July 24, 1928. 1,678,610

W. A. TEBO

SHUTTLE THREAD TENSION FOR REPLENISHING LOOMS

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Fig. 1

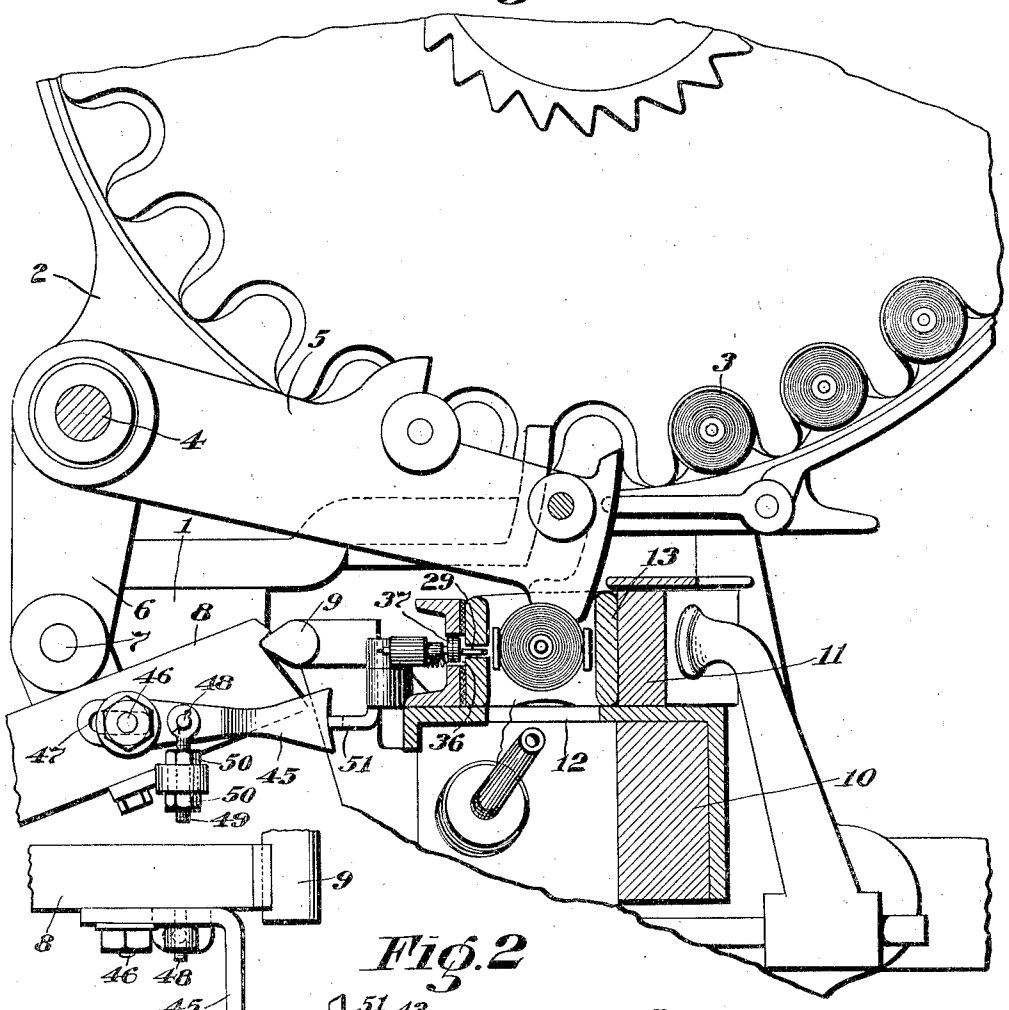
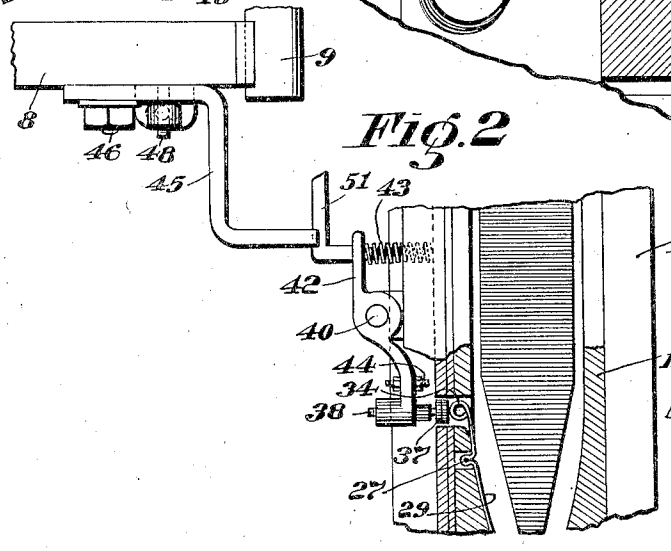


