Sept. 25, 1945. C. D. BROWN 2,385,756

SHUTTLE

Filed Oct. 28, 1944 2 Sheets-Sheet 1

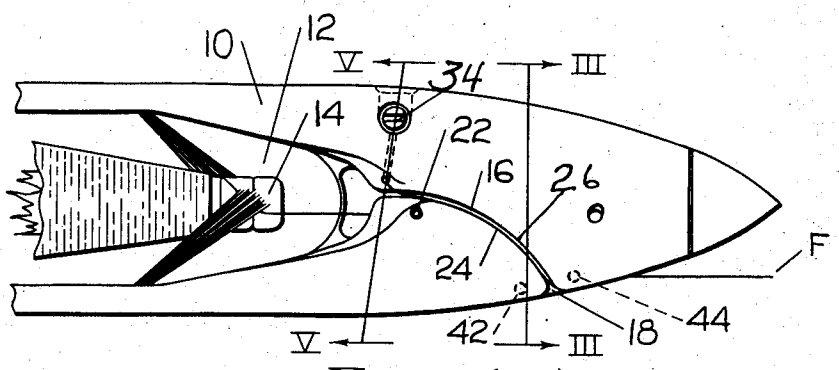


FIG. 1

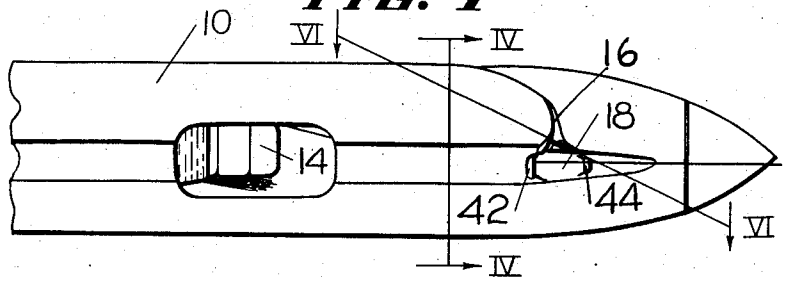


FIG. 2

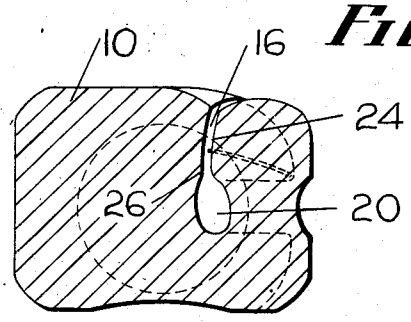


FIG. 3

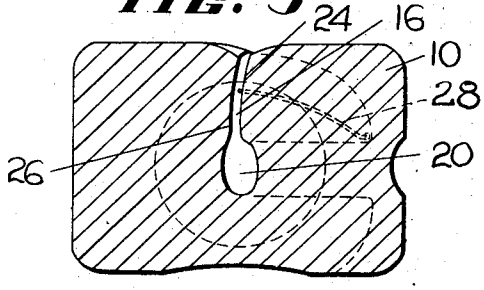


FIG. 4

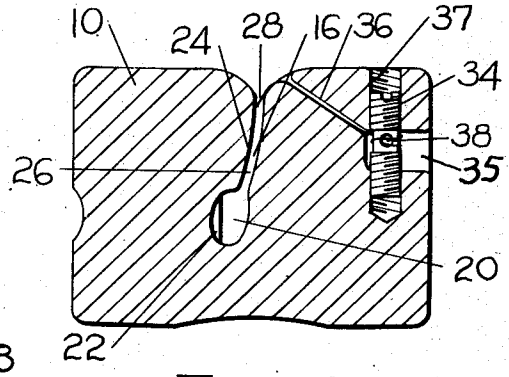


FIG. 5

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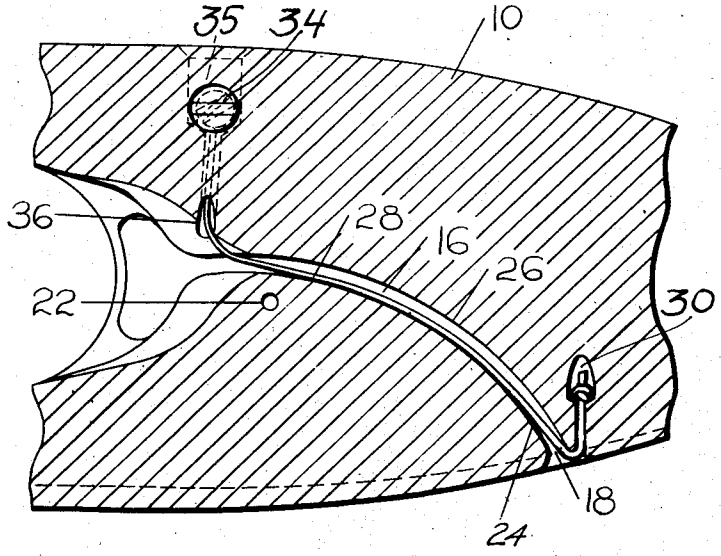


FIG. 6

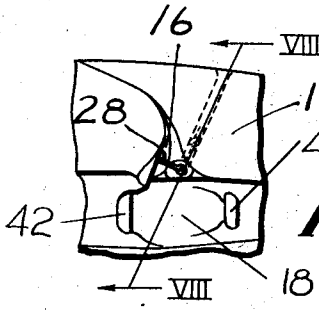


FIG. 7

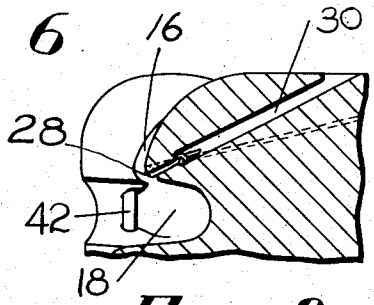


FIG. 8

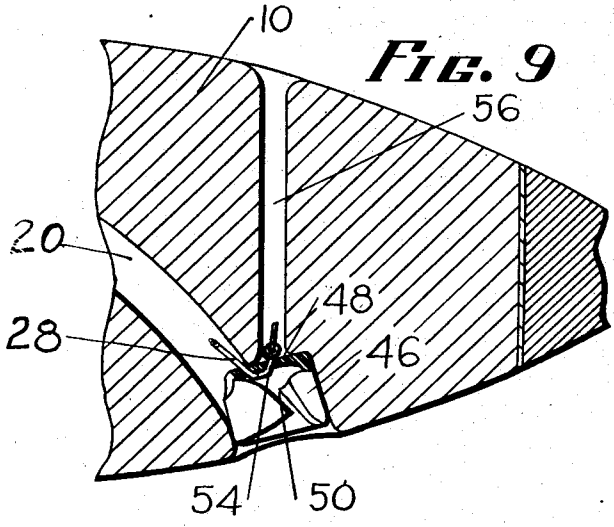


FIG. 9

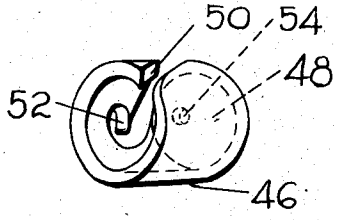


FIG. 10

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UNITED STATES PATENT OFFICE

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SHUTTLE

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

Application October 28, 1944, Serial No. 560,804

8 Claims. (Cl. 139—223)

The present invention relates generally to shuttles for automatic bobbin changing looms and, as illustrated herein, relates more particularly to threading devices for such shuttles.

Looms of the type above referred to comprise a shuttle carrying a bobbin, a magazine holding a reserve bobbin in transferring position, and means for transferring said bobbin when the supply of filling on the bobbin in the shuttle is substantially exhausted. The filling end of the new or reserve bobbin extends above the shuttles to a suitable holder.

