Nov. 27, 1951 D. E. HOUGHTON 2,576,789

SELVAGE LOOP FORMING DEVICE

Filed Aug. 31, 1949 3 Sheets-Sheet 1

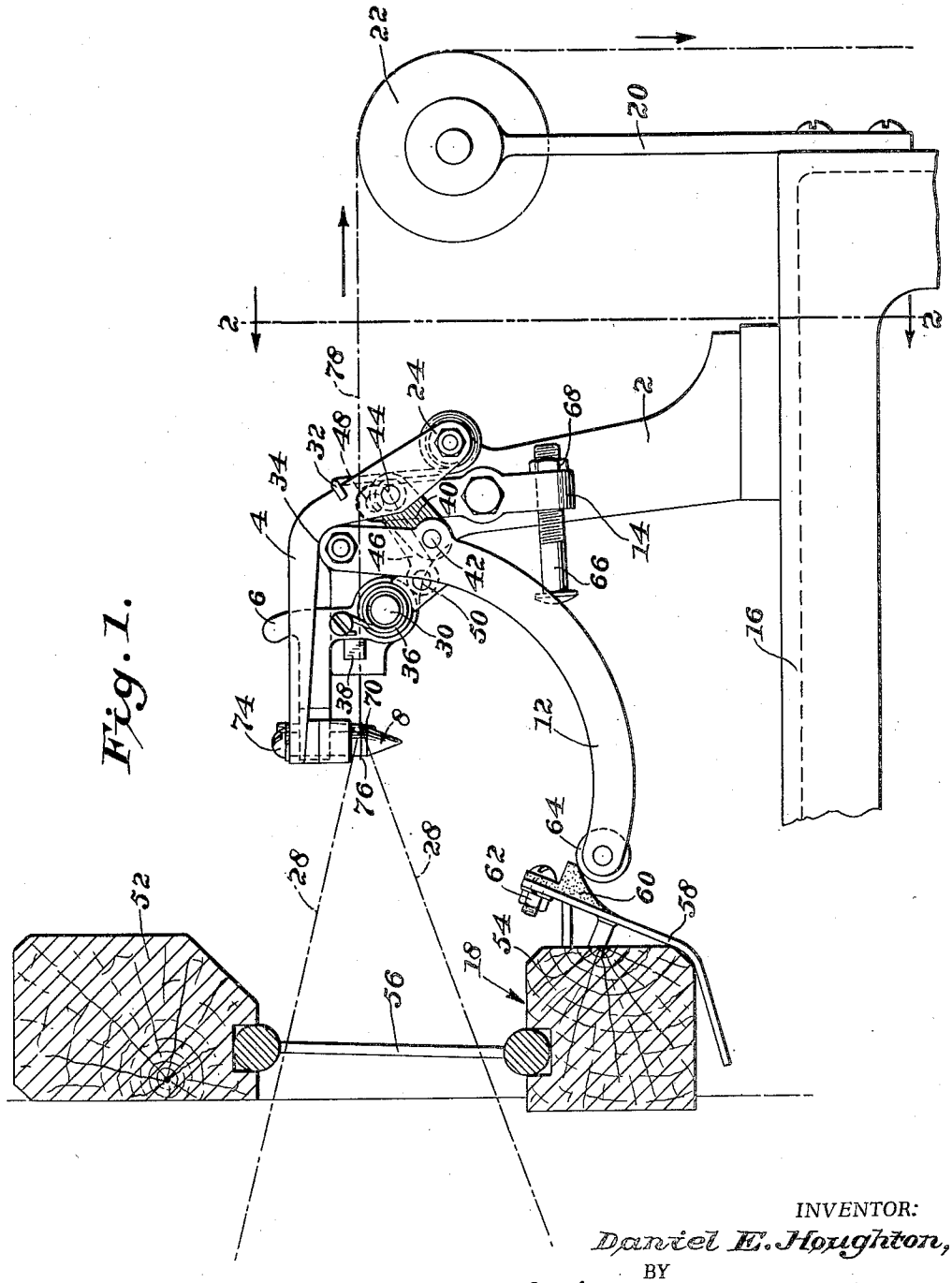


Fig. 1.

