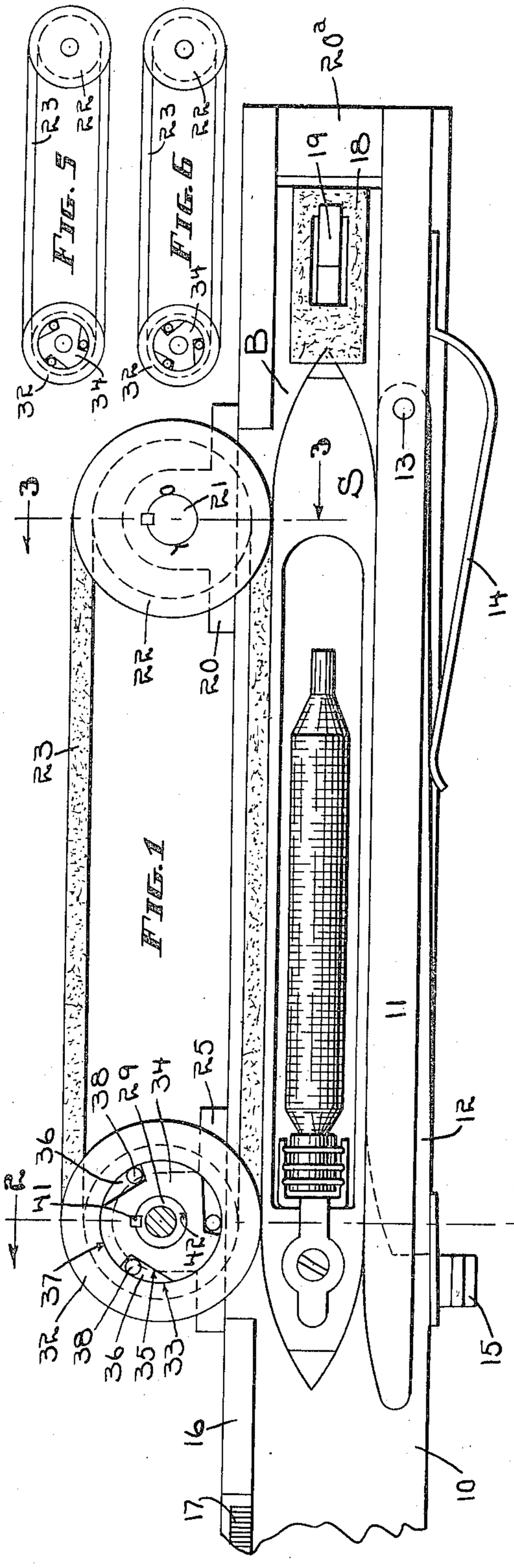
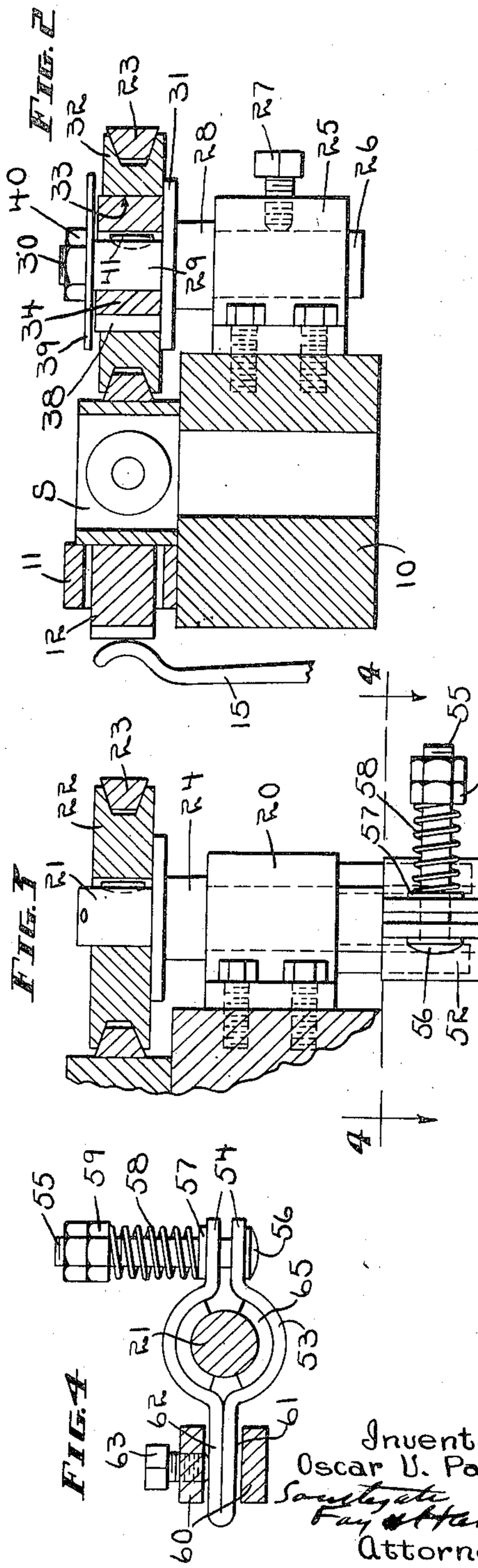
Aug. 20, 1935. O. V. PAYNE 2,012,050