In prior devices as used commercially, the threading devices are so constructed that the shuttle will become only partially threaded during the first pick after transfer and then during the next or return pick will become completely threaded and the filling thread will be carried down into the side delivery eye in the front wall of the shuttle. This failure to thread completely during the first pick is inherent in commercial shuttles and it often occurs that the shuttle will unthread from its partiially threaded position. When this occurs, the filling nearly always will break during the next pick. This condition does not arise very frequently but even occasional unthreading results in reduced efficiency of loom operation.

It has been proposed to eliminate the possibility of such unthreading by providing the loom with various devices which will effect complete threading of the shuttle at the time of transfer or shortly thereafter. Such devices, however, have not been commercially successful since they have been unduly complicated and have not operated satisfactorily.

One object of the present invention, accordingly, is to provide a shuttle with means which will cause the shuttle to be threaded during the first pick after transfer of a new bobbin thereto. To this end and in accordance with one feature of the invention, the present shuttle is provided with filling thread engaging and guiding means which will be effective during the first pick after transfer to deliver the filling to the side delivery eye.

With the above and other objects and features in view, the invention will now be described with particular reference to the accompanying drawings which illustrate a preferred embodiment of the invention and in which:

Fig. 1 is a plan view of a portion of a shuttle embodying the present invention;

Fig. 2 is a view in front elevation of the construction shown in Fig. 1;

Fig. 3 is a view in section taken along line III—III of Fig. 1;

Fig. 4 is a view in section taken along line IV—IV of Fig. 2;

Fig. 5 is a view in section taken along line V—V of Fig. 1;

Fig. 6 is a view in section taken along line VI—VI of Fig. 2;

Fig. 7 is a detail view in front elevation illustrating one form of side delivery eye;

Fig. 8 is a view in section taken along line VIII—VIII of Fig. 7;

Fig. 9 is a view in section illustrating a preferred form of side eye trap; and

Fig. 10 is a perspective view thereof.

The present invention is illustrated as embodied in a shuttle 10 having a cavity 12 in which a filling carrying bobbin 14 is releasably supported. The cavity 12 terminates in an outer reduced portion leading to a curved thread passage 16. This passage at its inner end terminates at substantially the longitudinal central line of the shuttle and curves forwardly and outwardly and terminates at the side delivery eye 18 of the shuttle.

The thread passage 16, as illustrated, is relatively narrow throughout its length and also throughout the major portion of its vertical extent as is clearly shown in Figs. 3, 4 and 5. The transverse dimension of the passage, however, may be varied within wide limits, as will later become apparent. The lower portion 20 of the passage 16 is of substantial width and is substantially oval in cross-section. A pin 22 is driven into the shuttle 10 near the inner end of the passage 16 and projects into the lower portion 20 of the passage 16 as shown best in Fig. 5. The pin 22 forms a post on which the filling bears as it runs through the shuttle during operation of the loom.

The front wall 24 of the passage 16 is preferably inclined slightly rearwardly and downwardly and is curved outwardly and forwardly on an arc of approximately two inches in radius. The rear wall 26 is preferably parallel to the front wall and is spaced therefrom a distance which is at least somewhat greater that the diameter of the heaviest or coarsest yarn which will be used in the shuttle. The width of the passage 16 formed by the walls 24 and 26 may, however, be substantially wider if so desired since the wall 26 does not affect directly the threading of the shuttle.

The passage 16 is provided with a wire guide 28 which is arranged to bear against the front

wall 24 with moderate pressure. Referring now to Fig. 6, the outer end of the guide wire 28 is knotted and held in a hole 30 drilled diagonally downwardly and forwardly from the top surface of the shuttle 10 to a point in the front wall of the shuttle just above the side delivery eye 18. The lower end of the hole 30 is smaller than the remainder thereof. A knot or loop is formed at one end of the wire 28 which is threaded through the hole 30, the reduced lower end of the hole 30 preventing the knot or loop from pulling through. The wire 28 is then threaded through the thread passage 16.

