

June 8, 1937.

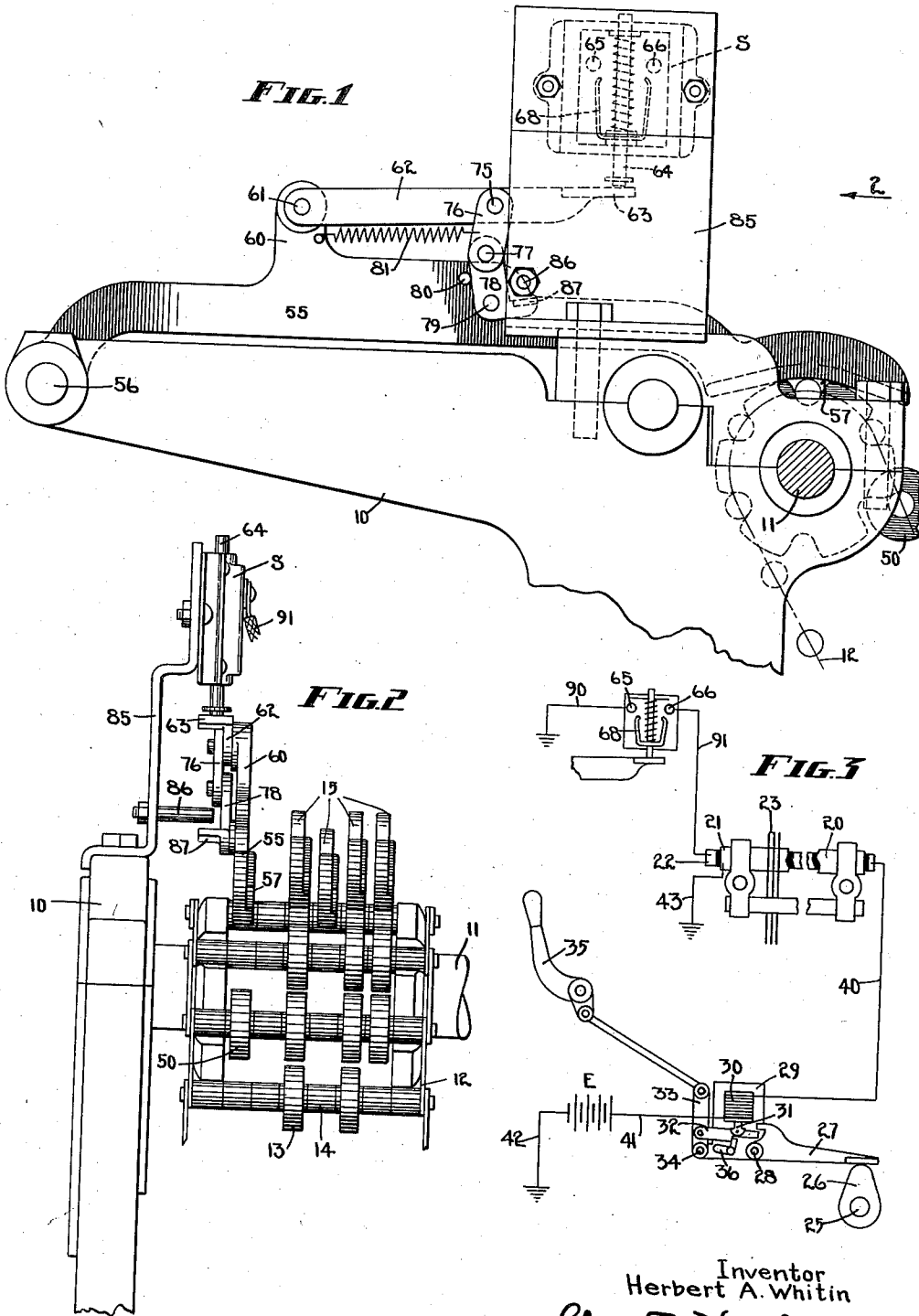
H. A. WHITIN

2,082,864

STOP MOTION FOR LOOMS

Filed Feb. 25, 1936

2 Sheets-Sheet 1.



Inventor
Herbert A. Whitin
Chas. T. Hawley
Attorney

June 8, 1937.