Fig. 2



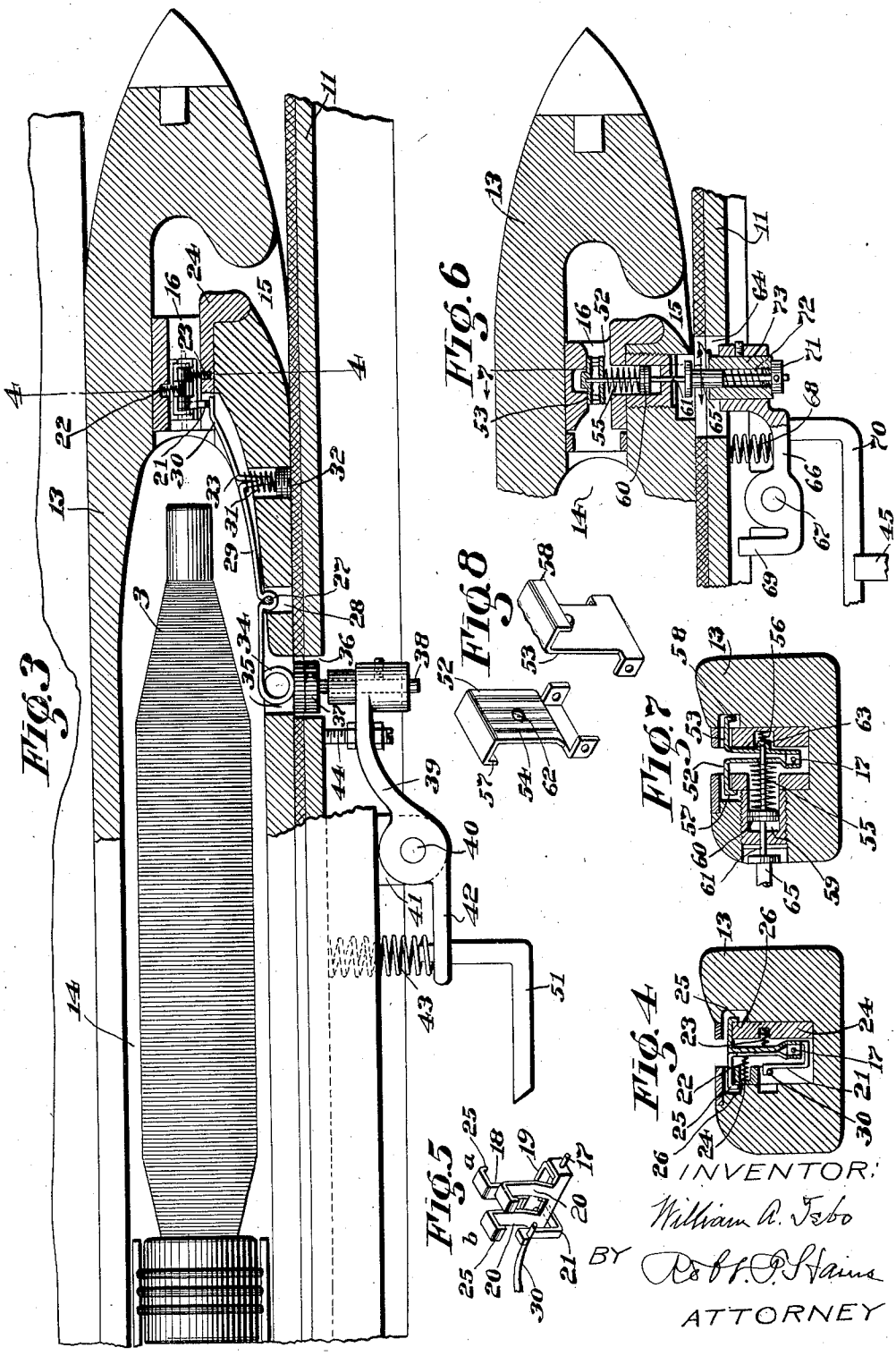
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Patented July 24, 1928. 1,678,610

UNITED STATES PATENT OFFICE.

