Nov. 14, 1961 C. C. HYDE 3,008,495

SKIM WIRE STOP MOTION FOR NEEDLE-TYPE PILE LOOMS

Filed Jan. 7, 1960

FIG. 4.

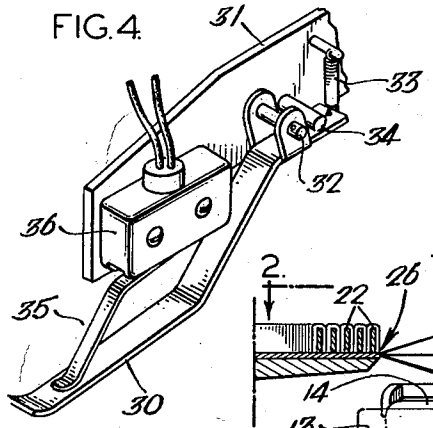


FIG. 1.

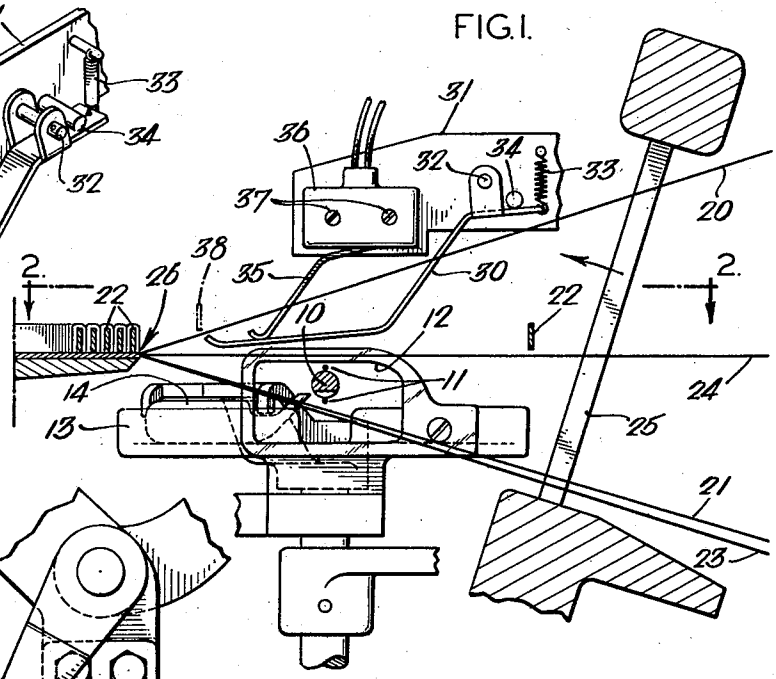


FIG. 2.

