June 19, 1951 J. G. CORL 2,557,533

STOP MOTION FOR NARROW FABRIC LOOMS

Filed May 12, 1950

Fig. 1.

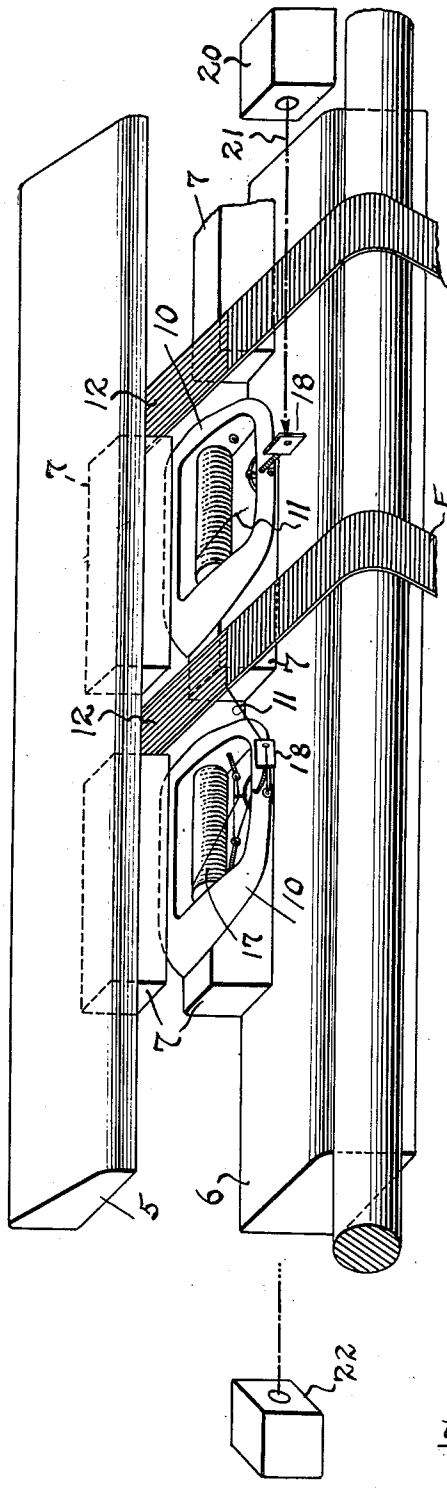
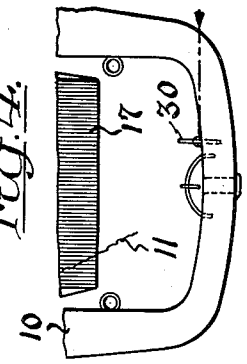


Fig. 4.



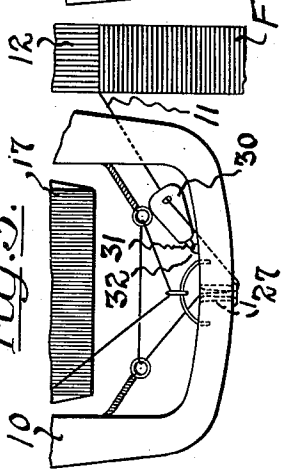
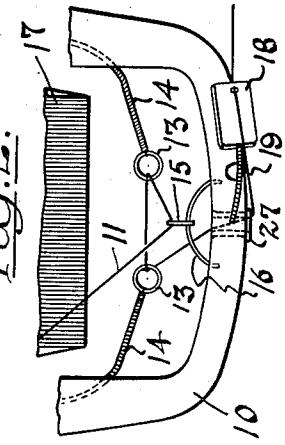


Fig. 3.

Fig. 2.



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STOP MOTION FOR NARROW FABRIC LOOMS

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10 Claims. (Cl. 139—371)

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The present invention relates to a device for stopping a loom, particularly a loom for narrow fabric, in the event of breakage of one or more of the filling yarns.

For many years there has been a need for a practical device for stopping looms, particularly narrow fabric and like looms in the same weaving cycle in which a filling thread breaks or loses tension for any reason.