H. A. WHITIN

2,082,864

STOP MOTION FOR LOOMS

Filed Feb. 25, 1936

2 Sheets-Sheet 2

FIG. 4

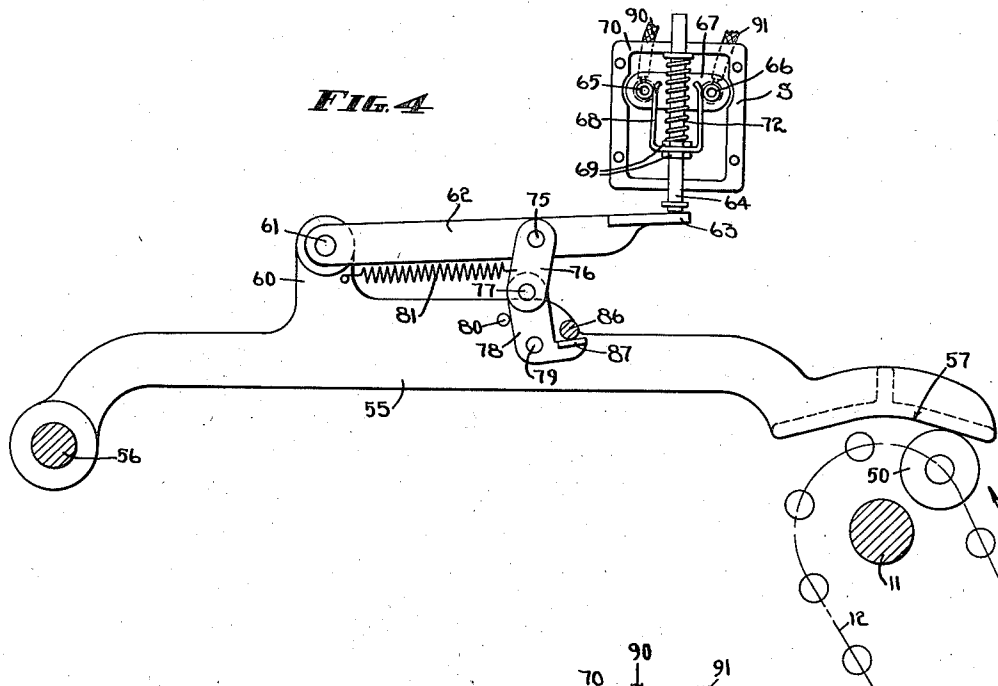


FIG. 5

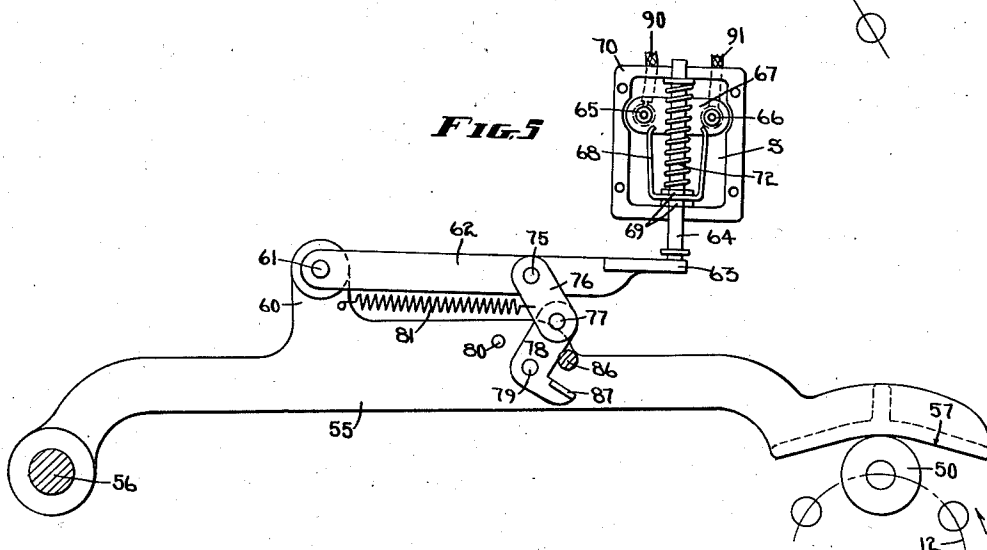
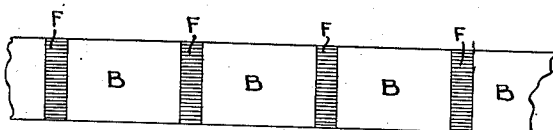


