Oct. 23, 1951 P. C. CONSOLETTI 2,572,111

SHUTTLE GUARD

Filed Dec. 28, 1948 2 SHEETS—SHEET 1

Fig. 5

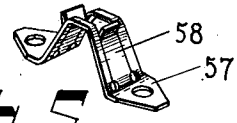


Fig. 1

Fig. 4

Fig. 3

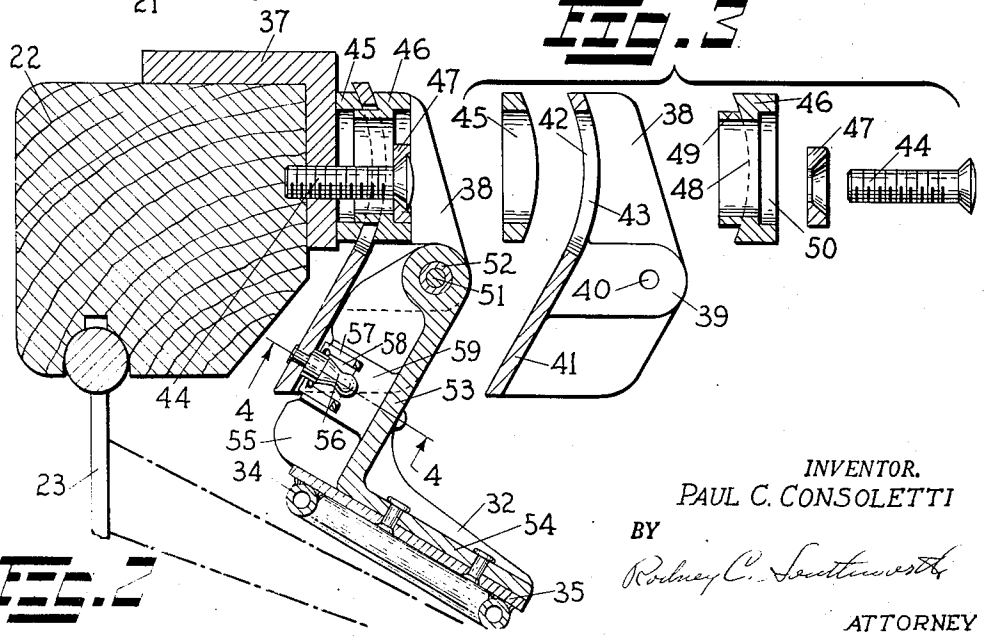


Fig. 2

INVENTOR.
PAUL C. CONSOLETTI
BY
Rodney C. Southworth
ATTORNEY

Oct. 23, 1951 P. C. CONSOLETTI 2,572,111

SHUTTLE GUARD

Filed Dec. 28, 1948 2 SHEETS—SHEET 2

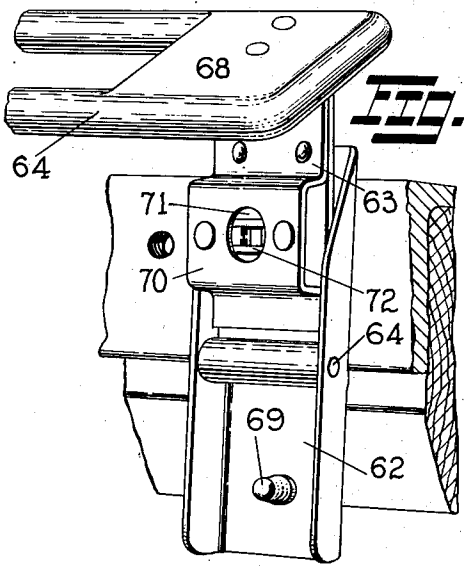


FIG. 6

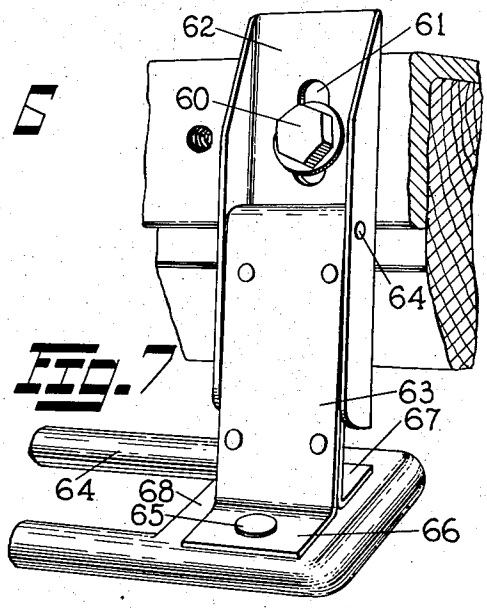


FIG. 7

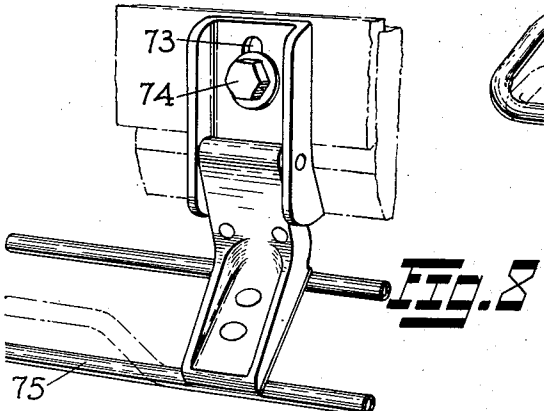


FIG. 8

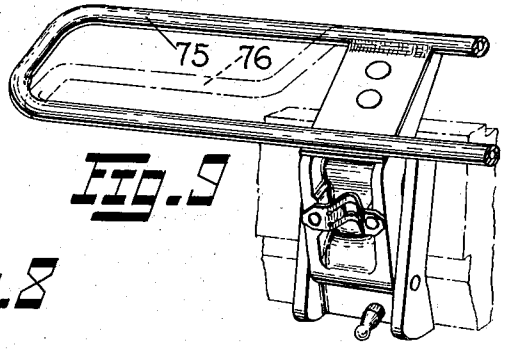


