J. W. KILLPARTRICK.

RELEASE MECHANISM FOR SHUTTLES.

APPLICATION FILED SEPT. 24, 1914.

1,153,500.

Patented Sept. 14, 1915.

2 SHEETS—SHEET 1.

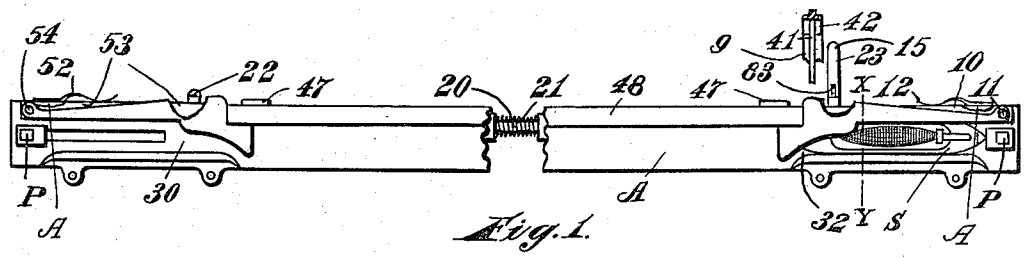

Fig. 1.

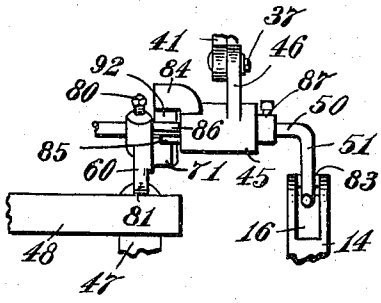

Fig. 2.

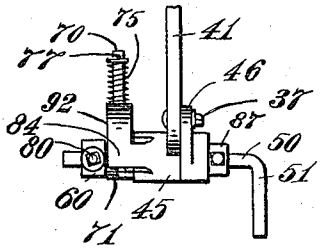

Fig. 3.

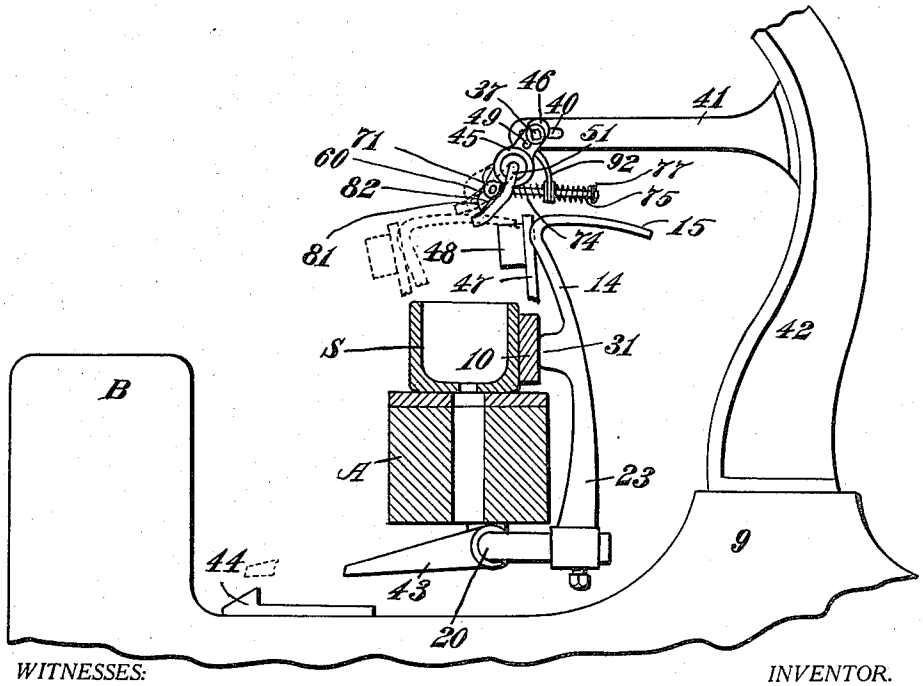

Fig. 4.

WITNESSES:

Lindsley A. Wood.

Fisher H. Pearson

INVENTOR.

John W. Killpartrick,

BY

Gardner W. Pearson

ATTORNEY.

