

J. STUER.
STOP MOTION FOR LOOMS.
APPLICATION FILED NOV. 23, 1915.

1,313,755.

Patented Aug. 19, 1919.
5 SHEETS—SHEET 1.

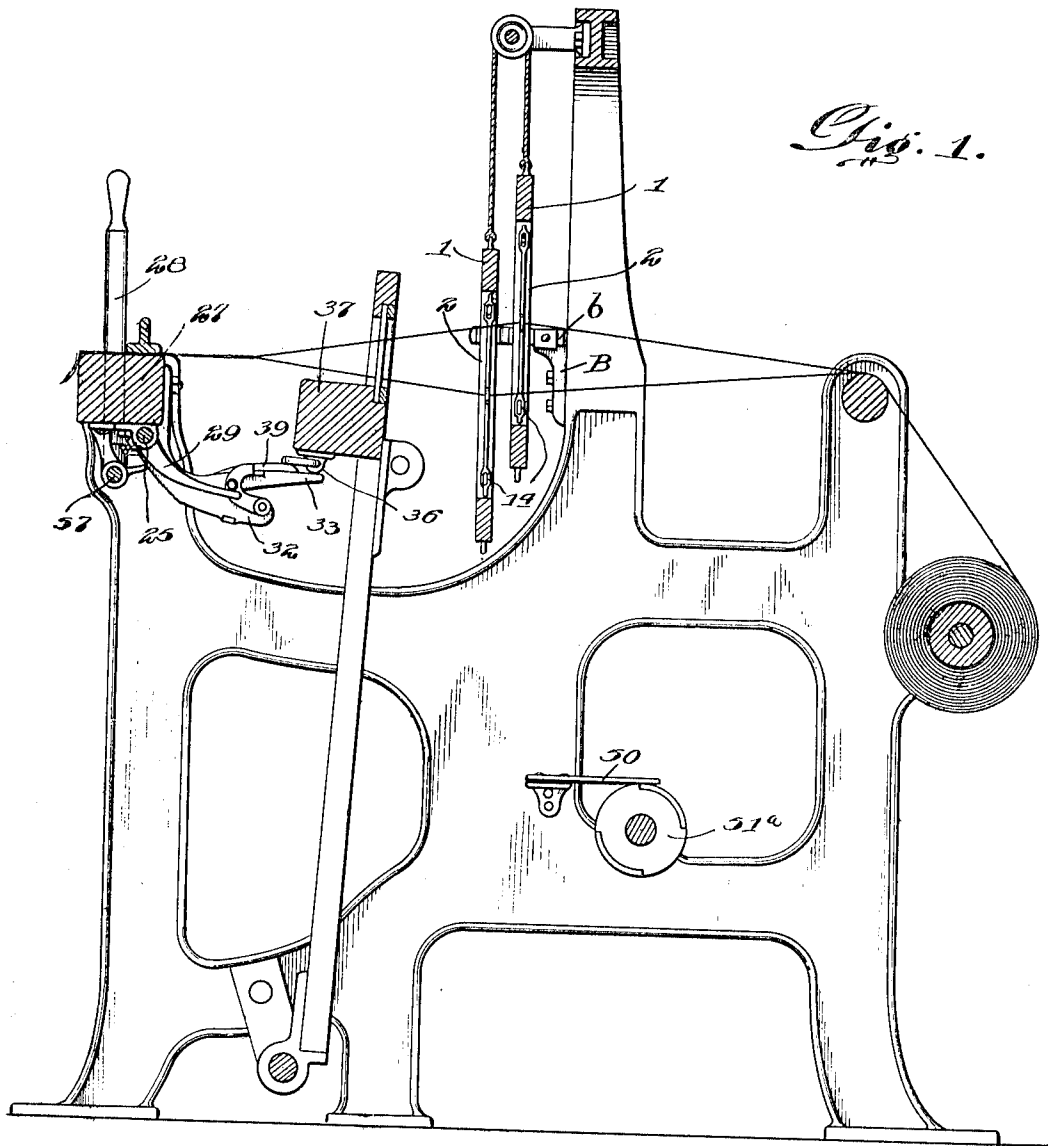


Fig. 1.