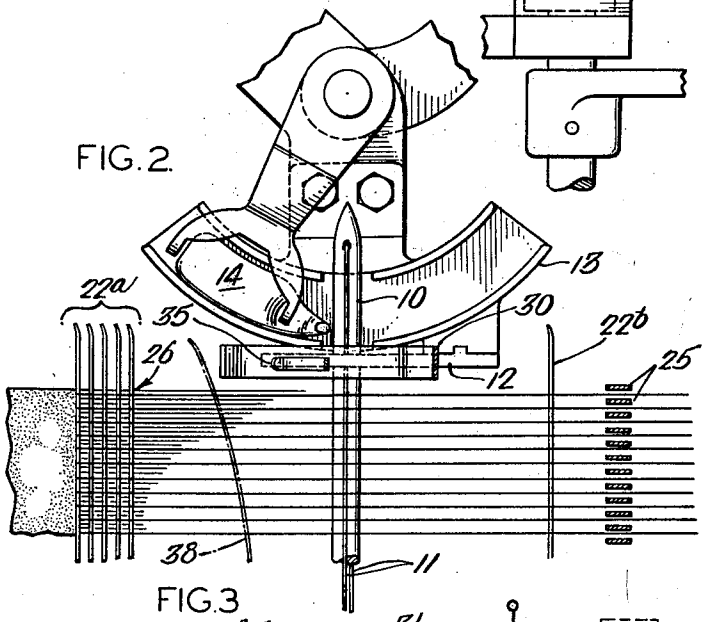


FIG. 3

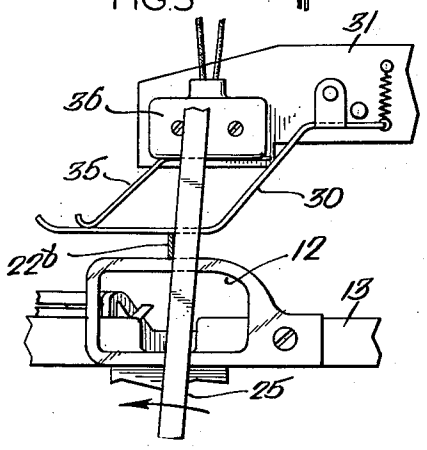
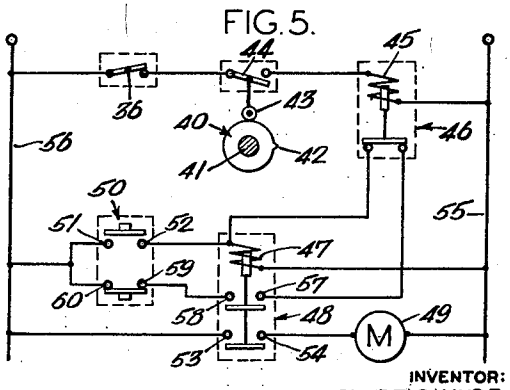


FIG. 5.



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United States Patent Office 3,008,495 Patented Nov. 14, 1961

3,008,495

SKIM WIRE STOP MOTION FOR NEEDLE-TYPE PILE LOOMS

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Filed Jan. 7, 1960, Ser. No. 1,015
1 Claim. (Cl. 139—336)

This invention relates to looms for weaving pile fabrics and particularly to a strop motion for a pile wire carpet loom which will immediately stop the loom in the event of a "skim" wire.

In the operation of a pile fabric loom of the type used in weaving Wilton and velvet carpets, the wires over which the pile warps are formed are sequentially inserted into the weaving shed by means of a standard wire motion. Occasionally the wire motion fails to pick up a wire and, therefore, no wire is actually inserted in the shed in its proper place. This is referred to as a "skip" wire. Another condition which occasionally takes place is called a "skim" wire in which the tip of the wire runs farther forward in the shed than it should with the extent that it engages some of the pile yarns forming the upper shed and jumps out of the shed over the upper pile. The present invention is directed particularly to detection of the latter condition and provides means for instantly stopping the loom in the event that the pile wire is not in its proper place when the reed beats up either because of a skim wire or a skip wire.

A primary object of the invention, therefore, is to provide in a transverse pile wire loom means for detecting the proper position of each pile wire and means for stopping the loom in the event such detector is not properly actuated by the pile wire.

A further object of the invention is to provide a feeler arm adjacent one selvage of a transverse pile wire loom and a switch positioned to be closed by said feeler arm to condition a sensing circuit.

A still further object of the invention is to provide a sensing finger positioned above the needle eye in the shuttle race of a needle insertion loom which is displaced on every beat up of the reed carrying a pile wire over the needle eye.

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

FIG. 1 is a sectional detail showing a part of a transverse wire pile fabric carpet loom in which the present invention is incorporated,

FIG. 2 is a view seen at 2—2 of FIG. 1,

FIG. 3 is a detail of part of the structure of FIG. 1 but with the reed beating up the pile wire into the normal operating position for actuating the detector finger,

FIG. 4 is a perspective showing the mounting of the detector finger and switch, and

FIG. 5 is a wiring diagram of the stop motion circuits.

Referring now more particularly to the drawings, the present invention is shown incorporated on a transverse pile wire carpet loom in which the filling or weft is inserted by means of a needle 10 which carries double filling wefts 11, 11. In such a loom the needle enters an eye 12 on the shuttle race 13 to position the wefts 11 for engagement and tying in with the selvage shuttle 14 shown in FIG. 2. This portion of the structure is conventional and is used on all types of needle looms, particularly Axminster, which employ a needle instead of a shuttle for inserting the filling wefts. It will be understood, however, that the present invention is not limited to such a needle insertion loom and can also be used on shuttle looms as well.