Tension is applied to the wire 28 by a screw 34 (Figs. 1, 5 and 6) which is threaded into a hole 37. A downwardly and rearwardly inclined hole 36 extends from the inner top end portion of the back wall 26 of the thread passage 16. A third hole 35 extends horizontally and intersects the two holes mentioned just above. This third hole is of a size sufficient to permit the end of the wire 28 to be threaded through a hole 38 in the screw 34. Thus, when the screw 34 is threaded into the hole 37, the wire 28 will be tightened and will bear tightly against the greater portion of the front wall 24 of the thread passage 16. The wire guide 28 conforms to the curvature of the wall 24 and is inclined downwardly and forwardly between the forward ends of the holes 30 and 36.

The shuttle is partially threaded when transfer of a bobbin is completed. The wire guide 28 engages the filling F as the shuttle 10 is picked out of the right hand shuttle box after the bobbin has been transferred. During this pick, the filling F is deflected forwardly and downwardly into the side delivery eye 18. The top surface of the shuttle on either side of the passage 16 is smooth and does not interfere with the deflection of the thread into the side delivery eye 18. The tension of the wire is sufficient to flatten the filling thread F which forms in effect a trough or groove which slides along the guide wire 28. In other words, the resistance to further deformation of the filling F is greater than resistance to sliding movement along said wire. Thus, during the first pick after transfer, the filling F will be delivered into the side delivery eye and the shuttle is completely threaded.

In the construction shown in Figs. 1 to 8, inclusive, the side delivery eye 18 is provided with a pair of posts 42, 44 against which the filling F runs as the shuttle is picked back and forth across the loom. These pins are of usual construction and need not be further described herein.

Under some conditions, the shuttle may become unthreaded and to avoid this difficulty a filling trap 46 has been provided in the side delivery eye. This trap 46 is generally cup-shaped and is substantially cylindrical in cross section and has a closed bottom end 48. The cylindrical wall is cut away at 50 to form a slot which is substantially in line with the slot forming the thread passage 16. The slot 50 terminates in a circular end portion which defines a hook 52 under which the filling F is threaded and which forms an effective thread trap. The slot 50 being in line with the thread passage 16 permits easy threading of the shuttle while the hook 52, under which the filling F is threaded, effectively prevents unthreading of the shuttle.

The trap 46, as shown best in Fig. 9, is provided with an opening 54 in the closed end 48 which receives the wire 28. The wire 28 is knotted or looped and the trap 46 thus provides an effective anchorage for the wire 28. The trap 46 is driven into a suitable opening formed in the front wall of the shuttle 10 and is maintained in said position by friction. A hole 56 is provided in the shuttle in line with the opening 54 in the bottom of the trap member 46 to provide convenient means for threading the wire 28 through the opening 54 without removing the trap member 46 from the shuttle. The above described trap 46 is not claimed herein since it is described and claimed in an application filed in the names of James Gardiner Allen and Antonio Villani, Serial #560,803, filed October 28, 1944.

The various parts have been described in detail but it may be well for a clearer understanding of the invention to outline briefly the threading of the shuttle during the first pick after transfer. When a new bobbin is transferred into the shuttle 10, the end of the filling F is held in position above the shuttle by a suitable holder and the filling end F is fed into the thread passage 16. Thus, the shuttle 10 is partially threaded at the completion of the transferring operation. When the shuttle 10 is picked out of the shuttle box after the transferring operation is completed, the filling thread F is deflected forwardly and downwardly into the side delivery eye 18. In actual practice it is found that the shuttle is completely threaded during the first eight inches of movement as it is picked out of the shuttle box, but, although such early threading is desirable, it is not essential, since, if the threading is completed before the first pick after transfer is completed, satisfactory operation of the loom will result.

Having thus described my invention what I claim as new and desire to secure by Letters Patent of the United States is:

1. A shuttle for an automatic bobbin changing loom having a side delivery eye and a forwardly and outwardly extending passage communicating with said side delivery eye and arranged to receive an incoming filling end during the first pick of the shuttle after transfer of a bobbin thereto, and a flexible guiding member bearing against one wall of said passage and arranged to deflect said filling end forwardly and downwardly into said side delivery eye during said first pick after transfer.