FIG. 9

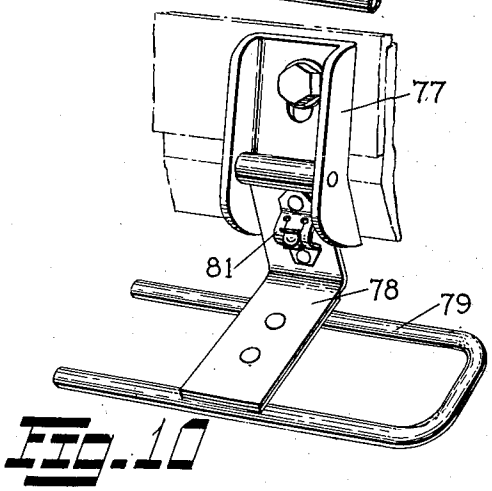


FIG. 10

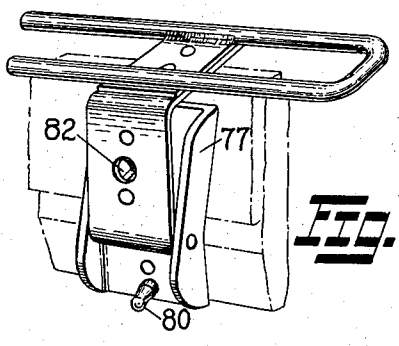


FIG. 11

INVENTOR.
PAUL C. CONSOLETTI
BY
Rodney C. Sauttenwath
ATTORNEY

Patented Oct. 23, 1951 2,572,111

UNITED STATES PATENT OFFICE

2,572,111

SHUTTLE GUARD

Paul C. Consoletti, Milford, Mass., assignor to Draper Corporation, Hopedale, Mass., a corporation of Maine

Application December 28, 1948, Serial No. 67,595

13 Claims. (Cl. 139—193)

1

This invention pertains to looms, and more particularly, to shuttle guards for fly shuttle looms.