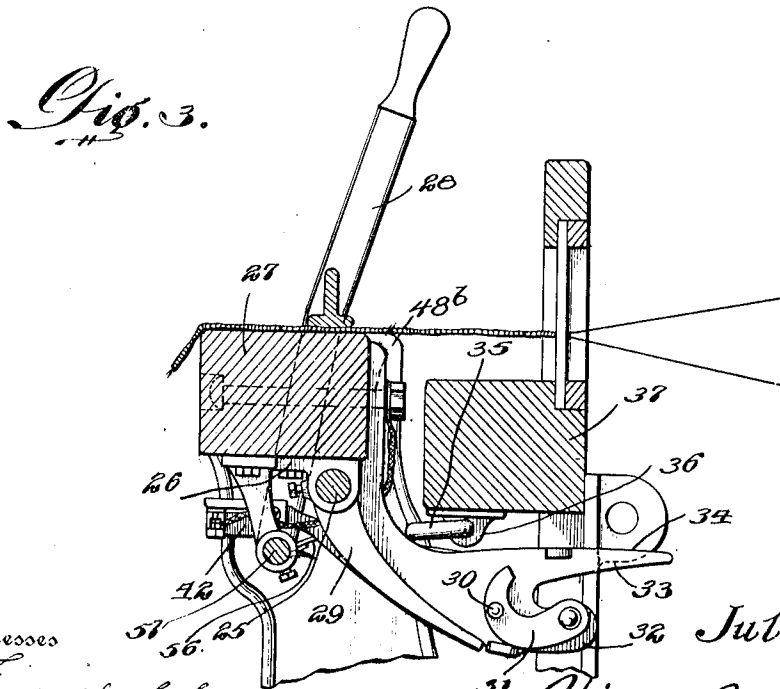
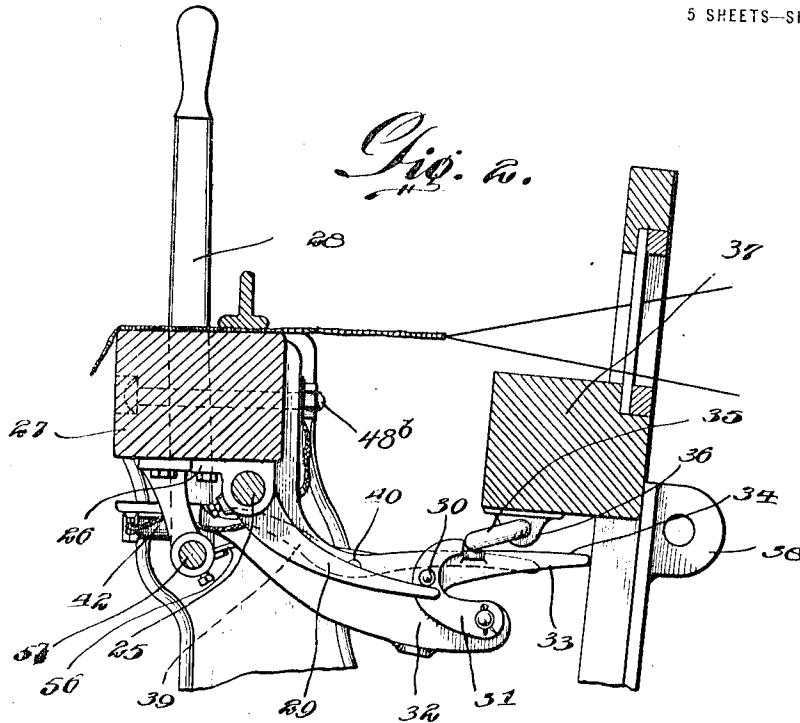
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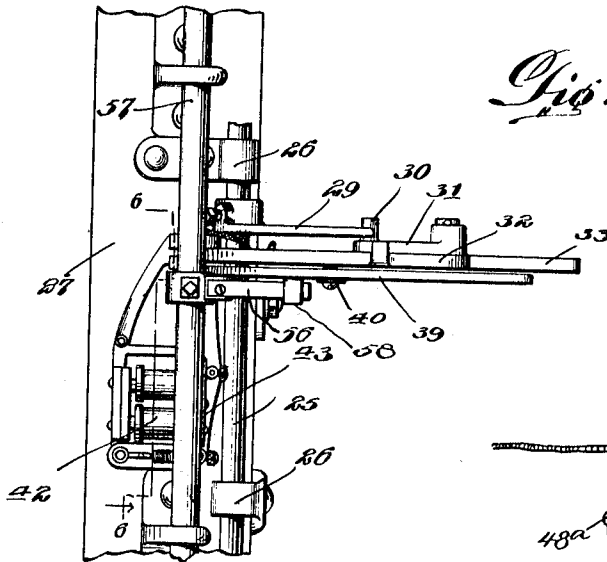