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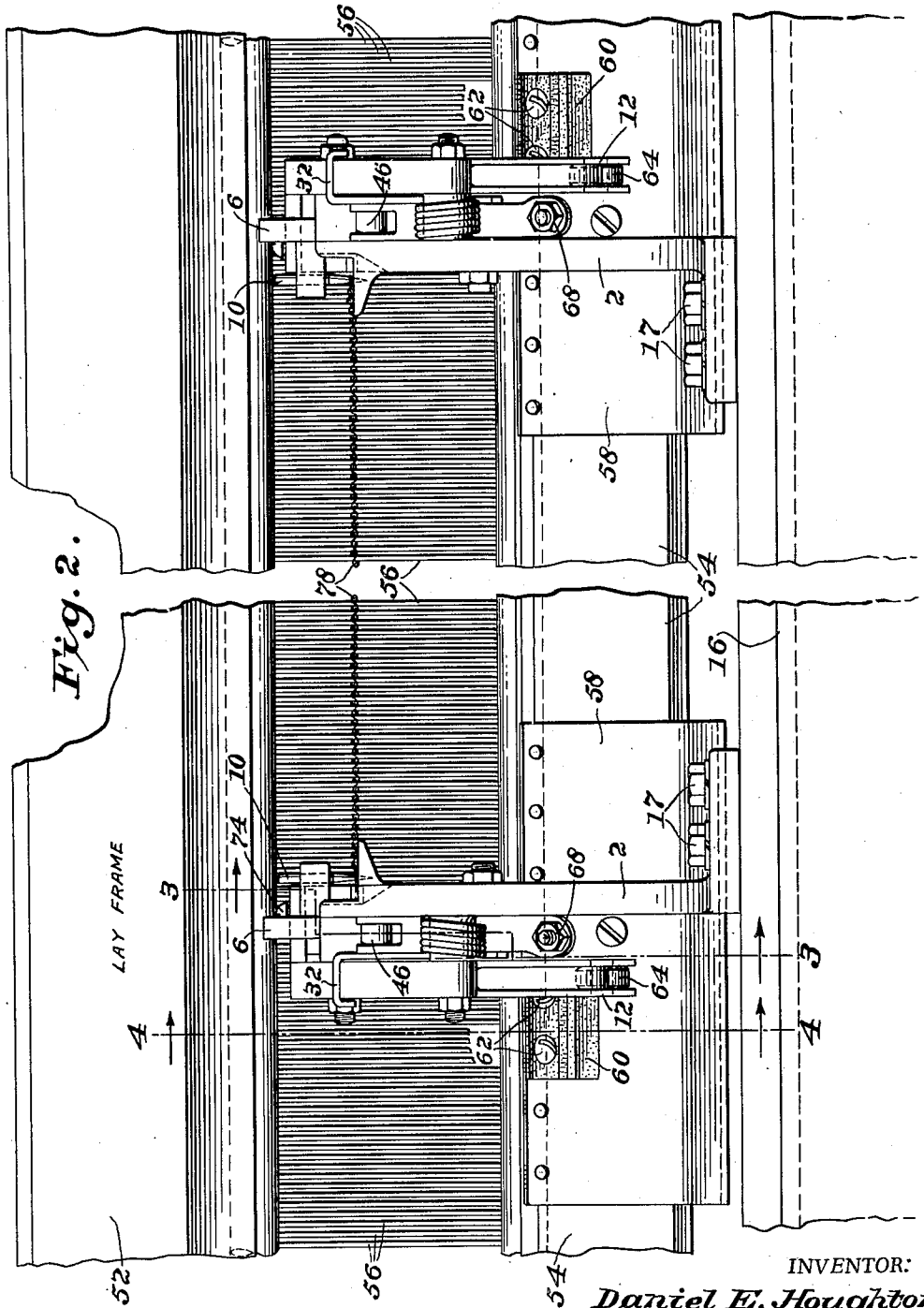


Fig. 2.

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Fig. 3.