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SHUTTLE-THREAD TENSION FOR REPLENISHING LOOMS.

Application filed November 18, 1927. Serial No. 234,252.

This invention relates to filling replenishing looms and is more particularly directed to the tensioning means employed in the shuttles of such looms for regulating the tension on the thread or filling.

It is now the ordinary practice to provide automatically threading shuttles with devices for tensioning the thread during weaving, so that it may be delivered from the shuttle and laid properly in the shed. In some of the devices heretofore suggested, the shuttle is provided with spring clamping means, usually comprising two or more members, between which the filling or thread passes and by which the tension is applied to the thread. Such spring clamping devices lend themselves favorably to the use of certain kinds of filling or thread, such, for instance, as silk, artificial silk, rayon and other types of thread, wherein the attrition due to the thread during weaving will not injuriously affect the tensioning action by scoring or the like.

During the weaving operation it is desirable that little or no tension will be placed upon the thread as the shuttle passes through the shed but that tension be applied to the thread as the shuttle enters the shuttle box or reaches the end of its flight, whereby the thread is drawn taut sometimes throughout its entire length and at least between the cloth selvage and the shuttle, so that the weft fork and thread parting mechanism may properly act upon the thread.

In filling replenishing looms it is of importance that the outgoing filling end be relieved from the tension devices of the boxed shuttle and that the tension devices themselves be so related that the incoming filling end may pass between the tensioning members during replenishment.

One of the features of the present invention therefore consists in providing thread tensioning members which are mounted in the shuttle and are normally under the influence of means for tensioning the thread when the shuttle is boxed, and controlling means for the tensioning members which is actuated on replenishment of filling for freeing the thread from the tensioning members that the old filling end may pass out of the shuttle with the ejected filling carrier or bobbin and the new filling end may enter between the tensioning members. More specifically, the present invention provides spring clamp tensioning members in the shuttle, preferably located in the longitudinal passage and a controller which is actuated on replenishment of filling for separating the spring clamping members and freeing the outgoing filling end that it may pass from the shuttle with the ejected filling carrier or bobbin and receive between the clamping members the incoming filling end.

The invention and new combination of parts and novel features thereof will best be made clear from the following description and the accompanying drawings of one good form thereof.

In the drawings:

Fig. 1 is a sectional side elevation of a filling replenishing loom at the replenishing side thereof, containing the present invention, some of the parts being broken away;

Fig. 2 is a detail plan view showing more particularly the controlling means for relieving and freeing the thread from tension during replenishment of filling;

Fig. 3 is an enlarged plan view with parts in section, showing the thread tensioning means and a controller for the tensioning means in their related positions during normal weaving operation;

Fig. 4 is a section on the line 4—4 of Fig. 3, showing the tensioning members in their thread tensioning position when the shuttle is boxed;

Fig. 5 is a detail detached view of the tensioning members shown in Fig. 4, but in their open or thread relieving position;

Fig. 6 is a detail sectional plan view showing a modified form of the present invention with the thread tensioning members in separated relation;

Fig. 7 is a section on the line 7—7 of Fig. 6; and

Fig. 8 shows a modified form of the tensioning members which may be advantageously employed in connection with the modifications of Figs. 5 and 6.

The loom frame 1 has mounted thereon the usual hopper stand 2 for filling carriers 3, and extending from the hopper stand 2 is the stud shaft 4 on which is mounted the tarnsferrer 5 having the downwardly extending arm 6 on which is pivotally mounted at 7 the dog 8 which is adapted to be engaged by a bunter 9 on the lay 10 when

filling replenishment is to be effected, through an indicating mechanism not here shown but well understood in the art.

The lay 10 carries the usual shuttle box 11 having a bottom opening 12 through which the ejected filling carrier may pass on replenishment of filling, as indicated in Fig. 1. The parts so far described are and may be of usual construction.

The shuttle 13 is provided with the usual bobbin chamber 14 and the side delivery eye 15, and between the bobbin chamber 14 and the side delivery eye is the longitudinally extending thread passage 16.