Fig. 4.

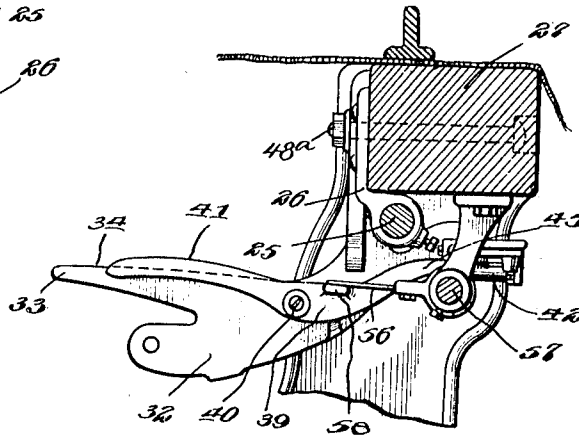


Fig. 5.

Fig. 6.

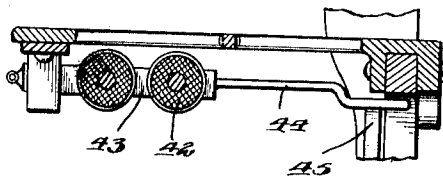
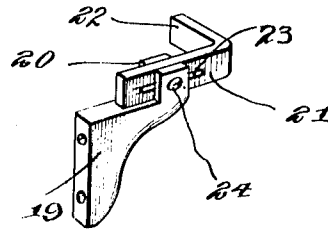


Fig. 7.



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5 SHEETS—SHEET 4.

