March 4, 1958 R. D. HEFFELFINGER ET AL 2,825,119

STOP MOTION

Filed Dec. 27, 1954

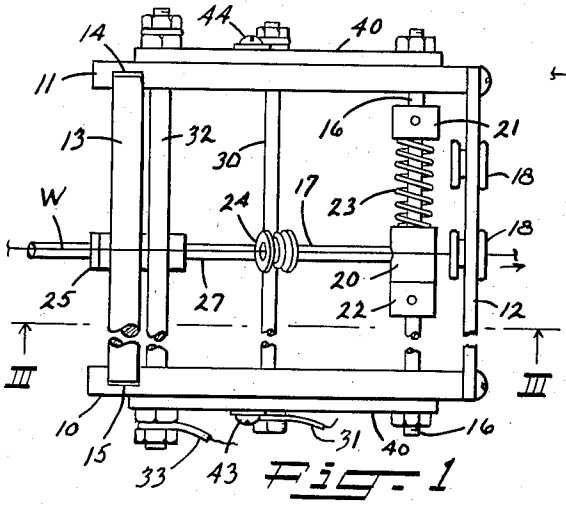


Fig. 1

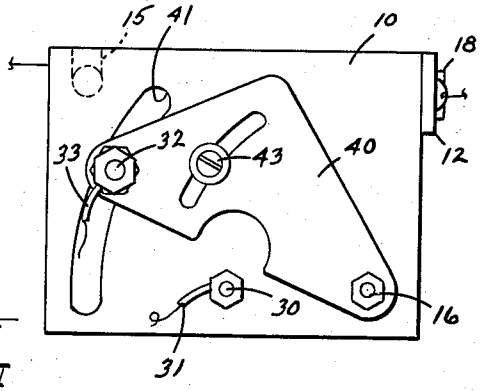


Fig. 2

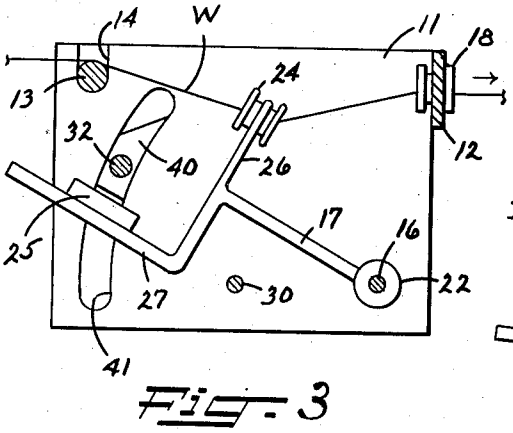


Fig. 3

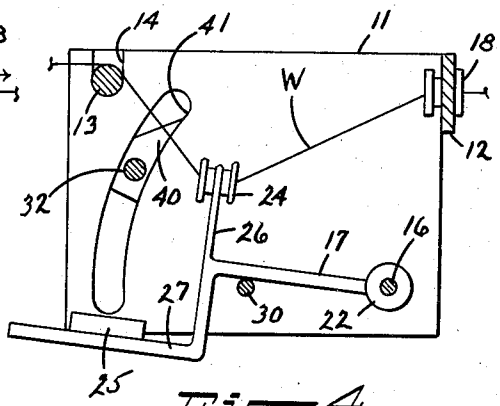


Fig. 4

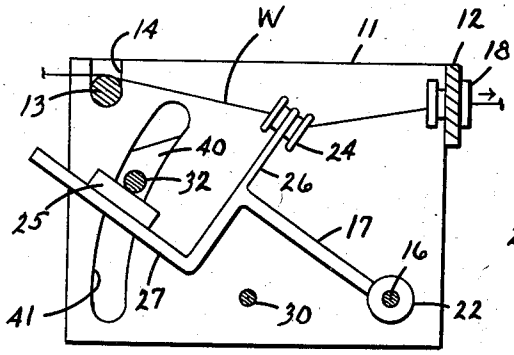


Fig. 5

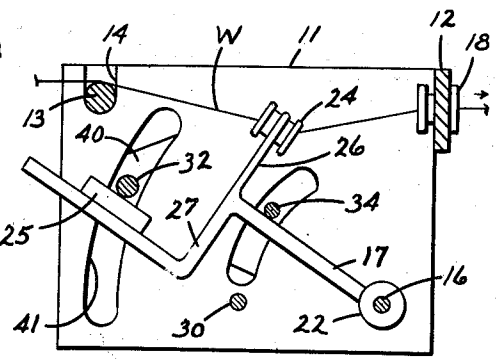


Fig. 6

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2,825,119

STOP MOTION

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1 Claim. (Cl. 28—51)

