Aug. 17, 1937. A. A. GORDON 2,090,040

PICK EASING MOTION

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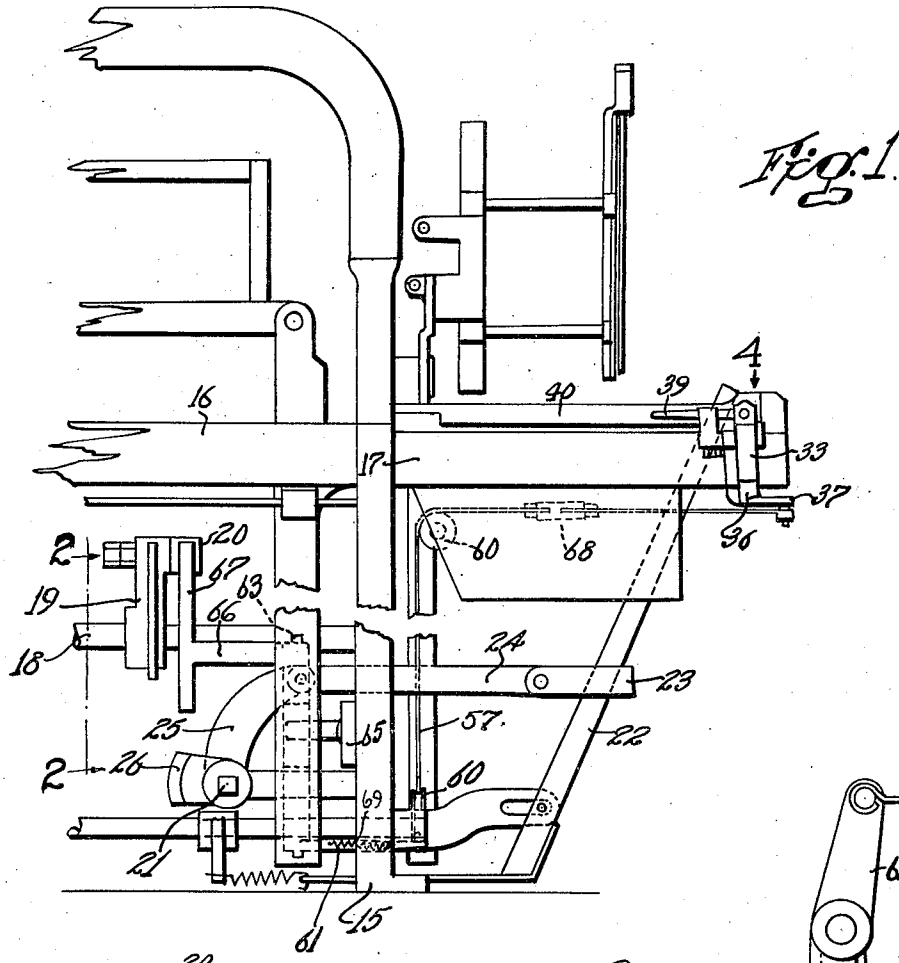


Fig. 1.

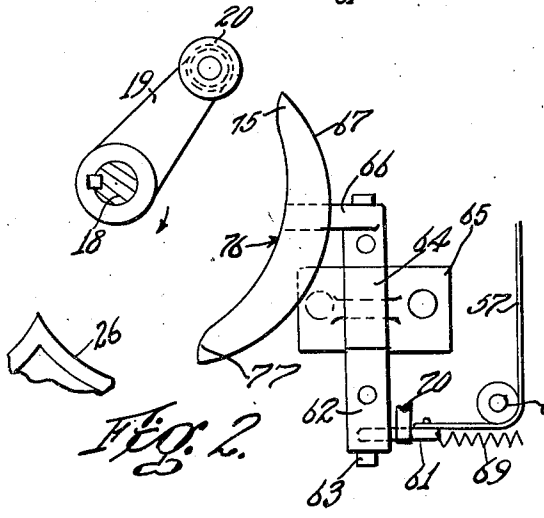


Fig. 2.

