

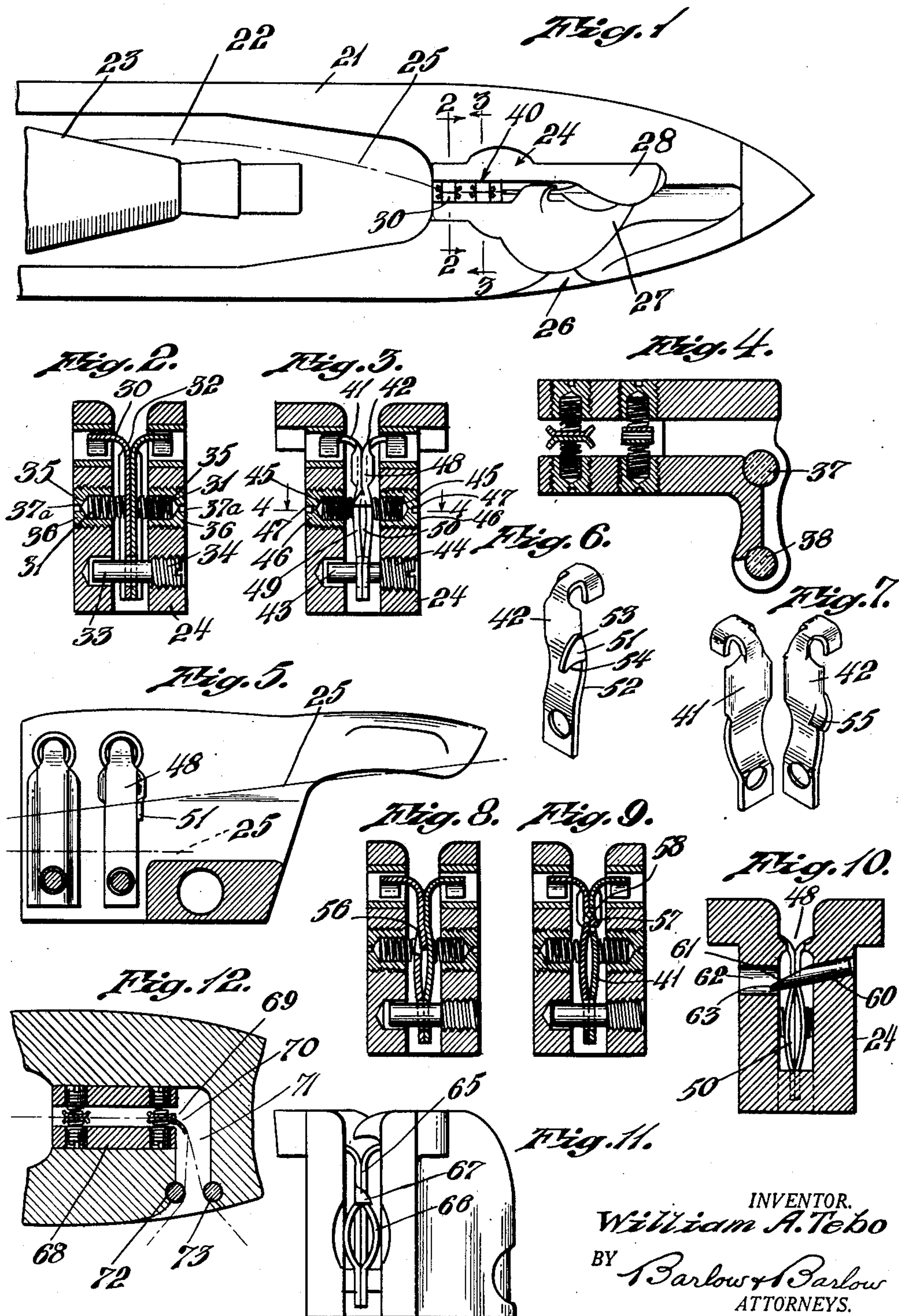
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SHUTTLE

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SHUTTLE

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This invention relates to a shuttle, more particularly to the type of shuttle used in automatic looms where there is an automatic transfer into the shuttle of a fresh bobbin to replace the bobbin after the yarn supply thereon has been exhausted; and the invention has for one of its objects the provision of a tensioning means for the yarn so as to cause the yarn to be laid in the shed under the same tension regardless of whether the shuttle is being thrown across the lay on its first pick after a transfer of the bobbin before complete threading has taken place, or upon some subsequent pick after transfer of the bobbin, and the yarn is completely threaded in the shuttle thread eye, whereby the fabric will be more evenly dyed than where a pick is laid in the shed of the cloth under a lesser tension because of there being less tensioning of the yarn during the first pick after transfer of the bobbin.