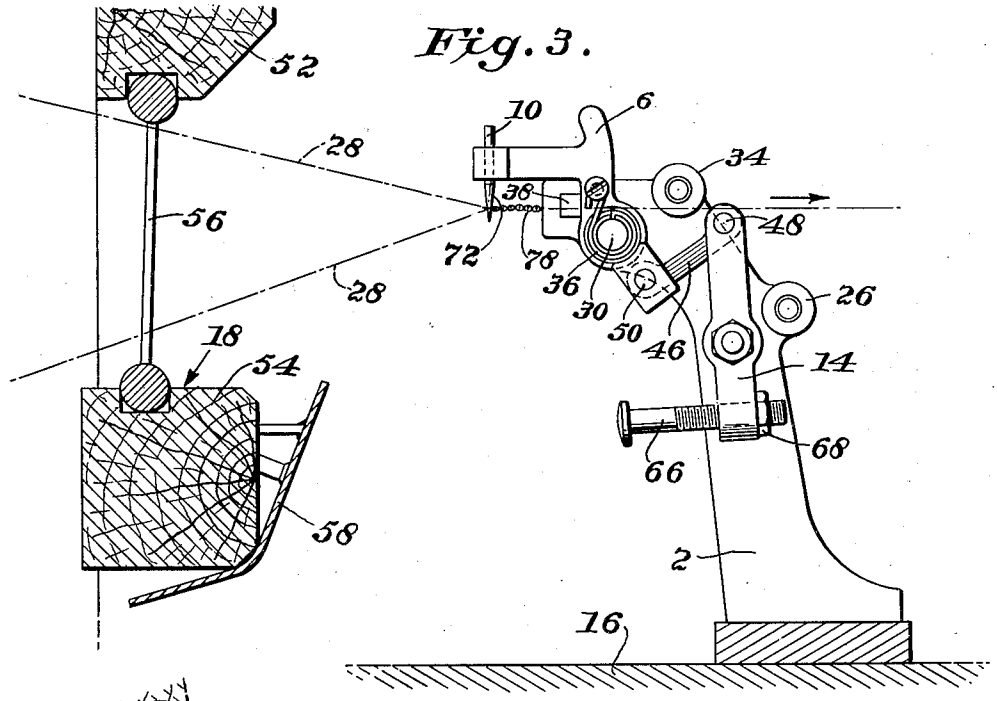


Fig. 4.

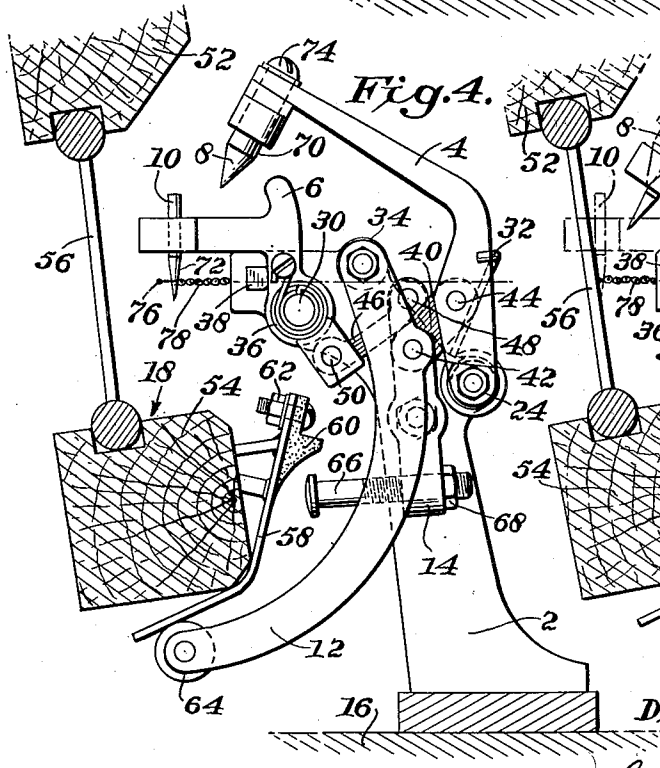
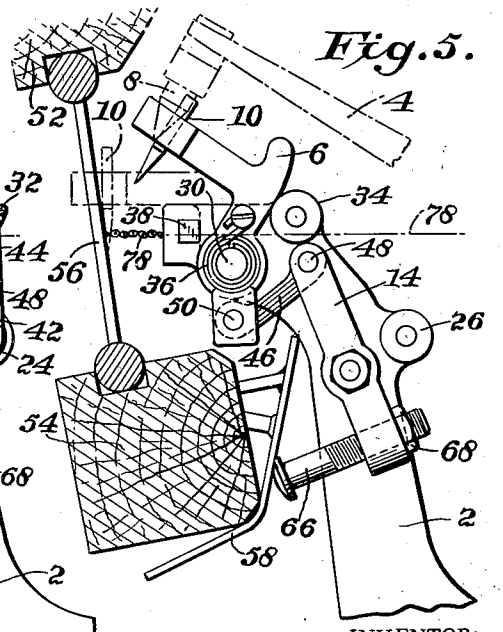