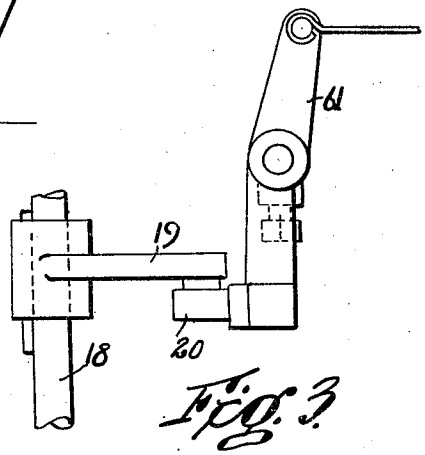


Fig. 3.

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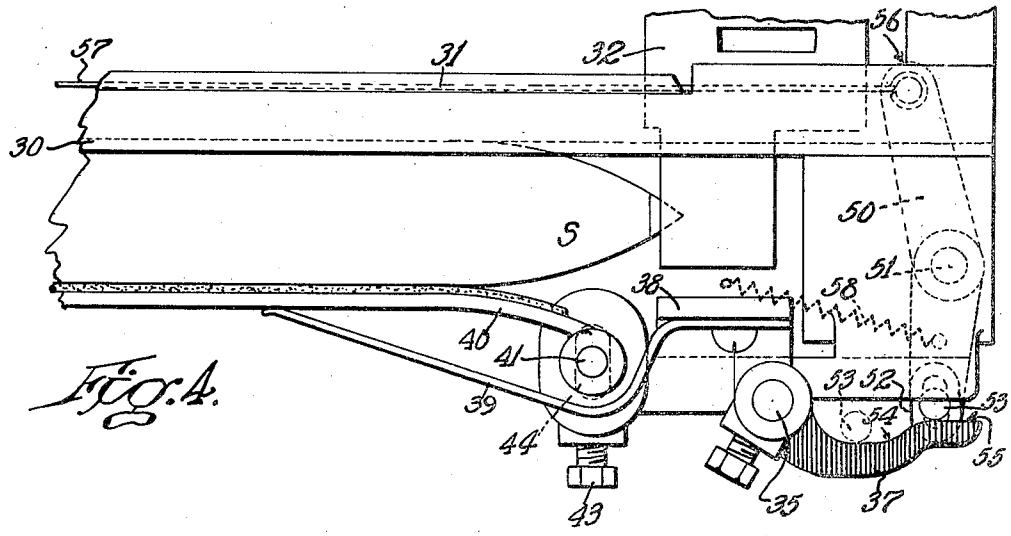
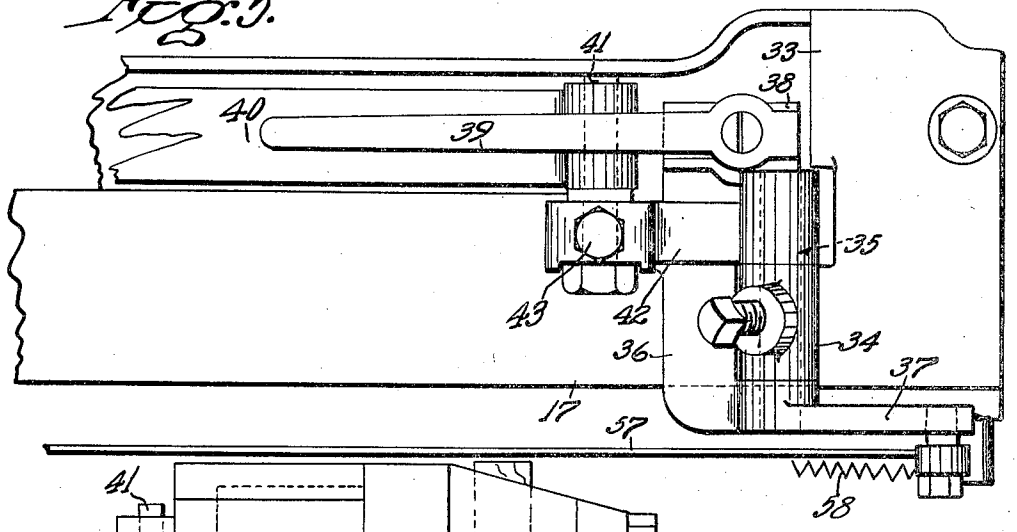


Fig. 4.