It is a general object of the invention to devise an improved shuttle guard which shall be relatively simple in construction and which shall serve effectively to confine the shuttle within the pathway in which it is intended to operate thereby to prevent injury to personnel in close proximity to the loom or injury to the warp threads forming a shed through which the shuttle passes.

It is a more specific object of the invention to devise a shuttle guard which shall be easily and readily movable from an active shuttle confining position to a raised position in which there is no interference with intended removal of the shuttle or interference with access to other parts or to the threads adjacent and at the fell of the fabric being woven.

A further specific object of the invention is that of devising a shuttle guard which shall serve to confine the shuttle to its intended pathway, to prevent escape of the shuttle at the ends of the lay and to eliminate additional parts at the hand rail such as the shuttle deflector carried at the end of that rail.

A further object of the invention is that of devising a shuttle guard which shall employ as a latching means a snap fastener of the axially engageable type so that movement of the guard from an inactive to an active position will serve to latch it in shuttle confining position, that position being retained against any action of the shuttle as the same may tend to escape from the shed due to unintended or unsatisfactory operation of the loom, but which shall permit ready and easy movement of the shuttle guard to a raised or inoperative position whenever the loom attendant so desires.

Other objects of the invention will become apparent from the following more detailed description.

In fly shuttle looms the movement of the shuttle to and fro across the lay and through the shed formed between opposed warp sheets is normally guided only by the lay and the reed so that the shuttle itself is relatively unconfined against movement in a forward direction, and may move upwardly until it engages the hand rail, although the hand rail itself is not of sufficient width to serve very effectively as a confining means. Normally the to and fro movement of the shuttle, if the loom is operating as intended, is not accompanied by any noticeably erratic movements or tendency to be thrown from the shed, but as is unavoidable at times, some unusual circumstance or circumstances give rise to situations in which the shuttle does tend to fly out of the shed and in these instances, of course, there is always the damage to the warp threads themselves, and if the loom operator or

2

others are in the immediate vicinity, the shuttle may cause bodily injury.

In avoiding the undesired escape of the shuttle from the shed, various types of shuttle guards have been devised, some of which have been employed in actual practice, but most of which have left much to be desired.

According to the present invention, a shuttle guard is provided and attached to the hand rail above the lay of the loom in such manner that it may be readily raised about a pivot from an active shuttle confining position in which it is virtually impossible for the shuttle to escape from the shed, to a relatively inactive position where it permits the weaver to have complete access to the fabric adjacent the fell, to the warp threads in the event he desires to repair broken threads at that point, to the shuttle in the shed, or in fact, to any of the parts or warp threads at that general area of the loom which would not otherwise be as accessible if the guard were to remain in its active position.

In accomplishing the above movement of the guard from active to inactive position, the weaver has only to grasp the shuttle guard at a convenient point and impart thereto a reasonable force to release the holding means whereupon it may be swung to its uppermost position where it will remain until intentionally moved to active position, or until the loom itself is again started. The type of hinge employed involves a particular relationship of parts such that the general movement of the shuttle upwardly or forwardly at a considerable angle merely tends to tighten the engagement of the snap fastener by which the guard is held in position, or else has no appreciable tendency to disengage that fastener. That permits employment of a fastener which is so easily engaged that the mere falling of the guard into position by tipping it forwardly manually, or by disturbance thereof as the loom starts and the lay begins to move to and fro, will securely latch the parts in active position, but which, as will hereinafter be more clearly explained, does not require any manual or other unlatching in addition to raising the movable part of the shuttle guard assembly itself, that being the only manual operation which the weaver must perform in order to render accessible all parts of the loom and fabric at that point.

