

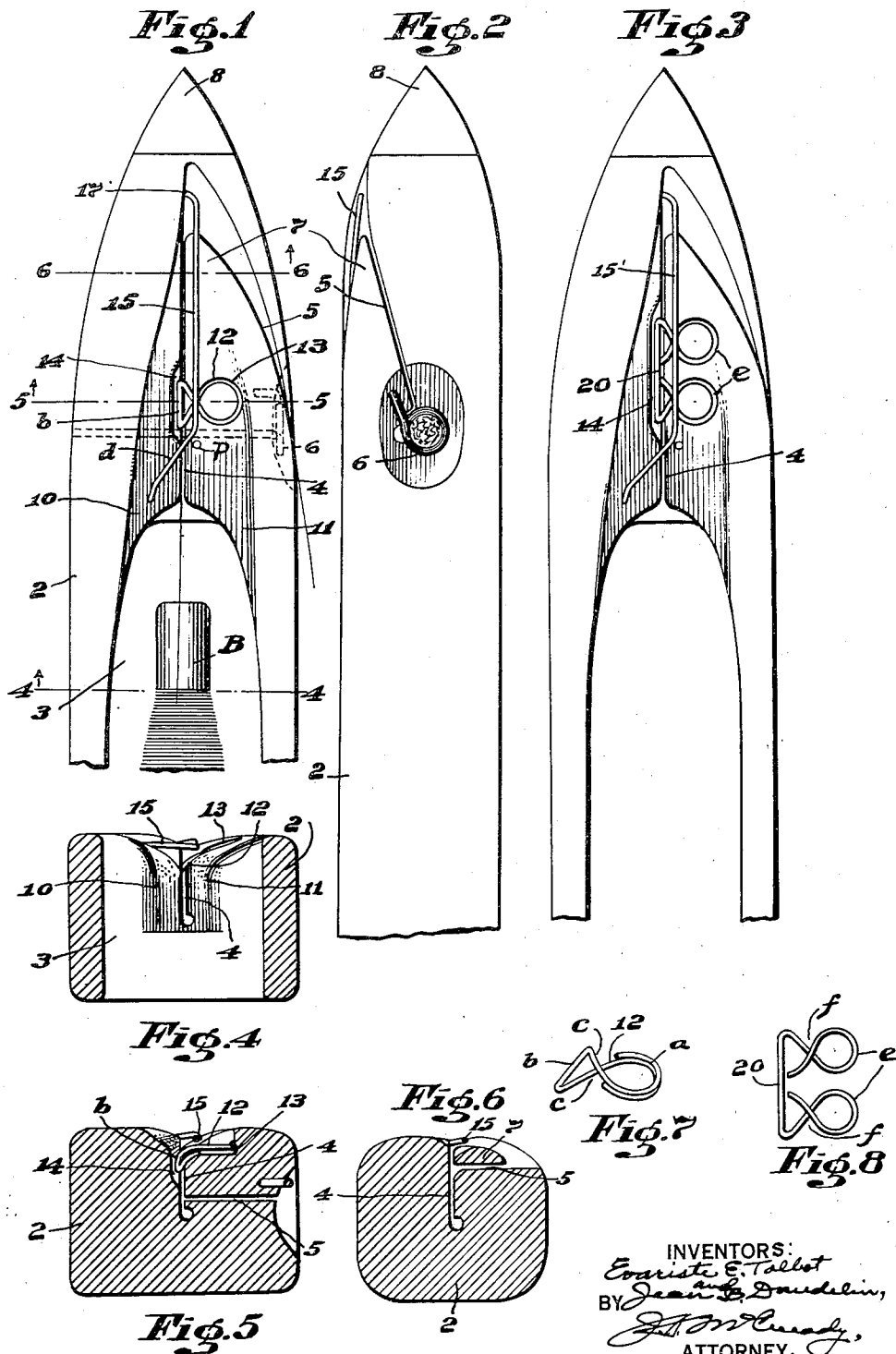
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LOOM SHUTTLE

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LOOM SHUTTLE

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This invention relates to shuttles of the automatic threading type designed primarily for use in automatic weft replenishing looms.

It is the chief object of the invention to improve the threading devices of shuttles of this character with a view to enabling them to operate equally well with right and left wound bobbins. While by far the greater percentage of the bobbins used in shuttles are right-hand wound, nevertheless a very substantial percentage of them also are wound in the opposite direction, and the latter cannot be used satisfactorily in automatic shuttles unless they are designed especially for the left-hand wind. To overcome this limitation or disadvantage of the present commercial automatic shuttles, constitutes the chief object of this invention.

The nature of the invention will be readily understood from the following description when read in connection with the accompanying drawing, and the novel features will be particularly pointed out in the appended claims.

In the drawing,

Figure 1 is a plan view of the threading end of a shuttle embodying features of this invention; Fig. 2 is a side view of the shuttle shown in Fig. 1;

Fig. 3 is a view similar to Fig. 1 but showing a slightly different construction;

Figs. 4, 5 and 6 are transverse, sectional views approximately on the lines 4—4, 5—5 and 6—6, respectively, Fig. 1; and

Figs. 7 and 8 are perspective views of the thread guards with which the shuttles shown in Figs. 1 and 3, respectively, are equipped.

