Dec. 29, 1936. O. V. PAYNE 2,065,731

ELECTRIC WARP STOP MOTION FOR TERRY TOWEL LOOMS

Filed Jan. 21, 1935 3 Sheets-Sheet 1

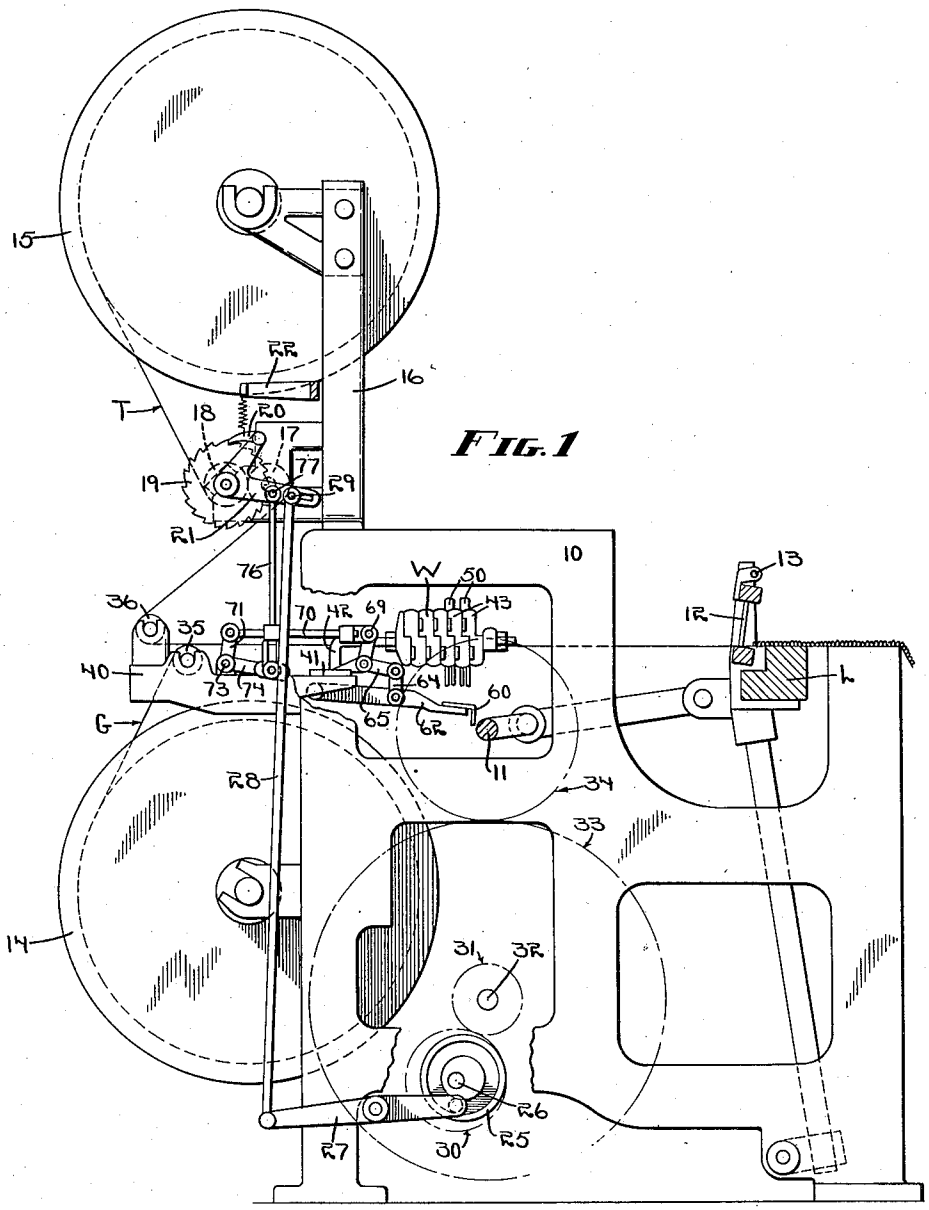


FIG. 1

Inventor
Oscar V. Payne
Southgate Fay & Hawley
Attorneys

Dec. 29, 1936. O. V. PAYNE 2,065,731

ELECTRIC WARP STOP MOTION FOR TERRY TOWEL LOOMS

Filed Jan. 21, 1935 3 Sheets-Sheet 2

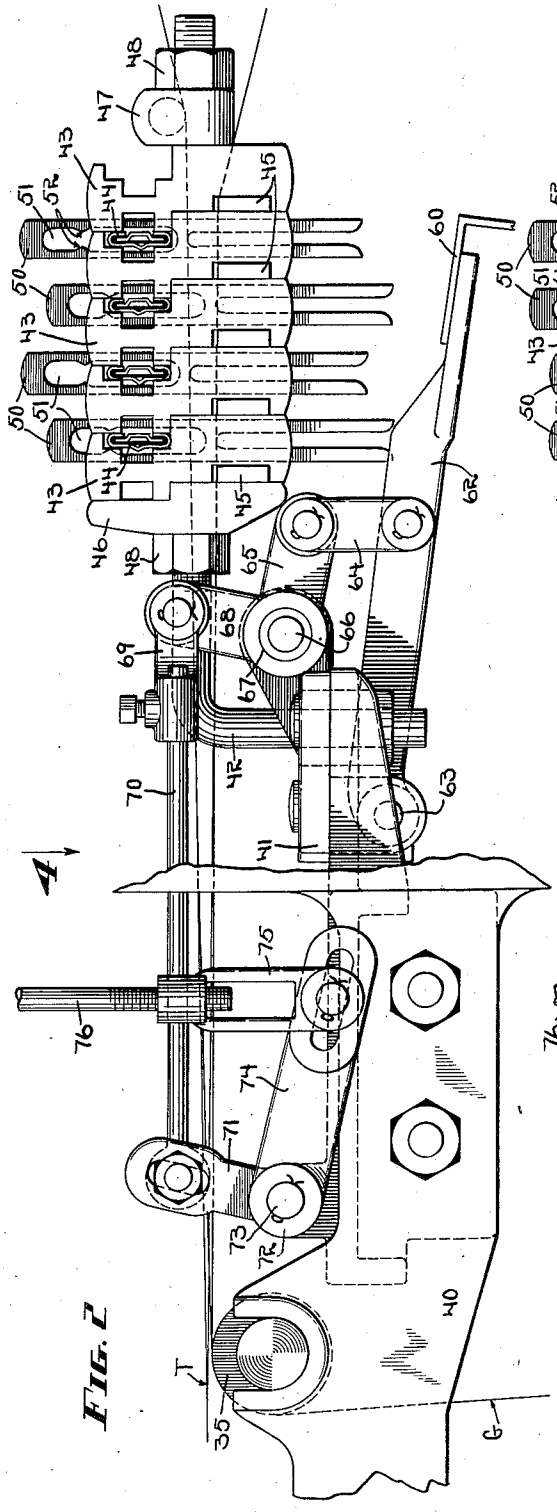


FIG. 2

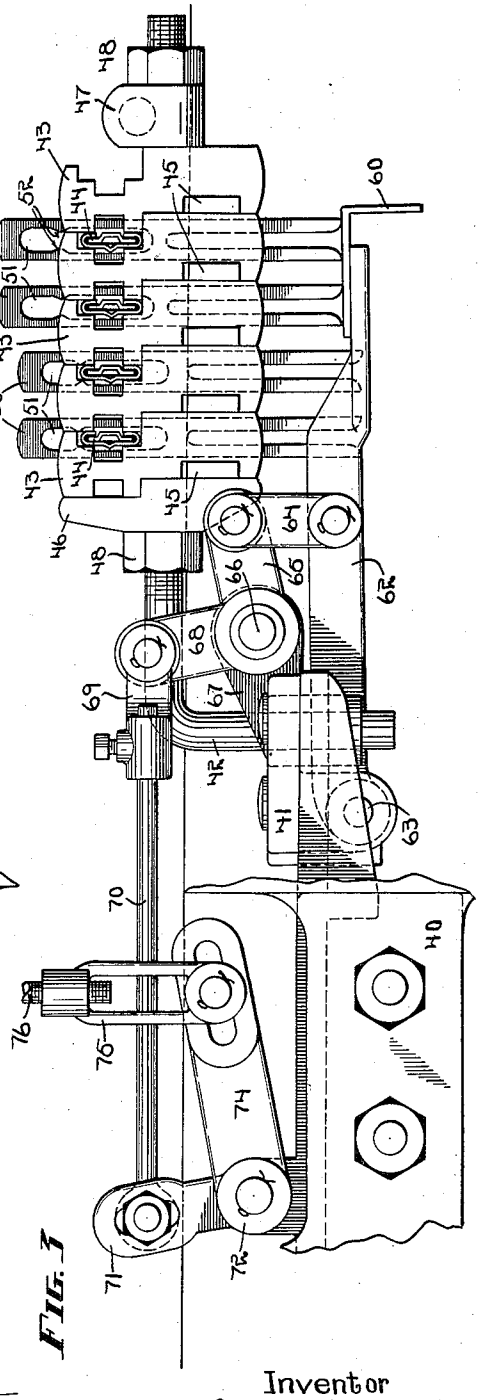


FIG. 3

Inventor
Oscar V. Payne
Attorneys

Dec. 29, 1936. O. V. PAYNE 2,065,731

ELECTRIC WARP STOP MOTION FOR TERRY TOWEL LOOMS

Filed Jan. 21, 1935 3 Sheets-Sheet 3

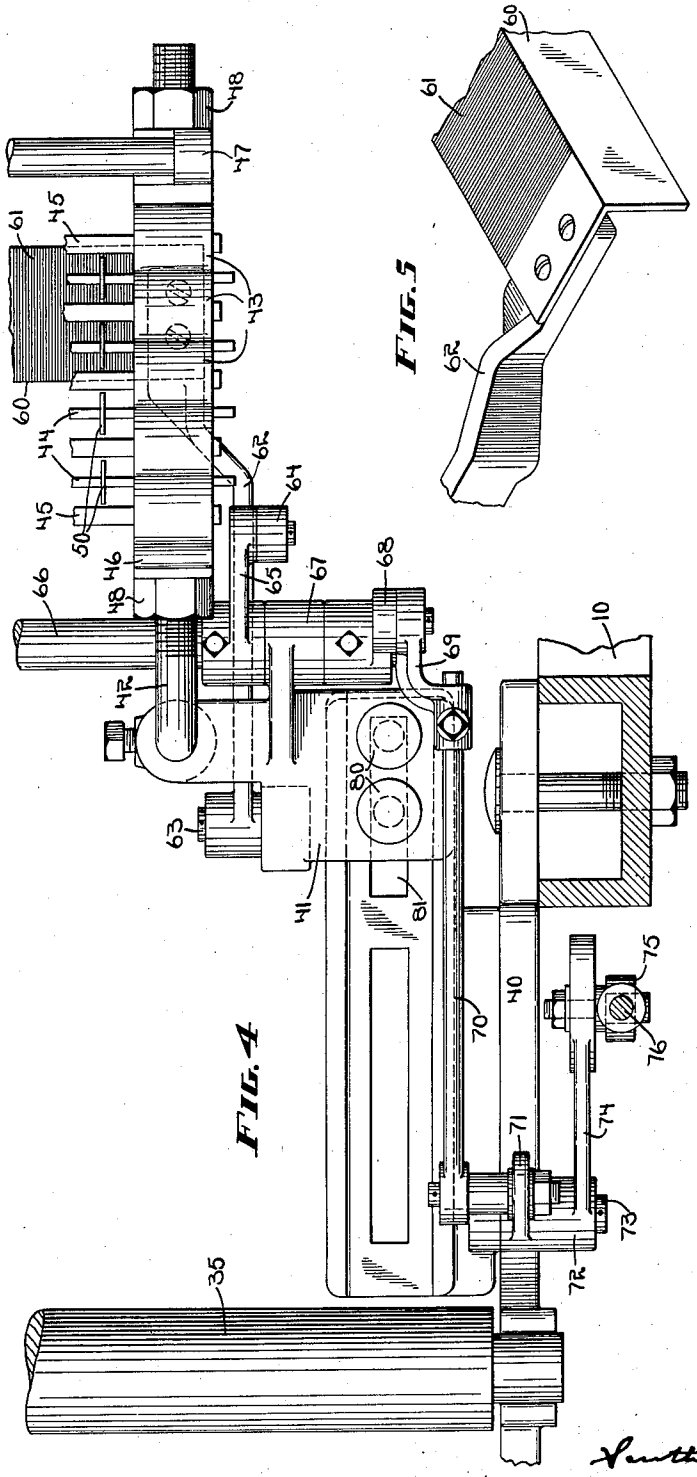


FIG. 4

FIG. 5

Inventor
Oscar V. Payne

Attorneys

Patented Dec. 29, 1936 2,065,731

UNITED STATES PATENT OFFICE

2,065,731

ELECTRIC WARP STOP MOTION FOR TERRY TOWEL LOOMS

Oscar V. Payne, Leicester, Mass., assignor to Crompton & Knowles Loom Works, Worcester, Mass., a corporation of Massachusetts

Application January 21, 1935, Serial No. 2,625

2 Claims. (Cl. 139—349)

This invention relates to improvements in warp stop motions for terry towel looms and it is the general object of the invention to provide a warp stop motion for the terry as well as the ground warp.