In accordance with conventional weaving practice, the pile warps 20 and 21 are separated to form sheds which

are raised and lowered by means of heddles or harness frames, not shown. The pile wires 22 are inserted into the sheds formed by the warps so that the pile weaves alternately over and under the sequentially inserted pile wires. In a similar manner the chain or binder warps 23 and 24 are raised and lowered so that the wefts 11 are inserted over and under groups of the chain warps as well as groups of pile warps. The reed 25 oscillates to beat up the pile wires 22 and the filling wefts 11 into the fell 26 of the fabric. When the pile wires 22 are inserted to their full extent in their proper position, they appear as shown generally in FIG. 2. The group of pile wires 22*a*, shown at the left of the figure, have already been beaten up into the fabric, whereas the pile wire 22*b* has just been inserted and will be beaten up as the reed 25 advances.

I position a feeler arm 30 on a bracket 31 in such a way that the feeler arm extends downwardly and over the needle eye 12 on the shuttle race. Each wire as it is beaten up into the fell passes over this needle eye as shown in FIGURE 3, and in so doing, it contacts arm 30 to pivot the arm on post 32 under bias of spring 33. A limit pin 34 controls the maximum downward pivoting position of the arm 30 and insures that the bracket will not interfere with the operation of shuttle 14. Elevation or pivoting of bracket or feeler arm 30 in turn actuates switch lever 35 secured to a microswitch 36 also mounted in bracket 31 by means of screws 37, 37. In the normal weaving operation the correctly positioned pile wire 22*b* is carried across the shuttle eye 12 as shown in FIG. 3 to pivot bracket 30 and open switch 36 through movement of switch lever 35. This normal action maintains a sensing circuit open to the relay for the main loom motor so that there will be no interruption in loom operation. If, however, because of a skip wire or a skim wire which would completely avoid any contact with arm 30, the sensing circuit remains closed because switch 36 is not actuated thus stopping the loom instantly. A skim wire as distinguished from a skip wire is inserted to the full extent but passes upwardly and forwardly through the shed to the general position indicated by the broken lines shown at 38 in FIGURE 2. It will be understood that the tip of the wire will extend through the shed in a position ahead of the switches and arm 30.

FIG. 5 illustrates the main and sensing circuits as controlled by switch 36. A cam 40 is connected to any suitable moving shaft 41 of the loom and contains a high point 42 which displaces cam follower 43 whenever the reed 25 oscillates to beat up a wire across the eye 12. This action of cam 40 cyclically closes normally open switch 44 in the energizing circuit for armature 45 of relay 46. Relay 46 is connected across the armature 47 of relay 48 which is the main actuation relay for the loom motor 49. With the starting switch 50 closed for normal operation, a circuit is completed through contacts 51, 52, and armature 47 to close contacts 53 and 54 thus completing the circuit to motor 49 from the main power leads 55 and 56. In this condition a holding circuit is also closed through contacts 57 and 58 of relay 48, relay 46, and contacts 59 and 60 of the starting switch. As long as the relay 46 remains unenergized, this holding circuit remains closed and motor 49 continues to run the loom. When the sensing circuit through armature 45 is closed by means of cam 40, armature 45 will be energized unless switch 36 is opened by the presence of the pile wires as shown in FIG. 3. The sensing circuit then for breaking the holding circuit remains uncompleted and the loom continues to operate. However, if for any reason there is no pile wire to open normally-closed switch 36 when the sensing circuit is conditioned by cam 40, relay 46 operates to open the holding circuit of relay 48 thus stopping the motor in the loom.

It will be understood that the present device is very effective in quickly stopping the loom in the event of a skim wire. The device is readily adapted to be used on any type of a transverse pile wire loom and has proved to be effective in maintaining the high quality of fabrics and decreasing the number of seconds.

Having thus described my invention, I claim:

In combination with a transverse pile wire loom having a series of sequentially inserted pile wires, a reed for beating up said pile wires into the fell of a fabric being woven, a weft inserting needle on said loom, a selvage shuttle for said needle, a shuttle race for said shuttle, an upper pile wire guiding surface forming an eye on said shuttle race, an arm movably positioned over the surface on the shuttle race eye and in predetermined spaced relation to said surface in the path of normally positioned

pile wires to be displaced thereby as they are beaten up by the reed, a switch responsive to displacement of said arm, a motor for operating the loom, an electrical circuit for said motor, a holding circuit for said electrical circuit, and electrical connections between the switch and the holding circuit for breaking the holding circuit in the event said switch is not actuated by a normally positioned pile wire.

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