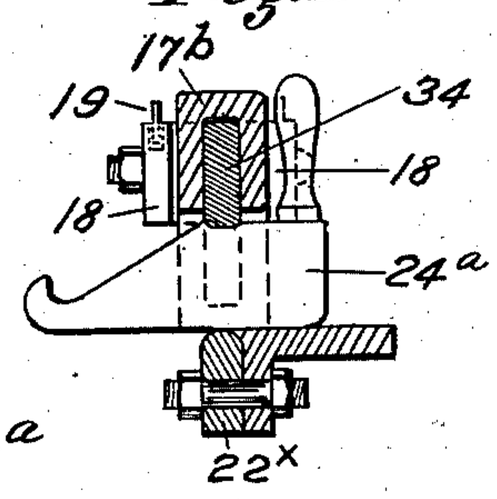


Fig. 12

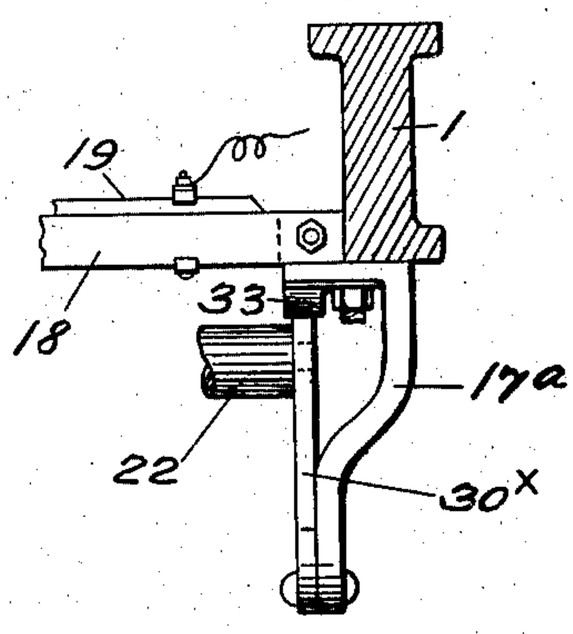
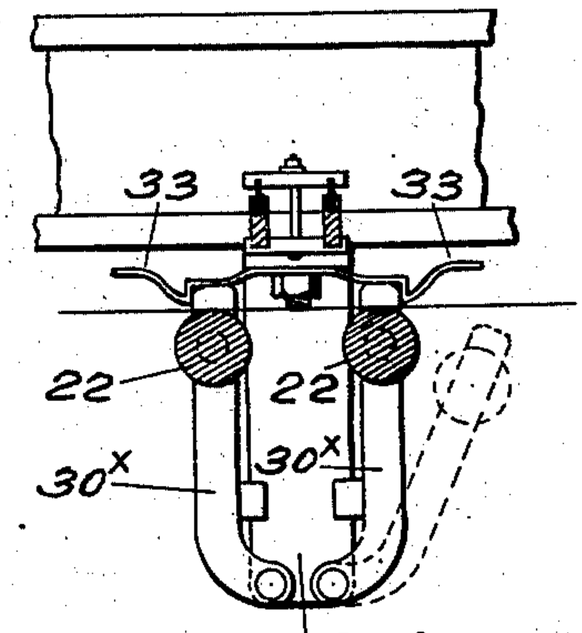


Fig. 13



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No. 741,951. Patented October 20, 1903.

UNITED STATES PATENT OFFICE.

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

WARP STOP-MOTION FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 741,951, dated October 20, 1903.

Application filed October 18, 1901. Serial No. 79,063. (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, both citizens of the United States, have jointly invented certain new and useful Improvements in Warp Stop-Motions for Looms, of which the following is a specification.

This invention relates to the class of warp stop-motions, especially electrical warp stop-motions, wherein a drop or drop device riding on a warp-thread falls when the warp-thread parts, and thus serves to set in operation a loom-stopping mechanism.

As herein illustrated the invention is represented as embodied in an electrically-controlled warp stop-motion employing warp-supporting bars and compound terminals or terminal bar of a controlling electric circuit. Means are also shown for breaking this circuit at the shipper-lever when the latter shifts in stopping the loom.