This invention relates to stop motion devices for textile machinery, and more particularly to mechanism which stops a warping machine under conditions of both excess and insufficient tension in any of the warp ends.

Stop motion devices for warping machines which are intended to stop the apparatus when there is more than a predetermined decrease in tension in one of the warp ends are well known. The usual circumstance under which such a condition exists is caused when an end breaks. However, no satisfactory device has been provided for stopping such a warping machine when the tension in one of the warp ends exceeds a predetermined value.

A primary object of the invention therefore is to provide a stop motion for a warping machine which closes an electrical circuit to the control mechanism of the warping machine under conditions of excessive tension in any warp end passing through the stop motion apparatus.

A further object of the invention is to provide an excess tension stop motion device for warping machines which includes means for indicating which warp end caused the actuation of the stop motion.

A further object of the invention is to provide a magnetic lock for holding a tension arm in a stop motion device.

A still further object of the invention is to provide, in a stop motion device for warping machines, a double pole switch and a position lock for holding the pivoting member of the stop motion in closed position when the circuit to one of the poles of the switch is completed.

Further objects will be apparent from the specification and drawings in which:

Figure 1 is a top view showing a stop motion mechanism constructed in accordance with the present invention;

Figure 2 is a front view of the apparatus of Figure 1;

Figure 3 is a transverse section as seen at III—III of Figure 1 with the mechanism in the normal running position;

Figure 4 shows the apparatus of Figure 3 with the stop motion circuit closed under conditions of insufficient tension in a warp end;

Figure 5 shows the apparatus of Figure 3 with the stop motion circuit closed under conditions of excessive tension in a warp end; and

Figure 6 shows a view of a modified form of the apparatus of Figures 1–5.

The invention comprises essentially the provision of a pivoted arm carrying a ceramic eye for each of the warp ends. The arm for each warp ends is weighted so that it is held in an elevated position between a guide bar and the eyeboard of the warping machine. A transverse bar below the pivoting arm is electrically connected to mechanism which stops the warping machine when a circuit is completed by contact of the pivoting arm with the bar. A second bar positioned above the pivoting arm is also connected electrically to the stop

motion circuit so that this circuit is completed to stop the machine in the event the pivoted arm is raised to contact the upper bar. A magnet retains the arm in the raised position when contact is made with the upper bar. In the preferred embodiment the upper bar serves the dual purpose of conducting the electrical current for actuating the stop motion and also the stop against which the pivoting arm is magnetically held. Under conditions in which it is desirable to have the upper contact bar be of magnetically non-attractive material, a supplementary bar may be used in conjunction with the magnetic stop bar.