J. W. KILLPARTRICK.

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2 SHEETS—SHEET 2.

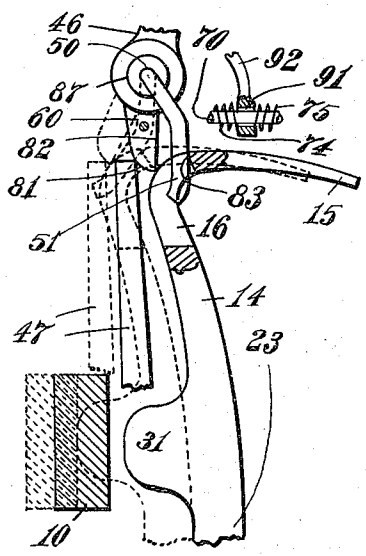

Fig. 5.

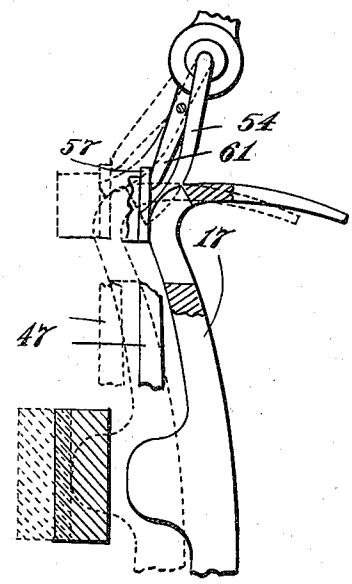

Fig. 6.

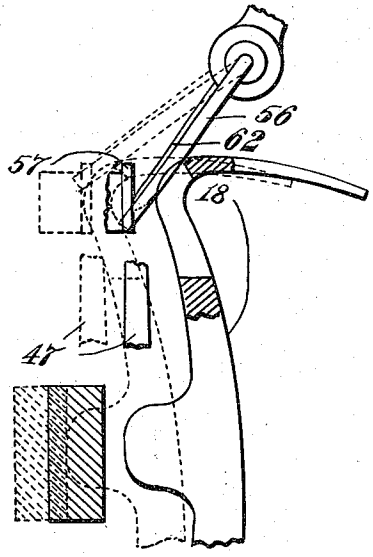

Fig. 7.

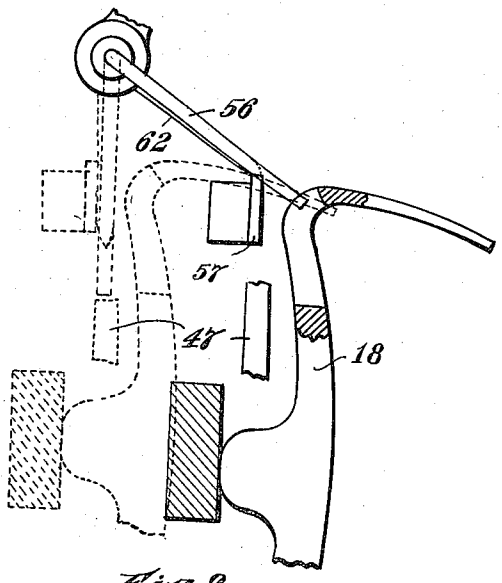

Fig. 8.

WITNESSES:

Lindsey A. Nicol.

Fisher & Pearson

INVENTOR.

John W. Killpartrick,

BY

Gardner W. Pearson

ATTORNEY.

COLUMBIA PLANOGRAPH CO., WASHINGTON, D. C.

UNITED STATES PATENT OFFICE.

JOHN W. KILLPARTRICK, OF LOWELL, MASSACHUSETTS.

RELEASE MECHANISM FOR SHUTTLES.

1,153,500. Specification of Letters Patent. Patented Sept. 14, 1915.

Application filed September 24, 1914. Serial No. 863,327.

To all whom it may concern:

Be it known that I, JOHN W. KILLPARTRICK, a citizen of the United States, residing at Lowell, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Release Mechanism for Shuttles, of which the following is a specification.

This invention relates to looms and has for its object to provide a simple and certain device for relieving the shuttle from the greater part of the pressure or from all the pressure of the shuttle binder at the time it is to be picked.