The hinge and fastener are so related with respect to the position of the shuttle as it slides on the lay and against the reed that upward or general upwardly and forwardly directed movements thereof do not unlatch the guard since the forces applied by a shuttle tending to escape as above indicated are directed at the proper side of the dead center position of the parts that they merely tend to latch more tightly, or in extreme conditions where some force may be applied at the opposite side of the dead center position, it is insufficient to release or disengage the snap

fastener. The holding power of that snap fastener need be no more than is provided in commercially available snap fasteners of the type involved.

The entire assembly may be angularly adjusted as will later be described by a simple adjusting feature which forms a part of the attaching means so that the shuttle guard may confine the shuttle as closely as possible without interference with the fabric or warp threads at the shed and thus, by this adjustment, the mechanism may be easily adapted to looms of varying dimensions and in which the shuttle shape and size vary as well as does the angle made by the warp sheet between the fell of the cloth and the point at which the warp sheet passes through the reed.

The invention will be described in greater detail in following paragraphs by reference to the accompanying figures of drawing in which a preferred form of the invention and modifications thereof have been illustrated.

In the figures:

Fig. 1 is a perspective view of a conventional fly shuttle loom to which the shuttle guard of the invention has been applied, sufficient of the parts being illustrated to show the relationship of the shuttle guard thereto.

Fig. 2 is a section taken through the hand rail of a loom such as shown in Fig. 1 and showing a preferred form of the invention.

Fig. 3 is an exploded view illustrating in section the parts of the shuttle guard by means of which it is attached to the hand rail and by means of which it may be adjustably positioned with respect to the lay and reed.

Fig. 4 is a section taken at line 4—4, Fig. 2.

Fig. 5 is a perspective view showing in detail a part of a snap fastener by which the shuttle guard is retained in active position.

Figs. 6 and 7 are views showing one modified form which the mechanism may take, Fig. 6 illustrating the guard in inactive position while Fig. 7 shows the parts in active or shuttle confining position.

Figs. 8 and 9 are corresponding views showing a second modification, and

Figs. 10 and 11 are similar views showing a still different form of the invention, although one in which the general inventive concept is substantially the same as that which is evident in the preferred form and the other modifications.

Now referring to Fig. 1, parts of a loom to which the shuttle guard of the invention has been applied include a lay 20, a shuttle box 21, a hand rail 22 and a reed 23, these all being attached in the usual way adjacent the upper ends of lay swords, one of which is indicated by numeral 24, and which swing to and fro on the usual pivot for the purpose of beating the filling into the shed of the fabric as is well known to those skilled in the art. A fly shuttle 25 of conventional construction is picked to and fro across the lay being guided along the upper surface of the lay and by the reed so as to pass through the shed formed by the upper warp sheet indicated by numeral 26 and the lower warp sheet 27 which converge forwardly to the fell 28 of the fabric. These warp threads are individually threaded through heddles 29 retained in the usual manner within harness frames 30 and operable by any convenient type of harness mechanism for varying the shed in accordance with the particular type of fabric being woven.

The shuttle guard as applied to the loom illustrated in Fig. 1 is comprised of two separate or individual units, one at the left and one at the right side of the loom, but it is to be understood that a single guard may extend across the entire width of the fabric being woven or may be subdivided into as many separate sections as are desired. Each of the sections here is identical and therefore a description of one will suffice for both.

In attaching the guard to the reciprocating lay structure, the hand rail serves very conveniently as an attaching point, but it is to be understood that any other part may be used for attachment of the guard or guards. The attaching means comprises two or more hinges for each shuttle guard member itself, these hinges having a fixed portion 31 which is more or less permanently bolted or otherwise connected to the hand rail and a movable or swinging member 32 pivoted at 33 to the first or fixed member 31. The shuttle confining means is preferably formed of bent tubular or other rod 34 which may be attached in any convenient manner as by welding plates such as the plate 35 to the rods, Fig. 2, these plates in turn being riveted or in any other manner connected to the lowermost portion of the movable hinge part 32.

