Oct. 27, 1942. B. W. BROUWER 2,300,199

SUPPORT FOR SHIFTING SHUTTLE BOX MECHANISM

Filed April 2, 1942

FIG. 1

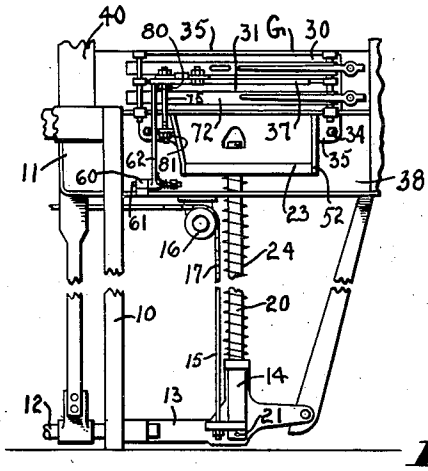


FIG. 3

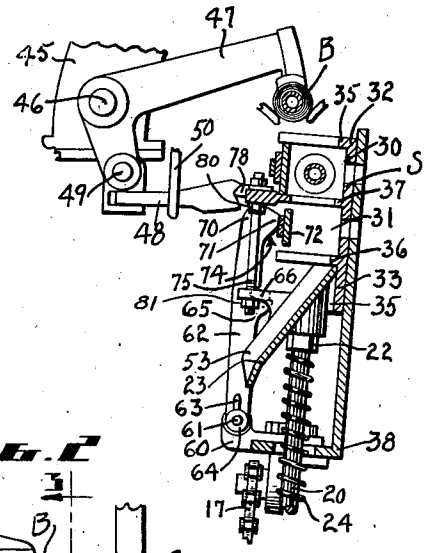


FIG. 2

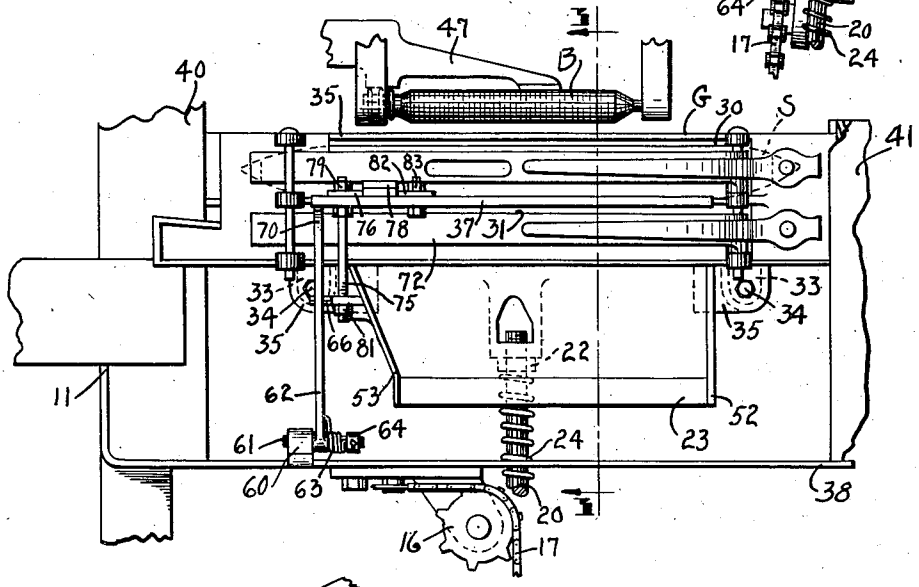
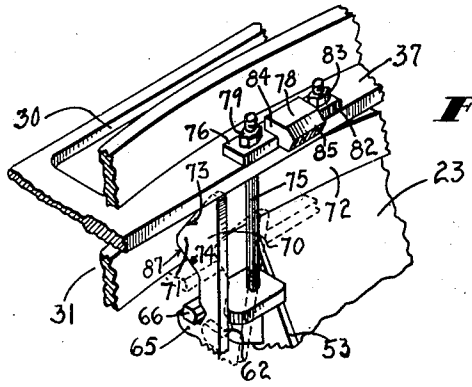


FIG. 4



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SUPPORT FOR SHIFTING SHUTTLE BOX MECHANISMS

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7 Claims. (Cl. 139—182)

This invention relates to improvements in shifting shuttle box mechanisms for looms and it is the general object of the invention to provide means for supporting the shifting shuttle boxes to arrest vibration thereof and give additional support to them at those times in the cycle of the loom operations during which weft replenishment can occur.