Terry towel looms operate usually with two warp systems one of which is tight at all times to form the ground weave, while the other supplies the terry warp and is periodically slackened to feed forwardly the thread necessary for the formation of the terry loops. The reed is so manipulated in a three-shot terry, for instance, as to have a short forward motion on the first and second beats or picks of the cycle in order to leave two shots of filling in different sheds an appreciable distance behind the fell of the cloth. On the third beat, however, the reed has a full or long forward stroke and beats the three shots of filling together with the terry warp up to the fell of the cloth, thus looping the slack terry warp between the fell and first of the three shots of filling. At this time it is necessary that the terry warp be slack enough to permit the formation of piles and it is an important object of my present invention so to control the warp stop motion applied to the terry warp as to prevent the same from operating on the terry forming beats.

I find it convenient to separate the drop wires into two groups, one of which is the usual kind for the ground warp and is mounted more or less stationary with respect to the loom while the wires of the second group for the terry warp may have associated therewith a bar operable to lift them on the terry forming beats of the loom so that they cannot fall and stop the loom. I do not wish to be restricted to an arrangement calling for two groups, however.

It is customary in certain types of terry towel looms to have pressure rolls located between the terry beam and the warp stop motion to feed the terry warp forwardly. There may be employed driving means to give said rolls a positive feeding movement on terry forming beats, and it is a further object of my invention to control the bar which lifts the terry drop wires by the same means which feeds the terry warp. Such a control synchronizes feeding of the terry warp and disabling of that part of the warp stop motion applied particularly to terry warps. This mechanism may if desired conveniently comprise a ratchet wheel and a feed pawl therefor which is given a feeding movement by a cam having an operating movement once for each terry forming cycle. While I have described the features of the invention as relates to a three-pick terry, yet it is obvious that the invention is not limited to a loom weaving a fabric of this kind.

In electric warp stop motions a circuit is usually closed by a fallen drop wire which bridges two oppositely charged electrodes. In order that a good contact may be secured there is usually a slight wedging action between the drop wire and the electrodes. The drop wires of the terry warp would have an opportunity to fall and become wedged on the detector bars every third beat of the loom, and the strain of loosening these wires would be likely to abrade and weaken the terry warp, resulting in breakage. My present invention prevents this wedging and therefore saves the terry warp.

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 claims.

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

Fig. 1 is a side elevation of the rear part of a loom having my invention applied thereto,

Fig. 2 is an enlarged view of a portion of the structure shown in Fig. 1 with the parts in normal position and the terry warp drop wires effective to detect,

Fig. 3 is a view similar to Fig. 2 but with the parts in a different position showing the terry warp drop wires ineffective to detect,

Fig. 4 is a detailed plan view taken in the direction of arrow 4, Fig. 2, and

Fig. 5 is a detailed perspective view of one end of the lifter for the drop wires.