Fig. 5.



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UNITED STATES PATENT OFFICE

2,576,789

SELVAGE LOOP FORMING DEVICE

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Application August 31, 1949, Serial No. 113,382

6 Claims. (Cl. 139—195)

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This invention relates to new improvements in looms and the art of weaving therewith. More particularly, it is concerned with selvage-forming devices for wire-cloth looms and the new methods of forming selvage during weaving.

Discussion of field of invention

In weaving, some provision must be made in the selvage to release the warp of the strain or jerk of the filling as the shuttle moves across the lay, so that the cloth retains the required dimensions. In many types of weaving operations, this is accomplished by the addition of extra ends in the selvage, but often the use of extra ends for this purpose is undesirable or impractical, e. g., in weaving of wire cloth, in which cases other provisions must be made for the formation of a satisfactory selvage.

One method commonly employed for forming selvage without use of extra ends is to use a pin, needle or some other loop-retaining member adjacent the selvage about which the filling is looped during the picking operation. These loop-retaining members absorb the strain of the filling during the time when it is relatively high. Then, after the picking operation is completed or nearly completed, these members are withdrawn in order to permit the newly laid filling to be beaten-up into the cloth.

Such selvage-forming devices are very widely used on wire cloth weaving looms, and various modifications are known which perform satisfactorily for substantially all speeds at which the machines have been though to be capable of operating. Thus, if one attempts to increase the rate of operation of such looms, it is soon found that a certain maximum rate of operation is reached which is limited by breakage of the filling as it is picked across the loom. This breakage generally occurs at the selvage loop pin and, apparently, is due to the fact that the strain imparted by acceleration of the shuttle exceeds the tensile strength of the filling at the point where it is bent around the pin. In other words, it has not heretofore been recognized that the method of selvage loop formation was a limiting factor in speed of operation of the looms and the speed at which these looms have been able to operate has been considered to be primarily limited to the threshold speed of filling breakage.

Objects

A principal object of this invention is the provision of a new method for weaving with looms and the provision of new improvement in loom

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structures making possible this new type of weaving operation.

Further objects include:

(1) The provision of new loom structures which make possible higher rates of operation than has been possible heretofore for comparable looms, not incorporating the new improvements of this invention;

(2) The provision of new selvage-forming devices for wire-cloth looms;

(3) The provision of a new method for forming selvage in wire-cloth looms;

(4) The provision of a method for reducing the strain imparted to filling during the picking operation in wire-cloth looms;

(5) The provision of new loom attachments which make possible reduction in strain upon the filling during loom picking operations;

(6) The provision of new methods and apparatus particularly useful in the weaving of wire cloth.

Still further objects and the entire scope of applicability of the present invention will become apparent from the detailed description given hereinafter; it should be understood, however, that the detailed description and specific examples, while indicating preferred embodiments of the invention, are given by way of illustration only, since various changes and modifications within the spirit and scope of the invention will become apparent to those skilled in the art from this detailed description.