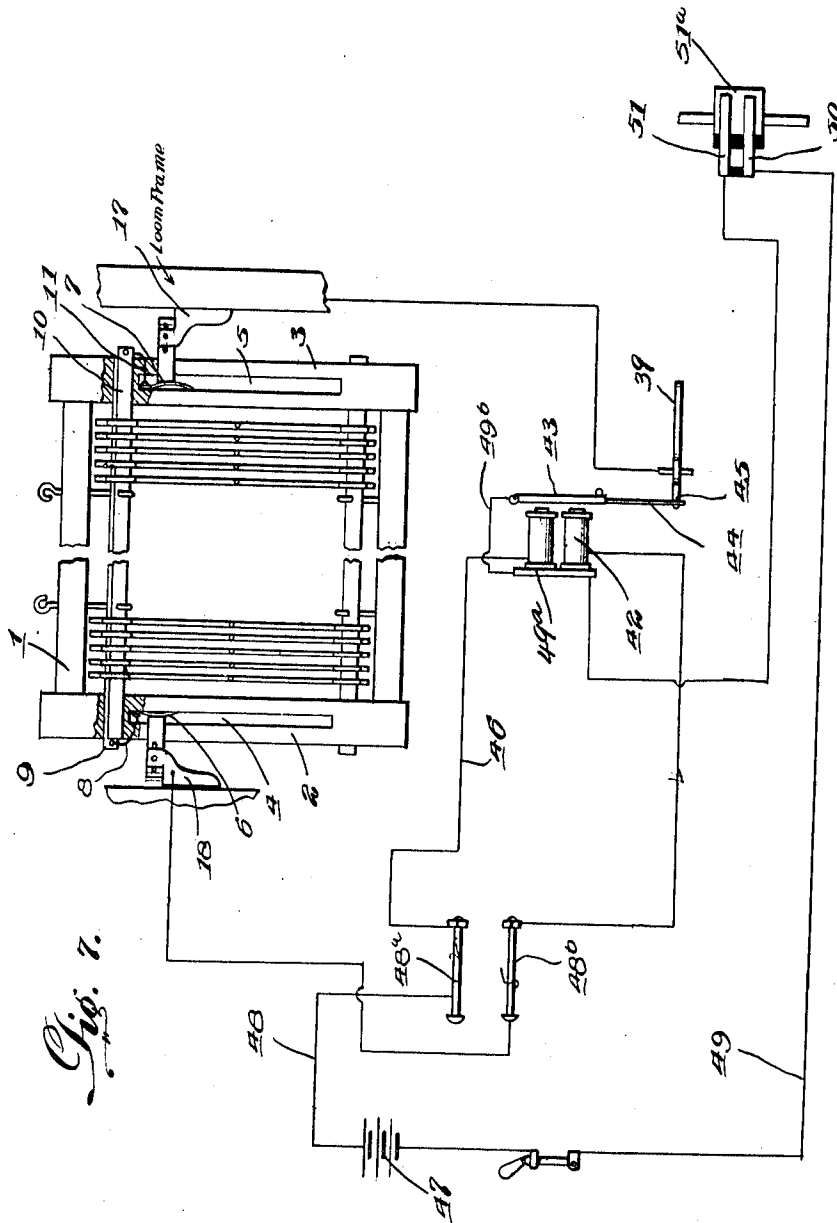


Fig. 7.

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5 SHEETS—SHEET 5.

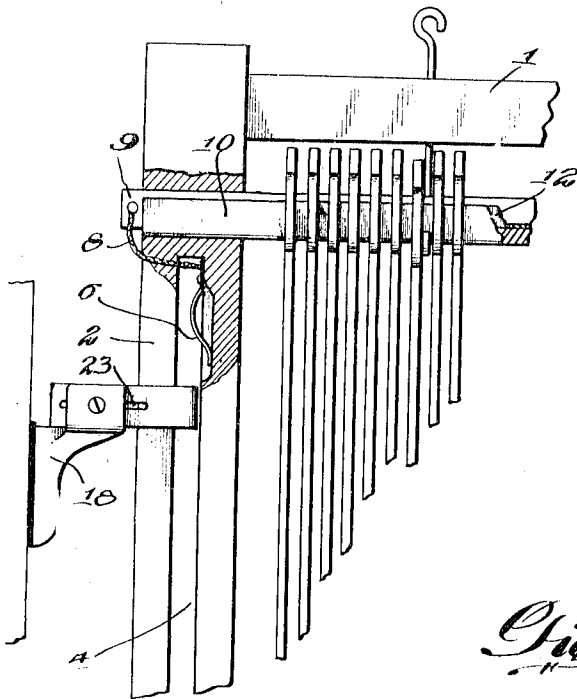


Fig. 8.

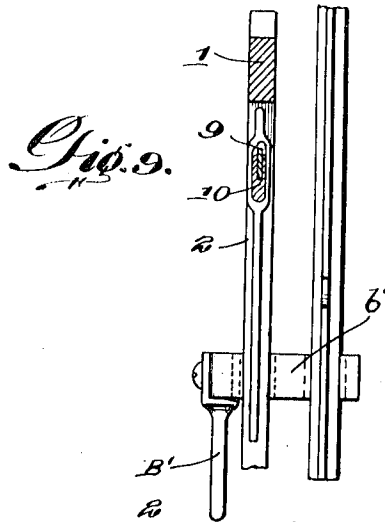


Fig. 9.

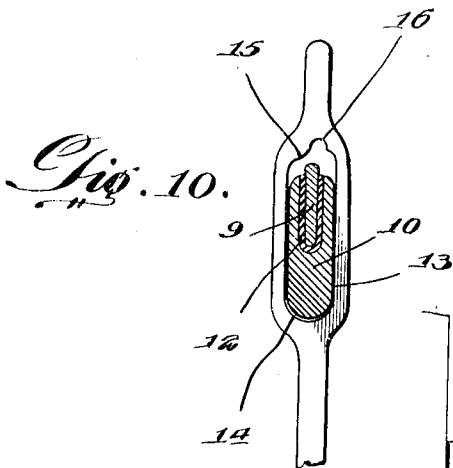


Fig. 10.