Mounted in the longitudinally extending thread passage 16 is the thread tensioning device which preferably comprises clamping members normally urged towards each other by yielding means to clamp the thread between them as it is delivered from the filling carrier 3 in the shuttle during weaving. The thread tensioning device is of the broad-faced type, and, as indicated in Figs. 4 and 5, comprises two members, *a* and *b*, in the present instance of the invention, which are mounted upon a pivotal support 17 extending longitudinally in the thread passage 16. As indicated in Fig. 5, the tensioning member *a* is provided with a plate 18 extending upwardly from the base portion 19, while the opposing tensioning member comprises the two plates 20 arranged in separated relation so that the plate 18 may enter between them when freed to the normally acting means for placing tension upon the thread. One of the tensioning members, *a* in the present instance, is provided with a finger 21 which extends below the opposing tensioning member *b* and extends upwardly, as indicated in Figs. 4 and 5.

As hereinbefore noted, the tensioning members are normally under the influence of yielding means tending to move them relatively into thread tensioning position, as indicated in Fig. 3, such yielding means consisting of the springs 22 and 23 which may be suitably seated in the walls of the threading block 24. Each of the tensioning members *a* and *b* has a laterally extending portion provided with a downturned flange 25, which engage behind shoulders 26 formed in the threading block, to limit their lateral movement under the action of the springs 22 and 23. From the construction thus far described it will be apparent that the tensioning members are normally under the influence of means for placing tension on the thread by relative movement of the tensioning members in the direction of approach.

Pivotally mounted on a pin 27 secured in a recess 28 of the shuttle is the controller arm 29, the end portion 30 of which engages the finger 21 of the tensioning member *a*. The controller arm 29 is normally under the influence of a spring 31 which may be seated in a suitable recess in the shuttle wood and adjusted by means of an adjusting screw 32, the controller arm being formed with a bent portion 33 for maintaining the spring in its proper relation with the arm. The spring 31 is of such strength as compared with the spring 22 of the tensioning member *a* that it will normally act when free to move the end 30 of the arm 29 inwardly to separate the tensioning members and relieve the tension on the thread.

The controller arm 29 has an end portion 34 which extends through an opening 35 in the wall of the shuttle, and under the influence of the spring 31 the end 34 of the arm will normally be projected through the opening 35 slightly beyond the side wall of the shuttle when the shuttle is not in the box, with the result that when the shuttle is picked and is passing through the shed, the controller will separate the tensioning members and permit the thread to be withdrawn from the shuttle substantially without tension. When, however, the shuttle enters the shuttle box, the end 34 of the controller arm 29 will engage the wall of the shuttle box 11 and be turned about its pivotal support 27 to thereby permit the tensioning members to apply tension to the thread.

When replenishment of filling is to be effected, it is desirable that the tensioning effect of the tensioning members upon the thread when the shuttle is boxed at the replenishing side of the loom be relieved in order to free the thread that it may be withdrawn from the shuttle by the ejected filling carrier during replenishment, and to this end the present invention contemplates means associated with the replenishing mechanism to relatively move the tensioning members in a direction of separation, so that during the replenishing operation the thread may be freed from the tensioning members and be withdrawn from the shuttle with the ejected filling carrier or bobbin.

As one good practical form of means to this end, the front wall of the shuttle box 11 is provided with an opening 36 into which extends the head 37 of a plunger 38 mounted upon a controller 39, shown in the present instance of the invention as a lever pivoted at 40 in front of the shuttle box. The pivot 40 may be conveniently supported by a bracket 41 and an arm 42 of the controller 39 is normally under the influence of a spring 43 tending to force the plunger head 37 inwardly through the opening 36 in the front wall of the shuttle box. Mounted on the controller 39 is a stop 44 adjustably mounted so that the full inward movement of the plunger head 37 under the action of the spring 43 may position the face of the plunger head substantially in line with the inner surface of the wall of the shuttle box. The result is that when the shuttle enters

the box and tension is applied to the thread by the tensioning members, the end 34 of the controller arm 29 may bear upon the inner face of the plunger head and continue to permit the tensioning members to act upon the thread.

When replenishment of filling is to be effected it is desirable, as hereinbefore stated, to relieve the tension upon the thread normally exerted thereon when the shuttle is boxed, and means are provided for withdrawing the plunger head 37 outwardly on replenishment of filling.