Another object of the invention is to accomplish the above result without hampering the action of the yarn during its usual course of manipulation in the shuttle, and by a simple and effective means which will allow easy threading such as has occurred before in the threading blocks of shuttles used commercially.

Another object of the invention is to cause temporary tension to additionally serve the function of a guide post over which the thread is drawn.

A further and secondary object of the invention is the provision of means which will assist in preventing unthreading of the shuttle after the same has been once threaded.

Another object of the invention is the provision of a stop on one of the tension members so arranged that it will act as a low web to hold the filling down in a threading block having a high web which high web for manufacturing reasons is some times more desirable.

With these and other objects in view, the invention consists of certain novel features of construction, as will be more fully described, and particularly pointed out in the appended claims.

In the accompanying drawing:

Fig. 1 is a top plan view of a portion of a shuttle showing the threading block equipped with my improvement;

Fig. 2 is a sectional view on substantially the line 2—2 of Fig. 1;

Fig. 3 is a sectional view on substantially the line 3—3 of Fig. 1;

Fig. 4 is a sectional view taken on substantially

the line 4—4 of Fig. 3, showing only the threading block of the shuttle;

Fig. 5 is a sectional view through the threading block of the shuttle, showing the yarn in the position which it will assume during the first pick of the shuttle across the loom;

Fig. 6 is a perspective view of one of the tension members, such as is shown in Fig. 3;

Fig. 7 shows perspective views of a pair of tension members of a somewhat modified structure with reference to Fig. 6;

Figs. 8 and 9 are sectional views of still different modified structures of tension members, the modification occurring chiefly in the stop which is formed for limiting the lifting or vertical rise of the thread;

Fig. 10 is a sectional view of a modified structure with a stop pin separate from the tension members;

Fig. 11 is an end view of a threading block showing a different arrangement of a pair of unit tension members with the auxiliary tension member which is used only during the first pick as arranged closer to the bobbin and of inverse relation with reference to the tension member previously referred to;

Fig. 12 is a sectional view of a fragmental portion of a shuttle showing a modified form of tension and modified form of threading block therein.

In the use of shuttles, it is recognized that after a transfer of the bobbin takes place in an automatic shuttle, there is less tension on the yarn during the first pick of this shuttle across the lay after the transfer than in subsequent picks. This is due to the fact that the yarn has not become moved completely into the eye of the shuttle and does not engage the porcelain post or posts which causes a friction thereon. Accordingly, in the formation of cloth, particularly after the cloth as been dyed, this slack pick may be noticed and is a technical flaw in the weaving, which cannot be overcome in a practical manner; and in order to provide more perfect fabric, I have arranged that on the first pick of the shuttle the yarn will have the same tension or substantially the same tension as on other picks so that such a flaw will not occur; and I do this by causing the yarn to contact with some surface which will apply friction thereto during this first pick but will disengage this surface after drawn into the shuttle eye where the usual amount of tension is applied to the yarn; and I have illustrated herein means by which this advantageous result may be accomplished, there being shown a

means with a pair of units, one of which continually engages the yarn and the other of which engages the yarn only during the first pick. I also provide that this additional tension means may be located between the usual tension and the thread eye, and if desired, serve as one of the guide posts, or in some cases it may be positioned in advance of the usual tension, in which case ballooning is permitted so that the distance provided for ballooning of the yarn in the shuttle will be reduced because of the additional tensioning means which I provide, and in this case quicker threading is accomplished; and the following is a more detailed description of the present embodiment of this invention, illustrating the preferred means by which these advantageous results may be accomplished:

With reference to the drawing, 21 represents the body of the shuttle having the bobbin opening 22 with the bobbin 23 mounted therein. A threading block designated generally 24 is located at one end of the bobbin opening 22 for receiving the yarn 25 and causing it to be moved into the side opening thread eye 26 in a usual and known manner, as the shuttle is thrown back and forth across the lay after transfer of the bobbin takes place, by reason of the horn 27 and overlapping guide portion 28.

In order that tension be applied to the yarn 25 a pair of tension members 30 of substantially identical construction are urged toward each other by springs 31 so as to cause their elongated faces 32 to contact. These members are mounted on a pin 33 which is threaded as at 34 to be secured into the wall of the threading block 24, as shown in Fig. 2. The springs 31 engage the seats 35 of the threaded cups 36 which may be turned to varying tension the spring by reason of the slots 37^a for the reception of a screw driver, or some other suitable turning instrument. As the shuttle starts on its first pick after a transfer of the bobbin takes place, the yarn 25 is drawn in between the tension members 30 because of their flaring upper ends, shown clearly in Fig. 2. This yarn 25 then extends out across the end of the shuttle and is substantially out of engagement with any other part of the shuttle in the first pick in the ordinary and usual type of threading block now furnished on the market. On the second pick, however, the yarn is then guided down by the horn and drawn about the posts 37 and 38, shown in Fig. 4, where additional rubbing friction occurs causing a greater tension on the yarn than on the first pick.