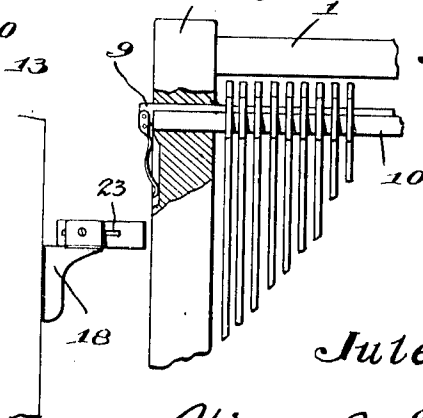


Fig. 11.

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UNITED STATES PATENT OFFICE.

JULES STUER, OF METHUEN, MASSACHUSETTS.

STOP-MOTION FOR LOOMS.

1,313,755.

Specification of Letters Patent.

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Application filed November 23, 1915. Serial No. 63,056.

To all whom it may concern:

Be it known that I, JULES STUER, a citizen of the United States, residing at Methuen, in the county of Essex and State of Massachusetts, have invented new and useful Improvements in Stop-Motions for Looms, of which the following is a specification.

This invention relates to devices for operating the stopping mechanism of a loom upon the breakage of a warp thread and has for its principal object to provide an electro-mechanical system by means of which excessive sparking between stationary and movable parts of the circuit and wastage of current is obviated.

My invention also has for an object to provide an electric circuit broken at all times except when a heddle frame reaches a lowermost position, that is, the position where the heddles are raised with relation to their associated heddle frame by the warp threads.

A further object of the invention is to provide electro-mechanical means by means of which the tripper lever carried by the lay will move in a path that will carry it past the shipper actuating mechanism so that the latter will remain inoperative.

A further object of the invention is to provide a bracket to which a portion of the shipper mechanism is attached with an extending curved finger upon which the tripper lever rides when the electro-mechanical means is rendered active through the breaking of a warp thread.

This invention also provides a pair of brackets forming the terminals of an electric circuit and having portions adjustable and slidably mounted within portions of a heddle frame, the latter carrying means for bridging the distance between the brackets upon the frame reaching its lowermost position.

In my system, I also make use of an electromagnet, the armature of which forms a portion of the circuit in which the magnets are arranged so that upon energization of the magnets and the attraction of the armature, the circuit will be broken and will remain broken until restored by means hereinafter described.

The invention accordingly consists in the features of construction, combination of elements, and arrangement of parts, which will be exemplified in the construction herein-

after set forth and the scope of the application of which will be indicated in the following claims:

Referring to the drawings:

Figure 1 is a vertical section through a well known form of loom showing my invention applied thereto.

Fig. 2 is an enlarged side elevation of a portion of my invention for operating the shipping mechanism.

Fig. 3 is a similar view showing the parts actuated.

Fig. 4 is a bottom plan view of Fig. 2.

Fig. 5 is a view similar to Fig. 3 showing the reverse side.

Fig. 6 is a detail section showing the associations between the magnet armature and the lever.

Fig. 7 is a diagrammatic view of the system.

Fig. 8 is a detail view of the heddle frame and one of the brackets associated therewith.

Fig. 9 is a detail view showing the heddle frames and one form of the bracket on the loom frame, through which bracket electrical connection is made in the manner described below.

Fig. 10 is a detail view of one of the heddles.

Fig. 11 is a view similar to Fig. 8 showing a slight modification.

Fig. 12 is a perspective view of one of the brackets.

Referring more particularly to Figs. 7 and 8, the heddle frame 1 has its side bars 2 and 3 provided with vertical slots 4 and 5. Arranged in the upper portion of the slots are spring contacts 6 and 7, the former being electrically connected by means of a wire 8 to a bar 9 having interfitting relation with a second bar 10 also in electrical connection with the spring contact 7 by means of the wire 11.

The bars 9 and 10 are secured to the bars 2 and 3 and are arranged transversely of the frame. The bar 9 is insulated throughout its length from the bar 10 by means of the insulating material 12.

