Feb. 3, 1942. C. D. BROWN 2,272,147

AUTOMATIC LOOM SHUTTLE

Filed Sept. 10, 1941 2 Sheets-Sheet 1

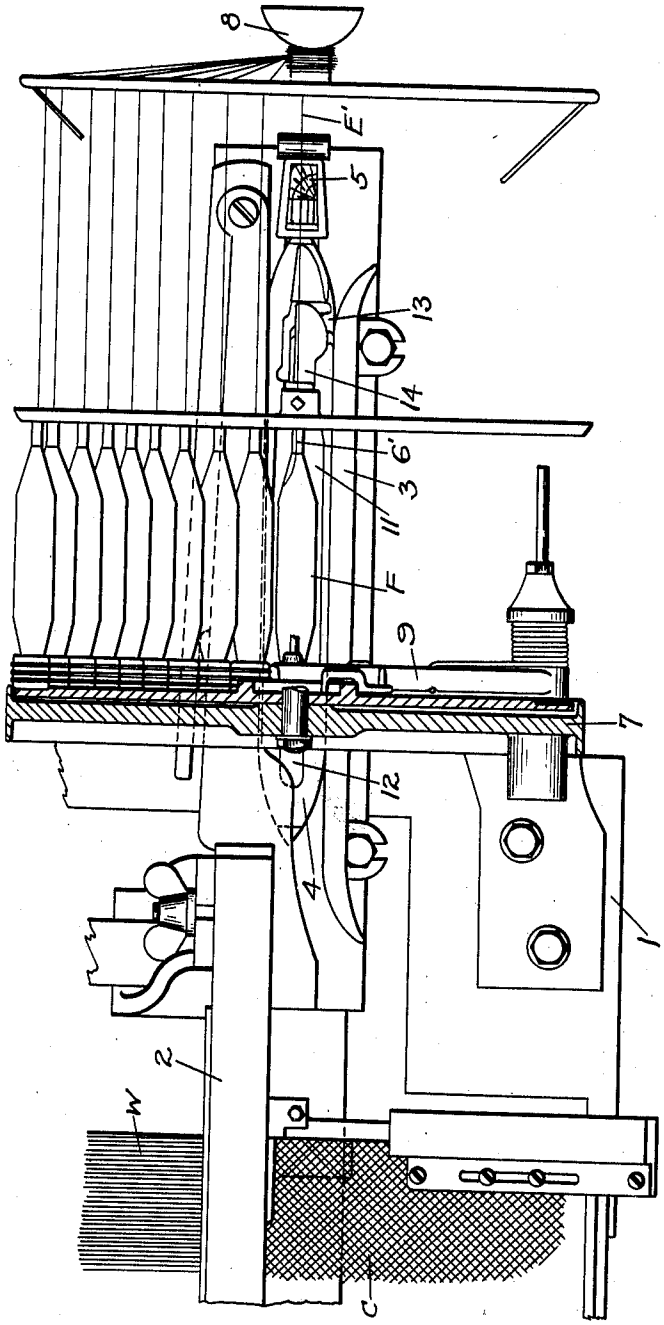


FIG. 1.

INVENTOR.
CARL D. BROWN.

BY Claude A. Snider
ATTORNEY.