In order to increase the tension on the first pick so as to substantially equalize the yarn tension with the tension which occurs on the second and subsequent picks after threading has occurred, I have provided an additional rubbing surface which in the form shown in Fig. 1 consists of a unit designated generally 40 and consisting of a pair of tension members 41 and 42 which are mounted very similarly to the mounting of the tension members 30 by means of a pin 43 threaded as at 44 to have engagement with the thread block designated generally 24. These tension members are urged toward each other by springs 45 seated in cups 46 which can be adjusted by means of a slot 47 in a manner similar to that above described. These tension members, however, differ from the tension members previously described and shown in Fig. 2 by reason of their contacting surfaces 48 occurring but a short distance of their length and at their upper portions; then these members bow outwardly as at

49 so as to allow a free space 50 through which the thread may pass without contact with either of these tension members. This additional tension is so arranged that during the first pick, when the thread or yarn 25 is at its upper portion of its travel, as shown in Fig. 5, it will pass through and engage the friction surfaces 48 of this tension unit, but after drawn to its full threading position, as shown at 25 in dotted lines in Fig. 5, it will pass out of contact with the surface 48 into the space 50 whereby the tension members apply tension only during the first pick when the yarn would ordinarily be free after it had passed beyond the tension members 30.

One of these tension members is shown in perspective in Fig. 6 in which it will be observed that an integral finger portion 51 is folded to extend laterally of the member 42 from the edge 52 across the other tension member 41, see Fig. 7, so that the yarn 25 will engage the upper surface 53 of this finger to be supported thereby, as shown in Fig. 5. This surface 53 is inclined, however, so that as the yarn is drawn down into the thread eye, it will move below this finger 51 and then the curved surface 54 will serve the purpose of preventing the yarn from lifting and becoming unthreaded from the shuttle due to any one of numerous causes which would cause unthreading in shuttles of the usual construction. This stop in functioning to prevent the thread from lifting in the threading block serves to function as a low web which is usually an integral part of the threading block; thus, in some cases where, for manufacturing reasons a high web is desired, I may obtain the function of a low web by the use of this stop and prevent the thread from flying out of the thread eye.

In some cases, instead of providing a finger such as 51 by folding the stock at right angles to the general plane of the tension member, as shown in Fig. 6, I may merely cut and bend outwardly a portion 55, such as shown in Fig. 7, or as shown in Fig. 8, a finger may be cut from the stock intermediately of the edges of the tension member, as shown at 56, in Fig. 8, for serving the same purpose of the stop as heretofore mentioned. Then again, this finger instead of being cut from the stock may be merely pressed out of the stock as at 57, in Fig. 9, to enter an opening 58 in the opposing member 41, or various other means of assisting in maintaining the thread at the upper level where tension occurs during the first pick may be provided.

The stop which I have referred to in the various forms of the device, has up to this point always been illustrated as occurring on one of the tensioning members or elements. It is, however, not necessary that this stop be mounted upon one of the tension members, and in Fig. 10 I have illustrated a modified form of stop such as a pin 60 located on an incline in the side wall of the threading block 24 nearer the thread eye in the path of travel of the yarn than either of the tension members, and having a tapered or beveled surface 61; the same, however, is located at a point to maintain the thread above the stop during the first pick so as to be in engagement with the friction surfaces as 48 heretofore described. This pin may extend across and into a somewhat enlarged opening 62, this opening being of sufficient size to permit the thread or yarn to be drawn around the end 63 of the pin upon its being moved into the thread eye whereupon it drops into the space 50 between the second or

additional tension members heretofore provided and described.

In each of the instances above described, where there has been a second unit provided for the additional tension which is to occur during the first pick, I have located this additional tension between the usual tension and the thread eye so as not to decrease the draft of the thread of the distance between the bobbin and the tension where ballooning must occur. However, as shown in Fig. 11, this unit designated generally 65 may occur adjacent or on the side towards the bobbin in which instance, however, the belly or enlargement 66 of the tension members will be greater than that heretofore illustrated and will be sufficiently great to permit a balloon of the yarn after it has passed into complete threaded position as a result of second pick, and in this way I do not decrease the draft of the shuttle nor in any manner affect its easy threading, and in fact, the yarn will, by reason of the closeness of these additional first pick tension members, thread easily due to the steeper angle of the yarn provided on the first pick, and after this pick has occurred with the yarn above a stop 67 the thread moves into its lower position of completely threading beneath the stop 67 and may balloon as usual without restriction due to the wide spreading apart of the belly 66 of the tension members.