General description

These objects are accomplished according to the present invention by a new process of loom operation in which the filling, after the beating-up operation, is passed back into the shed while a loop of a predetermined size is formed therein at a predetermined distance outside of the selvage. After the shuttle crossing the shed has passed its maximum speed and is slowing down, the pin holding the loop in the filling adiacent the selvage is withdrawn, so as to permit the selvage loop to draw closer in toward the warp. This causes the filling to be able to withstand greater strain when the shuttle is travelling at maximum acceleration. Then, as the shuttle continues, movement of the lop is arrested to form a second loop of predetermined size in the filling adiacent the selvage. Thereafter, the picking operation is completed, the newly laid filling is beaten into the cloth and the operation is repeated. The initial loop formed in the filling is larger in size than the final loop, so that contraction in loop

size takes place simultaneously with inward movement of the peak of the loop.

The success of he present invention is due to the discovery that the filling will stand a more severe jerk (which occurs when shuttle is moving at maximum acceleration) if it is wrapped around a pin of large radius than it will if wrapped around a small pin. As a result, a way has now been provided by which the speed of operation of wire-cloth looms having selvage loop forming devices can be increased substantially before the threshold shuttle speed for breakage of the filling is reached.

Detailed description

This new method of weaving and the new improvements in looms by which this is accomplished may be more fully understood by reference to the accompanying drawings, in which

Figure 1 is a side view of a portion of a wire-cloth loom showing the new selvage-forming devices of this invention mounted thereon.

Figure 2 is an end view of the loom shown in Figure 1, taken along the line 2—2 of Figure 1.

Figure 3 is a side sectional view of the loom shown in Figure 1, taken along the line 3—3 of Figure 2.

Figure 4 is a side sectional view of the selvage-forming device of Figure 1, taken along the line 4—4 of Figure 2.

Figure 5 is a side view partially in section and partially broken away of the selvage-forming device as shown in Figure 3 at another stage of the weaving operation.

As will be apparent from the discussion of my invention given herein, it concerns only specific parts of looms, so that the description of my new structures and their association with the remainder of the loom parts can be restricted to those portions of the loom to which these new improvements pertain.

Referring in detail to Figures 1 and 2 of the drawings, the preferred new selvage devices of this invention consist fundamentally of a stand or supporting member 2, lever members 4 and 6 carried by the stand 2, selvage loop forming pins 8 and 10 supported by the lever members 4 and 6 respectively, and operators 12 and 14 for moving the lever members 4 and 6.

The stand or supporting member 2 is fastened or attached to the side frames 16 of the loom, such as by bolts 17, between the lay 18 and support 20 for the breast roll 22.

As can be seen, the lever member 4 is fulcrumed at one end 24 to the stand 2 by being bolted to a bearing element 26 on the stand. This situates the lever member 4 parallel to the ends 28 and normal to the lay 18.

Similarly, the lever member 6 is fulcrumed on the bearing element 30 to the stand 2.

A spring member 32 urges the lever 4 downwardly so that when the operating member 12 is left free, the lever member 4 is forced down against the end 34 of the member 12 which thus serves as a stop means for the lever 4.

Similarly, lever 6 is provided with spring means 36 which urges the lever 6 down against the stop member 38.

The operating member or lever arm 12 is connected to the lever 4 through the link 40 which is fastened at one end upon the bearing 42 carried by member 12 and, at the other end, to the bearing 44 carried by the lever 4. Similarly, the lever member 6 is connected to its operating member 14 through the link 46 which is fastened

at one end to the bearing element 48 on the member 14 and at the other end to the bearing member 50 on the lever 6.

The lay 18 consists of the usual upper frame member 52, lower frame member 54 and reeds 56. Attached to the lower frame 54 is an engagement plate 58 which carries a bevelled block 60. This block 60 is fastened to the plate 58 by means of bolts 62 and is slotted so that the block may be adjusted in position relative to the plate 58. The block 60 may be made of any suitable material, but is preferably constructed of plastic material of high impact strength which absorbs noise of operation of the selvage-forming device.

The member 12 is provided at its free end with roller 64 for engagement with the bevelled block 60, while the operating element 14 is provided at its free end with the bolt 66 which may be fixed in position upon the member 14 by means of the lock nut 68.