Feb. 3, 1942. C. D. BROWN 2,272,147

AUTOMATIC LOOM SHUTTLE

Filed Sept. 10, 1941 2 Sheets-Sheet 2

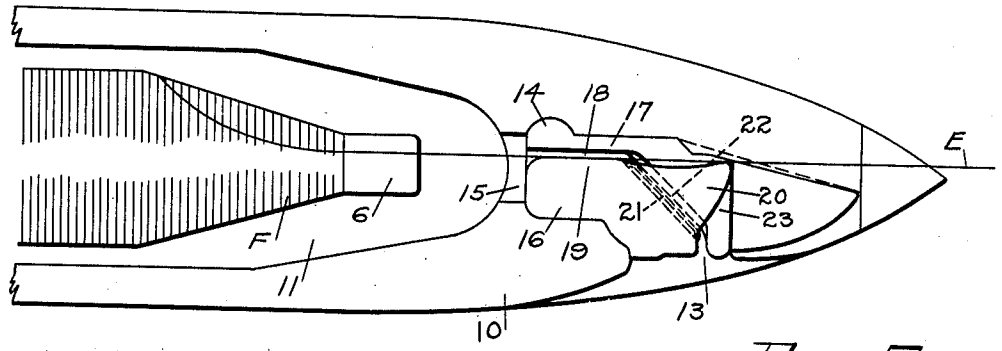


FIG. 2

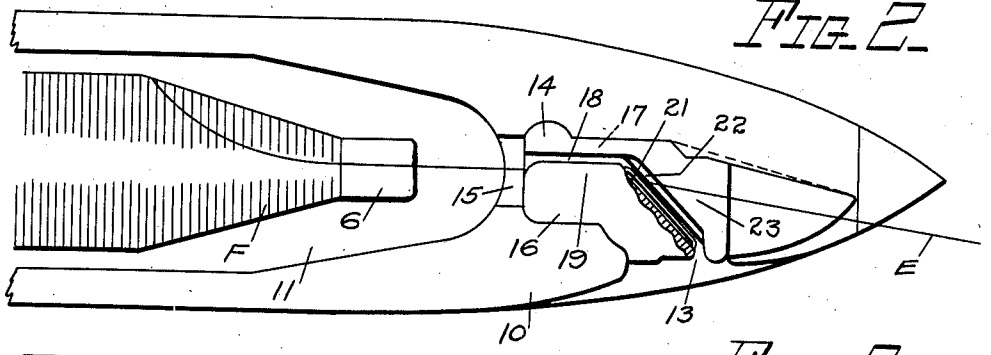


FIG. 3

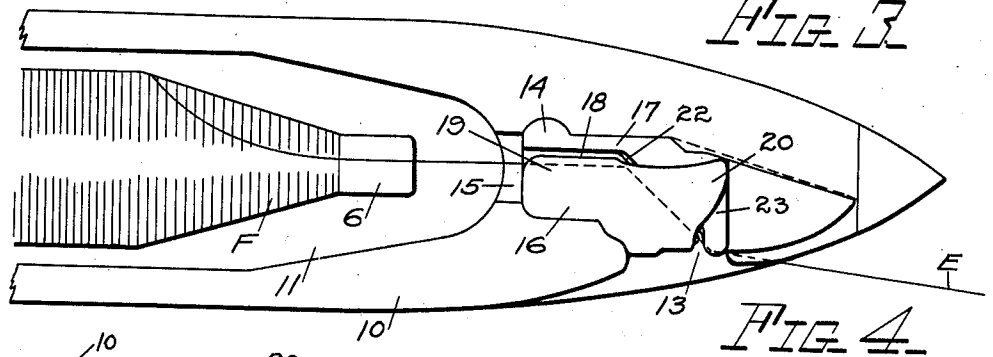


FIG. 4

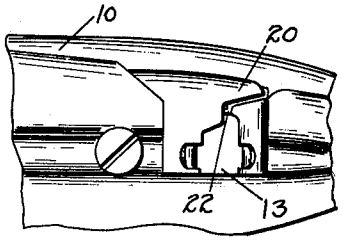


FIG. 5

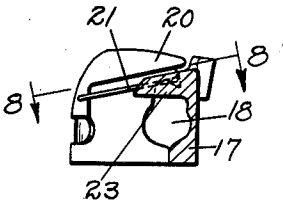


FIG. 6

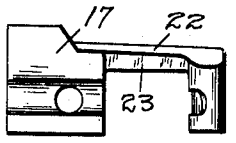


FIG. 7

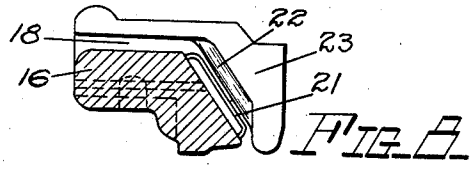


FIG. 8

INVENTOR.
CARL D. BROWN.

BY Claude F. Snider

ATTORNEY.