There are several devices available which are intended to stop the loom when the filling thread breaks or loses tension but they do not effect stoppage of the loom as quickly as desired. These devices stop the loom only after several passages of the shuttles following the breakage or loss of tension in the yarn, with the result that at the time of the looms' stopping a defect has already been introduced in the fabric. This results in the necessity for expending considerable sums of money in inspecting the ribbon or fabric during subsequent operations and results likewise in a waste of produced fabric. Furthermore, the necessity for constantly guarding against "floats" and "shires," as these marks are called in the industry, limits the number of shuttles that can be serviced by an operator.

The present invention provides an inexpensive and effective means of stopping a loom in the same cycle in which the yarn breaks or loses tension. As a consequence, inspection problems are reduced. Also the operator may handle a much larger number of shuttles since it is not necessary for him to constantly inspect shuttles for broken filling yarns.

It is an object of the invention to provide a loom stopping device which is substantially instantaneously operated upon breakage or loss of tension in the filling yarn.

It is another object of the invention to provide a loom stopping device of the character described which is readily attached to standard looms and which is inexpensive to manufacture and install.

It is a further object of the invention to provide a loom stopping device particularly adapted to installation on narrow fabric looms and which is simple and readily serviced.

Other objects and features of the invention will appear when the following description is considered in connection with the appended drawings, in which

Figure 1 is a fragmentary perspective view of part of a loom sufficient to illustrate the shuttle carrying batten and the shuttles showing the stop motion of my invention as applied thereto;

Figure 2 is a fragmentary plan view of a loom

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shuttle showing the flag forming a part of the stopping control device and the thread guiding and tensioning parts;

Figure 3 is a view similar to Figure 2 showing a modified form of flag in which the flag is pivotally mounted as distinguished from the spring mount of Figure 2; and

Figure 4 is another view of the structure of Figure 3 showing the flag in the position it assumes when the thread breaks or loses tension.

Referring to the drawings, and particularly Figures 1 and 2, there are shown the longitudinal or batten members 5 and 6 which form part of the oscillatory shuttle mounting. Attached to the batten members are the shuttle block pairs 7 between which the shuttles 10 move back and forth in laying the filling thread. As is well known, the batten structure carrying the shuttles and other operating mechanism well known in looms of this type but not shown here, oscillate front and back while the shuttles travel back and forth between shuttle block pairs 7 in a path at right angles to the travel of the narrow fabric bands F as they are woven. The warp yarns 12 are fed forwardly between the shuttle block pairs, as illustrated in the drawings.

As is well known, the shuttles 10 carry the filling yarn or filling thread 11 wound on quills 17 which are rotatably mounted in the shuttles. The yarn is fed through a tensioning mechanism to the ribbon being woven. In the particular form of tensioning mechanism illustrated in the drawings the yarn 11 passes through a pair of guide eyelets or rings 13 mounted on the end of coiled tension springs 14 which may move into and out of passages in the sides of the shuttles as the tension on the yarn varies, all as is well known in this art. The yarn before passing through the eyelets 13 passes through a ring 15 mounted on a curved wire support 16 in turn secured to the shuttle frame. As clearly illustrated in Figure 2, the yarn 11 passes from quill 17 through the guide ring 15, the righthand guide ring 13, the lefthand guide ring 13, and then through a tubular guide 27 mounted in the shuttle frame. Mounted on the front end of the shuttle frame as shown is an opaque flag 18 which can for example be in the form of a suitable sized rectangle of thin metal which is mounted by means of a coil spring 19 on the shuttle frame. The filling yarn 11 after issuing from the tubular guide 27 passes through a small hole near the outer free end of the flag 18 and from thence to the ribbon F. If the yarn 11 is broken or loses sufficient tension the supporting

spring 19 will hold the flag 18 in a vertical plane lying on the central longitudinal axis of the shuttle frame as clearly shown in the case of the righthand shuttle of Figure 1.