Referring first to Figs. 1, 2, and 4 to 6, inclusive, the construction there shown comprises a shuttle body 2 provided with the usual chamber 3 to receive a bobbin B. In front of this chamber the shuttle is provided with threading slots which may be of the general nature heretofore used. One of these slots starts approximately at the forward end of the bobbin chamber and is indicated at 4, while the other is cut into the side of the shuttle and thus is laterally disposed, as shown at 5. The latter intersects the former and extends backwardly to the hole in which the thread delivery eye 6 is mounted. In order to avoid confusion the slot 4 will be hereinafter referred to usually as a "groove". The formation of the parts just described results in providing the wood portion of the shuttle with a part 7 which may be aptly referred to as a "nose piece," it being understood, however, that this element is not to be confused with the nose 8 of the

shuttle. Normally the thread runs through the groove 4 close to its bottom, around the pin P, Fig. 1, and then laterally out through the thread delivery eye 6.

As is well understood by those skilled in this art, the threading operation requires that the thread drawn from the bobbin B be guided through the groove 4, around the nose 7, and through the slot 5 into the eye 6. While the motion of the shuttle and the manner in which the thread of the bobbin is secured while the transferring or bobbin changing operation is performed, are useful in producing this threading operation automatically, nevertheless the mere presence of the slots is not sufficient to ensure that result. Also, even if the threading operation starts properly, there is a strong tendency for the thread to escape from its guides during its flight, either because of the motion of the shuttle, the action of air currents created by such motion, the ballooning of the thread, or a combination of these factors, and others extremely difficult to analyze. The result appears to be that a loop of thread starting perhaps in the bobbin chamber will often run through the groove 4 and release the thread, or a loop may form in the opposite direction and produce a release in a similar manner. Either of these actions are much more likely to occur before the threading operation has been entirely completed.

The present invention deals especially with these conditions, and it provides an arrangement which serves both to facilitate the initial threading up and also to prevent a "looping out" action of the nature just described.

To these ends the portion of the shuttle at the junction of the chamber 3 with the groove 4, and which is customarily referred to as the "throat," is made substantially symmetrical with reference to the axis of the bobbin, or, more accurately stated, with reference to the longitudinal median plane of the shuttle. The surfaces of this throat are inclined toward the groove 4 and taper toward each other as they extend forwardly, approximately as indicated at 10 and 11, Figs. 1 and 4, so that they tend to guide the thread into the groove 4 regardless of the direction of the wind of the thread on the bobbin.

Between the throat and the nose 7 a guard 12 is located. Preferably this guard is made of spring wire, as shown in Fig. 7, and it comprises an approximately circular portion a having sufficient resiliency to expand into contact with the undercut wall surfaces of the socket 13, Fig. 5, and thus to hold itself in its operative position.

Parts of this member are also bent to produce the triangular portion *b* which is curved downwardly and extends across the groove 4 into a recess 14 formed in the opposite wall of the groove. Sufficient clearance is provided around the free portion *b* of this member to permit the thread to slide downwardly over its surface and around it as the thread enters the groove. And since the extreme end portion of this member lies to the left, Fig. 5, of the groove, while the rest of it lies on the opposite side, it performs a valuable function, of and by itself, in trapping a loop of thread tending to escape from the groove, the shape of this member providing V-shaped thread trapping notches *c-c*, Fig. 7, in the front and rear edges of it. As will be evident from an inspection of Fig. 1, these notches face lengthwise of the shuttle, one forward and the other rearward.

The device is made far more certain in its action, however, by associating a guide wire 15 with the parts just described. As best shown in Fig. 1, one end of this wire is anchored in the material of the shuttle at 16 adjacent to the throat and it then extends forward diagonally across the groove 4 and overlies the opposite wall in the adjacent portion of the nose 7 for the entire length of this nose portion, and is curved laterally at its forward end and anchored in the wood of the shuttle at the point 17.

During the threading-up operation, the diagonally disposed portion *d*, Fig. 1, of the guide just described serves to guide the thread into a slightly off-center relationship to the groove 4, but the forward pull on the thread from a point in advance of the shuttle draws the thread around this guide, over and around the guard 12, and down into the groove. This action normally occurs immediately after a new bobbin has been forced into the shuttle and while the shuttle starts on its first pick. Upon the next pick the thread normally slips through the slot 5 and into the eye 6. If, however, a loop tends to run backwardly through the groove 4 and thus to escape from it, the wire 15 guides this loop directly into the front notch *c* in the guard 12 and prevents the shuttle from unthreading. Or, if a loop should start in the opposite direction to escape from the slot 4, as for example, due to the momentum of the balloon coming off the bobbin, then the wire 15 will guide such a loop into the rearward notch *c* of the guard and effectually prevent its tendency to escape. Either condition usually will correct itself during the next pick.