Referring to Fig. 10, it will be seen that the upper longitudinal edge of the bar 9 projects an appreciable extent above the bar 10, while the sides of the bar 10 are spaced a slight distance from the vertical walls 13 of the slots 14 formed in the upper portion of the heddle.

The protruding portion of the bar 9 is ar-

ranged to engage the inclined walls 15 of the slots. These inclined walls 15 terminate in a circular depression 16 in which seats the edge of the bar 9 when the heddle reaches its final position upon breakage of the warp thread.

From this arrangement, it will be seen that initially upon breaking of a warp thread, that particular heddle gravitates vertically until the inclined wall strikes the bar 9, which causes lateral movement of the heddle for throwing one of the vertical walls into close contact with a side of the bar 10, thus it will be seen that the heddle when in a lowermost position bridges the distance between the bars so as to bring the contact 6 into electrical association with the contact 7.

In Fig. 1 I have shown a bracket B, and having pivotal connection therewith an arm *b* projecting through two heddle frames. A bracket B' of the same general type is shown in Fig. 9, the arm *b'* extending however at an angle with reference to the body of the bracket. The form of the bracket varies slightly according to the relative position of the frames, and in Figs. 7, 8 and 12 the pivoted arm is in the plane of the body of the bracket. In the following description of this feature of the construction, reference is made more particularly to the figures last named.

Secured to one vertical side of the loom frame is a bracket 17 while a similar bracket 18 is connected to but insulated from the opposite side of the loom.

Each of these brackets as clearly shown in Fig. 12 comprises a base 19 formed with a guide way 20 slidably receiving one limb 21 of an adjustable member 22. This member 21 has a slot 23 permitting adjustments by the nut 24. This member or arm 22 is movable within a slot of the heddle frame so as to contact with the spring when the frame reaches its lowermost position.

In the drawings, I have illustrated a portion of the well known form of shipping mechanism comprising the rock shaft or knock-off shaft 25 mounted in bearings 26 depending from the under surface of the breast beam 27. One end of the knock-off shaft 25 forming a part of the stop motion of the Knowles loom carries an offset member actuating the brake rod of that loom, said brake rod carrying an offset member engaging lever 28 for knocking off shipping shaft 57. This construction forms no part of the present invention, being well known and in common use. The knock off shaft 25 has connected to it a curved arm 29 that has one end portion normally resting against the lug 30 projecting laterally from a second arm 31. This arm 31 is pivotally connected to a bracket 32 secured to the breast beam opposite the race beam 37 and pro-

vided with an extending curved finger 33. Resting upon the upper curved surface 34 of the finger is the tripper lever 35 pivotally mounted to the under surface of the race beam 37 of the lay 38.

The curved finger 33 holds the trigger lever 35 from gravitating to its lowermost position and also guides the same into engagement with the free extremity of the second arm 31. With those parts just described, coöperates my electro-mechanical device for actuating the shipper lever mechanism upon breakage of a warp thread.

This device comprises a lever 39 curving in opposite directions from a central point. The central portion of the lever is pivotally connected to the bracket by means of the pin 40. That portion of the lever extending from the pin 40 toward the lay has a weight greater than that portion shown extending toward the breast beam so that when the same is free to move, it will move toward a vertical position. When all of the warp threads are continuous, that portion of the lever adjacent the race beam and designated by the numeral 41 will extend above the finger 33 so that during the oscillatory movement of the lay, the portion 41 will cause the tripper lever 35 to pass over the arm 31 with the result that the shipper mechanism remains in a neutral position.

Immediately the lever moved toward a vertical position, the tripper lever 35 is free to ride upon the finger 33 so as to engage the lever 31 upon movement of the lay toward the breast beam. When this action takes place, the lever 31 is rotated upon its pivot and through the action of the stud 30 causes the arm 29 to be depressed.

Upon depression of the arm 29, the rock shaft 25 is given a partial rotation for actuating the stopping mechanism. For retaining the lever 39 in a position to prevent engagement between the tripper lever 35 and the arm 31, I provide electro-magnets 42 the armature 43 of which is provided with an extension 44 arranged in the path of movement of the extremity 45 of the lever 39. Upon attraction of the armature 43 toward the magnets, the extension 44 will move away from the extremity 45 for allowing gravitation of the portion 41 of the lever, thus allowing the tripper lever 35 to come into engagement with the arm 31 for accomplishing the result heretofore set forth.