As illustrated in Figure 1, a light source 20 is arranged to cast a focussed beam of light 21 longitudinally of the batten frame, that is parallel to the axis of transverse reciprocation of the shuttles 10 with respect to the ribbons F so as to impinge upon the window of a photoelectric control device 22 unless interrupted by one of the flags 18. The photo-electric mechanism 22 is only diagrammatically illustrated since it as well as a suitable light source 20 is well known in the art and available in various forms. In accordance with this invention the photo-electric device 22 is to be arranged to actuate a control device (not shown) in the power circuit for the motor drive for the loom (not shown), so as to de-energize the drive motor whenever the light beam 21 is interrupted. The motor control art is well aware of many forms of control devices for this purpose and for this reason a detailed showing of a suitable form of shut-down control for the motor is not necessary.

In so far as the invention herein disclosed is concerned there is no novelty in the operation of the loom mechanism illustrated in the drawings for the purpose of explaining this invention. The warp threads are formed into a shed in any suitable manner to provide the space through which the shuttles may pass in laying the filling thread. The batten frame and associated mechanism on which the shuttles 10 reciprocate moves front and back in the usual manner to facilitate the passing of the shuttles through the shed. Likewise in accordance with usual practice the filling thread is forced into the apex of the shed or beaten into position by means of reeds not shown.

The feature of this invention resides in the fact that the filling thread 11 under normal tension will draw the flag 18 first to one side and then to the other side of its central position in the longitudinal axis of the shuttle as the shuttles move back and forth between the block pairs 7. Of course, the flag 18 in passing from one side to the other of its mounting point on the shuttle will pass through this central position but at the time it passes through this central position the batten framework is at such a rearward position that the flag 18 does not interrupt the light beam 21. However, should the filling thread 11 break or lose tension the flag 18 will assume the position shown on the right hand shuttle of Figure 1, and when the shuttle moves forwardly in the cycle in which the filling thread 11 breaks or loses tension it will move into position to interrupt the light beam 21, thus actuating the photo-electric mechanism 22 to in turn actuate the control device and the power circuit of the drive motor to stop the loom.

More specifically, as the shuttles 10 move to the left to the position shown in Figure 1, the filling yarn 11 pulls the flag 18 to the right side of its mounting point. As the shuttles move back from the position shown to the right, that is to the other side of the ribbon F, the direction of pull of the filling yarn will swing over to pull the flag 18 to the left of its mounting point. At the time the flag 18 moves through its central position the shuttle 10 will be back to a point where the light beam 21 will not be interrupted. However, assuming that the filling thread 11 breaks or loses sufficient tension, it will be obvious that

in any complete cycle of movement of the shuttle, flag 18 having assumed a central position will interrupt the light beam 21 to cause the loom to stop.

Thus this invention takes advantage of the fact that the shuttles shift back and forth first from one side to the other, and then back again with respect to the ribbon F being woven and move front and back with respect to the apex of the shed in adapting the use of a block structure such as illustrated for the purposes disclosed.

A modified form of flag mounting is illustrated in Figures 3 and 4. In this case the flag 30 is provided with a loop 31 at one end which is pivotally supported on a loop 32 mounted on the shuttle frame as shown. In this case the filling thread 11 is threaded through the tensioning and guiding means as before, but after issuing from the tubular guide 27 passes under the shuttle frame and then through a hole in the flag 30 in such manner that when the filling thread 11 is under proper tension the flag will be held in a raised position. However, as shown in Figure 4, when the thread 11 breaks or loses sufficient tension, flag 30 may fall by gravity into a vertical plane and assuming that the light beam 21 is properly arranged it will interrupt that light beam at some point in one complete cycle of movement of the shuttle, thus effecting shutdown of the loom as in the previous case.

From the above description it will be apparent to those skilled in the art that the subject matter of this invention is capable of detailed variation, and I do not therefore desire to be strictly limited to the form of the invention selected for illustrative purposes, but rather to the scope of the claims granted me.

