Dec. 15, 1931. A. HANNAH 1,836,965

SHUTTLE

Filed Nov. 5, 1927

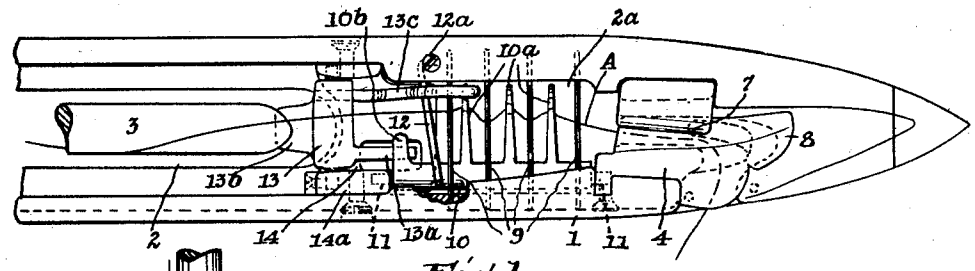


Fig. 1.

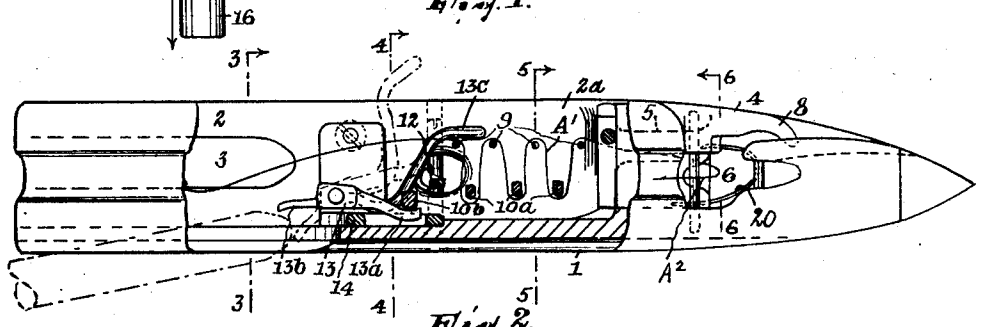


Fig. 2.

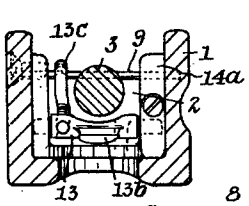


Fig. 3.

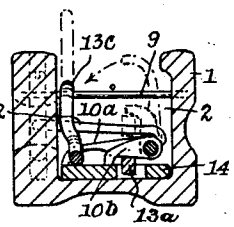


Fig. 4.

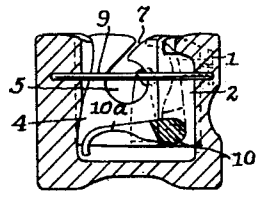


Fig. 5.

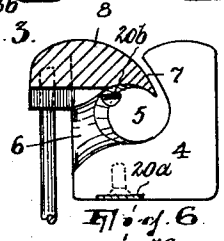


Fig. 6.

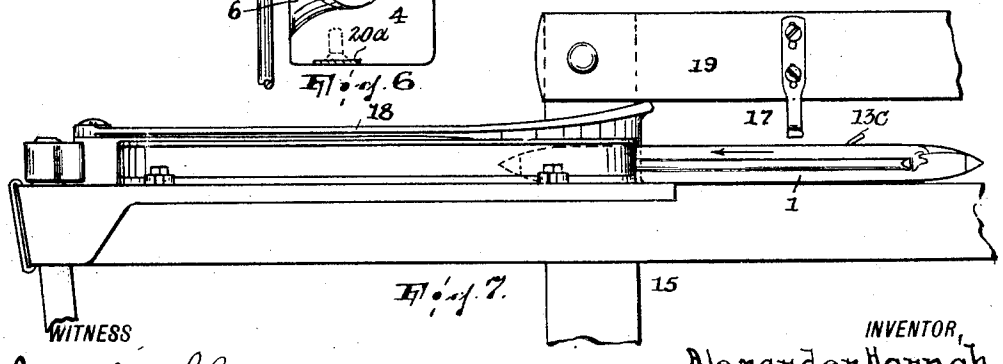


Fig. 7.

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UNITED STATES PATENT OFFICE

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SHUTTLE

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This invention relates to shuttles and has reference particularly to the means therein for controlling the filling, and especially imposing tension thereon. The object is to provide a simple and efficient means of this class whereby the filling may be established in its control by introduction of the filling laterally of itself into such control, either by hand or automatically.

In the drawings,

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

Fig. 2 is a side elevation, partly in section;

Figs. 3, 4, 5 and 6 are sectional views on lines 3—3, 4—4, 5—5 and 6—6 of Fig. 2; and

Fig. 7 is a view of the lay or batten of a loom and the shuttle in front elevation, illustrating a step in the operation of threading the shuttle when performed automatically.