Referring particularly to Fig. 1, I have shown a loom frame 10 having a lay L movable in usual manner by the top shaft 11. A reed 12 is pivoted as at 13 to the lay and has well-known operating connections not shown which are effective periodically to change the angular relation of the reed relatively to the lay. For convenience I have shown the parts proportioned to produce a so-called three-shot terry with the reed controlled so that it is in forward position every third beat of the lay, and in a relatively rear position for two beats. The ground warp beam 14 may be associated with any form of let-off not shown to produce the usual tension and hold the ground warp relatively tight at all times. The terry beam 15 may be mounted on brackets one of which is shown at 16 in Fig. 1 and except for a light friction not shown is free to move in a warp feeding direction.

The feed for the terry comprises front and back rolls 17 and 18, respectively, which are mounted for rotation and are normally held against each other. A ratchet feeding wheel 19 is secured to the rear roll 18 and a feed pawl 20 is mounted on a rocking lever 21 which preferably oscillates about the axis of the rear roll. This pawl is controlled by a movable arm 22 operated by some part of the loom such for instance as the pattern mechanism. In Fig. 1 the arm 22 is shown down to permit the pawl to have a feeding relation with respect to the ratchet, and this condition will exist until the pattern chain calls for a heading, at which time the periodic feeding will be omitted.

The means for operating the pawl constitutes a cam 25 on a stud 26 and having connection with a cam lever 27 the rear end of which is attached to a driving rod 28. The latter extends upwardly and is adjustably connected as at 29 to the lever 21. The cam 25 is shown herein as an eccentric and is operatively connected to a gear indicated diagrammatically at 30 rotating about the stud 26. A second gear 31 on the bottom shaft 32 is two-thirds as large as the gear 30, and by this relation the rod 28 is given an upward movement every third beat of the loom because of the fact that the driving gears 33 and 34 on the bottom and top shaft, respectively, have a ratio of two to one.

The lower or ground warp G is led upwardly over a guide bar 35 while the terry warp T from the upper beam is led down under the rear roll 18, up and over the front roll 17, and then back and under a rear guide bar 36. From the rolls 35 and 36 the two systems of warp threads are led forwardly toward the warp stop motion designated generally at W.

Those parts of the loom already described may be of usual construction and operate to hold the ground warp tight but feed the terry warp forwardly a predetermined amount at periodic intervals.

The warp stop motion is set forth herein as of the electrical type, but I do not wish to be limited to this form of motion, inasmuch as certain features of my invention apply equally well to any form of warp stop motion which depends for its operation upon the falling of a drop wire. Accordingly, the loom is provided with a rearwardly extending bracket 40 which supports the rolls 35 and 36 and also carries a support 41 as shown in Fig. 4, from which extends forwardly a threaded holding rod 42. It is to be understood that the structure shown in Figs. 2, 3, and 4 is located at each side of the loom and a description of one side of the warp stop motion will suffice for both.

Strung along the rod 42 are units 43 between which are disposed the contact bars 44 and separator warp positioning bars 45. End clamps 46 and 47 may be located behind and in front of the series of units 43, respectively, if desired, and the whole structure is held tightly between nuts 48 which are threaded on the rod 42.

The drop wires for the several banks are all substantially alike and are designated at 50, each drop wire having an upper slot 51 into which project contacting lobes 52 that operate when the drop wire falls to connect the two parts of the contact bar so that an electric circuit may be completed through instrumentalities not shown herein but well understood for the purpose of stopping the loom. The drop wires are normally held with the lobes above the contact bars by means of the warp of both systems which lie along the tops of the separator bars 45.

The warp stop motion itself forms no part of my present invention and may be the same as set forth in my prior Patent No. 1,852,217.

It will be understood that the terry warp is given its forward feed at some time prior to the actual beat-up of the reed, and there results an interval of time in which the drop wires corresponding to the temporarily slack terry warp would fall to give indication. Furthermore, their weight would retard the forward feeding which is necessary for the formation of the piles on the fabric. As set forth herein I have divided the drop wires into two series, the left rear pair of the banks of drop wires as shown in Fig. 2 corresponding to the ground warp, while the right front pair correspond to the terry warp.