Fig. 5.



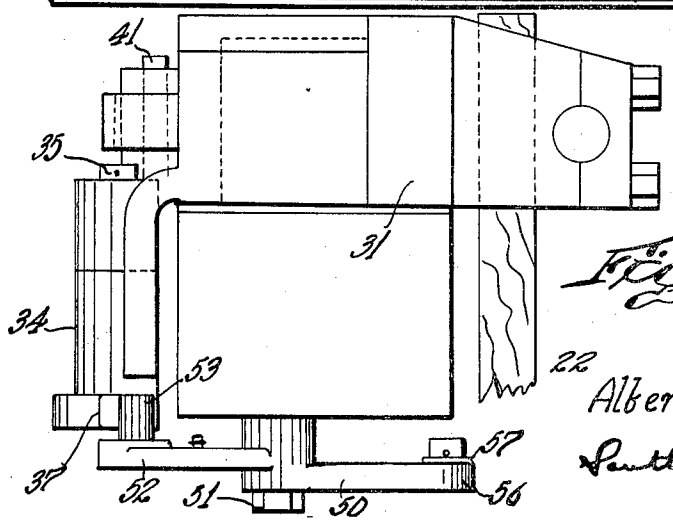


Fig. 6.

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PICK EASING MOTION

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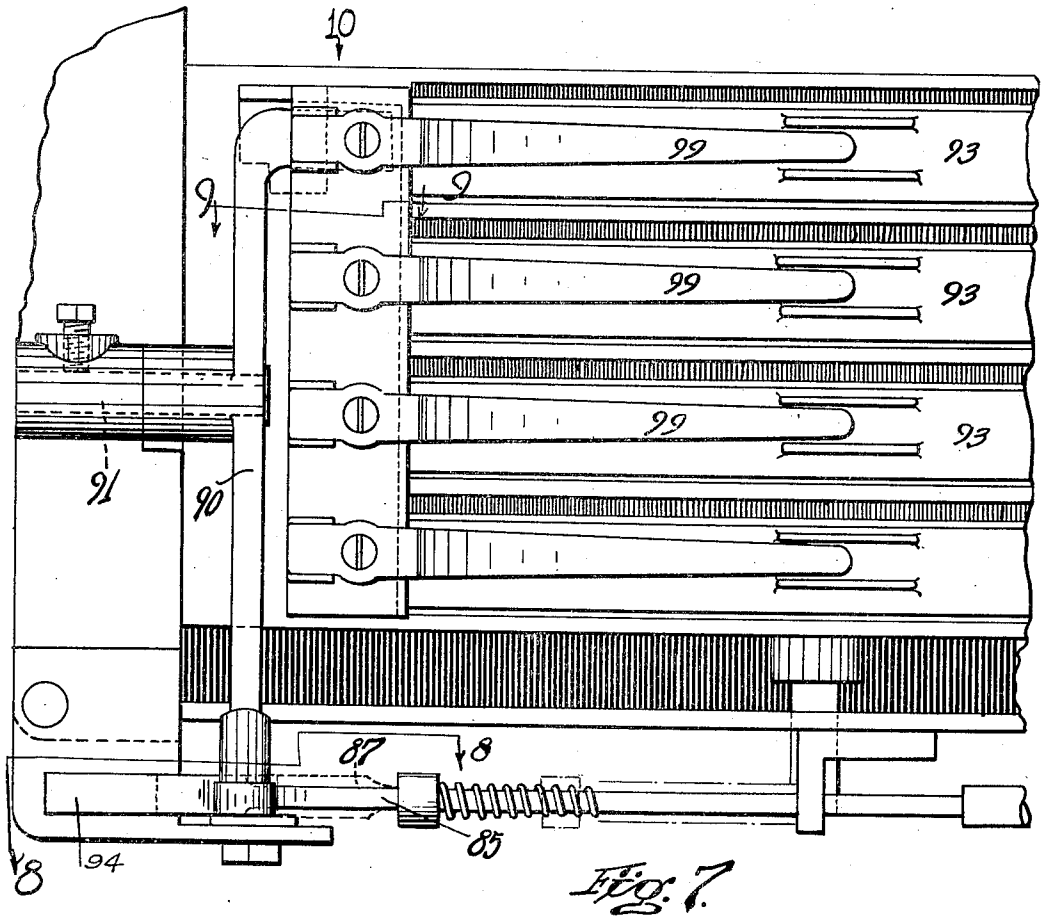


Fig. 7.