The shuttle body 1 and its quill or bobbin cavity 2 (open top and bottom) with the quill or bobbin 3 therein may be the same as usual, as also may be, if the shuttle is to be automatically threaded, the fitting or threading block 4 housed in the forward part of the body and affording the longitudinal filling or thread passage 5 (Figs. 5 and 6) and lateral filling-outlet or side delivery eye 6, the longitudinal top slit 7 by which the filling is entered laterally of itself down into the passage, and the forwardly projecting deflected horn 8 which retains the filling in said passage once it has entered the same.

In a horizontal plane and each traversing the forward extension 2*a* of cavity 2 are the parallel pins or guides 9, here fixed at their ends in holes in the shuttle body and adapted to support the filling in bridging relation to the cavity. A lever 10, in the form of a plurituned fork, is fulcrumed at 11—11 in the fitting 4 and in the lateral upstanding wall 14*a* of a stand or bracket 14 fixed in cavity 2, so that the fulcrum of said lever is longitudinal of the shuttle and its tines or guides 10*a* project transversely, or substantially parallel with the guides 9; these guides are in vertical planes alternating with those of the guides 9 and they are arched. The fulcrum of said lever 10 is more or less near the bottom and one side of cavity extension 2*a*, and the guides 10*a* are of such length that when the lever is tilted to the position shown in Fig. 4 by dotted lines the ends of the tines, whose arching gives them a hook-like form, project above the guides 9 and when the lever is depressed the end of an arm 10*b* of the lever may encounter the base of stand 14 as a stop. The lever may be normally urged to the latter position (full lines, Fig. 4) by yielding means, such for instance as an elastic rubber strip 12 one end of which is attached to the fulcrum part of said lever and the other to a revoluble pin 12*a* mounted in the shuttle body and which may be turned to cause the strip to wrap around or unwrap from the same to vary the tension of said strip.

If the tension means formed by guides 9 and the spring-pressed tined lever is to be threaded by hand such may be accomplished by elevating the latter to the dotted-line position, placing the filling on the guides 9 as shown in Fig. 4 so that it will be caught by the tines when they descend, and then releasing the lever, whereupon the filling will be drawn into the zig-zag arrangement A′ shown in Fig. 2. During weaving the filling is withdrawn from the shuttle and in its travel from the quill cavity or bobbin chamber to the side delivery eye it is deflected over the guides 9 and under the tines or guides 10*a* in a zigzag course as indicated in Fig. 2, so that the yielding character of the tines or guides 10*a* takes up slack and applies tension to the filling.

Preferably for elevating lever 10 there is a device here taking the form of a lever 13 fulcrumed on a transverse axis in the stand, 14, hereinbefore mentioned. One arm 13*a* of this lever projects forwardly and underlies the arm 10*b* of lever 10 and the other, 13*b*, projects rearwardly and serves as a finger-piece when the lever 10 is to be manually elevated. This lever 13 may serve as a detent to hold lever 10 in its elevated position, as by its arm 13*a* being then in position (see dotted lines Fig. 4) to obstruct return or downward movement of lever 10, or in what I term the "cocked" relation of these parts, the friction between parts 13*a* and 10*b*

being then sufficient to keep the lever 13 elevated.

Where the threading is to be automatically performed the lever 13 has an additional arm 13*c* which projects upwardly and forwardly and is adapted to protrude from the top of the shuttle when the parts 10 and 13 are in cocked position. Assume the loom 15 (Fig. 7) to be of the usual type (as, for example, shown in Patent #540,454) employing a shuttle whose filled quill or bobbin is entered into the quill or bobbin cavity, as 2, by a downwardly moved presser 16 or other actuator on the loom, such as the usual transferrer, the quill or bobbin then in the shuttle will be ejected and if the shuttle contains the present improvements the force of the presser or transferrer to introduce the filled quill or bobbin will, through such quill or bobbin and the outgoing empty quill or bobbin (whose tip overlies arm 13*b* of lever 13—Fig. 2), shift member 13 and consequently member 10 to cocked position, so that the filling (whose end may be previously attached to some part of the loom, as usual) will bridge the cavity and rest on the pins or guides 9 while the tines of member 10 are raised into dotted line position Fig. 4. In the present example, this will occur when the shuttle is in the right-hand shuttle box. Upon the shuttle performing its next flight to the opposite shuttle box 18 the member 10 will fall and the filling, having meanwhile found its way down through slit 7 into passage 5 so as to be caught under the tines of said member 10 when it thus falls, will be held as seen in Fig. 2, extending zigzag around the guides 9 and 10*a* and controlled by member 10.