In carrying my invention into effect I provide means to support the drop wires when the terry group is slack, and preferably raise the drop wires slightly above their normal position so that their weight is taken off the terry warp. To accomplish these results I provide a plate 60 which extends as shown in Figs. 1 and 4 under the front pair of banks of drop wires and this plate may preferably have a ribbed or corrugated surface 61. The plate extends across the loom and is supported at each end by mechanism similar to that shown in Figs. 2, 3, and 4.

The end of the plate 60 is secured to an arm 62 which has pivotal connection as at 63 to the support 41. A link 64 extends upwardly from arm 62 and is connected to an arm 65 secured to a rock shaft 66. The latter is journaled in a bearing 67 preferably formed as part of the support 41, see Fig. 4, and extends across the loom. A second arm 68 also secured to the shaft 66 extends upwardly to have connection with a rod head 69 which is attached to the forward end of an actuator rod 70. The latter extends rearwardly to have connection with an arm 71 of a lever 72 pivotal about a stud 73 fixed with respect to the bracket 40. A second arm 74 extends forwardly from the lever 72 and has adjustable connection with the rod head 75 located on the bottom of rod 76. The upper end of rod 76, as shown in Fig. 1, is attached to the lever 21 as at 77 and is therefore raised on the terry forming beats of the loom.

In operation, the terry warp will be given a forward feeding every third pick as already described, at which time rod 76 will be raised by lever 21 to rock lever 72 and cause rearward movement of actuator rod 70. The rock shaft 66 thereupon has a left hand motion as viewed in Fig. 2 and operates through arm 65 and link 64 to raise arm 62 from the position shown in Fig. 2 to that shown in Fig. 3. In this way plate 60 raises the front pair of banks of drop wires so that even though the terry warp is temporarily slack the drop wires cannot fall to indicate a stop. Furthermore, the parts may be so proportioned that the drop wires will be raised slightly above their normal position with the terry taut so that none of the weight of the drop wires will be on the terry warp during the pile forming beat of the lay. The preventing of indication and raising of the wires off the warp are two separate features and need not necessarily be used together.

As suggested in Fig. 4 bolts 80 pass through slot 81 in the bracket 40 to vary the position of the warp stop motion and also the plate 60 with respect to the front of the loom. By having the

units 43, together with the contact and separator bars, mounted on the same part which supports the arm 62 and plate 60, the entire motion can be moved back and forth while preserving the correct relation between the plates 60 and the banks of drop wires with which it is intended to cooperate.

While I have shown the invention in connection with gearing which gives a so-called three-shot terry, yet I do not wish to be thus limited, and I wish it also to be understood that my invention is not limited to electrical warp stop motions, inasmuch as it is usable wherever slackness of warp would tend to cause indication to stop.

From the foregoing it will be seen that I have provided simple means for raising the drop wires corresponding to the terry warp on terry forming beats of the loom so that the drop wires are unable to move to indicating position during the time that their corresponding warp threads are slack. It will also be seen that the drop wires may be raised off their warp threads so that their weight does not interfere with the forward feeding of the terry warp. While I have shown means for elevating only part of the drop wires, a procedure which necessitates dividing the drop wires between the ground and terry warps, yet I deem it to be within the scope of my invention to raise all of the drop wires so that the latter can be dropped indiscriminately on ground and terry warp.

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 warp stop motion for a loom, a terry warp, means to render the terry warp periodically slack, a bank of drop wires for the terry warp, means to stop the loom when any drop wire of the bank is down, a bar extending under the drop wires and normally spaced below and out of contact with said wires, means to raise the bar and cause the latter to support the drop wires in normal raised position when the terry warp is slack, each drop wire when falling because of a warp fault being free to descend without frictional engagement with the bar.

2. In a warp stop motion for a loom, a terry warp, means to render said terry warp slack at periodic intervals, a bank of drop wires for the terry warp, means to stop the loom when any drop wire is down, a bar located under and normally out of contact with the drop wires, means to raise the bar when the terry warp is slack to support the drop wires in normal elevated position and means on the bar to engage the lower parts of the drop wires and resist lateral movement of the latter when the terry warp is slack.

OSCAR V. PAYNE.