As can be seen by reference to Figure 4, the pins 8 and 10 are mounted upon the levers 4 and 6, so as to depend therefrom with the longitudinal axis of the pins aligned in a plane which runs parallel to the lay and with the rear edges 70 and 72 of the pins in line with the fell of the cloth. The pins may be mounted upon their respective lever members in any suitable fashion, but in the particular form shown in the figures, the pin 10 is press fitted through a hole in the lever 6, while the pin 8 is fastened to the lever 4 by a machine screw 74 which passes through a hole in the lever.

As will be observed, the outside pin 8 is larger in diameter than the inside pin 10. The selvage forming device illustrated in the drawings comprises only a pair of pins. This is the preferred form of my new device, but it should be pointed out that they may incorporate three or more pins, provided they are placed in substantial alignment, as above described in connection with Figure 1, and are arranged for independent movement as the two pins 8 and 10.

Description of operation

With particular reference to Figures 3 to 5, the operation of the device described above is as follows:

As soon as the beating-up operation is completed, and the lay 18 is withdrawn, the shuttle, not shown, is moved into the shed formed between the ends 28. This is carried out so that the filling 76 passes from the fell of the cloth around the pin 8, forming a loop in the filling just outside the selvage. As the shuttle proceeds across the loom, the lay 18 gradually moves back toward the fell of the cloth and, in doing so, the block 60 comes in contact with the roller 64 of the operating member 12. As the backward movement of the lay proceeds, the member 12 is moved until the member 12 assumes the position shown in Figure 4. This movement of member 12 causes a corresponding upward movement in the lever 4 which carries the pin 8 upwardly out of alignment with the pin 10 and withdraws the pin 8 from the loop in the filling 76. The length of the member 12 and its position relative to the lay 18 is designed so that the movement thereof carries the pin 8 out of the loop in the filling after the shuttle has started to slow up, but before it reaches the end of its travel.

When the pin 8 is withdrawn, a slack in the filling 76 results. This is taken up by further movement of the shuttle and filling until the filling loops about the smaller pin 10.

The shuttle continues in movement across the shed to finish the picking operation. With the picking completed, the reeds must move forward to beat up the newly laid filling and, in order to permit this, the pin 10 is withdrawn. This is accomplished by upper movement of the lever 6 which is brought about by engagement of the bolt 66 with the plate 58 as the lay moves rearwardly. As can be seen, contact of the bolt 66 with the plate 58 causes the member 14 to pivot with the upper end thereof, moving toward the lay and forcing the lever 6 to pivot about bearing 30, through the link 46, so that the pin carrying end of the lever 6 raises upwardly and withdraws the pin 10 from the selvage loop.

With the pin 10 withdrawn, the lay completes the beating-up of the filling and then proceeds forward again to reform the shed for the next picking operation. As the lay moves forward, the operating members 12 and 14 are released, dropping the levers 4 and 6 and realigning the pins 8 and 10 for the next picking operation. Thereafter, the process is repeated resulting in the formation of the cloth 78 which passes over the breast roll 20 to the tension rolls and wind-up rolls (not shown).

The same operation of selvage formation takes place, alternately, at each side of the cloth during the weaving operation, and the general description above applies to the operation and apparatus of either side.

Modification and equivalents

As has been mentioned above, those skilled in the art will appreciate that various modifications can be made in the structures specifically described above and, it will be recognized that the new weaving operations disclosed herein can be accomplished by other means which are considerably different in structure than the specific selvage-forming devices described. One modification, mentioned above, is the use of three or more movable pins in the selvage-forming device. If desirable, a plurality of selvage loop forming pins or needles could be employed with other types of operating members, such as cams, or the like, or the pins can be operated by hand. Conversely, it would be possible to conduct my new method of selvage loop formation without use of pins or needles by using elements about which the filling could loop and which could be contracted during the picking operation to permit the change in size of loop to be brought about after which such contractable loop formers could be withdrawn to permit the beating-up to take place.