One important feature of the invention is a means for separating the compound terminals or bar-terminals of the circuit from the warp-supporting bars to enable the weaver to get at the parted warp-thread for twisting or tying it. As these features are ordinarily constructed there is not room enough in most cases for the weaver to work, and the present invention provides for the convenient separation, usually in a vertical direction, of the supporting-bars from the terminal bar. This is accomplished, as herein shown, either by elevating the terminals or by depressing the warp-supporting bars.

In the accompanying drawings, which serve to illustrate the invention, Figure 1 is a side elevation of the loom on a relatively small scale, showing the application of the invention thereto. This view does not show all of the features of loom, but is somewhat diagrammatic, being intended only for illustration. Fig. 2 is a front elevation of the left-hand end of the breast-beam; and Fig. 3 is a plan of the same, showing the shipper-lever in section. Fig. 4 is a plan of one end of the separating device on a large scale. Fig. 5 is a cross-section at x^5 in Fig. 4, and Fig. 6 is a view from the right in Fig. 5. Fig. 6^a shows the slide-block 24 detached. Figs. 7 and 8 illustrate a modification of the device seen in Figs. 4 to 6, the former view being a vertical section at x^7 in Fig. 8 and the latter view a vertical section at x^8 in Fig. 7. Figs. 9, 10, and 11 illustrate another modification of the same device wherein the terminal bar is elevated. Fig. 9 is a side view, Fig. 10 an end view, and Fig. 11 a cross-section at x^{11} in Fig. 9. Figs. 12 and 13 illustrate another modification wherein the warp-supporting bars are hinged at points below the warp. The former is a side view and the latter a cross-section. Fig. 14 is a view, on a small scale, illustrating the utilization of the warp-supporting bars also as lease-rods.

Referring to Figs. 1, 2, and 3, 1 is the metal frame of the loom; 2, the lay; 3, the breast-beam; 4, the shipper-lever; 5, the warps; 6, the warp-beam; 7, the reed, and 8 the heddles. These parts are all common in looms. The shipper-lever, as usual, occupies a slot 9 in a bracket 3^a, forming an extension of the breast-beam, and engages when the loom is running a shoulder 9^a. (Seen in Fig. 3.) When freed from this shoulder, a spring, as 4^a, shifts the shipper-lever to stop the loom. In order to set the shipper-lever free in the present construction, an electromagnet 10 is mounted on the loom-frame below the bracket 3^a, and its armature-lever 10^a is coupled by a link or rod 11 with a device 12, commonly called a "dagger," which is hinged to the shipper-lever, and when the magnet 10 is excited and draws down its armature-lever the dagger 12 is drawn down (see dotted lines in Fig. 1) into the path of a projecting piece or bunter 13, mounted on the lay or some other vibrating or moving part. The impingement of the bunter on the dagger frees the shipper-lever and permits the latter to act to stop the loom. The important feature of this device consists in the balanced construction of the dagger 12 and armature-lever 10^a. The dagger is in the form of a lever fulcrumed at 12^a on the shipper-lever 4, and the armature-lever is also fulcrumed on the loom-frame or other fixed

part. No springs are employed, the parts being nearly balanced and actuated by gravity to put the parts in their normal or inoperative positions. In order to excite or energize the electromagnet 10, and thus set in motion the loom-stopping devices whenever a warp-thread parts, a controlling electric circuit 14 is employed. This circuit includes the coils of said magnet and a generator 15, and it has its terminals and circuit-closing devices (to be hereinafter more particularly described) situated at the point indicated by A in Fig. 1. It may be briefly explained here that the circuit-closing device comprises metal drops which ride on the respective warp-threads and are normally in contact with one terminal of the controlling-circuit and which fall, when their supporting-threads part at some point near the drop devices or unduly slacken and sag at the drops when they part at a greater distance from the drop devices, into contact with the other terminal of said circuit, thus completing the circuit through the operating-magnet. The metal frame of the loom forms a part of the circuit 14—that is to say, the current flows from one pole of the generator to the electromagnet, thence through the coils of the latter, thence to a metal contact spring or strip 16, which is mounted on but insulated from the loom-frame and which is in rubbing contact with the shipper-lever, thence through the shipper-lever to the loom-frame, and thence through the loom-frame to one of the terminals at A. From the other terminal it flows to the other pole of the battery. When the shipper-lever is released, it shifts and breaks the circuit by moving out of contact with the strip or blade 16. When the loom is again set in motion, the break in the circuit at this point will be reclosed.