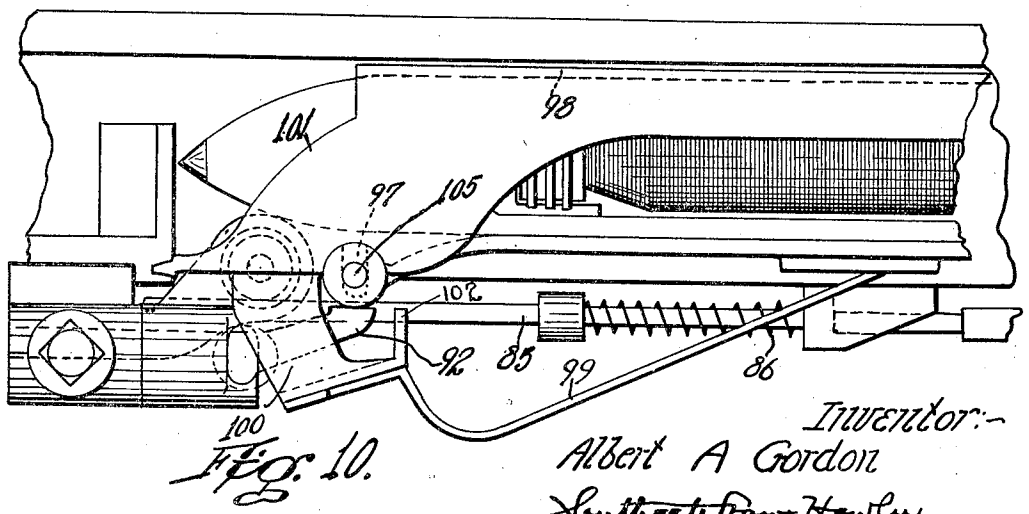


Fig. 10.

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PICK EASING MOTION

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Fig. 8.

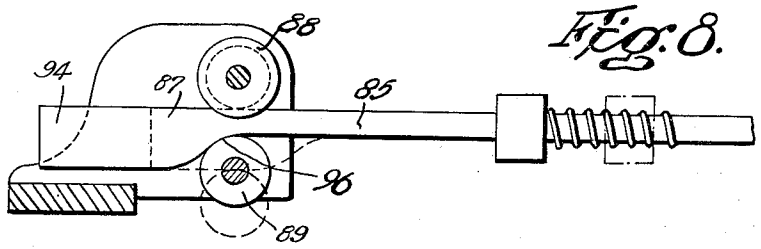


Fig. 9.

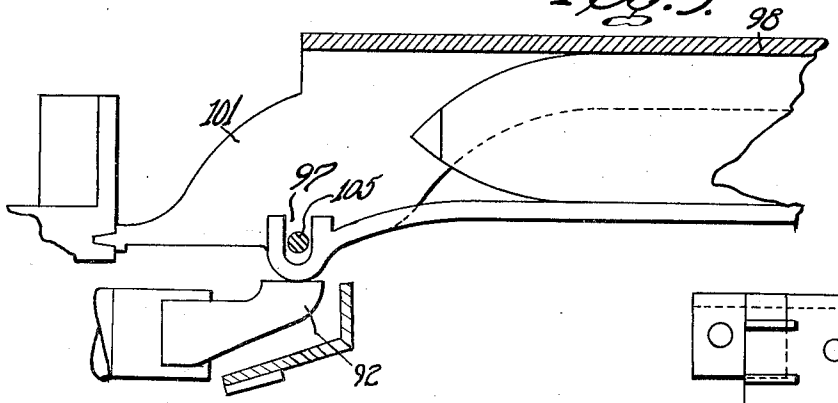
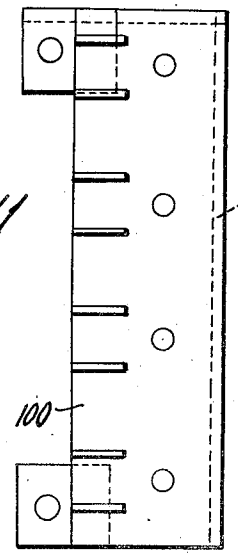