Most looms are provided with binders which are arranged to frictionally engage the shuttle as it enters the shuttle box not only for the purpose of preventing the shuttle from rebounding but also for the purpose of assisting in bringing the shuttle to rest. Such shuttle binders are generally engaged by one or more springs which tend to press them toward the shuttle thereby creating or increasing the friction between the shuttle and its binder. If no means are provided for releasing the pressure which causes the friction, the picker must not only overcome the inertia of the shuttle itself but also the friction between it and the binder. This necessitates a harder blow by the picker than if there were no such friction and such harder blow requires more power. To be of advantage in saving power, the means for releasing the pressure which causes the friction must use less power than the picker exerts to overcome the friction. The means must not interfere with the operation of the protector mechanism.

My invention is for the purpose of disengaging some or all of the springs which directly or indirectly engage the binder from just before the shuttle is struck by the picker until it has left the shuttle box or has cleared the binder. It is arranged, however, so that before the shuttle has reached the shuttle box and binder at the other end of the lay, the pressure on the binder at that end has been resumed. By so relieving the pressure of such springs, the power for operating the picker and therefore for operating the loom can be reduced whereby a saving is made, and as there is less power required, there is less wear on the parts and consequently fewer supplies are necessary. Not only this but with my invention less attention to the loom is necessary on the part of the operators. For the above reasons more cloth can be produced per loom with less cost.

In the drawings, Figure 1 is a plan view of the lay beam of a loom with part of the frame thereof. Fig. 2 is a front elevation in detail of the working parts of my device. Fig. 3 is a plan view thereof. Fig. 4 is a side elevation enlarged as from the right of line *x*—*y* on Fig. 1. Fig. 5 is a side elevation of the working parts shown in Fig. 4 in different positions. Figs. 6 and 7 are views similar to Fig. 5 showing modified constructions, both in side elevation. Fig. 8 is a side elevation of the modification shown in Fig. 7 with the parts in different positions.

The parts which are old and form no part of my invention are the loom frame 9, the lay at the top of which is the lay beam A, the shuttle boxes 30 and 32 at each end of the lay, the breast beam B, the shuttle binders 10 and 53 which are pivoted to the lay beam at the back thereof that is at the side farthest from the breast beam, at 11 and 54, one at each end thereof. Other old parts are the protector shaft 20 which is journaled to the back of the lay, the protector shaft spring 21 which tends to turn the shaft in such a direction that the binder fingers 22 and 23 which are carried thereby will be forced respectively against the free ends of the binders 10 and 53. The dagger 43 and frog 44 are also of a well known construction.

P represents the pickers and S the shuttle both of any usual construction.

12 and 52 represent the light binder springs which I prefer to use for the purpose of exerting sufficient pressure upon the binder to keep it in engagement with the shuttle, if the shuttle is at that end of the lay beam, to prevent it from wabbling or getting out of place.

My invention is applicable to looms wherein the protector shaft is journaled at the back of the lay beam that is the side farthest from the breast beam. In looms of this construction, the binders and binder fingers as well as the protector shaft are at the back of the lay beam.

The shuttle is picked after the lay has advanced toward the breast beam and is approximately half way back to its extreme backward point while it is receding from

the breast beam. In order to release the relatively strong pressure which is exerted upon the binders by the protector shaft spring 21 operating through the protector shaft 20 and binder fingers 22 and 23, I use mechanism to accelerate the backward or receding movement of the parts of the binder fingers which engage the binders, whereby the pressure thereon is relieved. This is so adjusted that such pressure is reduced or checked entirely from the time just before the shuttle is picked until it has cleared the binder on the side from which it is picked, but the pressure is allowed to be again exerted before it reaches the shuttle binder at the other end of the lay.

My purpose is accomplished by slightly turning the protector shaft so as to move the binder fingers slightly away from the binders at the appropriate time. I could accomplish this turning by means of an additional member but I prefer to utilize one of the binder fingers as 23 for the purpose. I do this by forming binder finger 23 with a longitudinal extension 14 which extends upward above the shuttle box and is extended backward in the form of a tail or table 15. At the junction of the table and extension is a slot 16. At 31 is a boss which engages binder 10. On account of the greater distance from the pivot, it requires less power applied near slot 16, to overcome spring 21 than that spring exerts on the binder at boss 31. I fix to that part 42 of the loom frame 9 which extends above the lay beam, a bracket 41 so as to project forward and over the lay in proximity to the binder finger 23. This is preferably provided with a horizontal slot 40 and supports an arm 46 which has a slot 49 through which and through slot 40 passes a bolt 37 whereby arm 46 may be adjusted forward and back or up and down or pivotally as desired.