The shock incident to the shuttle flight or its picking movement may cause the member 13 to fall and so allow the member 10 to do so, but in any event member 13 will be depressed as it encounters a trip or stop 17 or other suitable actuator on some part 19 of the loom (Fig. 7) before the shuttle is fully boxed at the opposite side of the loom.

In the well known way the filling, on the shuttle next proceeding to the right from the left-hand box, forms in a bight A^2 (Fig. 2) and thus becomes established in the outlet 6. Sometimes in the use of fittings, such as 4, adapted for the self-threading of the shuttle the filling works back out of this outlet, which of course is positioned at the side of the shuttle next to the cloth. To prevent this I place in the fitting 4 a bent elastic clip 20 (Figs. 2 and 6) having one end 20*a* wide and the other end a tapered tongue 20*b*; such ends project rearwardly and the former is held between the fitting 4 and the bottom of the housing formed in the shuttle body to receive such fitting while the latter bears against the under side of horn 8 near the forward end of passage 5. This clip forms a simple expedient for the purpose in hand, preventing return of the filling from outlet 6 once it has become established therein by its bight forcing its way between the tongue 20*b* and the under side of horn 8.

From the construction described as one good form or embodiment of the invention it will be noted that on replenishment of filling in the shuttle, the tensioning members will be moved into non-tensioning relation thereby freeing the filling previously in the shuttle that it may be freely withdrawn therefrom by the quill or bobbin as it is ejected from the shuttle during replenishment, and that the filling leading from the incoming quill or bobbin will be placed in position for the tensioning effect of the tensioning members when the tensioning members are again moved relatively into tensioning position.

Having thus fully described my invention, what I claim is:

1. In combination, with a shuttle having an upwardly open cavity and means to underlie and thereby support a length of filling in bridging relation to the cavity, a filling-catching member having a free end and movable back and forth in the shuttle from one to the other of two positions in one of which said free end is within and in the other of which it is exterior of said means and being normally held in the first position.

2. In combination, with a shuttle having an upwardly open cavity and means to underlie and thereby support a length of filling in bridging relation to the cavity, a filling-catching lever fulcrumed in the shuttle and having a free end and movable back and forth in the shuttle from one to the other of two positions in one of which said free end is within and in the other of which it is exterior of said means and being normally held in the first position.

3. In combination, with a shuttle having an upwardly open cavity and means to underlie and thereby support a length of filling in bridging relation to the cavity, a filling-catching member having a free end and movable back and forth in the shuttle from one to the other of two positions in one of which said free end is within and in the other of which it is exterior of said means and being spring-held in the first position.

4. In combination, with a shuttle having an upwardly open cavity and means to underlie and thereby support a length of filling in bridging relation to the cavity, a filling-catching lever fulcrumed in the shuttle and having a free end and movable back and forth in the shuttle from one to the other of two positions in one of which said free end is within and in the other of which it is exterior of said means and being spring-held in the first position.

5. In combination, with a shuttle having

spaced supports to be bridged by the filling, a filling-catching member movable in the shuttle and normally urged from one to the other of two positions so related to the bridging part of the filling that in such movement said part will be bent by said member, said member being also movable back from the second to the first position, and means, when said member is in the first position, to retain it in such position.

6. In combination, with a shuttle having spaced supports to be bridged by the filling, a filling-catching lever fulcrumed in the shuttle and normally urged from one to the other of two positions so related to the bridging part of the filling that in such movement said part will be bent by said lever, said lever being also movable back from the second to the first position, and a lever fulcrumed in the shuttle and movable into position when the first lever is in said first position, to retain it in such position.

7. In combination, with a loom and its shuttle, the latter having means to hold a filling package and spaced supports to be bridged by the filling extending from the package, of a filling-catching member movable in the shuttle from one to the other of two positions so related to the bridging part of the filling that in such movement said part will be bent by said member, and means, including an actuator on the loom, for causing such movement of said member.

8. In combination, with a loom and its shuttle, the latter having means to hold a filling package and spaced supports to be bridged by the filling extending from the package, of a filling-catching member movable in the shuttle from one to the other of two positions so related to the bridging part of the filling that in such movement said part will be bent by said member, and normally urged to the second position, a detent in the shuttle to hold said member in the first position and movable to clear the same, and means on the loom for causing said detent to clear said member.

9. In combination, with a loom and its shuttle, the latter having means to hold a filling package and spaced supports to be bridged by the filling extending from the package, of a filling-catching member movable in the shuttle from one to the other of two positions so related to the bridging part of the filling that in such movement said part will be bent by said member and normally urged to the second position, and means, including an actuator on the loom, for causing said member to move from the second to the first position.