What is claimed is:

1. In a loom adapted to weaving fabrics and having shuttles which move transversely with respect to the longitudinal axis of the fabric being woven as well as longitudinally thereof, in combination means for projecting a beam of light transversely of the longitudinal axis of the fabric being woven, light sensitive means actuated upon interruption of said light beam to control a drive motor for the loom, and means mounted on each shuttle so as to interrupt said light beam upon breakage of the filling yarn or loss of tension therein.

2. In a combination of the type described, a plurality of shuttles each carrying a filling yarn, means for effecting reciprocation of said shuttles along two axes at right angles to each other, a displaceable flag mounted on each shuttle, the filling yarn normally deflecting said flag from a central position, means for projecting a beam of light along a predetermined path, and light sensitive control means actuated upon interruption of said light beam when breakage of said filling yarn or loss of tension therein releases said flag.

3. In a loom adapted to weave narrow fabrics and having filling yarn shuttles which move both transversely and longitudinally thereof, in combination means to project a beam of light parallel to the transverse movement of said shuttles, light sensitive control means normally illuminated by said light beam, a flag member movably mounted on each shuttle so as to interrupt said light beam when in a central position, and guiding and tensioning means for directing the filling yarn so as to normally deflect said flag member from its central position whereby breakage of the filling yarn or loss of tension therein releases said flag member to its central position.

4. In the combination of claim 3, a flexible member for mounting said flag on said shuttle.

5. In the combination of claim 3, means for pivotally mounting said flag member on said shuttle.

6. In a loom adapted to the weaving of narrow fabrics and having filling yarn shuttles which move both transversely and longitudinally of said fabrics in the weaving thereof, in combination means for passing a beam of light transversely of said fabrics, a light sensitive control device positioned to be normally illuminated by said light beam, a flag member fixed to each shuttle and normally urged to a position to interrupt said light beam, and means for guiding a filling yarn from each of said shuttles to the narrow fabric being respectively woven thereby for normally holding said flag from its said position.

7. In a loom adapted to the weaving of narrow fabrics and having shuttles which move both transversely to the fabric and longitudinally thereof, in combination means for directing a beam of light transversely across the loom adjacent the most forward position of the shuttles, a light sensitive cell upon which said beam of light normally impinges, a flag member fixed to each shuttle, resilient means constantly urging said flag to a position to interrupt said light beam when said shuttle is in its most forward position, and means for guiding the filling yarn from said shuttle to position in the respective fabric, said guide means including means for holding said flag member against said urge whereby upon a predetermined decrease in the tension of the filling yarn said flag member is released and interrupts said beam of light when said shuttles next reach their most forward position.

8. In a loom adapted to the weaving of narrow fabrics and having shuttles which move both transversely to the fabric and longitudinally thereof, in combination a light source arranged to project a beam of light transversely across the loom adjacent the most forward position of the

shuttles, a light sensitive cell upon which said beam of light normally impinges, a flag member pivotally mounted on each shuttle and gravitationally urged to a position to interrupt said light beam when said shuttle is in its most forward position and means for guiding the filling yarn from each shuttle to position in the respective fabric, said guide means including means for holding said flag member against said gravitational urge whereby upon a predetermined decrease in the tension of the filling yarn said flag member is released and interrupts said beam of light when said shuttles next reach their most forward position.

9. In a mechanism for stopping a loom upon the breakage of a filling yarn, the loom having filling yarn shuttles which move both transversely and longitudinally of the fabric being woven, in combination means for projecting a light beam parallel to the path of transverse movement of said shuttles, a light sensitive control device normally energized by said light beam, a flag member for each shuttle, and means for attaching said flag members to said shuttles respectively so that said flag members interrupt said light beam when the filling yarn is broken or loses tension, and means for guiding the filling yarn under tension from each shuttle to the fabric being woven thereby and arranged to hold said flag member out of central position.

10. In the combination of claim 9, said filling yarn passing through an aperture in the flag to normally deflect it from central position.

JAMES G. CORL.

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The following references are of record in the file of this patent:

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