47 is the sword of the loom the top of which extends slightly above the reed cap 48.

Preferably integral with arm 46 is formed a hub 45 which serves as a bearing for the stiff wire rod 50 which I will call the accelerator rod. At one end this is bent at substantially right angles to form an arm 51 which is adapted to engage the top of binder finger extension 14. Its end is of such length as to enter slot 16. At the other end of accelerator rod 50 is carried an arm or tongue 60 adjustable thereon by means of a set screw 80. The free end 81 of tongue 60 is curved toward the front as shown while the back 82 is preferably straight. Tongue 60 is of such length and so adjusted that the top of lay sword 47 will strike its curved forward face 81 on the back stroke and its straight back face 82 on the forward stroke. This face 81 is preferably cut as a cam face the shape of which may be made to determine the result of its sliding or wiping contact with the end of sword 47 on the speed of tongue 60 as it is pressed back thereby.

The table 15 extends backward and is of such length that as the lay, carrying binder finger 23 with it, moves forward, accelerator arm 51 will ride upon it as shown in Fig. 4 in a position where it is out of action. As the lay recedes or moves back, the parts are so adjusted that just before the pick is to be made, accelerator arm 51 reaches the top edge 83 of slot 16 and slips down and over into slot 16. At the same time or a trifle later, the lay sword 47 strikes the front curved cam face 81 of tongue 60 and presses back tongue 60 carrying with it accelerator arm 51.

As there is no yielding to the lay sword as it moves back, it slips upward over front face 81 of tongue 60 and thereby produces a wedge or cam action which moves back the end of tongue 60 and of arm 51 not only as fast as the lay but faster. This is the accelerator action and causes the accelerator arm 51 acting on extension 14 of binder finger 23 to move faster than the lay beam and to turn protector shaft 20 slightly whereby both binder fingers leave their respective binders for a brief interval until the end of lay sword 47 slips back over cam face 81 to a point where on account of the cam curve as shown in Fig. 4, it ceases to move the tongue 60 backward but permits protector spring 21 to bring the binder fingers back into engagement with the binders. As the lay continues to move backward, sword 47 slips by the tip end of tongue 60 to the position shown by the full lines in Fig. 4. On the forward stroke, sword 47 strikes behind the free end of tongue 60 on the straight back surface 82 and carries it forward to a point where it slips past allowing tongue 60 to fall to a point where accelerator arm 51 lands on table 15. This point is such that on the back stroke, sword 47 again engages the front curved face 81 of tongue 60. If tongue 60 and arm 51 were free to revolve in hub 45 without control, they would be knocked around in an erratic fashion and would not operate properly if at all. To limit the revoluble action, I form an extension 84 on hub 45 which limits the movement of tongue 60 through the medium of a stop 85 carried thereby. I also prefer to use a pin 86 which extends from tongue 60 and bears against the adjoining end of hub 45 thus in connection with collar 87 set on rod 50 keeping tongue 60 and arm 51 in the same position.

To prevent the parts from running wild, I use a tongue controller spindle 70 having a head 71 pivoted to tongue 60 and I pass this spindle through a supporting slot 91

at the free end of a support 92 fixed to hub 45. This controller support 92 is preferably of curved or bow shape as shown. Through the other end of controller spindle 70, I pass a pin preferably a split pin 77 and around the spindle, I place spiral springs 74 and 75 one between support 92 and head 71 and the other between support 92 and pin 77. The action of these springs on controller spindle 70 and thus on tongue 60 and arm 51 is to bring them back to the normal position when out of engagement with sword 47 or extension 14 and to tend always to bring them back from either side toward that normal position. The action of the lay sword on the accelerator tongue 60 is somewhat in the nature of a trigger action and it is necessary that the accelerator arm 51 should be so positioned that on the forward stroke after the end of the lay sword has cleared the tongue, the arm should drop back onto the table 15 thus permitting tongue 60 to fall back into the backward path of the lay sword.