SHUTTLE BOX CONSTRUCTION FOR LOOMS

Filed Aug. 29, 1933





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Patented Aug. 20, 1935 2,012,050

UNITED STATES PATENT OFFICE

2,012,050

SHUTTLE BOX CONSTRUCTION FOR LOOMS

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Application August 29, 1933, Serial No. 687,320

14 Claims. (Cl. 139—186)

This invention relates to improvements in loom shuttle boxes and it is an object of the invention to provide a construction wherein the shuttle may be subjected to a variety of controls while entering or leaving the shuttle box.

It is a further object of my invention to provide a shuttle box with a movable or travelling friction surface which may be so controlled to resist movement of the shuttle into the box but without resisting picking, or allow the shuttle to enter the box with little or no resistance and effective to resist picking. This result may be accomplished by the use of a clutching part which can be reversed at the will of the user.

It is a further object of my invention to employ an endless belt to define one side of the shuttle box and train this belt around a pair of pulleys one or both of which may be retarded as to motion in either direction. This feature of my invention contemplates a clutching device which can be rendered effective to check the shuttle in either direction while permitting free movement in the opposite direction. By removing certain parts of the clutching device the shuttle can move freely both into and out of the box, and if desired a clamp friction can be used to offer equal resistance to shuttle motion in opposite directions. All desirable combinations of controls for the shuttle are therefore available.

It is a further important object of my invention to provide a travelling box forming element which may be common to the various arrangements already described, and present a friction surface which imposes a drag on the shuttle and also acts to force the latter against the opposite part of the shuttle box.

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

Fig. 1 is a top plan view of one end of the lay having my invention applied thereto,

Figs. 2 and 3 are vertical sections on lines 2—2 and 3—3, respectively, of Fig. 1,

Fig. 4 is a detail horizontal section on line 4—4 of Fig. 3, and

Figs. 5 and 6 are diagrammatic figures showing the clutching mechanism in different positions.

Referring to the drawing, the lay 10 has a box front 11 slotted to receive a binder 12 pivoted to the box front as at 13. A spring 14 urges the binder rearwardly and a protector finger 15 is positioned for movement by the binder to non-protecting position when the shuttle S enters the box B. A box back guide 16 aligns with reed 17, and a picker 18 propelled by a picker stick 19 and resting against a stop 20*a* may be employed to pick the shuttle out of the box. The matter thus far described may be of common construction and of itself forms no part of my present invention.

In carrying my invention into effect I secure a stand 20 to the rear of the lay near the outer end thereof and mount rotatably in said stand a vertical shaft 21 to the upper end of which is keyed or otherwise secured a pulley 22. The latter may be grooved to receive a V-belt 23 the straight sides of which extend parallel to the lay or the path of movement of the shuttle. The shaft 21 may have a shoulder 24 to rest on stand 20 and support the pulley in correct position.

A second stand 25 also secured to the back of the lay has extending upwardly therethrough a stud 26 secured in the stand by a set screw 27 and having a shoulder 28 to rest on the top of the stand. Projected upwardly from the shoulder is a cylindrical bearing 29 terminating in a reduced threaded end 30. A washer 31 may rest on the shoulder 28 and afford support for a second pulley or guide wheel 32 the periphery of which is grooved to receive the belt 23. This second pulley has an internal cylindrical bore 33 into which fits a clutch 34 having notches 35 therein to define with the bore 33 a plurality of wedge shaped pockets 36. The clutch has cylindrical surfaces 37 located between the notches to provide sufficient guiding and bearing surfaces for the bore of the pulley 32. Clutching pins or rollers 38 are located in the pockets and have diameters slightly less than the large ends of the pockets. These pins or rollers are held in position by the lower washer 31 and an upper washer 39 held in place by a nut 40 on the threaded end 30. A key 41 between the bearing 29 and the clutch 34 provides means for holding the clutch against rotation when the set screw 27 is clamped against the stud 26.