In filling mixing weft replenishing looms of a type which has recently gone into use shifting shuttle boxes are located at each end of the loom to cooperate with a set of shuttles which follow each other in rotation. The shuttle boxes at the replenishing end of the loom are shifted by a yieldable actuator which operates on a four-pick cycle to hold the boxes down for two successive picks and then up for the next pair of picks. Replenishment occurs when the shuttle boxes are raised and the latter should be temporarily at rest with respect to the lay to insure complete movement of the incoming bobbin into the shuttle in the upper box. It is an important object of my present invention to provide means to give support to the shuttle boxes additional to that derived from the yieldable actuator to prevent their vibration with respect to the lay and hold them temporarily at rest relatively to the lay so that should replenishment occur the full bobbin can be moved completely into the depleted shuttle by the transfer mechanism.

In my prior Patent No. 2,263,261 I have shown a bobbin chute connected to the shuttle boxes and the box lifter rod in such a way that the lifting force for the boxes is transmitted through the bobbin chute. It is a further object of my present invention to provide the bobbin chute with means to cooperate with the aforesaid support.

The bunter which actuates the transferrer latch is customarily mounted on the shifting shuttle box mechanism in looms of the type to which my invention more particularly relates, being generally secured to the floor of the top box. It is another object of my present invention to connect the box carried bunter to the bobbin chute so that the latter will support the bunter.

In looms of the type mentioned the lower shuttle box is always empty with its binder in shuttle checking position during a replenishing operation. Before the shuttle boxes start to descend subsequent to a replenishing operation a second shuttle enters the lower box to move the binder outwardly, or forwardly as shown hereinafter. It is another object of my present invention to provide a support for the bobbin chute to be controlled by the binder of the lower shuttle box in such a way that when the lower box is empty the support can move into cooperative relation with respect to the bobbin chute, but when a shuttle enters the lower box the binder will move the support away from cooperating relationship with respect to the bobbin chute.

With these and other objects in view which will appear as the description proceeds, my invention resides in the combination and arrangement of parts hereinafter described and set forth.

In the accompanying drawing, wherein a convenient embodiment of my invention is set forth,

Fig. 1 is a front elevation of the shuttle boxes, actuating mechanism therefor, and the support forming the subject matter of my present invention,

Fig. 2 is an enlargement of the shuttle boxes and support shown in Fig. 1,

Fig. 3 is a vertical section on line 3—3 of Fig. 2, and

Fig. 4 is a perspective view of a portion of the shuttle boxes showing the transfer latch operating bunter, the bobbin chute and the support for the latter.

Referring particularly to Fig. 1, I have shown a loom frame 10 and lay 11 which swings back and forth on a rocker shaft 12. A rocker foot 13 secured to shaft 12 has slidably mounted therein a sleeve 14 attached at its lower end to a connector 15 which extends upwardly over a sheave 16 rotatably mounted on the lay. From sheave 16 the chain moves to well-known operating mechanism, such as a Knowles head not shown, which pulls on and releases a chain 17 forming part of connector 15 to raise and lower the sleeve. A box rod 20 extending through the sleeve 14 has the lower end thereof provided with a collar 21 for engagement with the bottom of the sleeve. The rod extends upwardly from the sleeve and is attached as at 22 to a bobbin chute 23. A spring 24 surrounding the box lifter rod is located between the top of sleeve 14 and the bobbin chute. When the connector 15 raises the sleeve 14 an upward force is transmitted through the spring 24 to the bobbin chute, and under ordinary conditions the spring is sufficiently strong to raise the boxes. If, however, a shuttle should fail to be completely boxed and should project into the path of some part carried by the lay, the spring 24 will be compressed

to prevent breakage of the shuttle as the sleeve rises.