2. A shuttle for an automatic bobbin changing loom having a side delivery eye and a forwardly and outwardly extending passage communicating with said side delivery eye and arranged to receive an incoming filling end during the first pick of the shuttle after transfer of a bobbin thereto, and a flexible wire member bearing against and cooperating with one wall of said passage and arranged to apply pressure to said filling end to deflect it forwardly and downwardly into said side delivery eye during said first pick after transfer.

3. A shuttle for an automatic bobbin changing loom having a side delivery eye and a forwardly and outwardly extending passage communicating with said side delivery eye and arranged to receive an incoming filling end during the first pick of the shuttle after transfer of a bobbin thereto, said passage being curved and having a forward convex wall, and a wire guide member bearing against said convex wall throughout the greater portion of said convex wall and arranged to deflect said filling end forwardly and downwardly into said side delivery eye during said first pick after transfer.

4. An automatically threading shuttle for a bobbin changing loom having a bobbin receiving recess, a side delivery eye and a curved passage connecting said recess and said side delivery eye, said curved passage being arranged to receive an incoming filling end during the first pick after transfer of a bobbin thereto, a flexible guide member cooperating with the convex wall of said passage and arranged to deflect said filling end forwardly and downwardly into said side delivery eye during said first pick after transfer, and means for applying tension to said guide member.

5. An automatically threading shuttle for a bobbin changing loom having a bobbin receiving recess, a side delivery eye and front and rear curved walls forming a curved passage connecting said recess and said side delivery eye, said passage being arranged to receive an incoming filling end during the first pick after transfer of a bobbin thereto, a flexible wire anchored at one end in the body of the shuttle and engaging one of said curved walls substantially throughout its length and arranged to deflect the incoming filling end forwardly and downwardly into said side delivery eye during said first pick after transfer, and means to which the other end of said wire is secured and which is arranged to vary the tension of said wire against said wall.

6. An automatically threading shuttle for bobbin changing looms having a recess in which a replaceable filling carrier is supported, a side delivery eye and a passage having a curved forward wall and connecting said recess and said side delivery eye, said passage being arranged to receive an incoming filling end during the first pick after transfer of a bobbin thereto, a flexible guide member anchored to the shuttle adjacent to the side delivery eye thereof and engaging said curved wall substantially throughout its length and arranged to deflect said incoming filling end forwardly and downwardly into said side delivery eye during said first pick after transfer, and adjustable means for anchoring the other end of said flexible guide member and for varying the tension of said flexible guide member against said convex wall.

7. An automatically threading shuttle for a bobbin changing loom having a bobbin receiving recess, a side delivery eye, and a thread passage connecting said recess and said side delivery eye and arranged to receive an incoming filling end during the first pick after transfer of a bobbin thereto, said passage being curved and having substantially parallel curved walls, one of said walls being convex and forming a guiding surface for said filling end, parts located adjacent to each end of said passage and against which the filling runs during picking of the shuttle, a flexible wire guide member fixed at one end to said shuttle and bearing against said convex wall to deflect the filling forwardly and downwardly into said side delivery eye during said first pick after transfer, and an adjusting screw threaded into the body of said shuttle and to which the other end of said flexible wire guide member is secured and which is arranged to vary the tension of said wire against said wall.

8. An automatically threading shuttle for a bobbin changing loom, said shuttle comprising a body having a recess in which a replaceable bobbin is supported and a side delivery eye, said shuttle having also a curved thread passage connecting said recess and said side delivery eye, the forward wall of said recess being convex and the rear wall being concave and substantially parallel to said forward wall, a flexible wire guiding member fixed at one end adjacent to one end of said rear wall of said passage and arranged to bear against said forward wall to deflect an incoming filling forwardly and downwardly into said side delivery eye during the first pick after transfer of a bobbin thereto, and means adjacent to the other end of the passage for anchoring the other end of said flexible wire guide member and for varying the tension of said wire guide member against said wall.

CARL D. BROWN.