These bent rod members are so formed or have such a space between the front and rear longitudinal portions thereof that a shuttle may not escape between them. The ends 36 thereof are carried around or formed in such a manner as to guard or guide the shuttle downwardly and rearwardly toward its proper position at the lay in the event it tends to rise upwardly upon its movement from the shuttle box in passing across the shed to the opposite end of the lay, or in the other situation, where the shuttle is just leaving the shed and is to enter the shuttle box at that side, these cross members 36 serve to confine the shuttle to such a pathway that it must enter the guiding structure of the box itself. Incidentally, there is no need for the usual leather or other shuttle deflector commonly provided at each end of the hand rail where the shuttle is about to leave the shed and enter the box.

From an inspection of Fig. 1 it is quite apparent that the shuttle guard, although it serves very effectively to close off any space through which the shuttle might escape or fly out of the shed, does not obstruct the weaver's view of the lay, shuttle, warp threads or fell of the fabric even when the lay is in its foremost position at which time the shuttle guard tends to overlie the fell. Of course, when the guard is raised to inactive position as shown at the right hand end of Fig. 1, there is no interference or obstruction of view whatsoever and the loom is as freely accessible at that point as would be the case if there were no shuttle guard whatsoever.

The details of one particular, and incidentally, a preferred form of the invention are evident in Figs. 2, 3, 4 and 5, and while all of the forms of the invention illustrated herein are generically similar, this particular form of the invention provides for an angular adjustment or positioning of the shuttle guard in a very convenient and effective way. The hand rail 22 is provided with a reinforcing strip 37 which extends along most of the length thereof and is attached to the wooden part of the hand rail in any convenient manner, although it is to be understood that in some instances, metal hand rails may be employed and then there is no need for this reinforcing or protecting metallic piece. In some instances, the

hinge members may be attached directly to the wooden rail itself.

In connecting the hinge parts to the rail, an arcuately formed bracket or hinge member **38** similar to the simple hinge part **31** of Fig. 1, is provided with bosses **39** through which are drilled the pivot openings **40**, the back or web **41** of the hinge being arcuately formed as at **42** adjacent its uppermost end and being slotted at **43** for the passage of the attaching bolt or screw **44**. Complementary pieces are provided at either side of the arcuate part **42** of the hinge, the innermost of these being indicated by numeral **45** while the outer washer or retaining piece **46** has a concavely formed surface adapted to bear at the opposite side of web **43** from that against which the convex surface of the element **45** bears.

The parts are clamped in an adjusted position by a screw **44** tightened against the countersunk washer **47** which in turn bears against the face of a slot **48** in the washer **46**. This latter element also has a sleeve **49** which extends into the internal bore of the convex washer **45** thereby to center the parts so that the arcuate portion of the hinge may bear evenly and properly against the concave and convex surfaces between which it is clamped. It is to be understood that the slot **48** is just wide enough for reception of screw **44** with a resonable amount of clearance and that, since the washer **47** is of much smaller diameter than the diameter of a counterbore **50** within which it fits, that the entire assembly may be moved vertically within limits defined by the slot **48**, while the angular adjustment provided by the arcuate web **43** and the convex and concave washers is in effect, a separate or independent adjustment so that the angle and the vertical position of the guard may be separately varied within rather wide limits. The slot **43** is wide enough to encompass the sleeve **49**. A number of spaced, tapped holes in the rail or other support, Fig. 1, provide for lateral positioning or adjustment of the guards.