Patented Feb. 3, 1942 2,272,147

UNITED STATES PATENT OFFICE

2,272,147

AUTOMATIC LOOM SHUTTLE

Carl D. Brown, Hopedale, Mass., assignor to Draper Corporation, Hopedale, Mass., a corporation of Maine

Application September 10, 1941, Serial No. 410,275

12 Claims. (Cl. 139—223)

The present invention pertains to shuttles for automatic bobbin changing looms and more particularly relates to threading devices for such shuttles.

Looms of the type mentioned comprise a shuttle carrying a bobbin, a magazine holding a reserve bobbin in transferring position, and means for transferring such reserve bobbin into the shuttle when the filling supply in the old bobbin in the shuttle has become substantially exhausted. The filling end on the reserve bobbin in transferring position extends from the bobbin longitudinally above the shuttle to a suitable holder. The shuttle is provided with threading devices operative after transfer to thread the filling end into a delivery eye carried in the front wall of the shuttle.

In prior shuttles as used commercially, the threading devices are so constructed that the filling end becomes "partially" threaded into a longitudinal thread passage during the first pick of the shuttle after transfer. Then, not until the second or return pick is the filling threaded down into the side delivery eye. Such prior shuttles are subject to the filling becoming unthreaded from its "partially" threaded position, either during the interval between the first and second picks after transfer or during the first part of such second pick.

The frequency with which this unthreading actually occurs varies appreciably with different operating conditions. The occasional unthreading which occurs even under the best conditions results in appreciable decrease in efficiency of loom operation, and the more frequet unthreading which occurs under unfavorable conditions is a major cause of filling breakage.

It has been proposed heretofore to eliminate the possibility of such unthreading by providing the loom with mechanical or pneumatic devices for completely threading the filling into the side delivery eye at the time of transfer or during the interval between transfer and the first pick of the shuttle thereafter. Such devices have been complicated and expensive and have not operated satisfactorily. They accordingly have not been used commercially.

The principal object of the present invention is to provide a shuttle for automatic bobbin changing looms, having a side delivery eye as aforesaid and means constructed and arranged to effect the complete threading of the filling into such eye during the first pick of the shuttle after transfer, which means shall be carried by or shall comprise a part of the shuttle itself, thereby eliminating the aforesaid possibility of unthreading from a partially threaded position without any necessity for adding complicated threading devices to the loom.

The foregoing and other objects are accomplished in the construction illustrated on the accompanying drawings, of which:

Fig. 1 is a plan view, partly in section, of the replenishing end of a usual bobbin changing loom having the preferred form of my improved shuttle therein;

Fig. 2 is a plan view of the thread delivery end of said shuttle, showing an incoming filling end in the position it assumes immediately after transfer;

Fig. 3 is a view similar to Fig. 2 but showing said incoming filling end in the process of being threaded into the delivery devices of the shuttle;

Fig. 4 is a view similar to Figs. 2 and 3 but showing said filling end fully threaded;

Fig. 5 is a fragmentary view of said shuttle from the front thereof;

Fig. 6 is a view in elevation of the outer end of the threading device of said shuttle, with part thereof broken away;

Fig. 7 is a front view of one part of said threading device; and

Fig. 8 is a horizontal sectional view of said threading device.

The drawings (Fig. 1) show part of a usual automatic bobbin changing loom which may include a frame 1 supporting a lay 2 for reciprocation toward and from the front of the loom, the lay 2 having a shuttle box 3 at the right hand end thereof for receiving a shuttle indicated generally at 4 and to be more fully described. The warp threads W feed from the rear of the loom toward the front thereof and are interlaced with filling thread inserted by the shuttle, to form cloth C.

The shuttle is picked from side to side of the loom by means, such as picker stick 5. The supply of filling F to be interlaced with the warp threads W may be carried on a bobbin 6 in the shuttle.

The loom shown includes bobbin changing mechanism for automatically transferring a reserve bobbin to the shuttle 4 whenever the filling supply F on the bobbin 6 in the shuttle 4 becomes substantially exhausted. To this end, such mechanism may include a magazine 7 supported above the shuttle box 3 for carrying a supply of reserve bobbins with one of the latter,

6', in transferring position directly above the shuttle box 3. The filling end E' from this reserve bobbin 6' extends outwardly to a suitable holder such as that shown at 8. A transferer 9 transfers the bobbin 6' down into the shuttle 4 at the proper time, as is well known in the art.