In some cases, as shown in Fig. 12, the threading block 68 may be formed and located as there shown with one of the pairs of tension members such as the unit 69 such as either 30 or 40 located at the forward part of the threading eye to make it unnecessary to use one of the porcelain posts, such as 37. The tension pad nearest the shuttle eye is extended as at 70 so that the yarn as drawn about this tension member is guided to the center of the eye 71 and its next contact from this tension will be with either the post 72 or 73, as indicated in Fig. 12. One of the various stops heretofore mentioned may be used.

The known use of grinding or grooving the tension members at an angle to the general run of the yarn may be utilized to increase or retard the downward movement of the yarn, as may be desired. Further, the springs for urging the tension members into yarn tensioning position may be varied as to position to vary the tension on the yarn at different positions along the members, and the tension of one unit may be different than the tension of the next unit for the accomplishment of different results.

For the purpose of illustrating this invention, the tension units are positioned in generally a vertical position, although usual positions such as horizontal or angular to the vertical may be used as desired. It will also be understood that the unit which applies tension on the first pick only may be used with any number of other units additional to the one unit with which it is here shown.

The foregoing description is directed solely towards the construction illustrated, but I desire it to be understood that I reserve the privilege of resorting to all the mechanical changes to which the device is susceptible, the invention being defined and limited only by the terms of the appended claims.

I claim:

1. In a shuttle for an automatic loom, a threading block having means to cause the yarn to partially move to threaded position on the first pick of the shuttle, said yarn being under greater

tension because of its path of travel when completely threaded than in the path of travel when partially threaded on the first pick, and a pair of relatively movable vertically extending members having opposing yarn contacting surfaces at one vertical level and spaced to permit the yarn to run free between them at a different vertical level.

2. In a shuttle for an automatic loom, a threading block, a pair of tension members in said block to engage opposite sides of the yarn and apply tension thereto throughout the movement of the thread during threading, and additional means engaging opposite sides of the yarn during the travel of the shuttle on its first pick after a transfer of the bobbin, the location of said additional tension being such that the yarn draws out of said additional tension upon the second pick of the shuttle, and a stop to assist in maintaining the yarn in the additional tension during the first pick of the shuttle.

3. In a shuttle having a bobbin opening, a threading block at one end thereof, a pair of mechanical tension units spaced longitudinally of the shuttle, one of said units having a pair of upright elements contacting substantially throughout their length, and the other unit having a pair of upright elements contacting through a portion of their upright extent and spaced through the lower portion of their upright extent at a location where the thread travels on the second and subsequent picks after transfer.

4. In a shuttle having a bobbin opening, a threading block at one end thereof, a mechanical tension unit having a pair of upright elements contacting through a portion of their length to engage the thread and spaced through the lower portion of their length and through which spaced portion the thread travels.

5. In a shuttle having a bobbin opening, a threading block at one end thereof, a pair of mechanical tension units spaced longitudinally of the shuttle, one of said units having a pair of elements contacting substantially throughout their length, and the other unit having a pair of elements contacting through a portion of their length and spaced through a portion of their length, the yarn in complete threaded position being located in said spaced portion, and the unit having the spaced portion being located adjacent the bobbin, said space being of sufficient extent to prevent material restriction of ballooning of the yarn.

6. An automatically threading loom shuttle having a threading block wherein the running filling occupies one path during the first pick after transfer and a relatively different path during subsequent picks, means to apply greater tension on the thread when in the first pick path than in the different subsequent paths, and a stop to hold the thread in the first pick path during said first pick and over which the thread passes on the second pick after transfer.

7. An automatically threading loom shuttle having a threading block wherein the running filling occupies one path during the first pick after transfer and a relatively different path during subsequent picks, means to apply greater tension on the thread when in the first pick path than in the different subsequent paths, and a stop to hold the thread in the first pick path during said first pick and over which the thread passes on the second pick after transfer, said stop having a shape to serve to prevent unthreading after the thread has passed thereover.

8. An automatically threading loom shuttle having a threading block wherein the running filling occupies one path during the first pick after transfer and a relatively different path during subsequent picks, means presenting different surface areas with which the thread may engage, and a stop located to maintain the thread along the greater surface areas during said first pick, and over which the thread passes on the second pick after transfer to become located along the lesser surface areas.

9. In a shuttle for an automatic loom, a threading block having means to cause the filling yarn to partially move to threaded position on the first

pick of the shuttle after transfer of the bobbin, said yarn being under greater tension because of its path of travel when completely threaded than in the path of travel when partially threaded on the first pick after transfer, a pair of relatively movable vertically extending members having opposing filling yarn contacting surfaces at one vertical level and spaced to permit the yarn to run with less tension between them at a different vertical level, and a stop to control movement of the filling yarn on the first pick of the shuttle.

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