The principle which I utilize in operating my device is to so transmit the backward motion of the lay itself to the protector shaft and through it to the binder fingers that the protector shaft will be turned thereby moving the free ends of the binder fingers backward from the binders to release the pressure on the binders. As the whole lay with the binders and binder fingers is moving backward the actual result is to accelerate the movement of this part of the binder fingers. After this acceleration, it is necessary to allow the protector shaft spring to turn back the protector shaft replacing the pressure on the binders. As all parts are moving, this is more a waiting action of that part of the binder fingers for the binders to reach them. When they come together again, they resume their normal functions and this should be so timed that it occurs before the shuttle enters the shuttle box. I prefer to utilize the end of the lay sword to engage the accelerator tongue 60 but it is manifest that any flat piece of metal may be fastened to the lay so as to project above the reed cap in place of it if desired. Any means movable with the lay and projecting therefrom may be used.

Broadly stated, my invention comprises means movable with the lay and projecting therefrom, such as the lay sword, in engagement with mechanism attached to the loom frame comprising an accelerator tongue in engagement with such projecting means and an accelerator arm in engagement with an arm carried by the protector shaft or which may be an extension of a binder finger said accelerator arm and tongues being carried by the same pivot. The relation between the tongue and projecting means or between the accelerator arm and the binder finger extension or both being that of sliding contact so as to turn the protector shaft carrying with it the binder fingers away from the binders before the pick and allowing them to return to their normal positions before the shuttle reaches the other shuttle box. The controller mechanism is very necessary for satisfactory operation but might be omitted.

The shape of the adjoining sliding surfaces mentioned above may be varied and modified in several ways providing that the result of the sliding action is the pushing away of the binder fingers from the binders for a brief interval. It might be stated that the desired result is to cause the free ends of the binder fingers to move at one point faster and at another point slower than the lay beam.

In Fig. 6 I show a modification in which 61 is the tongue the front and back faces of which at the free end are of the same shape and do not affect the acceleration of the parts. The accelerator arm 54 however is curved in a manner somewhat similar to 51 and engages the slotted extension 17 of a binder finger. An examination of the action shown between the dotted lines and the full lines indicates that as the parts are moved back by the flat piece of metal 57 which performs the function of the end of the lay sword, the extension 17 slips up on arm 54 and this carries it during a part of the stroke back away from the lay beam giving the accelerator action desired. Slightly beyond the point shown in the full lines, however, it not only ceases to accelerate but waits or delays until the lay beam or the binder reaches it when it continues in normal operation.

In Fig. 7, I show another modified construction in which not only the tongue 62 has no face at its free end cut as a cam but the accelerator arm 56 is perfectly straight. The desired acceleration is caused in this case by the angle at which the tongue and arm are set with reference to the flat piece of metal 57 on the lay and the extension 18 of a binder finger. An examination of the dotted and full line positions in Fig. 7 shows that as the extension 18 slips up on arm 56, it moves backward slightly from the lay and binder on the down stroke of the tongue and arm and then when they are about vertical as shown in the dotted lines in Fig. 8, dwells or waits until the lay comes up when it reengages the binder and remains in engagement therewith and out of engagement with the arm during the up stroke. The accelerator parts including the hub and what it carries may be fixed directly to the loom frame as for instance by making the bracket and arm of one casting but I prefer the arrangement shown as it allows extensive adjustment. I may make the binder finger exten-

sion of malleable iron so that it can be bent more or less for adjustment and I can not only bend the accelerator arm but can adjust its relative position with reference to the accelerator tongue by means of the set screw 80. While I prefer to use the light binder springs 12 and 52, my device will work if they are entirely dispensed with. I can accomplish my purpose by properly shaping the tongue and binder finger extension or their equivalents as shown in Figs. 4, 5 and 6 or by arranging the normal angles thereof as shown in Figs. 7 and 8 or by using both methods as shown in Figs. 4 and 5 as only a slight action is necessary to accomplish the desired result.