The particular shuttle 4 shown on the drawings includes a shuttle body 10 having a bobbin receiving cavity 11 and holding means 12, Fig. 1, so supporting the bobbin 6 in the cavity 11 as to permit ejection of the bobbin and transfer of a reserve bobbin into the shuttle. This shuttle also includes a side delivery eye 13 from which the filling thread emerges during normal operation of the loom. The parts or construction of the shuttle as thus far described may be of any usual construction.

The terms, "forwardly," "outwardly" and the like, as used herein, are applicable to the shuttle described when the shuttle is positioned in the loom, in the shuttle box 3. Thus, "forwardly" means in a direction toward the front of the loom, and "outwardly" means in a direction from the cloth C toward the holder 8, which is toward the right in Fig. 1. The terms "pick" and "picking" as used herein are to be given their narrower meaning, referring to the actual flight or movement of the shuttle from one side of the loom to the other; they are not to be construed in the broader sense which refers to the complete cycle of loom operation.

The transfer of a reserve bobbin to the shuttle 4 occurs when the shuttle is positioned in the shuttle box 3 and the lay 2 is in its extreme forward position, as shown on Fig. 1. The filling end E' remains attached to the holder 8 and accordingly extends from the bobbin in the shuttle longitudinally, in an outward direction, above the outer end of the shuttle. This filling end which is formed by the transferring operation and subsequent picking of the shuttle is known in the art as the "incoming" filling end, designated by the character E on Figs. 2–4.

Immediately following the transferring operation, the lay 2 moves rearwardly and the shuttle 4 is picked inwardly of the loom, which is toward the left on Fig. 1. As the shuttle is thus picked, the filling thread unwinds from the bobbin 6. The present invention provides means for fully threading this unwinding filling thread, i. e., the incoming filling end E, into the side delivery eye 13 during this first pick of the shuttle after the transferring operation.

To the end mentioned, the invention in its broader concept contemplates the provision of any suitable guiding means carried by a shuttle and constructed and arranged to deflect an incoming filling end into a suitable side delivery eye during said first pick after transfer. In the preferred embodiment of the invention, shown on the drawings, such guiding means are carried by and incorporated in a threading block 14 fixed in a recess 15 in the shuttle body 10 in longitudinal alignment with the cavity 11.

The particular threading block 14 has a front wall 16 and a rear wall 17 spaced to form a longitudinal thread passage 18 in alignment with the cavity 11 and bobbin 6. The thread passage 18 is arranged to receive the incoming filling end E during the first pick of the shuttle after transfer. To this end, a guide device such as portion 19 of the threading block projects from the front wall 16 rearwardly over the thread passage 18, leaving a relatively narrow entrance slot as shown.

The filling end E, Fig. 2, in unwinding from the bobbin 6 swirls about and, upon striking the portion 19, is deflected down into the thread passage 18. The portion 19 and a horn or guard 20 which projects outwardly and rearwardly from the wall 16 serve to retain the filling end E in the thread passage 18 as the shuttle continues its flight.

The side delivery eye 13 is located in the front of the shuttle, below the top and near the outer end thereof. This location, it will be noted, is outwardly of the shuttle from the outer end of the thread passage 18. In order to fully thread the filling end E (extending through the thread passage 18 as just described) into the side delivery eye, it is necessary only to engage such filling end and deflect the same forwardly and downwardly into said eye. The particular means for this purpose shown on the drawings comprises cooperating thread engaging guide surfaces 21 and 22.

The surface 22 is formed on the top of a bridge member 23 which may be formed integral with the back wall 17 and which extends from the outer end of the thread passage 18 forwardly and outwardly. The surface 22 is located near the top of the thread passage 18 and accordingly engages any filling end extending through the thread passage and to the holder 8. This guide surface is inclined from the thread passage 18 outwardly and forwardly at an acute angle to the filling end E and the longitudinal axis of the shuttle.