10. In combination, with a loom and its shuttle, the latter having means to hold a filling package and coactive means to exert a slip-grip on the filling extending from the package one of which is movable into and out of such coactive relation to the other, and means, including an actuator on the loom, to move the former into coactive relation with the latter of said coactive means.

11. In combination, with a loom and its shuttle, the latter having means to hold a filling package and coactive means to exert a slip-grip on the filling extending from the package one of which is movable into and out of such coactive relation to the other, and means, including an actuator on the loom, to move the former out of coactive relation with the latter of said coactive means.

12. 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.

13. 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 an operation of the replenishing mechanism to free the thread from the tensioning members during replenishment of filling.

14. 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 replenishment of filling for releasing the tensioning means from the thread during replenishment of filling.

15. 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.

16. 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.

17. 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.

18. 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 to move the tensioning members relatively into thread tensioning relation, 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.

19. 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 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.

20. In a filling replenishing loom, filling replenishing mechanism, an automatically threading loom, shuttle, tension members mounted in the shuttle and over and under 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.

21. An automatically threading loom shuttle having a chamber for a thread package and a side delivery eye, coacting thread tensioning members to exert a slip grip tension on the thread and mounted for relative movement into and out of thread tensioning position, means actuated on replenishment of filling for relatively moving said members out of thread tensioning position to permit the incoming thread extending from the thread package to be positioned for engagement by the tensioning members when they are moved into tensioning position, and means for moving the thread tensioning members relatively into thread tensioning position after replenishment of filling that the incoming thread may be tensioned on the first pick of the shuttle following replenishment.

22. A tensioning device for an automatic loom shuttle, comprising the combination with a shuttle body provided with means for releasably holding a quill, of thread tensioning means carried by said shuttle body, and means carried by said shuttle body including a member extending into the path of movement of and adapted to be operated by the quill when the latter is being ejected from the holding means, to actuate said tensioning means, for the purpose of disengaging said tensioning means from the thread.

23. A tensioning device for an automatic loom shuttle, comprising the combination with a shuttle body provided with means for releasably holding a quill, of thread tensioning means pivotally connected with said shuttle body and a tensioning means controlling member carried by the shuttle body and adapted to be operated by the quill when the latter is being ejected from the holding means, to actuate said tensioning means, for the purpose of disengaging said tensioning means from the thread.

24. In the weft replenishing loom, a shuttle having a bobbin therein to be moved out of the shuttle at depletion of weft, a weft tension device carried by the shuttle to engage the weft extending from the bobbin, and means including a pivoted member carried by the shuttle and operated by the bobbin as the latter is moving out of the shuttle to render said tension mechanism temporarily ineffective to tension the weft extending from the bobbin.

25. An automatically threading loom shuttle having a chamber for a thread package and a side delivery eye, coacting thread tensioning members to exert a slip grip tension on the thread and mounted for relative movement into and out of thread tensioning position, means actuated on replenishment of filling for relatively moving said members out of thread tensioning position to release the thread then in the shuttle and permit the incoming thread extending from the thread package to be positioned for engagement by the tensioning members when they are moved into tensioning position, and an actuator on the loom to operate said means for moving the thread tensioning members relatively into thread tensioning position after replenishment of filling.

26. In a weft replenishing loom, a shuttle having a bobbin therein to be moved out of the shuttle on depletion of weft, a weft tensioning device carried by the shuttle to engage the weft extending from the bobbin, and means operated by the bobbin as the latter is moving out of the shuttle to render said tension mechanism temporarily ineffec-

tive to tension the weft extending from the bobbin.

27. In a filling replenishing loom, 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, means normally acting to move the tension members relatively into thread tensioning relation, and a controller actuated on replenishment of filling in opposition to said normally acting means to free the thread from the tensioning members during replenishment of filling.

28. A shuttle for automatic replenishing looms, comprising a shuttle body, thread tensioning means carried by the shuttle body, and means operable by a bobbin during the replenishing operation for placing said tensioning means in position to automatically receive the thread from the new bobbin.

29. A shuttle for automatic replenishing looms, comprising a shuttle body, thread tensioning means carried by the shuttle body, a member carried by said body and normally occupying a position in the path of travel of the empty bobbins as they are displaced during a replenishing operation, and connections between said member and said tensioning means whereby displacement of an empty bobbin will move said tensioning means to a position to automatically receive the thread from a fresh bobbin as it is inserted into the shuttle.

30. A shuttle for automatic replenishing looms, comprising a shuttle body, thread tensioning means carried by said body, a finger pivotally mounted in said body in the path of travel of the empty bobbins as they are displaced during a replenishing operation, and connections wholly within the shuttle between said finger and thread tensioning means whereby movements of the former may control the latter.

In testimony whereof I affix my signature.

ALEXANDER HANNAH.