FIG. 6



Inventor
Herbert A. Whitin

Chas. D. Hawley
Attorney

UNITED STATES PATENT OFFICE

2,082,864

STOP MOTION FOR LOOMS

Herbert A. Whitin, Worcester, Mass., assignor to
Crompton & Knowles Loom Works, Worcester,
Mass., a corporation of Massachusetts

Application February 25, 1936, Serial No. 65,564

5 Claims. (Cl. 139—340)

This invention relates to improvements in stop motions for looms and it is the general object of the invention to provide means whereby the loom can be stopped at periodic intervals determined preferably by the pattern of the fabric being woven.

In certain types of looms, particularly those weaving blankets, it is desirable to draw off enough warp at the end of the blanket to form a fringe. The ordinary loom runs continuously from one unit to the next without interruption, no provision being made for drawing off a fringe warp. The pattern mechanism of the individual units being woven will ordinarily have some part which makes a complete revolution for each fabric unit, such, for instance, as the box chain if the fabric has fancy cross stripes and the loom is equipped with shifting shuttle boxes. It is an important object of my present invention to provide mechanism wherein the arrival of the aforesaid part at a given position will act automatically to stop the loom, after which the weaver can slacken the let-off and advance the take-up a sufficient amount to provide for fringing. In the particular illustration given herein a section of the pattern chain having one riser is utilized to effect loom stoppage when the riser arrives under a control lever, but I do not wish to be limited to that particular type of indication.

Inasmuch as it is common practice for a weaver to run several looms, it is desirable to break the stopping circuit as soon as the loom is stopped, or as soon as indication for loom stoppage is given. By such a provision the loom can be stopped without danger of overheating the electrical system should the weaver be delayed in reaching the stopped loom. It is therefore a further object of my invention to provide means whereby the indication given by the regularly moving part of the loom is of sufficient duration to give a complete and definite stopping impulse, after which the circuit is broken, the completion and the breaking of the circuit preferably occurring during the upward motion of the pattern chain lifter lever.

It is a more specific object of my present invention to provide a toggle joint control for the element which actually closes the electric switch, the toggle at the beginning of the upward movement of the lever being in position to cause closure of the switch, but being acted upon during continued upward movement of the lever being in position to cause closure of the switch, but being acted upon during continued upward movement of the lever to move to a different position to per-

mit opening of the switch. It is by this particular means that I prevent continued energization of the electrical stopping circuit. The particular advantage of this type of switch control grows out of the fact that when the loom stops the pattern chain will ordinarily hold its indicating lever raised, but when the switch is opened as already described there is no interference when the loom is started after the fringe has been pulled off.

While I have set forth diagrammatically two instrumentalities operating electrically which are found on a good many looms at the present time for the purpose of carrying the stopping impulse into effect, yet I do not wish to be limited to the use of these devices.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth.

In the accompanying drawings, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is a rear elevation of the upper part of a pattern control mechanism for a loom having my invention applied thereto.

Fig. 2 is an end elevation taken in the direction of arrow 2, Fig. 1.

Fig. 3 is a diagrammatic view showing the control for the loom.

Figs. 4 and 5 are views similar to a portion of Fig. 1 showing the parts in different positions, and Fig. 6 illustrates one type of fabric which can be woven to advantage with my invention.

As actually used my invention has been adapted to the well-known Knowles head and the drawings illustrate a portion of the latter structure, but I do not wish to be limited to such a pattern control. As shown in Fig. 1 a frame 10 which may be part of a Knowles head mounted on the upper part of the loom arches at one end of the loom carries a cylinder shaft 11 which as shown in Fig. 2 has provision for a pattern chain 12. The latter has four spaces for risers 13 and sinkers 14 to control four box indicating levers 15. Driving mechanism for the cylinder is not set forth herein but may be of the usual construction, and the pattern chain makes one complete revolution for each weaving unit.

It is convenient to operate my loom in connection with a warp stop motion. Referring to Fig. 3, the stop motion proper is shown at 20 and comprises a grounded bar 21 and an insulated bar 22, these bars preferably being formed in a unit which is surrounded by the drop wires 23, and said bars are so related that when one of the drop

wires falls electrical connection is established to connect both of said bars. This motion may be similar to that shown in patent to Payne No. 1,852,217.