The surface 22 tends to deflect forwardly any filling thread running longitudinally of the shuttle through thread passage 18 and across such surface or the edges thereof. The cooperating guide surface 21 enhances this deflecting action as will be described.

In the embodiment shown, the surface 21 is comprised of the exterior surface of a wire which is supported beneath the portion 19 and horn 20, the ends of the wire being bent and embedded in the material of which the threading block is formed. The surface 21 is parallel to the surface 22 but spaced inwardly therefrom to form a path for the filling thread between the two surfaces. This path is preferably not appreciably wider than the diameter of the filling thread to be used in the shuttle. The surface 21 is slightly shorter than the surface 22 and the rearward or entrance end of the path therebetween is so located as to receive the incoming filling end E immediately upon the swirling of the latter into the longitudinal thread passage 18.

The said incoming filling end being then held in engagement with the surface 22 by the surface 21, these surfaces exert a strong forward deflecting force on the filling end. Fig. 3 of the drawings is intended to illustrate the deflecting action of the guide surfaces, the position of the filling end E shown thereon not being a position in which the filling end runs for any appreciable length of time. In actual practice, as soon as the filling end E engages the surfaces 21 and 22, it is very quickly deflected forwardly and downwardly to the side delivery eye.

The surfaces 21 and 22 are inclined downwardly, as shown more clearly by Fig. 6. These surfaces are also curved forwardly at their extreme forward ends. Thus, the exit end of the path between the surfaces 21 and 22 is located at the upper, outer corner of the side delivery eye 13. The filling end E emerges from this exit while the shuttle is in flight during the said

first pick after transfer. The axis of the bobbin 6 and the longitudinal axis of the thread passage 18 being below the top of the side delivery eye as is usual, the filling end E will assume its normal running position in the side delivery eye as soon as it emerges from said exit.

It will be apparent that with shuttles constructed to fully thread the incoming filling end into the side delivery eye during the first pick after transfer, in accordance with the present invention, there is no "partially threaded" position from which the filling can become unthreaded, and the above mentioned filling breakage is accordingly entirely eliminated.

Having fully disclosed the preferred embodiment of my invention, I claim:

1. A shuttle for the usual automatic bobbin changing loom, said shuttle having a side delivery eye, a longitudinal thread passage arranged to receive the usual incoming filling end during the first pick of the shuttle after transfer of a bobbin thereto, and guide devices carried by said shuttle and arranged to deflect said filling end laterally into said side delivery eye during said first pick after transfer.

2. A shuttle for the usual automatic bobbin changing loom, said shuttle having a bobbin receiving cavity, a side delivery eye in the front of the shuttle substantially below the top thereof, a longitudinal thread passage aligned with said cavity and into which passage the usual incoming filling end enters during the first pick of the shuttle after transfer of a bobbin into said cavity, and guide devices engaging said filling end in said thread passage and deflecting the same laterally into said side delivery eye during said first pick after transfer.

3. A shuttle for a bobbin changing loom of the usual type wherein the filling end from a newly transferred bobbin extends longitudinally of the shuttle to a holder, said shuttle comprising a shuttle body having a cavity for receiving said bobbin, a side delivery eye in said shuttle body near one end thereof, and guide devices constructed and arranged to engage said filling end and deflect the same laterally into said side delivery eye during the first pick of the shuttle away from said holder, said devices being carried by said shuttle and being located between said cavity and said side delivery eye.

4. A shuttle for a bobbin changing loom of the usual type wherein the filling end from a newly transferred bobbin extends longitudinally of the shuttle above the same to a holder, said shuttle comprising a shuttle body arranged to receive and hold said bobbin, a side delivery eye in the front of said shuttle body near the outer end thereof, a longitudinal thread passage arranged to receive said filling end during the first pick of the shuttle after a transfer, a guide device for retaining said filling end in said thread passage, and another guide device constructed and arranged to engage said filling end extending through said passage and deflect the same forwardly and downwardly into said side delivery eye during said first pick after transfer, the last said guide device having filling engaging edges inclined outwardly and forwardly from said thread passage to said side delivery eye.