The shuttle box gang G comprises upper and lower shuttle boxes 30 and 31, respectively, which may be made as indicated in Figs. 2 and 3 with a box back 32 having depending lugs 33 which are secured as at 34 to lugs 35 on the bobbin chute. The upper box 30 has a horizontal top 35 secured to the back 32 while the lower box has a floor 36 also secured to the back 32. An intermediate shelf or floor 37 secured to and extending forwardly from the back 32 provides the floor for the top box and the top for the bottom box. The lay end 38 secured to the lay has inner and outer box guides 40 and 41 to guide the gang G as it moves vertically with respect to the lay.

The loom is provided with weft replenishing mechanism a portion of which is indicated in Figs. 2 and 3. This mechanism comprises a frame 45 secured to the loom frame in front of the shuttle boxes and carrying a stud 46 on which the transferrer arm 47 is pivoted. A dog or latch 48 is pivoted to the transferrer arm at 49 and is normally in down position but can be raised by a connector 50 to transfer position when a replenishing operation of the loom is to occur. A reserve bobbin B will be under the transferrer arm at the time of transfer to be moved downwardly into shuttle S in the upper shuttle box when the latter is raised. At the time of replenishment the depleted bobbin from the shuttle S will move downwardly through the temporarily empty shuttle box 31 and between the right and left hand flanges 52 and 53, respectively, of the bobbin chute toward a bobbin can not shown.

The matter thus far described of itself forms no part of my present invention and may be made and operated as set forth in my previously mentioned patent.

In carrying my present invention into effect I provide the lay end 38 with a stand 60 bolted thereto and carrying a stud 61 on which is pivoted an upwardly projecting support lever 62. A spring 63 having one end secured to the lever 62 and the other end held by a collar 64 on the stud tends to move the lever 62 rearwardly or in a right hand direction as viewed in Fig. 3. Lever 62 is provided with a supporting finger or arm 65 to extend under a lug 66 cast on and projecting from the left of flange 53 of the bobbin chute. The upper end of lever 62 is provided with a head 70 having a rearwardly projecting nose 71 which overhangs floor 36 of box 31 and is positioned for engagement with the binder 72 of the lower shuttle box 31. The head is provided with an upwardly and forwardly extending incline 73 positioned for engagement with the floor 37 of the upper shuttle box. Lever 62 has a rear surface 74 below and forward of the nose for engagement with floor 37 when the boxes are down.

Secured to the lug 66 is an upwardly extending rod 75 which extends through the shelf or floor 37 and a wing 76 of the bunter 78. Upper and lower nuts 79 and 80, respectively, secure the wing 76 to floor 37 and the latter to rod 75. Rod 75 is threaded into lug 66, see Fig. 4, and a nut 81 on the rod under lug 66 cooperates with the latter to secure the rod to the lug. The bunter has a right hand wing 82 for attachment as at 83 to the floor 37. Between the wings is located the bunter proper designated at 84 and provided with an operating edge 85 for cooperation with the latch 48. The bunter is thus fastened to the floor 37 and rises and falls with the shuttle boxes and is the means by which force is transmitted from the lay to the transferrer mechanism. The bunter will be in high position when the boxes are raised during a transferring operation of the loom and will be in low position when the shuttle boxes have dropped to permit picking of the replenished shuttle S. While I have shown a rod 75 connected to the bunter mechanism I do not wish necessarily to be limited to this particular construction, inasmuch as it is sufficient for certain purposes of my invention if the rod 75 is connected to the floor 37 of box 30.