The stop motion assembly shown in Figures 1–5 comprises spaced end members 10 and 11 of electrically non-conductive material. An eyeboard 12 connects and is secured to the upper corners of members 10 and 11. The opposite upper corner of the members carries a guide bar removably seated in notches 14 and 15 in the members. A rod 16 is secured to the lower corners of end members 10 and 11 and serves as a journal for a plurality of pivoting arms 17, one of which is illustrated. It will be understood that there is a separate pivoting arm 17 for each of the warp ends passing through the various eyes 18, 18 in eyeboard 12. For purposes of clarity, however, only one of these arms is shown and described. Each arm assembly comprises a hub 20 which in the assembled form is spring loaded axially on rod 16 by means of suitably locked collars 21, 22 and compression spring 23. As shown in Figures 3–5 the pivoting arm carries a ceramic eye 24 and a magnet 25 on offset portions 26 and 27 of the arm respectively. The lower bar 30 extends between end members 10, 11 and is electrically connected to the stop motion relay of the warping machine through a conductor 31. The upper bar 32 is also connected to the stop motion relay through conductor 33. In the normal operating position shown in Figure 3, the warp ends pass over guide 13, through eyes 24 on each arm and then through the proper eyes 18, 18 in eyeboard 12. The lateral spacing between guide 13 and the eyeboard is a factor in controlling the angular pivotal increments of arm 17 in accordance with the tension or change in tension, in the warp W. In the event that the tension in the warp falls below a predetermined value, arm 17 drops of its own weight to complete the stop motion circuit through contact with bar 30. Under this condition the operator is always able to detect which end caused the shutdown of the machine because the arm 17 will be out of alignment with the remaining arms in the assembly. The position of the arm shown in Figure 4 illustrates this condition. Also if the particular shutdown was due to a broken end, such broken end is usually readily detectable without looking at the individual arms.

In the event there is excessive tension in the warp end W, arm 17 pivots upwardly as shown in Figure 5 until the magnet 25 contacts bar 32. This contact similarly completes a circuit to the stop motion relay, thus shutting down the warping machine and also holds the arm 17 in its raised position. Since there is a slight relaxation or reduction in tension when the machine stops, the arm 17 that activated the stop motion would drop slightly so that it would be likely to fall back to approximately its normal position as shown in Figure 3 if it were not held in the raised position. Thus, the operator would be unable to detect which of the warp ends caused the shutdown and therefore correction of the faulty condition could not be made without starting the machine again.

Under conditions in which it is undesirable to use a material for rod 32 that is magnetically conductive or under conditions in which corrosion would be likely to occur, a second upper bar 34 (Figure 6) may be po-

sitioned so that contact is made between arm **17** and bar **34** simultaneously with the attraction of magnet **25** to bar **32**. Suitable adjustment of the high tension shutdown position is readily achieved by mounting bar **32** in secondary non-conductive brackets **40**, **40** on the outside of members **10** and **11**. Brackets **40**, **40** are pivoted on shaft **16** and carry bar **32** which passes through slots **41**, **41** formed in members **10** and **11** in concentric relationship with the axis of the rod **16**, as shown. The brackets **40**, **40** can be locked in any adjusted position by means of screws **43** and **44** as shown in Figure 2.

It will thus be understood that we have provided a simple improvement to the stop motion device for a warping machine which satisfactorily stops the machine in the event of excessive tension occurring in any of the warp ends. The mechanism is automatically self-indicating so that the operator can quickly detect which end has caused the shutdown so that rapid correction of the condition can be effected.

Having thus described our invention, we claim:

A stop motion assembly for warping machines comprising spaced end members of electrically non-conducting material, a yarn guide supported on said end members, an eye board supported on said end members in spaced relationship with said yarn guide, a bar connecting said members and serving as a lower electrical contact, a rod extending between said members comprising a journal, brackets of electrically non-conducting material mounted on said journal rod in spaced apart relationship for movement relative to said end members, an arcuate slot formed in each of said end members, said slots being in aligned relationship and concentric with the journal axis, a second bar comprising an upper electrical contact passing through said aligned slots and supported by said brackets, said second bar being adjustable along said arcuate slots relative to said first mentioned bar by movement of said brackets relative to said end members, means for releasably locking said brackets in fixed position relative to said end members, at least one arm pivoted at one end to said journal rod for swinging movement between said upper and lower electrical contacts, spring means coiled on said rod and resiliently urging said arm into a fixed lateral position on said journal rod, a guiding eye fixed to the end of said arm through which a yarn passes intermediate its path over said yarn guide and through said eye board, and a magnet fixed to said arm at a radial distance from the journal axis substantially equal to the radius of said arcuate slots whereby a subnormal tension in the yarn passing through said guiding eye permits said arm to fall by gravity and engage said lower electrical contact, while an excessive tension in the yarn pivots said arm upwardly against said upper electrical contact to be maintained in said elevated position by said magnet.

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