Fig. 11



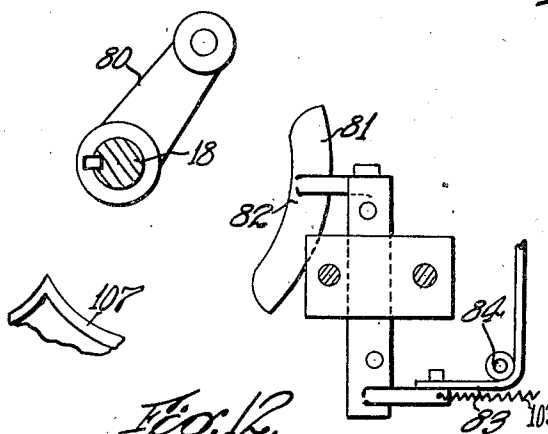


Fig. 12.

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UNITED STATES PATENT OFFICE

2,090,040

PICK EASING MOTION

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Application September 14, 1934, Serial No. 743,983

12 Claims. (Cl. 139—187)

This invention relates to pick control mechanism for looms and it is the general object of the invention to provide means operated by the picking motion to apply and relieve pressure on the shuttles.

In drop box looms of the weft replenishing type there is a plain shuttle box on the magazine end and shifting boxes at the other end. Picker sticks to propel the shuttles one at a time first from one side and then the other are generally operated by picking arms on a shaft. The shuttles enter the plain and shifting boxes when the lay is approximately midway between front and back positions and moving forwardly. Half a pick later the shuttle is picked to the opposite side of the loom. It is an important part of my invention to provide means operated by the picking mechanism to check the shuttle as it enters a box and relieve the pressure before the shuttle is again picked.

At the plain end the pressure can be applied for half a pick or more, since the shuttle remains in the single box at rest relatively to the lay during the time the lay is in the forward part of its stroke. When the shuttle enters a shifting box, however, the box may start to shift almost immediately, and the checking pressure should be removed soon enough to avoid interference with the box shift. These results I accomplish by having the picking mechanism related to the checking devices for varying lengths of time, the check at the plain end being held preferably though not necessarily for a relatively long time, while the check at the other end is relieved quickly. Cams of different lengths to coact with the picking arms may be used for the purpose, as set forth hereinafter.

It is a further object of my invention to propel and check the shuttles by the same mechanism, that is, the picking motion, thereby making an existing part perform an additional function. The checking pressure should be released before picking and by having the checking and picking cams in successive engagement with the picking arm, I assure release of the shuttle before it is picked.

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 claims.

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

Fig. 1 is a front elevation of the plain end of a loom having my invention applied thereto,

Fig. 2 is a vertical section on line 2—2, Fig. 1,

Fig. 3 is a plan view of the structure shown in Fig. 2,

Fig. 4 is an enlarged plan view of a part of the plain shuttle box, looking in the direction of arrow 4, Fig. 1,

Fig. 5 is a front elevation of the structure shown in Fig. 4,

Fig. 6 is a right end elevation of Fig. 5,

Fig. 7 is a view similar to Fig. 1 but of the opposite or shifting shuttle box end of the loom,

Fig. 8 is a detail horizontal section on line 8—8, Fig. 7,

Fig. 9 is a detail horizontal section on line 9—9, Fig. 7,

Fig. 10 is a plan taken in the direction of arrow 10, Fig. 7,

Fig. 11 is a detail front elevation of the binder guard shown in Fig. 10, and

Fig. 12 is a view similar to Fig. 2 looking in the same direction but showing the picking motion and check at the shifting shuttle box end of the loom.