In operation, the boxes will rise and fall as already described, rising when the lay is in the forward part of its stroke and being in fully raised position on the next forward stroke of the lay. When the upward shift is completed a shuttle in the lower box 31 is picked out to the opposite end of the loom and the binder 71 will move rearwardly to the shuttle checking position shown in Fig. 3. The lever 62 will therefore move rearwardly with the binder under the action of spring 63 to move the supporting finger 65 under the lug 66. Since lever 62 is pivoted to a part fixed with respect to the lay end, the bobbin chute will temporarily be held against downward motion with respect to the lay by the parts 65 and 66. This operation occurs regularly during loom operation and if transfer should occur during the aforesaid second forward beat of the lay the lever 62 will support the bobbin chute and the latter, acting through rod 75, will support floor 37 to prevent vibration or downward motion of the shuttle boxes. During the third forward beat of the lay, or the one occurring subsequent to transfer, a shuttle will enter the lower box to move the binder 72 forwardly, the effect of which is to move the finger 65 forwardly from under lug 66. This operation occurs prior to the time in the loom cycle when the connector 15 operates to effect lowering of the shuttle boxes, and the latter are therefore free to descend without interference on the part of the lever 62. Should the forward part of the shelf 37 overhang the nose 71 as the boxes descend it will engage the inclined surface 73 and give the lever an additional forward motion. As the boxes move to their lowest position the lever 62 will move rearwardly until surface 74 engages floor 37. The lever will remain in this position, see dotted lines of Fig. 4, until the boxes start to rise, whereupon floor 37 will engage rearwardly and upwardly extending incline 87 connecting nose 71 with surface 74 and rock lever 62 forwardly. Further ascent of floor 37 will permit nose 71 to move rearwardly toward binder 72.

From the foregoing it will be seen that I have provided simple means for providing temporary support for the shifting shuttle boxes during that point in the cycle of loom operations when transfer can occur. It will further be seen that the support is controlled by the binder of the lower box and cooperates with the bottom chute which is directly connected to the lower shuttle box and is connected to the floor 37 by rod 75, hence when finger 65 is under lug 66 the entire box and chute structure is temporarily held against downward motion with respect to the lay. It will further be seen that the rod 75 assists in holding the bunter mechanism fixed to the floor 37 and that because of this construction the bunter derives temporary support from lever 62 during the transferring operation and cannot move downwardly with respect to the latch pivot 49. The rod 75 and the parts associated with it are not

claimed herein but are being made the subject matter of a divisional application, and the claims of the present application are restricted to the lock member and the bobbin chute.

Having thus described my invention it will be seen that changes and modifications may be made therein by those skilled in the art without departing from the spirit and scope of the invention and I do not wish to be limited to the details herein disclosed, but what I claim is:

1. In a loom having a lay provided with a pair of shuttle boxes which are shifted vertically by a downwardly yieldable actuator and wherein provision is made for downward replenishment of a shuttle in the upper shuttle box while the lower shuttle box is empty and the shuttle binder of the latter is in the path of a shuttle entering the lower box, a bobbin chute secured to the under side of the shuttle boxes and moving vertically with the latter and connected to the yieldable actuator to transmit a lifting force from the actuator to the shuttle boxes, a lever pivoted on the lay and having an arm to engage the shuttle binder of the lower shuttle box, means tending to move the lever toward said binder, and cooperating locking parts on said lever and bobbin chute in position for mutual engagement when the binder is in said path of a shuttle entering the lower box to prevent downward motion of the bobbin chute and shuttle boxes with respect to the lay, said binder effective to move the lever to disengage said cooperating parts when a shuttle enters said lower box and moves the binder.

2. In a loom having a lay provided with a pair of shuttle boxes which are shifted vertically by a downwardly yieldable actuator and wherein provision is made for downward replenishment of a shuttle in the upper shuttle box while the lower shuttle box is empty and the shuttle binder of the latter is in the path of a shuttle entering the lower box, a bobbin chute secured to the under side of the shuttle boxes and moving vertically with the latter and connected to the yieldable actuator to a transmit a lifting force from the actuator to the shuttle boxes, a lock lever pivotally mounted on the lay, means tending to move said lock toward said shuttle binder, and cooperating parts on said lever and bobbin chute in mutually engaging position when said binder is in said shuttle path to prevent downward movement of the chute and boxes relatively to the lay, entry of a shuttle into said lower box moving the binder and causing the latter to move the lever and said cooperating parts out of engaging position with respect to each other.

3. In a loom having a lay provided with a pair of shuttle boxes which are shifted vertically by a downwardly yieldable actuator and wherein provision is made for downward replenishment of a shuttle in the upper shuttle box while the lower shuttle box is empty and the shuttle binder of the latter is in the path of a shuttle entering the lower box, a bobbin chute secured to the under side of the shuttle boxes and moving vertically with the latter and connected to the yieldable actuator to transmit a lifting force from the actuator to the shuttle boxes, a stop on said bobbin chute, a member supported by the lay in position for engagement by said shuttle binder, a stop on said member, and means to move said member to cause interengagement of said stops when the shuttle binder is in said shuttle path to prevent downward movement of the shuttle boxes relatively to the lay, entry of a shuttle into said lower box moving the binder and causing the latter to move said member to effect relative movement of said stops to non-engaging position.