The clutch is provided with a cylindrical bore 42 proportioned to receive the bearing 29 and said clutch member is reversible with respect to the bearing, this result being accomplished by moving the nut 40 and the washer 39, after which the key can be removed and the clutch changed from the position shown in Fig. 5 to that shown in Fig. 6.

When the parts are in the relation shown in Fig. 1 the shuttle upon entering the box will en-

gage the belt and tend to move the same in a counter clock-wise direction so that the part of the belt contacting with the shuttle tends to move to the right as viewed in Fig. 1. This movement causes a rotary motion on the part of the pulley 32 and the rolls 38 are thereupon moved toward the small or wedging ends of the pockets 36, after which the fixed clutch tends to prevent further rotation of the pulley and the belt is arrested in its movement with the shuttle except for such slippage as may exist between the belt and the pulleys. The shuttle therefore continues to move in the box against the resistance offered by the belt and finally comes to rest in some such a position as indicated in Fig. 1. When the picker operates the shuttle will move to the left, the first effect of which will be to move the belt and therefore pulley 32 in a clock-wise direction with resultant movement of the clutching pins 38 toward the large ends of the pockets. The pulley is therefore free to rotate without restraint and the shuttle can be picked out of the box without being required to overcome any resistance offered by the frictional contact with the belt. Certain conditions of loom operations may render this mode of operation desirable, such for instance, as a high speed loom where it is necessary to check the shuttle in order to absorb the excess energy due to its quick flighting, but where as little resistance as possible is offered to the picking of the shuttle to save power.

If the opposite control conditions are desired, the clutch can be reversed as already set forth so that it will assume the position shown in Fig. 6. Under these conditions the frictional contact between the belt and shuttle will cause the pulley 32 to rotate in a counter clock-wise direction and move the pins toward the large parts of the pockets, after which the belt will move freely without imposing appreciable resistance to the boxing of the shuttle. Upon the subsequent pick, however, movement of that part of the belt contacting with the shuttle to the left will move the locking pins into the small ends of the pockets to wedge the clutch against the pulley 32, after which movement of the belt is effectively resisted so that the shuttle is required to be picked against the frictional resistance of the belt. These conditions might be desirable on a slow running wide loom where the force of the shuttle is almost spent as it nears the end of its flight and little or no resistance should be offered as it enters the box, but where the flight is so long that all of the connections of the picking mechanism not shown should be tightened by imposing frictional resistance to movement of the shuttle as the same starts to leave the box.

Should it be desired to permit the shuttle to move both into and out of the shuttle box unresisted by the belt the rollers 38 can be removed, or key 41 taken out. Under this latter condition the key may be placed in one of the pockets for safe keeping.

When the pulley 32 is unable to resist movement of the belt in either direction it is possible to effect a still further control of the shuttle by offering resistance to the belt in both directions through the medium of some such a device as that shown in Fig. 3. The shaft 21 may be extended downwardly and have a washer 50 supported by a pin 51. A clamp device 52 resting on the washer 50 may be made of sheet metal or other resilient material and comprises a body 53 from which project ears 54. A bolt 55 extending through the ears may have a head 56 bearing against one of said ears and be surrounded by a washer 57 bearing against the other ear. A compression spring 58 around the bolt presses against the washer 57 to exert a variable pressure thereon determined by the position of nut 59.

In order that the clamp may be held substantially stationary I extend downwardly from the stand 20 a pair of fingers 60 having a space 61 therebetween into which an arm 62 of the clamping element projects. A screw 63 may be employed if desired to hold the arm tightly with respect to the stand 20.

By varying the setting of the nut 59 the pressure of the lining 65 of the clamp device against the shaft 21 can be altered so that any desired resistance to movement of the pulley 22 can be had. When the third condition, already described, is desired, namely that the belt should move freely in both directions, this clamp can be released, but when resistance to belt movement in both directions is desired the clamp is tightened and may in effect be caused to hold the belt stationary. Between these extremes of adjustment of the clamping device the belt can be caused to travel with the shuttle against an adjustable resistance.