5. A shuttle for the usual automatic bobbin changing loom, said shuttle comprising a shuttle body having a bobbin receiving cavity, a longitudinal thread passage arranged to receive the usual incoming filling end during the first pick of the shuttle after transfer of a bobbin thereto, a side delivery eye in the front of said body outwardly of the shuttle from the outer end of said thread passage, and means for deflecting said incoming filling end forwardly into said side delivery eye during said first pick after transfer, said means comprising a guide device extending from said thread passage forwardly and outwardly to said side delivery eye.

6. An automatically threading loom shuttle of the type having a longitudinal thread passage arranged to receive the usual incoming filling end during the first pick of the shuttle after transfer, said shuttle having a side delivery eye, and a thread deflecting guide constructed and arranged to engage said filling end in said thread passage and deflect the same laterally into said side delivery eye during said first pick after transfer.

7. A shuttle for the usual automatic bobbin changing loom, said shuttle having a side delivery eye and means for fully threading the usual incoming filling end into said side delivery eye during the first pick of the shuttle after transfer of a bobbin thereto, said means including a thread deflecting guide device having an entrance arranged to receive said incoming filling end during said first pick after transfer, said guide device being inclined from said entrance to said delivery eye and being further constructed and arranged to deflect said filling end laterally into said side delivery eye as aforesaid.

8. An automatically threading shuttle for the usual bobbin changing loom wherein the filling end from a newly transferred bobbin extends longitudinally of the shuttle, said shuttle having a side delivery eye and guide means comprising inclined guide surfaces arranged to engage said filling end and deflect the same laterally into said side delivery eye during the first pick of the shuttle after transfer of said bobbin thereto.

9. An automatically threading shuttle for the usual bobbin changing loom wherein the filling end from a newly transferred bobbin extends longitudinally of the shuttle, said shuttle having a longitudinal thread passage, a side delivery eye, and cooperating thread engaging guide surfaces spaced apart to form a path extending from said thread passage to said side delivery eye, said surfaces and said path being inclined at an acute angle to said thread passage in the direction to deflect said filling end laterally into said side delivery eye during the first pick of the shuttle after transfer of said bobbin thereto.

10. An automatically threading shuttle for the usual bobbin changing loom, said shuttle having a side delivery eye and a threading block, said threading block having a longitudinal thread passage and guide devices constructed and arranged to deflect the usual incoming filling end laterally into said side delivery eye during the first pick of the shuttle after transfer of a bobbin thereto, said guide devices comprising cooperating thread engaging guide surfaces forming a path extending from said thread passage to said side delivery eye, said surfaces and said path being inclined at an acute angle to said thread passage in the direction to deflect said incoming filling end as aforesaid.

11. An automatically threading shuttle for the usual bobbin changing loom, said shuttle having a threading block provided with a longitudinal thread passage, and a side delivery eye in the front of said shuttle outwardly thereof from the outer end of said thread passage, said threading block having a thread directing portion extending over said thread passage and arranged to direct

the usual longitudinally extending incoming filling end into said thread passage, said threading block having a thread deflecting guide surface extending from said thread passage forwardly and outwardly to said side delivery eye, and a second guide surface engaging said filling end in said thread passage and holding the same against the first said guide surface whereby said filling end is deflected laterally into said side delivery eye during the first pick of the shuttle after transfer of a bobbin thereto.

12. An automatically threading shuttle for the usual bobbin changing loom, said shuttle having a threading block provided with a longitudinal thread passage, and a side delivery eye in the front of said shuttle outwardly thereof from the outer end of said thread passage, said threading block having a thread directing portion extending over said thread passage and arranged to direct the usual longitudinally extending incoming filling end into said thread passage, said threading block having a bridge at the outer end of said thread passage, said bridge having a thread deflecting guide surface inclined forwardly and outwardly to said side delivery eye, said threading block having a second guide surface parallel to but spaced from the first said guide surface for engaging said filling end in said thread passage and holding the same against the first said guide surface whereby said filling end is deflected laterally into said side delivery eye during the first pick of the shuttle after transfer of a bobbin thereto.

CARL D. BROWN.