Now reverting to Fig. 2 in particular, the lower or movable hinge member **32** is pivoted on a pin **51** which passes through the drilled apertures **40** in lugs **39** at each side of the relatively fixed hinge member and through a sleeve or bushing **52** in the said movable member. This movable member comprises an angular portion including the web **53** extending more or less vertically downward and the web **54** which is preferably disposed at about right angles thereto and to which the plate **35** or other attaching means for the shuttle confining member itself is fixed. This lower hinge member is shrouded by the side plates or flanges **55** which extend along either side of the web **53** and carry one portion of a snap fastener more particularly illustrated in Figs. 4 and 5 in addition to this Fig. 2. The side flanges **55** serve as stop members for the movable hinge member when it is swung downwardly so that the guard is in active position. These flanges stop against the web **41** of the fixed hinge member and thus, prevent movement too far in that direction. The snap fastener itself really determines the actual position in which the parts remain.

The snap fastener is of a type to be engaged upon relative movement between the two parts thereof as one slips past the other and which then offers considerable resistance, or makes necessary the application of a reasonable amount of force, before the same may be withdrawn or separated. The actual construction is such that

more force is normally required to separate the fastener than to interengage or latch it. As herein described and shown, the type of snap fastener preferably to be employed is one which makes engagement by axial movement of one part thereof relatively to the other, although there may be some departure from truly axial movement.

The snap fastener comprises two parts, a central ball stud **56** and a spring clip **57**. There are various forms of snap fasteners of this type, but that shown here is illustrative of most of them. The ball stud attaches by riveting or may be fixed in any other satisfactory manner to one of the parts, herein, the web portion **41** of the relatively fixed hinge member, while the spring clip is fixed to the web **53** of the relatively movable hinge member. It is quite apparent that these parts may be reversed without affecting their general efficacy.

The ball stud fits within the spring portions **58**, one at either side of the spring clip which is better shown in Fig. 5. That clip is preferably riveted or attached by screws or bolts to the adjacent portions of the relatively movable hinge member and, as herein shown, the spring clip is attached by screws which are threaded into bosses **59** at each side of the hinge member, these bosses being integral with the flanges **55**, previously mentioned.

In operation of the parts, the shuttle guard may be assumed to be in raised or elevated position in which position it tilts back so that the center of its mass lies behind the pivot point, see the right hand guard in Fig. 1, and will not move from that point except upon the starting of the loom or intentional displacement as by the weaver taking the guard and swinging it downwardly. As the loom is started, the rapid movement of the lay will cause the guard to swing forwardly and drop to a position in which it will actively confine the shuttle, that position being retained since the spring clip automatically makes engagement with the ball portion of the ball stud.

If it is desired to move the shuttle guard to an inoperative position to get it out of the way so that the shuttle may be removed through the warp threads or so that access to the fell of the fabric may be unobstructed, a smart pull forwardly serves to disengage the clip from the ball stud whereupon the shuttle guard is readily moved to any desired position.

The shuttle confining member **34** actually lies very close to the warp sheet at the shed and, by the adjustment above described, the clearance between the thread and the tubular members **34** may be reduced to a minimum or to any desired dimension. The angle being variable independently of the vertical adjustment, it is apparent that the best operating conditions may be obtained, that is, both parts of the tubular shuttle confining member may be placed in close proximity to the warp sheet and so far downwardly with respect to the shuttle, that it is virtually impossible for that shuttle to escape past the guard. As may be seen from an inspection of Fig. 2, any movement of the shuttle in a general upward direction causes it to strike against the rearmost bar **34** and that merely tends to hold the movable portion of the shuttle guard more tightly in its downwardly latched position. That results since the movable shuttle guard parts in falling downwardly to become

latched, move well past what may be considered a dead center position with respect to pivot 51, or well past a position in which the upward movement or general upward movement against the bar 34 would tend to open the snap fastener in which event the device might fail to confine the shuttle as intended. The shuttle very seldom moves directly forwardly without having a considerable component of motion in an upward direction and therefore as verified by a relatively great number of tests in which the shuttle has been purposely displaced, the shuttle guard as herein described and claimed serves almost without fail to confine the shuttle within the shed and to direct the point thereof longitudinally of the shed so that no damage is done even though the shuttle may be displaced to a point where it would otherwise be thrown entirely out of the shed and clear of the loom itself.