Referring first to the plain end of the loom shown in Figs. 1 to 6, the loom frame 15 has a breast beam 16 and lay 17, bottom shaft 18, picker arm 19 with roll 20 and picking shaft 21, as usual. A picker stick 22 is connected by lug strap 23 and sweep stick 24 to sweep arm 25 on the picking shaft. A picking shoe 26 on shaft 25 is positioned to engage the picking ball or roll 20 every alternate beat of the lay, although I am not limited to such an arrangement.

The plain shuttle box 30, Figs. 4, 5 and 6, has a box back 31 along which slides the picker 32 to propel shuttle S. A stand 33 on the lay has a hub 34 in which is fixed a pin 35 forming the pivot of a checking lever 36. The latter has an arm 37 at the bottom thereof and an upper arm 38 to which is secured the binder spring 39 for binder 40. The binder is mounted pivotally on a stud 41 held in an intermediate arm 42 of lever 36. A set screw 43 holds the stud in its arm and a slot 44, Fig. 4, permits adjustment toward and from the shuttle.

A transmitting lever 50 is pivoted to the lay at 51 and has a forward arm 52 slotted to adjustably hold stud 53 in position to slide along the rear face of arm 37. This surface is inclined as at 54 and has a dwell 55. The rear end 56 of lever 50 is connected to a wire or similar connector 57, and a spring 58 connected to the lever acts to turn the latter so as to move the stud 53 off the dwell and also pull wire or connector 57 outwardly, or to the right in Fig. 4.

Connector 57 extends around rolls 60 and is attached to an arm 61 having a hub 62 secured in adjusted angular position on a vertical shaft 63. The latter extends upwardly through hub 64 of a stand 65 fixed to the loomside, and has secured to the top thereof a second arm 66 carrying a cam 67, see Fig. 2. A turnbuckle 68 can be turned to tighten the connector 57. A spring 69 holds arm 61 against a stop 70.

In operation, assuming that arm 19 is in the position shown in Fig. 2 with roll 20 moving toward cam 67, spring 69 holds the cam rearwardly, or toward the picking arm, and spring 58 is holding stud 53 at the bottom of the incline 54, or to the left thereof as indicated in dotted lines, Fig. 4. As the picking arm rotates the roll 20 will strike the top of cam 67 and rock shaft 63 to tighten connector 57. An inclined surface 75 on the cam causes the latter to move forwardly, and a dwell 76 concentric with the bottom shaft 18 maintains the connector taut. As roll 20 leaves the dwell it moves over a second incline 77 and then moves toward and engages picking shoe 26 to propel the shuttle in the plain box. The second incline permits the loom to be turned backwardly without causing breakage between the roll 20 and cam 67.

When connector 57 is tightened it rocks lever 50 counter-clockwise to move stud 53 up incline 54 toward dwell 55. The lever 37 thereupon rocks clockwise, Fig. 4, and moves arms 38 and 42 rearwardly, the effect of which is to move the binder 40 tightly against the shuttle and also increase the pressure of the binder spring by moving the same as a whole toward the binder.

The bottom shaft rotates once for two picks, and as shown the cam 67 will engage the picking roll during about one-half of a pick of the loom, acting to tighten the connector 57 and increase shuttle checking during the time that the lay is moving from bottom center almost to picking at top center. During the first part of this period the shuttle will arrive from the opposite side and enter the box against the increased resistance of the binder. As will be apparent from Fig. 2, the cam 67 and connector 57 will be relieved a short time before picking, and spring 58 will be able to restore the binder spring and binder to forward released position prior to picking. The shuttle can therefore be picked out of the box with a minimum of power.

The mechanism at the drop box end of the loom, shown in Figs. 7 to 12, operates in a similar manner, although the time of checking is somewhat different. As shown in Fig. 12 the second picking arm 80 coacts with a shorter cam 81 similar to cam 67 having a short dwell 82. A second connector 83 extends around guide sheaves 84 and is attached to a rod 85 pushed to the left, Fig. 7, by a compression spring 86. A head 87 on the rod lies between a guide roll 88 on the lay and a roll 89 on the bottom of pressure lever 90. The latter is pivoted to the lay at 91 and has an upper finger 92 which bears against the front outer end of the shuttle binder 93 which is in active position, or opposite the race. Head 87 has broad and narrow parts 94 and 95, respectively, connected by an inclined cam face 96, and movement of rod 85 to the right, Fig. 7, or inwardly, will rock lever 90 to push finger 92 rearwardly.