As can be appreciated, the levers, their respective operating members and the stands can assume various shapes and design and still accomplish the method of this invention. Likewise, the particular manner by which the stand is mounted upon the loom is substantially unimportant to the invention provided that it is located so that the loop-forming pins are aligned with the fell of the cloth and adjacent the selvage.

Conclusion

My invention, as described herein, provides a new method for weaving cloth made possible through a new type of selvage-forming operation. This new type of weaving operation permits looms, particularly wire-cloth looms, to be run at substantially increased speeds, due to the fact that my new method reduces the tendency of the filling to break as a result of the picking tension at high speeds of operation. While this new method can be accomplished generally with various forms of apparatus, it has been found to work very successfully on a preferred type of selvage-forming device utilizing the new principles of the invention as described herein.

I claim:

1. A selvage-forming device for looms comprising means for forming a selvage-loop of a predetermined size in a filling thread, means for forming a second loop of smaller diameter in the thread before the thread is beaten into the cloth, means co-ordinated with the passage of the thread across the shed of the loom to inactivate said first loop-forming means and allow said second loop-forming means to operate up the thread as the thread passes farther into the shed, and means for moving said first and second loop-forming means to permit the thread to be beaten into the cloth upon completion of the filling operation.

2. A selvage-forming device for looms comprising a pair of pins, one being smaller in diameter than the other, a stand member, a pair of lever members fulcrumed on said stand member, each of said pins being carried individually upon one of said lever members in alignment, stop means for preventing the points of the pins from descending below the level of alignment and means connected to said lever members for moving them upwardly to individually withdraw the respective pin carried thereby out of said alignment.

3. In a wire-cloth loom having a lay, and side frames, selvage-forming devices comprising a stand carried upon a side frame, a pair of lever members fulcrumed on said stand for movement in a plan normal to the lay, a pin carried upon a free end of each of said lever members, the inside pin being smaller in diameter than the other pin, means carried on said stand for engagement with the lay to move said large pin-carrying lever member upwardly and stand-carried means for moving said small pin-carrying lever member upwardly upon engagement with the lay.

4. A selvage-forming device for wire-cloth looms comprising a stand adapted for attachment to a loom, a pair of pins, one pin being smaller in diameter than the other, a pair of lever members fulcrumed on said stand, each of said pins being carried individually by one of said lever members with the points of the pins in horizontal alignment and the longitudinal axis of the pins being parallel to one another, stop means carried by the stand for limiting the downward movement of said lever members below a position where the points of said pins are in horizontal alignment, spring means for urging said lever members downwardly, a pair of lever operating members fulcrumed to the stand, each of said operating members being operatively connected to an individual lever member by a movable link, whereby movement in the operating member resulting from the force applied to the free end thereof imparts an upward movement in the connected lever member.

5. In a wire-cloth loom having a lay and side frames, a pair of selvage-forming devices carried upon said side frames adjacent the sides of the warp, each of said selvage-forming devices comprising a stand adjustably fastened to a side frame, a pair of lever members fulcrumed on said stand for movement in a vertical plane normal to the lay, a pin carried upon a free end

of each of said lever members, the inside pin being smaller than the outside pin, stop means carried by the stand for limiting the downward movement of said lever members beyond a point where the rear sides of the pins carried thereby are in horizontal alignment, the pins being carried upon said lever members with the longitudinal axis thereof being parallel, spring means for urging said lever members downwardly, a lever operating member fulcrumed upon said stand and connected through movable links to each of said lever members, whereby movement of the free end of said operating members causes an upward movement in the respective lever member and means carried upon said lay for abutting engagement with the free end of said operating members, the operating member connected to said largest pin carrying lever being positioned for contact with said lay carried means before the other operating member.

6. A method of weaving cloth which comprises beating-up the filling, picking the filling back into the shed, while forming a selvage loop of predetermined diameter in the filling, releasing

the stress holding said loop at said predetermined diameter as the filling passes further into the shed, thereby allowing said loop to contract in size, positive stopping the contraction of said loop to form a second loop of predetermined diameter of smaller size than said first loop size, and then completing the picking operation.

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