Thus the threading devices of the shuttle operate with a high degree of certainty, and they accommodate either a right or left-hand wind with approximately equal facility. An especially important feature of this invention resides in the shape of the portion *d* of the guide 15 and its relationship to the guard 12 and the slot 4. The fact that the portion *d* of this member crosses the slot 4 diagonally, serves to guide the thread properly, both during the initial threading-up operation, and also in the event of ballooning or the subsequent formation of a loop or similar shape in the thread which tends to make it escape from the threading devices. Such formations strike the diagonal portion *d* and are thrown by it into the rearward notch *c* in the guard 12 where it is effectually trapped and thus is prevented from running through the slot and getting out of control.

In some shuttles, particularly those of larger sizes, it is preferable to make the guard of the

form shown at 20 in Figs. 3 and 8. This guard is provided with two circular portions or eyes *e* which also have ample resiliency to lock themselves in the sockets in which they are located in the shuttle, it has a longer bar located in the recess 14' in the opposite wall of the groove 4', and it cooperates with the guide wire or rod 15' in essentially the manner above described in connection with Fig. 1. That is, it is provided with thread trapping notches *f* at its front and rear edges which cooperate with this bar in the same manner as the notches *c-c* cooperate with the guide 15.

While we have herein shown and described typical embodiments of our invention, it will be understood that the invention is susceptible of embodiment in other forms without departing from the spirit or scope thereof.

Having thus described our invention, what we desire to claim as new is:

1. A loom shuttle provided with a bobbin chamber and a threading groove extending forwardly from said chamber, a guard extending laterally across said groove from one wall thereof into overlapping relationship with the opposite wall and lying above the normal running position of the thread so that the thread must pass over, around, and under said guard in moving into said position, said guard having a V-shaped thread trapping notch in one edge thereof, the open side of said notch facing lengthwise of the shuttle, and a guide extending along said groove above the guard where it will guide a loop tending to escape from said groove into said notch in the guard and prevent such escape.

2. A loom shuttle provided with a bobbin chamber and a threading groove extending forwardly from said chamber, a guard extending laterally across said groove from one wall thereof into overlapping relationship with the opposite wall and lying above the normal running position of the thread so that the thread must pass over, around, and under said guard in moving into said position, said guard having thread trapping notches in the front and rear edges thereof, and a guide extending along said groove above said guard where it serves to guide a loop of thread into one of said notches when such a loop travels along the guide either forward or backward through the groove.

3. A loom shuttle provided with a bobbin chamber, a threading groove extending forwardly from said chamber, a thread delivery eye and a thread guiding slot communicating with said eye and said groove, one wall of said groove being recessed above the normal path of travel of the thread through it, a guard mounted in said shuttle at the opposite side of said groove from said recess and extending across the groove and into said recess, said guard having V-shaped notches in its front and rear surfaces, facing forward and rearward, respectively, and a thread guide secured in the wall of the shuttle at the side of said groove in which said recess is formed and overlapping the opposite wall of the groove and extending longitudinally forward in a generally parallel direction to the groove where it serves to guide the thread into said groove and to direct an escaping loop into one or the other of said notches.

4. A loom shuttle provided with a bobbin chamber, a threading groove extending forwardly from said chamber, a guard extending laterally across said groove from one wall thereof into overlapping relationship with the opposite wall

and lying above the normal running position of the thread so that the thread must pass over, around, and under said guard in moving into said position, and a throat portion at approximately the junction of said groove with said chamber, said portion having walls inclined at opposite sides of the groove to guide the thread into it, and the center line of the throat being approximately in the median plane of the shuttle, one wall of said groove being laterally recessed and a guard mounted in the opposite wall and extending downwardly in a diagonal direction across said groove and into said recess, whereby during the threading operation the thread must pass over and downwardly around said guard, said guard being provided with a V-shaped thread trapping notch in one edge thereof, said notch facing lengthwise of the shuttle.

5. A shuttle according to preceding claim 4, in combination with a guide secured in the material of the shuttle at the same side of the groove in which said recess is formed, said guide being provided with a diagonally inclined portion adjacent to said chamber lying across and above the groove and then extending forwardly, the guide crossing said guard immediately above the notched portion thereof.

6. A loom shuttle provided with a bobbin

chamber, a threading groove extending forwardly from said chamber, a guard extending laterally across said groove from one wall thereof into overlapping relationship with the opposite wall and lying above the normal running position of the thread so that the thread must pass over, around, and under said guard in moving into said position, a thread delivery eye at one side of said shuttle and a laterally disposed slot communicating with said eye and intersecting said groove, said slot cooperating with said groove to provide a nose piece around which the thread must be passed during the threading operation, a guard mounted on the nose piece side of said groove and extending downwardly across the groove, a guide anchored in the material of the shuttle at the opposite side of said groove and extending diagonally across the groove and then forwardly above said guard to a position in front of and overlapping said nose piece, said guard having thread trapping notches in its front and rear edges and said guide being located with reference to it to direct a loop of thread tending to escape from said groove into one or the other of said notches.

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