5 The knock-off mechanism shown in the lower part of Fig. 3 is actuated by the bottom shaft 25 of the loom which carries a cam 26 to give a knock-off lever 27 periodic oscillations about a fixed pivot 28. A fixed support 29 positions a solenoid 30 so that the core 31 can elevate a link 32 into the path of the knock-off lever. The link is attached to an arm 33 pivoted at 34 and operatively related to the shipper handle 35. A latch 36 operated preferably by gravity permits the link 32 to be down during normal running, but as soon as the solenoid 30 raises the link 32, the latch will move under said link to maintain it elevated in the path of the knock-off lever 27 without requiring further energization of the solenoid 30. The knock-off may be substantially the same as that shown in patent to Payne No. 1,873,465.

The insulated bar 22 is connected by wire 40 to the solenoid and the latter is connected by wire 41 to a source of electric energy E one side of which is grounded through wire 42. The outer bar 21 may be grounded through connection 43, and from the circuit shown in the lower part of Fig. 3 it will be apparent that excitation of the solenoid will effect rocking of the shipper handle 35 to stop the loom.

The matter thus far described is of common construction and is set forth herein merely for illustrative purposes.

35 The purpose of my invention can be illustrated by reference to Fig. 6, where is shown a strip of cloth having several fabric units B, as blankets, separated by zones F of warps to be cut later to form fringes. Patent to Came No. 1,612,096 shows a type of take-up which can be readily advanced to provide the zones F.

In carrying my invention into effect I provide the pattern chain 12 with a single riser 50 which as the chain moves assumes a position over the shaft 11 once for each complete fabric unit produced by the loom. An indicator lever 55 is pivoted at 56 to the structure 10 and has a run 57 to be raised by the riser 50. An upstanding horn 60 on lever 55 has pivoted thereto as at 61 a switch arm 62 having a foot 63 located under the plunger 64 of a switch S. The latter is supplied with electrodes 65 and 66 mounted on an insulating base 67 and positioned for engagement with a spring contactor 68. The latter is mounted on the plunger between holding nuts 69, and the plunger is guided for vertical motion on framework 70 of the switch. A compression spring 72 surrounding the plunger acts to push the latter down to maintain the spring contactor 68 normally out of contact with the electrodes 65 and 66.

Pivoted to the lifter arm as at 75 is a toggle link 76 which in turn is pivoted as at 77 to a second link 78 pivoted at 79 to the indicating lever 55. A stop pin 80 limits left hand movement of link 78 as viewed in Fig. 4 under the action of a tension spring 81 interposed between the horn 60 and link 76. The normal lifting position of the toggle is that shown in Figs. 1 and 4.

70 The switch is mounted on a bracket 85 extending upwardly from the structure 10 and carries an operating pin 86 which extends over a lip 87 projecting laterally to the right as viewed in Fig. 4 from link 78. Electrode 65 is grounded

through wire 90, while the other electrode 66 is connected by wire 91 to the insulated bar 22.

Under normal conditions the riser will be away from the run 57 so that the indicator lever 55 will be down as shown in Fig. 1, with the lip located an appreciable distance under the operating pin 86, as shown in Figs. 1 and 2. As the last pick of the unit being woven is laid the chain will move the riser 50 under the run 57 to elevate indicator lever 55 from the position shown in Fig. 1 to the intermediate position shown in Fig. 4. During the first part of the upward movement of lever 55 the toggle remains in the position of Fig. 1, the lifter arm 62 therefore being positioned positively to raise the plunger 64 until the spring contactor 68 electrically connects the electrodes 65 and 66. Thereupon current flows, as shown in Fig. 3, in the following circuit: battery E, wire 41, solenoid 30, wire 40, bar 22, wire 91, electrode 66, contact 68, electrode 65, wire 90 to the ground and up from the ground through wire 42 back to the battery. Current flowing in this circuit will energize the solenoid 30, causing the latter to raise the knock-off link 32 and permitting the latch 36 to move to a position where it will maintain the link in the path of the knock-off lever 27 without continued energization of the solenoid.