In the present instance of the invention, the dog 8 of the replenishing mechanism has adjustably mounted thereon the bunter or fan-tail 45, Figs. 1 and 2, which, when the dog 8 is positioned for replenishment of filling, is made effective to withdraw the plunger head 37. As shown in Fig. 1, the bunter 45 is secured to the dog 8 by a bolt 46 which extends through a longitudinal slot 47 of the bunter, and in order to adjust the bunter in the vertical direction to properly perform its function, the bunter 45 has connected therewith at 48 the adjusting bolt 49 which may be held in adjusted position by the set nuts 50.

The arm 42 of the lever 39 mounted on the lay in front of the shuttle box has an arm 51 which extends laterally in position to be engaged by the bunter 45 as the lay moves frontwardly on call for replenishment of filling, with the result that the lever or controller 39 is turned upon its pivotal support 40 to withdraw the plunger head outwardly, as indicated in Figs. 1 and 2, the result being that on call for replenishment of filling, the controller arm 29 will be turned upon its pivotal support 27 under the action of the spring 31 to force the end 30 of the controller arm against the finger 21 of the tensioning member *a*, thereby separating the tensioning members and relieving the tension on the thread during replenishment of filling, and at the same time providing an entrance for the incoming thread between the tensioning members.

Thus, during normal weaving operation between the intervals of replenishment of filling, the tensioning members will act to apply and maintain tension on the thread as the shuttle enters the shuttle box, and on call for replenishment of filling the controlling means will act in opposition to the normally acting springs of the tensioning members *a* and *b* to free the thread and thus permit the outgoing filling end to be withdrawn from the shuttle with the ejected filling carrier and the incoming filling end to be received between the tensioning members.

Various changes and modifications may be made in the details of the present invention without departing from the true scope thereof, and one such means is shown by Figs. 6, 7 and 8. The tensioning members, as indicated in Fig. 8, may consist of upstanding corrugated plates 52 and 53 having the corrugated faces 54, as shown by Fig. 8, and such tensioning members may be pivotally supported in the longitudinally extending thread passage, as previously described for the tensioning members shown by Figs. 4 and 5.

In the modification of the controlling means, as indicated in Figs. 6 and 7, the tensioning members 52 and 53 are normally under the influence of springs 55 and 56, the latter of which may be seated in a suitable recess in the wall of the threading block, as indicated in Fig. 7, and each of the tensioning members 52 and 53 may be provided with the downturned end portions 57 and 58 for engagement with stop shoulders formed in the walls of the threading block, thereby to limit their movement transversely of the thread passage.

In the modification of Figs. 6 and 7, the spring 55 is mounted in a recessed block 59, one end of the spring resting upon the head 60 of a plunger stem 61 and the opposite end of the spring resting upon the outer surface of the tensioning member 52. The plunger stem 61, in the modified construction, is shown as passing through a hole 62 formed in the tensioning member 52, and the end of the stem rests in a seat 63 formed in the opposing tensioning member 53, the effect being that should the plunger stem 61 be moved inwardly, the tensioning member 53 will be moved laterally of the thread passage, away from the tensioning member 52, which is stopped in its lateral movement by the shoulder 57, thereby freeing and relieving the tension upon the thread.

In the modified construction, means are provided for actuation on replenishment of filling to effect such lateral separation of the tensioning members, as indicated more particularly in Fig. 6, wherein it will be noted that the front wall of the shuttle box is provided with an opening 64 near the side delivery eye 15 of the shuttle, and extending through this opening is the plunger 65 mounted on a controller lever 66 which is itself pivotally supported at 67 at the front of the shuttle box. The controller lever 66 is normally under the influence of a spring 68 tending to withdraw the plunger 65 outwardly, and a stop 69 formed on the opposite end of the controller lever serves to limit its outward movement to such an extent that during the intervals between replenishment, the face portion of the plunger 65 will be in the plane of the inner wall of the shuttle box and not act upon the tensioning members. Secured to the controller lever 66 is the arm 70 which is mounted between the pivotal point 67 and the plunger 65 and is adapted to be engaged by the bunter 45 when

the latter is positioned by the dog of the replenishing mechanism on call for replenishment of filling, the result being that when replenishment is to be effected, the plunger end portion of the controlling lever 66 will be moved inwardly and act upon the plunger stem 61 to separate the tensioning members to free the thread passing between them. The plunger 65 is provided with a stop collar 71 and is normally under the influence of a spring 72, thereby imparting to the plunger head a yielding inward movement in its bearing 73.