From the foregoing it will be seen that I have provided a shuttle box construction including a friction surface the movement of which can be controlled in any way desired both as regards the boxing and picking of the shuttle. The belt set forth herein affords one means for presenting a travelling surface to engage the shuttle and either resist or permit free movement of the latter, according to the setting of the parts described. The clutch is reversible when a difference in the resistance in the boxing and picking is desired, and can be disconnected when uniform conditions of boxing and picking are desired, either by having free or resisted movement of the belt. In certain forms of the invention the belt is given a step by step movement to carry it progressively around the pulley so that new surfaces are continually being presented to the shuttle with reduced wearing effect on the travelling surface. It will also be seen that the clamp for the pulley 22 can be used when the clutch 34 is operative, the clamp permitting a wide range of yielding resistance on the part of belt movement in the direction opposite to the motion which is positively prevented by the clutch. While I have shown the space between the belt and the box front 11 as adaptable for one width of shuttle, yet it is within the scope of my invention to vary this distance for the accommodation of shuttles of different widths.

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, a shuttle box, means presenting a continuous surface forming a side of the shuttle box, and means to cause said surface to have a step by step motion due to successive boxings of a shuttle.

2. In a loom, a lay operating with a shuttle, a shuttle box, a surface to engage the shuttle to travel along in contact therewith and forming one side of the shuttle box, and means to resist movement of said travelling surface in one direction only, said surface being movable in the opposite direction without resistance on the part of said means.

3. In a loom operating with a shuttle, a lay, a shuttle box, a belt forming one side of the shuttle box, a pair of pulleys carried by the lay and around which the belt moves, and means to resist movement of one of said pulleys.

4. In a loom operating with a shuttle, a shuttle box, a belt forming part of the shuttle box, a pair of pulleys around which the belt is trained, and clutch means to cooperate with one of the pulleys to prevent movement thereof in one direction.

5. In a loom operating with a shuttle, a lay, a shuttle box, a belt mounted on the lay and forming part of the shuttle box, and a reversible controller for the belt effective to resist motion of the belt longitudinally of the lay in either of two directions depending upon the position of said reversible element.

6. In a loom operating with a shuttle, a lay, a shuttle box, a belt mounted on the lay forming part of the shuttle box, and a detachable reversible pulley for the belt effective to resist motion of the belt in either of two directions depending upon the position of the reversible element, said reversible element when detached from the belt being incapable of offering resistance to movement of the latter in either direction.

7. In a loom operating with a shuttle, a lay, a belt on the lay forming part of the shuttle box, a controller for the belt tending to prevent movement of the latter in one direction, and a yielding resistance additional to the controller tending to prevent movement of the element in the opposite direction.

8. In a loom operating with a shuttle, a lay, a belt mounted thereon to engage the shuttle, a reversible controller for the belt to prevent movement of the latter while in contact with the shuttle in either of two directions depending upon the position of the reversible element, and a yielding resistance tending to resist motion of the belt in either direction independently of the controller.

9. In a loom operating with a shuttle, a lay, a shuttle box, a belt on the lay forming part of the shuttle box, a reversible detachable controller for the belt effective to prevent motion of the latter along the lay in either of two directions depending upon the position of the reversible element, the belt moving without resistance on the part of the controller when the latter is detached, and means independent of the controller to impose a yielding resistance to the belt tending to resist motion of the belt irrespective of the position of the controller or whether the latter is detached.

10. In a loom operating with a shuttle, a shuttle box, a travelling surface forming part of the shuttle box, a shuttle to enter and leave the box, the travelling surface capable of resisting movement of the shuttle when entering or leaving the box, and a plurality of controls for said surface one of which prevents movement of the surface in either of two directions while permitting unobstructed movement of the surface in the opposite direction, another of said controls capable of disconnecting the first control from the travelling surface, and the third control effective to resist movement of the travelling surface in either direction independently of the first control.

11. In a loom operating with a shuttle, a shuttle box for the shuttle to enter and leave, a travelling surface forming part of the shuttle box and positioned for engagement with the shuttle when the latter is in the box, and a plurality of controls for the travelling surface effective to resist movement of the travelling surface when the shuttle is entering or leaving the box, or effective to render said travelling surface free to move with the shuttle when the latter is moved into or leaving the box.

12. In a loom operating with a shuttle, a shuttle box for the shuttle to enter and leave, a travelling surface to engage the surface and forming part of the box, and two separate controls for said travelling surface, one effective to resist movement of the surface in one direction only, and the other to resist movement of the surface in the opposite direction.

13. In a loom operating with a shuttle, a shuttle box, a travelling surface forming part of the shuttle box, a pair of supports for the travelling surface each movable with the latter, one of said supports being movable freely in opposite directions, and means to prevent movement of the other support in one direction.

14. In a loom, a lay, a shuttle box, a pair of pulleys mounted on the lay at one side of the shuttle box, means to resist movement of one of the pulleys, and a shuttle engaging belt cooperating with the pulleys and forming part of the shuttle box.

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