Each binder 93 is open slotted as at 97 so that the binder can float toward and from the box back, or lay end 98, being guided by a pin 105 on the lay, and each binder has a spring 99 on a spring holder 100. The latter is secured to the shifting box structure 101 and is shaped as seen in Figs. 10 and 11 with a vertical guard or binder engaging edge 102 located near the floating ends of the binders.

In the operation of this part of the invention, the cam 81 will be held rearwardly by a spring 103 similar to spring 69 and rod 85 will be held yieldingly to the left as shown in full lines, Figs. 7 and 8. Prior to entry of the shuttle into the cell or box 93 opposite the race or lay, picking arm 80 will cause cam 81 to move forwardly to tighten connector 83. The broad part 94 of head 87 moves to the dotted position, Figs. 7 and 8, rocking lever 90 to force finger 92 against the active binder and move the latter rearwardly. As the shuttle enters the box it will be checked by the binder, but the dwell 82 is short and the connector 83 is quickly slackened by passage of picking arm 80 away from cam 81, after which the shuttle boxes can shift if necessary. Finger 92, being relieved, will not resist such shifting, since spring 86 moves the narrow head part 95 opposite roll 89 as soon as connector 83 is slackened.

The binders move into engaging position relatively to finger 92 as the boxes shift, and as the box structure 101 comes to rest after a shift the binder of the active cell or box will be in position to cooperate with the lever 90. A binder pin 105 guides the back and forth motions of the binder and extends through the slots 97 for this purpose.

After the picking arm 80 moves away from cam 81 it will strike picking shoe 107 to pick the shuttle in active position in the shifting boxes. In this instance, as in the first described, the picking arm leaves the cam 81 and therefore relieves pressure on the shuttle to be picked before the picker shoe is moved.

From the foregoing it will be seen that I have provided means for checking the shuttle as it enters the box and thereafter relieving the pressure on it prior to picking. This result is accomplished by connections from the picking motion so that the part which picks the shuttle also controls the relieving of the checking force, thus insuring releasing of the shuttle before it is picked. On the plain end of the loom the shuttle checking pressure can be applied just before boxing and maintained until just before picking, if desired, but on the shifting shuttle box end of the loom the checking pressure is relieved as soon as the shuttle is boxed in order to avoid interference with box shifting. In both instances, however, the pressure is applied and then relieved prior to picking by a control exercised by the picking motion. It will be seen that as the arm 19 rotates it reaches a given point in its travel where it effects picking, and that this same arm controls the shuttle checking before reaching this point, as will be apparent from an inspection of Fig. 2.

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 operating with a shuttle, a picking arm, shuttle checking means, connections between the picking arm and checking means to require the picking arm first to cause the checking means to exert a resistant force derived from the picking arm on the shuttle and then relieve said resistant force, the picking arm thereafter

operative to pick the shuttle when the force on the latter has been relieved.

2. In a loom operating with a shuttle, a picking arm moving in a fixed path, a cam to be engaged by the arm located along one portion of the path, a picking element located along another portion of the path to be engaged by the arm after the latter has engagement with the cam, shuttle checking and relieving means operatively connected to the cam, and shuttle propelling means operatively connected to the picking element, said picking arm operative to engage and become disengaged from the cam prior to engagement with the picking element.

3. In a loom operating with a shuttle, a shuttle box to receive the shuttle and from which the latter is picked, picking mechanism, a lever pivotally mounted with respect to the shuttle box, a binder for the shuttle mounted on the lever, means operative prior to arrival of the shuttle in the box to move the lever in one direction to cause the binder to move to shuttle checking position by a force derived from the picking mechanism, and subsequently operating means to move the lever in the opposite direction to move the binder away from shuttle checking position prior to picking.