Referring now, primarily, to Figs. 4 to 6, which show in detail the parts at A in Fig. 1 at one side of the loom, 17 is a bracket mounted on the loom-frame at the side, and on it are mounted two terminals or terminal bars in branches of the controlling-circuit. Each compound terminal consists of a terminal bar 18, in which is set and insulated a terminal strip 19. The bars 18 are put in the circuit by being in electrical contact with a block 17^a on the bracket, the latter being in contact with the loom-frame. The strips 19 are put in the circuit by means of a metal bridge 20, which rests on said strips. 21 represents the metal drops which ride on the warp-threads and embrace the bars 18. The warp is supported on bars 22, which have each a journal 22^a, which plays in an upright slot 23 in the bracket 17, as seen in Fig. 6, where the bracket is broken away to show the slot. Thus the bar 22 can be raised and lowered. The means for raising and lowering the bars 22 consist of a slide-block 24, mounted slidably in a way or keeper 25 in the bracket 17 and provided with an operating-handle 26. In the upper edge of the block 24, Fig. 6^a, are formed two upper bearings 27 for the journals of the bars 22 and two lower bearings 28 therefor, the upper and lower bearings being connected by inclined tracks or ways 29. Fig. 5 shows the parts in their normal position, with the slide-block 24 pushed in and the journals of the warp-supporting bars 22 resting in the upper bearings 27. To lower the bars 22, the slide-block is drawn out. This causes the journals of the bars to lift out of the upper bearings and slide down the inclined tracks 29 until they lodge in the lower bearings, as indicated in dotted lines in Fig. 5. This lowering or separating device will be, of course, duplicated, one such device being situated at each side of the loom; but as they are identical only one has been shown. The slide-blocks 24 will be, by preference, independently operative, so that either or both ends of the bars 22 may be lowered to afford room between said bars and the terminal bars for the weaver to get at the parted warp-thread for repairing it; but the blocks 24 might, of course, be connected, so as to move together when drawn out or pushed in.

Figs. 7 and 8 illustrate another separating device wherein the supporting-bars 22 for the warp are displaced in a somewhat different manner. In this construction the bars 22 are mounted in upright arms 30, pivoted below in the bracket $17^\times$ and adapted to be moved outward and downward from their normal positions, the journals or tenons of the bars playing along curved bearing and guide slots $17^{\times\times}$ in the bracket. The bars 22 are spread apart by a lever 31 and link 32, coupled together and to the upper ends of the respective upright arms 30.

Figs. 12 and 13 illustrate a somewhat similar construction to that shown in Figs. 7 and 8 and last described; but in the present case the operating lever and link are omitted. The warp supporting bars 22 in Figs. 12 and 13 are mounted in upright arms $30^\times$, pivoted below in the bracket 17^a and held up when in their normal positions by suitable fasteners or latches 33. Either bar 22 may be shifted independently of the other.

Figs. 9, 10, and 11 illustrate a separating device wherein the terminal bar or compound terminals are lifted and the warp-supporting bar remains stationary. In these views only one warp supporting bar, $22^\times$, is shown, said bar being below the space between the two terminal bars. The supporting-bar $22^\times$ is secured to a bracket 17^b on the loom-frame, and the two bars 18 of the compound terminals are secured to a sliding head or end piece 34, which is adapted to play up and down in a vertical guide-slot formed in a part of the bracket 17^b. Through this part of the bracket and crossing the guide-slot therein is a mortise or way to receive a slide-block 24^a, which takes under the end piece 34 and elevates it and the terminals when pushed in, as shown

in Fig. 11. Fig. 10 shows the block 24ª in its normal position.

It will be understood that the separating devices illustrated in Figs. 7 to 13 will be in duplicate, one device at each side of the loom.

It is not necessary that the warp-supporting bars shown in Figs. 7, 8, 12, and 13 be cylindrical, and they may be fixed in the upright arms which carry them. In the construction of Figs. 4 to 6 they will be rollers, by preference.

Being the first, as we believe, to employ means for momentarily or temporarily separating to a greater extent than in the normal condition the warp-threads from the electric terminal bars of the operating-circuit of a warp stop mechanism or the similarly-situated guide-bars of the drops which ride on the warp-threads in mechanical warp stop mechanisms for the purpose of facilitating access to the parted warp-threads for repairs, we claim such means broadly and do not limit ourselves to the specific device or devices employed for effecting this separation. It will be noted that by the means we employ the parts are not removed from the loom, but merely displaced without disturbing the warps. Where the guide-bars of the drops 21 are made movable, as in Figs. 9 to 11, the slots in the drops may be extended upward, so as to allow of a sufficiently-extended movement of the bars upward without disturbing the drops.