I claim:

1. In release devices for shuttle binders having a binder, a frame, a spring actuated protector shaft, binder fingers carried by the protector shaft in such positions as to each bear against a shuttle binder one of said binder fingers having a longitudinal extension with a table at an angle therewith and a bearing slot at the junction of the table and extension, a bracket fixed to the frame, an arm with a hub adjustable on said bracket, an accelerator rod pivoted in the hub having at one end an angular bend forming an accelerator arm adapted to engage the slotted extension of said binder finger, a tongue on the other end of said rod, a bowed support fixed to the hub and having a supporting slot at its free end, a tongue controller spindle having a head pivoted to said tongue and passing through said supporting slot, a split pin which passes through the end of the controller spindle, controller springs which extend between said bowed support and the split pin and between the bowed support and the head of the controller spindle, together with a pin fixed to said tongue and in engagement with the hub as described.

2. In release devices for shuttle binders having a binder, a frame, a spring actuated protector shaft, binder fingers carried by the protector shaft in such positions as to each bear against a shuttle binder one of said binder fingers having a longitudinal extension, a bracket fixed to the frame, an arm with a hub adjustable on said bracket, an accelerator rod pivoted in the hub having at one end an angular bend forming an accelerator arm adapted to engage the extension of said binder finger, a tongue on the other end of said rod, and tongue controller means as described.

3. In release devices for shuttle binders having a binder, a frame, a spring actuated protector shaft, binder fingers carried by the protector shaft in such positions as to each bear against a shuttle binder one of said binder fingers having a longitudinal extension with a table at an angle therewith and a bearing slot at the junction of the table and extension, a bracket fixed to the frame, an arm with a hub adjustable on said bracket, an accelerator rod pivoted in the hub having at one end an angular bend forming an accelerator arm adapted to engage the slotted extension of said binder finger, a tongue on the other end of said rod, and tongue controller means as described.

4. In release devices for shuttle binders having a binder, a frame, a spring actuated protector shaft, binder fingers carried by the protector shaft in such positions as to each bear against a shuttle binder one of said binder fingers having a longitudinal extension, a bracket fixed to the frame, an arm with a hub adjustable on said bracket, an accelerator rod pivoted in the hub having at one end an angular bend forming an accelerator arm adapted to engage the extension of said binder finger, and a tongue on the other end of said rod as described.

5. In release devices for shuttle binders having a binder, a frame, a spring actuated protector shaft, binder fingers carried by the protector shaft in such positions as to each bear against a shuttle binder one of said binder fingers having a longitudinal extension, a bracket fixed to the frame, a flat piece of metal fixed to the lay and projecting therefrom, an arm with a hub adjustable on said bracket, an accelerator rod pivoted in the hub having at one end an angular bend forming an accelerator arm in engagement with the extension of said binder finger, and a tongue carried by said rod in position to engage the flat piece of metal carried by the lay, said tongue and accelerator arm being so placed and having their faces which engage said flat piece of metal and extension respectively so formed that they will move said extension back from the lay beam on its backward stroke and then allow it to wait, as described.

6. In release devices for shuttle binders having a binder, a frame, a spring actuated protector shaft, binder fingers carried by the protector shaft in such positions as to each bear against a shuttle binder one of said binder fingers having a longitudinal extension, a bracket fixed to the frame, a flat piece of metal fixed to the lay and projecting therefrom, an arm with a hub adjustable on said bracket, an accelerator rod pivoted in the hub having at one end an angular bend forming an accelerator arm in engagement with the extension of said binder finger, and a tongue carried by said rod in position to engage the flat piece of metal carried by the lay, said tongue and accelerator arm being so placed that they will move said extension back from the lay beam on its backward stroke and then allow it to wait, as described.

7. In release devices for shuttle binders having a binder, a frame, a spring actuated protector shaft, binder fingers carried by the protector shaft in such positions as to each bear against a shuttle binder one of said binder fingers having a longitudinal extension, a flat piece of metal fixed to the lay beam and projecting therefrom, a hub attached to the loom frame, an accelerator rod pivoted in the hub having at one end an angular bend forming an accelerator arm in engagement with the extension of said binder finger, and a tongue carried by said rod in position to engage the flat piece of metal, said tongue and accelerator arm being so placed that they will move the binder finger extension back from the lay beam on its backward stroke and then allow it to wait, and tongue controller means as described.

In testimony whereof I, hereto affix my signature in presence of two witnesses.

JOHN W. KILLPARTRICK.

Witnesses:

GARDNER W. PEARSON,

FISHER H. PEARSON.