The electro-magnets 42 are arranged in a circuit 46 that includes a source of current 47. This circuit comprises a conductor 48 that connects one pole of the source of current 47 to a bolt 48^a mounted in the loom frame but insulated therefrom and supporting my improved mechanism. This bolt 48^a is electrically connected to one extremity of the coils of the electro-magnets while the remaining extremity is electrically con-

nected to a second bolt 48^b also insulated from the movable frame and coöperating with the bolt 48^a to support my improved mechanism.

5 A second conductor connects the bolt 48^b to the bracket 18 from whence the current passes by way of the spring contact 6 through the bars 9 and 10 to the brackets 17, that is in electrical engagement with the metallic frame of the loom. As the lever 10 39 is supported by the frame and normally bears upon the extension 44 of the armature, current will pass from the loom frame through the lever 39 to the armature 43, the latter being electrically connected to the magnet frame 49^a, by means of a conductor 49^b, and insulating from the loom frame by means of magnet frame 49^a attached to and insulated from the bracket 32.

20 The magnet frame 49^a is electrically connected by means of a conductor to a brush 51 bearing upon a commutator 51^a mounted upon one of the shafts of the loom that makes one complete revolution when a heddle frame has passed from its uppermost position to its lowermost position and back to its original position, said commutator 51^a moving so as to make and break the circuit at each time the heddle frame has passed from 25 its uppermost position to its lowermost position.

For completing the circuit I provide a second brush 50 arranged parallel to the brush 51 and connected by means of a conductor 49 to the other pole of a source of 30 current.

From this arrangement, it will be seen that the circuit is only closed when the heddle frame is in its lowermost position, 40 that is to say, when the heddles are held in an elevated position with relation to the frame by the warp threads. Upon breakage of a thread, that particular heddle will not be held up so that current will pass 45 from the source of current through the bolt 48^a to the coil of the electro-magnets, back to the bolt 48^b from whence it passes to the bracket 18. From the bracket 18 the current passes through the spring contact 6 to the bar 9, from the bar 9 to the bar 10 through the released heddle from whence the current passes through the contact spring 7 to the bracket 17 to the loom frame.

In view of the fact that the lever 39 is in 55 electrical engagement with the loom frame and bears upon the extension of the armature, current will pass through the lever to the armature and to the magnet frame through the conductor 49^b, the circuit being 60 completed from the magnet frame to the source of current by means of the conductor 49, brushes 50 and 51 and commutator 51^a. Upon completion of the circuit, the magnets 42 are energized for attracting the 65 armature 43. This attraction of the arma-

ture 43 causes the end of the extension 44 to move away from the end of the lever 39 for allowing the latter to assume a position that will not prevent engagement between the tripper lever 35 and the arm 31. 70

The numeral 56 designates a leaf spring rigidly secured to the shipper shaft 57 and this leaf spring 56 coöperates with a lug 58 formed on the lever 39 at a point adjacent the electro-magnet so that upon the operation of the shipping mechanism by the instrumentalities previously mentioned, the shaft 57 will be given a partial rotation and as a result the leaf spring 56 pressing downwardly upon the lug 58 will space the extremity of the lever 39 a distance from the extension 44 of the armature 43. Upon the spacing of the extension of the armature 43 away from the adjacent extremity of the lever 39, the continuity of the electric circuit at this point will be permanently broken 85 until the operator resets the shipping mechanism, which causes the leaf spring 56 to move away from the lug 58 for allowing the extremity of the lever 39 to regain its initial 90 position.