4. In a loom having a lay provided with a pair of shuttle boxes separated by a floor for the upper box and a vertically shiftable downwardly yieldable actuator, the loom having provision for downward replenishment of the shuttle in the upper shuttle box while the lower shuttle box is empty and the shuttle binder of said lower box is in the path of a shuttle entering the lower box, a bobbin chute secured to the under side of the shuttle boxes and connected to said actuator, a lock member pivoted to the lay in position for engagement with and movement by the shuttle binder, cooperating parts on said member and said bobbin chute to be in mutually engaging position to prevent downward movement of the shuttle boxes with respect to the lay when the shuttle binder is in said shuttle path, entry of a shuttle into the lower shuttle box moving the binder and causing the latter to move said member to cause relative movement of said cooperating parts to non-engaging position, and a cam on said member for engagement with said floor of the upper shuttle box as the shuttle boxes descend to move said member out of the path of the descending floor.

5. In a loom having a lay provided with a pair of shuttle boxes separated by a floor for the upper box and a vertically shiftable downwardly yieldable actuator, the loom having provision for downward replenishment of the shuttle in the upper shuttle box while the lower shuttle box is empty and the shuttle binder of said lower box is in the path of a shuttle entering the lower box, a bobbin chute secured to the under side of the shuttle boxes and connected to said actuator, a lock member pivoted to the lay in position for engagement with and movement by the shuttle binder, cooperating parts on said member and said bobbin chute to be in mutually engaging position to prevent downward movement of the shuttle boxes with respect to the lay when the shuttle binder is in said shuttle path, entry of a shuttle into the lower shuttle box moving the binder and causing the latter to move said member to cause relative movement of said cooperating parts to non-engaging position, and means on said member presenting a surface extending upwardly and forwardly from said binder for engagement with said floor as the boxes descend to move said member out of the path of the descending floor.

6. In a loom having a lay provided with a pair of shuttle boxes separated by a floor for the upper box and a vertically shiftable downwardly yieldable actuator, the loom having provision for downward replenishment of the shuttle in the upper shuttle box while the lower shuttle box is empty and the shuttle binder of said lower box is in the path of a shuttle entering the lower box, a bobbin chute secured to the under side of the shuttle boxes and connected to said actuator, a lock member pivoted to the lay and having a nose for engagement with and movement by the shuttle binder, cooperating parts on said member and said bobbin chute to be in mutually engaging position to prevent downward movement of the shuttle boxes with respect to the lay when the shuttle binder is in said shuttle path, entry of a shuttle into the lower shuttle box moving the binder and causing the latter to

move said member to cause relative movement of said cooperating parts to non-engaging position, a cam on said member above said nose for engagement with said floor as the shuttle boxes descend to move said nose out of engaging position with respect to said floor, and a second cam on said member below said nose to engage said floor for movement by the latter of the nose out of the path of said floor as the boxes rise.

7. In a loom having a lay provided with a pair of shuttle boxes separated by a floor for the upper box and a vertically shiftable downwardly yieldable actuator, the loom having provision for downward replenishment of the shuttle in the upper shuttle box while the lower shuttle box is empty and the shuttle binder of said lower box is in the path of a shuttle entering the lower box, a bobbin chute secured to the under side of the shuttle boxes and connected to said actuator, a lock member pivoted to the lay in position for engagement with and movement by the shuttle binder, cooperating parts on said member and said bobbin chute to be in mutually engaging position to prevent downward movement of the shuttle boxes with respect to the lay when the shuttle binder is in said shuttle path, entry of the shuttle into the lower shuttle box moving the binder and causing the latter to move said member to cause relative movement of said cooperating parts to non-engaging position, and means on said member for engagement with said floor to move said member out of the path of said floor as the shuttle boxes rise and fall.

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