From the construction described it will be apparent that when the shuttle enters the filling replenishing box, the tensioning members will be caused to act upon the thread and apply tension, but should replenishment of filling be initiated, the tensioning members will be separated to relieve the tension on the thread during the replenishing operation, so that the old filling end may be withdrawn from the shuttle with the outgoing bobbin and the new filling end may enter between the tensioning members when the fresh bobbin is inserted in the shuttle.

What is claimed is:

1. An automatically threading loom shuttle having a bobbin chamber, a side delivery eye, and a longitudinally extending thread passage, tensioning members mounted in the thread passage of the shuttle to place tension on the thread as it is drawn between the tensioning members, means normally acting to move the tensioning members relatively in a direction to place tension on the thread, replenishing mechanism, and means actuated by or through the replenishing mechanism to separate the tensioning members and free the thread on replenishment of filling.

2. In an automatic filling replenishing loom, the combination of replenishing mechanism, a shuttle having a longitudinally extending thread passage, tensioning members mounted in the thread passage of the shuttle to apply tension to the thread as it is withdrawn from the shuttle and between the tensioning members, and means rendered effective by a call for an operation of the replenishing mechanism to free the thread from the tensioning members during replenishment of filling.

3. In a filling replenishing loom, the combination of a shuttle, tension means within the shuttle for frictionally engaging the thread of the boxed shuttle to place tension on the thread, and means rendered effective on a call for replenishment of filling for releasing the tensioning means from the thread during replenishment of filling.

4. In a filling replenishing loom, the combination of an automatically threading loom shuttle, tensioning members within the shuttle for engaging the thread of the boxed shuttle to place tension on the thread, and means actuated by or through a part associated with the replenishing mechanism for freeing the tensioning action of the tensioning members upon and to free the thread during replenishment of filling.

5. In a filling replenishing loom, the combination of an automatically threading loom shuttle having a bobbin chamber, a side delivery eye, and a longitudinally extending thread passage, thread tensioning members between the bobbin chamber and side delivery eye, means normally acting upon a tensioning member to place tension on the thread of the boxed shuttle, replenishing mechanism, and a controller acting during replenishment of filling in opposition to the said normally acting means to free the thread from the tensioning members.

6. In a filling replenishing loom, the combination of replenishing mechanism, an automatically threading loom shuttle, opposed thread tensioning members carried by the shuttle and normally acting to place tension on the thread of the boxed shuttle, and a tension member controller operable on replenishment of filling to separate the tensioning members and free the thread passing between them.

7. In a filling replenishing loom, the combination of replenishing mechanism, an automatically threading loom shuttle having a bobbin chamber, a side delivery eye, and a longitudinally extending thread passage, tensioning members carried by the shuttle between the bobbin chamber and side delivery eye, yielding means normally acting on the tensioning members to press them upon the thread, and a controller actuated on replenishment of filling in opposition to the normally acting means to release the thread passing between the tensioning members that the outgoing thread may be withdrawn from the shuttle.

8. In a filling replenishing loom, the combination of an automatically threading loom shuttle, a tension device carried within the shuttle to frictionally engage the thread of the boxed shuttle to place tension on the thread, replenishing mechanism, and controlling means for the tension device in the shuttle actuated by a part of the replenishing mechanism on replenishment of filling to free the thread from the tension device that it may be free to be withdrawn from the shuttle by the outgoing thread carrier.

9. In a filling replenishing loom, the combination of an automatically threading loom shuttle having a bobbin chamber, a side delivery eye, and a longitudinally extending thread passage, a spring clamp tension device between the bobbin chamber and side delivery eye, filling replenishing mechanism, spring clamp tension controlling means, and devices positioned on call for replenishment of filling for actuating the controlling means

on frontward movement of the lay to release the thread from the spring clamp tension device during replenishment of filling.

10. In a filling replenishing loom, filling replenishing mechanism, an automatically threading from shuttle, spring actuated tension members mounted in the shuttle and between which the thread passes and means operating in conjunction with the replenishing mechanism when the shuttle is boxed to render the tensioning action of said members ineffective during replenishment of filling.

11. In a filling replenishing loom, filling replenishing mechanism, an automatically threading loom shuttle, spring actuated tension members mounted in the shuttle and between which the thread passes, and means operating through the wall of the shuttle box and in conjunction with the replenishing mechanism when the shuttle is boxed to render the tensioning action of said members ineffective during replenishment of filling.

In testimony whereof, I have signed my name to this specification.

WILLIAM A. TEBO.