The operation is set forth in greater detail as follows:

When the loom is running, spring 56 is raised above element 58. The center of 95 gravity of lever 39 is a little farther away from extremity 45 than the pin 40. In other words that portion of the lever extending from pin 40 toward extension 44 and co-acting therewith causes element 41 to be held 100 up above arm 31. After the end breaks and before the loom stops, if the harness for the heddle where the break occurs, is up, it must descend. When the harness is down, this heddle will electrically connect bars 9 and 105 10. A vibration or sinking movement at times results from the uneven lifts of the harnesses where many harnesses go down together, causing certain heddles to strike bars 9 and 10 without having any ends out. 110 After these vibrations are over, the commutator 51^a connects electrically with brushes 50 51, completing a circuit and causing magnet 42 to attract armature 43 and move extension 44 away from extremity 45. Lever 115 39 having a greater weight on the end 41 causes extremity 45 to raise above extension 44, breaking the circuit until the loom is again started, as explained below. The raising of extremity 45 causes 41 to lower and 120 exposes arm 31 to trip 35.

From this time until the stopping of the loom the following takes place: Trip 35 in its oscillatory movement strikes arm 31 and through lug 30 depresses arm 29 causing the 125 loom to stop. At the time trip 35 strikes arm 31 the commutator 51^a has revolved so far that there is no electrical connection with brushes 50 and 51. The loom in its stopping movement rotates partially, the 130

shipping shaft 57, which in consequence moves leaf spring 56 down onto lug 58 and brings end 45 below extension 44, and low enough so there is no electrical connection 5 between 45 and 44. The connection remains broken while the harness is down.

When the broken thread is repaired and the loom is starting, the shipping handle is moved in a direction opposite to that in 10 which it moved when stopping. The shipping shaft also rotates in an opposite direction and causes spring 56 to raise from lug 58, causing end 45 to press against extension 44, where it rested before the thread 15 broke.

It will be observed that when spring 56 presses lug 58, it brings extremity 45 a little below extension 44; also that the break at 45 is only made when element 44 allows 45 20 to rise, after which element 44 returns to normal position until the loom stops. At the proper time, end portion 45 (beveled on the under side) is manually depressed and throws element 44 out of its path and to a 25 position below element 44, the latter again assuming normal position.

Having described my invention, what is claimed is:

1. In a stop motion for looms, a rock shaft 30 for actuating the shipper mechanism, a curved arm secured thereto, a second arm having a projection engaging said first mentioned arm, a bracket to which said second arm is pivoted and provided with a curved 35 finger above which said second arm normally projects, a tripper lever carried by the lay of the loom and arranged to slide on said finger so as to engage said second arm, a balanced lever pivoted at a central point 40 to said bracket and normally projecting above said second arm and normally holding said tripper lever out of engagement with said finger, an electro-magnet for holding said lever in its normal position, a cir- 45 cuit therefor including the balanced lever, and warp controlled means for closing said circuit upon breakage of the warp threads.

2. In a stop motion for looms, a rock shaft for actuating the shipper mechanism, a

curved arm secured thereto, a second arm 50 having a projection engaging said first mentioned arm, a bracket to which said second arm is pivoted and provided with a curved finger above which said second arm nor- 55 mally projects, a tripper lever carried by the lay of the loom and arranged to slide on said finger so as to engage said second arm, a gravity operated device including a lever pivoted at a central point to said 60 bracket and normally projecting above said second arm and normally holding said tripper lever out of engagement with said fingers, an electro-magnet engaging one end of said lever for holding the latter in its normal position, a circuit therefor including the 65 gravity operated device, and warp controlled means for closing said circuit upon breakage of the warp threads.

3. In a stop motion for looms, a rock shaft for actuating the shipper mechanism, a 70 curved arm secured thereto, a second arm having a projection engaging said first mentioned arm, a bracket to which said second arm is pivoted and provided with a curved 75 finger above which said second arm normally projects, a tripper lever carried by the lay of the loom and arranged to slide on said finger so as to engage said second arm, a gravity operated device pivoted at a central point to said bracket and normally project- 80 ing above said second arm and normally holding said tripper lever out of engagement with said finger, an electro-magnet engaging one end of said gravity operated device for holding the latter in its normal position, a 85 circuit therefor, warp controlled means for closing said circuit upon breakage of the warp threads, and mechanical means for restoring said lever to normal position upon restoration of said first and second men- 90 tioned arms to normal position.

In testimony whereof I affix my signature in presence of two witnesses.

JULES STUER.

Witnesses:

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DEP. STUER.