Up to this time the lip 87 has been out of contact with the operating pin 86, but as the riser 50 continues to lift the indicator lever the latter will move upwardly to force the lip against the operating pin. Since the latter is stationary the link 78 will rock in a right hand direction as viewed in Fig. 1 around axis 79, breaking the toggle and moving the links to the position shown in Fig. 5. The spring 72 exerts a greater force than does tension spring 81, and as soon as pivot 77 moves to the right of a line joining axes 75 and 79, the downward thrust of spring 72 acting through the plunger 64 will cause the lifter arm 62 to descend relatively to the indicator lever 55. It is in this way that the contact 68 is moved down from the position shown in Fig. 4 to that illustrated in Fig. 5 to be out of contact with the electrodes of the switch even though the lever 55 be in its highest position.

At a later time in the cycle of loom operations the cam 26 will oscillate lever 27 and act in a manner set forth in the aforesaid Patent No. 1,873,465 to stop the loom. The weaver can then manipulate the let-off and take-up mechanisms to advance the fabric sufficiently to provide for the required fringe.

Upon restarting the pattern chain will move to permit descent of lever 55, causing a corresponding downward movement of the lifter arm 62, and as the foot 63 remains in contact with the plunger 64, the tension spring 81 will restore the toggle to its normal position shown in Fig. 1. This restoration occurs during a time when the lip is moving away from the operating pin, and the latter therefore offers no interference to the resetting of the toggle.

When the loom stops as already described the riser 50 will be under the run 57, with the result that the indicator lever is elevated. If some provision were not made to permit breaking of the contact between the electrodes 65 and 66, such as that already described, an attempt to restart the loom after the fringe had been drawn off would give a second indication to the solenoid 30 before the loom had run far enough to move the riser 50 away from the run 57. It is for this rea-

son that I arrange to open the switch as lever 55 approaches high position.

From the foregoing it will be seen that I have provided simple means to stop a loom when the pattern mechanism reaches a given point in the cycle of its operations, corresponding preferably to the completion of a fabric unit. It will further be seen that the control interposed between the pattern chain and the switch S is such that as the indicator rises the switch is first closed and thereafter opened, thereby avoiding continued energization of the stopping circuit while the loom is at rest. Furthermore, by opening the switch as described the loom can be restarted after the fringe has been drawn off without a repeated indication.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a loom, a pattern chain, an electric switch tending normally to be in open position, means to initiate loom stoppage when the switch is closed, a lever to be raised by the pattern chain, means controlled by the lever and operative during the first part of the up motion of the lever to establish an operative connection between the lever and switch to close the switch, and means operative during the remainder of the up motion of the lever to break the connection between the lever and the switch.

2. In a loom weaving successively a plurality of fabric units, loom stopping mechanism, a pattern chain having a revolution for and controlling the weaving of each unit, an electric switch to stop the loom when closed and tending normally to be in open position, a lever to be raised by the pattern chain when a fabric unit is finished, means defining a toggle joint moved by the lever to close the switch during the first part of the up motion of the lever, and means to break

the toggle joint during the latter part of the up motion of the lever, the switch thereupon tending to return to open position.

3. In a loom weaving successively a plurality of fabric units, loom stopping mechanism, a pattern chain having a revolution for and controlling the weaving of each unit, an electric switch tending to remain open and effective when closed to initiate stopping of the loom, a lever to be raised by the chain when a fabric unit is finished, a switch arm on the lever, a toggle joint between the switch arm and lever which when in normal position causes the switch arm to close the switch when the lever rises, and means operative after the lever has risen a given amount and before completion of up motion thereof to break the toggle joint.

4. In a loom weaving successively a plurality of fabric units, loom stopping mechanism, a pattern chain having a revolution for and controlling the weaving of each unit, an electric switch normally open and effective when closed to stop the loom, a lever to be raised by the pattern chain when a fabric unit is complete, means defining a toggle joint normally positioned when the lever starts to rise to cause closing of the switch, and means operative during the latter part of the up motion of the lever to break the toggle, the switch thereupon returning to open position.

5. In a loom, a pattern chain, an electric switch effective when closed to stop the loom, an element to be given a motion at regularly recurring intervals of the loom operation by the chain, means operatively interposed between the element and the switch including a releaseable member effective during the first part of the motion of said element to close the switch, and means operative during the latter part of the motion of said element to release said member and render the latter ineffective to close the switch.

HERBERT A. WHITIN.