Preferably the magnet 10 will be mounted on the loom-frame, as shown; but obviously it might be mounted on any special support as well.

Obviously the warp-supports may be made to serve as lease-rods, if desired. This is illustrated in Fig. 14. Whether these supports perform the functions of lease-rods also merely depends on the arrangements of the warps and not on the construction of the parts.

As we are the first, as we believe, to employ in a warp stop-motion a dagger or a balanced lever-like dagger coupled to the shipper-lever and connected by intermediate means to the armature-lever of an electromagnet in order to stop the loom when a warp-thread breaks, we claim same broadly and do not limit ourselves to specific details of mechanism for accomplishing the result.

Having thus described our invention, we claim—

1. In a warp stop mechanism for looms, the combination with a warp-supporting bar, drops or drop devices riding on the warp-threads, and a guide-bar for said drops normally adjacent to said supporting-bar, one of said bars being movable toward and from the other, of means for displacing said movable bar to afford room for repairing a parted warp-thread.

2. In a warp stop mechanism for looms, the combination with a warp-supporting bar, and drops or drop devices riding on the warp-threads adjacent to said supporting-bar, of a guide-bar for said drops situated above and also adjacent to the supporting-bar, normally, one of said bars being movable toward and from the other to afford room for repairing a parted warp-thread, and means for moving said movable bar.

3. In a warp stop mechanism for looms, the combination with drops or drop devices riding on the warp-threads, and a guide-bar for said drops sustained in position on the loom, of a warp-supporting bar mounted movably in guides on the loom below the said guide-bar and normally adjacent thereto, the said guides so disposed as to permit the supporting-bar to move toward and from said guide-bar, and means for moving said supporting-bar, for the purpose set forth.

4. In a warp stop mechanism for looms, the combination with drops riding on the warp-threads, a guide-bar for said drops, and a warp-supporting bar movable up and down, of means for elevating said bar to its normal supporting position.

5. In a warp stop mechanism, the combination with drops riding on the warp-threads and a fixed guide-bar embraced by said drops, of slotted brackets on the loom-frame, warp-supporting bars guided at their ends in the slots in the brackets, slide-blocks with inclined tracks and bearings under the ends of said bars, and guides in which said blocks slide.

6. In an electrical warp stop mechanism for looms, the combination with a circuit including a generator and electromagnet, circuit-closing devices adapted to complete the circuit through said magnet when a warp-thread breaks, a bunter on a moving part of the loom, and the shipper-lever, of a balanced lever-like dagger fulcrumed on the shipper-lever, a balanced armature-lever adjacent to the magnet and a connector between one arm of said dagger and one arm of the armature-lever, substantially as set forth.

7. In a warp stop-motion, the combination with an electric circuit, including a generator and magnet, lease-rods or supporting-bars, and drop devices riding on the warp-threads, of a guide-bar for said drop devices situated normally adjacent to the supporting-rods and forming terminals of said circuit, and means for increasing, when desired, the normal distance between said terminal bar and lease-rods.

8. In an electrical warp stop-motion for looms, the combination with circuit-closing drops supported on the warp-threads, and an operating electric circuit adapted to be closed by the falling of any one of said drops, said circuit including a generator and an operating-electromagnet, a shipper-lever, a dagger movably attached to said shipper-lever, means

coupling said dagger to the armature-lever of said electromagnet, and electromechanical means controlled by said circuit for stopping the loom when said circuit is completed by the fall of a drop.

9. In an electrical warp stop-motion for looms, the combination with the controlling-circuit, including a generator and operating-electromagnet, and means for completing said circuit when a warp-thread breaks, of a dagger in the form of a lever pivotally attached to the shipper-lever of the loom, the said shipper-lever, means connecting one arm of said dagger with the armature-lever of the controlling-magnet, and means, coöperating with said dagger when the controlling-circuit is closed by the breaking of a warp-thread, to actuate mechanism to stop the loom.