4. In a loom operating with a shuttle, a shuttle box into which the shuttle moves and from which the shuttle is picked, a lever pivotally mounted with respect to the shuttle box, a binder mounted on the lever, a binder spring also mounted on the lever and having engagement with the binder, means to rock the lever in one direction to cause the binder and spring to move to a position to exert an increased checking force on the shuttle, and other means subsequently operative to move the lever in the opposite direction to move the binder and spring in a direction to relieve the checking pressure on the shuttle prior to picking.

5. In a loom operating with a shuttle, a shuttle box, a lever pivotally mounted with respect to the box, a shuttle binder pivotally mounted on the lever, a binder spring supported by the lever and normally operative to move the binder to shuttle checking position, picking mechanism for the shuttle, and connections between the picking mechanism and the lever effective prior to boxing of the shuttle to rock the lever in one direction to cause the binder and binder spring to be in position to exert checking force on the shuttle as the same is boxed, and said picking mechanism and connection thereafter effective to rock the lever in the opposite direction to move the binder and binder spring away from shuttle checking position prior to picking of the shuttle by the picking mechanism.

6. In a loom, a lay, a set of shuttle boxes shiftable relatively to the lay, a binder pin on the set of boxes, a binder for each shuttle box having a rearwardly opening slot to contain the pin, a pressure arm to press the binder of the active shuttle box rearwardly toward shuttle checking position, and a guard on the set having means to limit forward motion of all the binders to prevent disengagement of the pin and slotted parts of the binders.

7. In a loom operating with a shuttle, a shuttle box, an element forming part of the box movable to check and also relieve the shuttle, a rotating shaft, a picking member rotating with the shaft, and operative to move the shuttle out of the box, and means operated by the picking member to move the element by a force derived from the picking member toward the shuttle to check the latter prior to picking and thereafter release control of the member during picking.

8. In a loom operating with a shuttle, a shuttle box, a rotating picking member reaching a given position periodically during loom operation and operative when reaching said position to propel the shuttle out of the box, checking means to resist motion of the shuttle relatively to the shuttle box, and means operated by the picking member before reaching said point to move said checking means toward the shuttle to check the latter prior to picking and thereafter lessen the resistance offered by the checking means to motion of the shuttle.

9. In a loom operating with a shuttle, a shuttle box, a rotating picking member reaching a given position periodically during loom operation and operative when reaching said position to propel the shuttle out of the box, check means to exert a force on the shuttle to resist motion thereof, and a controller for the check means operated by the picking member before the latter reaches said point, first, to transmit a positive force derived from the picking member to the check means to move the latter toward the shuttle to increase the force exerted by the check means against the shuttle and second, to thereafter lessen the force transmitted to the check means as the shuttle is propelled out of the box by the picking mechanism.

10. In a loom operating with a plurality of shuttles, a lay, shifting shuttle boxes any one of which is capable of moving to active position relatively to the lay, a binder for each shuttle box, a rotating shaft, a picking member rotating with the shaft, a pressure exerting element for the binder in active position, and force transmitting means operated by the picking member to move the element toward the actively placed binder by a force derived from the picking member prior to picking, the picking member thereafter moving out of force transmitting relation with respect to the force transmitting means prior to picking to relieve the active binder.

11. In a loom operating with a shuttle, a shuttle box, checking means for the shuttle, propelling means to move the shuttle out of the shuttle box, an actuator for the checking means, a second actuator for the propelling means spaced from the first actuator, and a moving picker arm to engage the actuators successively and moving away from the actuator of the checking means before engaging the actuator of the shuttle propelling means.

12. In a loom operating with a shuttle, a shuttle box, checking means to resist the motion of the shuttle into and out of the shuttle box, propelling means to move the shuttle out of the shuttle box, an actuator for the checking means capable of increasing and decreasing the resistance offered by said checking means to motion of the shuttle in the shuttle box, a second actuator for the propelling means, and a moving picker arm to engage the first actuator to increase the resistance of the checking means on the shuttle and thereafter pass out of engagement with the first actuator and then engage the second actuator to propel the shuttle out of the shuttle box.

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