10. In an electrical warp stop-motion for looms, the combination with the controlling-circuit, including a generator, an operating-electromagnet and terminals, and drop devices mounted on unbroken warp-threads and adapted, on the breaking of their supporting-threads, to close said circuit of the terminals thereof, of the shipper-lever, a lever-like dagger carried by said shipper-lever and held normally by gravity in inoperative position, connecting means between one arm of said dagger and the armature-lever of the electromagnet, whereby the excitation of said magnet shifts said dagger into its operative position, and means adapted to impinge upon said dagger and through it actuate the loom-stopping mechanism.

11. In an electrical stop-motion for looms, the combination with an electric circuit and an operating-electromagnet having an armature-lever, a shipper-lever, and a knock-off lever, of a lever-like dagger mounted on the shipper-lever, a connector between one arm of said dagger and one arm of the armature-lever, and means for impinging on said dagger when the latter is in its operative position to stop the loom.

12. In a warp stop-motion, the combination with drops or drop devices riding on warp-threads, of a guiding-bar for said drop devices normally sustained at a fixed distance above said warp-threads, and means for increasing, when desired, the normal distance between the guiding-bar and warp-threads.

13. In an electrical warp stop-motion, the combination with drop devices riding on unbroken warp-threads, of a terminal for said drop devices normally sustained at a fixed distance above said warp-threads, means for increasing, when desired, the said normal distance between the warp-threads and said terminal, and means, when a warp-thread sags or parts, for closing an electric circuit and thereby actuating loom-stopping mechanism to stop the loom.

14. In an electrical warp stop-motion for looms, the combination of drop devices mounted on and normally sustained by unbroken warp-threads and adapted, on undue slacking or breaking of the warp-threads, to assume an abnormal position and close an electric circuit, said electric circuit, including its generator and electromagnet, said magnet being mounted independent of the shipper-lever and having its armature connected to a piece or dagger attached to the shipper-lever, said piece adapted, when put in its abnormal position by the excitation of the magnet, to act to stop the loom.

15. The combination in a warp stopping mechanism for looms, of a shipper-lever and means to release the same to stop the loom comprising a dagger pivotally mounted on said shipper-lever and normally held out of the path of travel of a moving part of the loom, and means mounted independent of the shipper-lever and actuated upon the breakage or undue slackness of a warp-thread to move said dagger into the path of travel of a moving part of the loom.

16. The combination in a warp stopping mechanism for looms, of a shipper-lever and means to release the same to stop the loom comprising a dagger pivoted on said shipper-lever, a bunter on the moving part of the loom and means mounted independent of the shipper-lever to move said dagger into the path of travel of said bunter upon the breakage or undue slackness of a warp-thread.

17. The combination in an electrical warp stopping mechanism for looms of a shipper-lever and means to release the same to stop the loom, comprising a dagger fulcrumed on said shipper-lever, an electromagnet having an armature-lever fulcrumed on the loom-frame, a link connecting said armature-lever and said dagger, a controlling electric circuit for said electromagnet, a bunter on a moving part of the loom and a circuit-closing device operating upon the breakage or undue slackness of a warp-thread to move said dagger into the path of travel of said bunter.

18. The combination in an electrical warp stopping mechanism for looms of a shipper-lever and means to release the same to stop the loom, comprising a dagger fulcrumed on said shipper-lever, a bunter on the moving part of the loom, an electromagnet mounted independent of the shipper-lever for actuating said dagger, a controlling electric circuit for said magnet and a circuit-closing device operating upon the breakage or undue slackness of a warp-thread to move said dagger into the path of travel of said bunter.

19. The combination in an electrical warp stopping mechanism for looms, of a shipper-lever and means to release the same to stop the loom comprising a dagger fulcrumed on said shipper-lever, a bunter on the moving part of the loom, an electromagnet mounted independent of the shipper-lever for actuating said dagger, a controlling electric circuit

for said magnet, a metal drop riding on a warp-thread normally in contact with one terminal of said controlling-circuit, and adapted upon the breakage or undue slackness of a warp-thread to close said circuit and thereby energize said magnet to move the dagger into the path of travel of said bunter.

In witness whereof we have hereunto signed our names, this 14th day of October, 1901, in the presence of two subscribing witnesses.

WILLIAM H. BAKER.
FREDERIC E. KIP.

Witnesses:
PETER A. ROSS,
F. D. DIMAR.