The end portions of the shuttle confining, tubular or other structure designated by numeral 36 are so positioned that as the shuttle is guided thereby adjacent the ends of the lay, it may not escape beyond its intended pathway in entering the box or in entering the shed. While some variation in its pathway may be evident, the point thereof will be guided below and within the guard members at the inner end of the shuttle box so that it must enter that box rather than being thrown clear, and also upon leaving the box and entering the shed, the shuttle must be confined between the reed, shuttle guard and the top of the lay beam.

Now referring to Figs. 6 and 7, a slightly modified form of the invention is evident. The hinges employed in this modification are of pressed steel or similar pressed metal construction and the attachment of each hinge member to the hand rail is accomplished by means of a screw 60 which is passed through a slot 61 in the relatively fixed hinge member 62 which is constructed as a channel section and is thus relatively strong although easily and cheaply fabricated. The relatively movable hinge member 63 is pivoted at 64 to the side flanges of the other hinge member 62 and the attachment of the shuttle confining means itself designated by numeral 64 is accomplished by rivets 65 or other attaching means which pass through the bent ends 66 and 67 of the member 63 to enter a plate or other interconnecting and attaching means, for example, the plate 68 to which the bars 64 are welded or otherwise connected.

As shown in Fig. 6, the ball stud 69 is fixed in the lower end of the hinge part 62. The other portion of the snap fastener is riveted or otherwise retained in a part of the relatively movable hinge 63 formed by offsetting one end thereof as illustrated to form a rectangular space for the spring clip. This offset, rectangular enclosure 70 has a hole 71 through which the ball stud may project for engaging the spring clip designated by numeral 72 and which may be precisely the same, or is at least generally similar, to that described with respect to the preferred form of the invention. As the shuttle guard is dropped to active position the stud will engage the spring clip and hold the guard in operative position until it is forcefully moved therefrom to be tilted upwardly to an inactive position. The parts in that position, Fig. 6, are retained there since the center of mass lies rearwardly of the pivot 64, although not so far in that direction but that upon starting the loom, the movement of the lay will immediately cause it to fall forwardly.

Now referring to Figs. 8 and 9, the elements illustrated are those of Fig. 1 and of Figs. 2–5, except for the fact that there is no adjustment provided other than that vertical adjustment which is afforded by the slot 73 through which the screws 74 pass for attaching the hinges to the hand rail. The mechanism is somewhat simpler, of course, than the adjustable form of the invention described relatively to Figs. 2 and 3, and where angular adjustment is not necessary or desired, that modification serves quite effectively. Here the hinge parts are preferably formed of molded aluminum or other cast metal, although they may be fabricated in other ways if desired.

In some instances the dimensions and other characteristics of a loom are such that the shuttle confining member, if formed as described with respect to Figs. 1, 6, 7 and as in these Figs. 8 and 9, full line views, the end 75 of the shuttle confining member would engage the adjacent temple as the reed moves forwardly. To avoid that, the tubular rod is bent to the dot-and-dash position 76 whereupon it will pass above the temple thereby avoiding interference, but otherwise serving to confine the shuttle as previously described. This slight offset of the ends of the shuttle confining rod members does not seriously affect their function.

In Figs. 10 and 11, a slightly different form of hinge is evident in that the relatively fixed hinge portion 77 is substantially like that illustrated in Figs. 8 and 9, and like that of Fig. 2, except that there is no provision for adjustment. The relatively movable hinge member 78 is of sheet stock angularly bent to the proper shape and form and has the shuttle confining member 79 attached to the somewhat horizontally extending angular portion of the hinge in a manner similar to that illustrated in Fig. 2, except that the rivets pass through two thicknesses of sheet material rather than through a piece of sheet or plate and a part of a cast hinge. The ball stud 80 is attached at the lower portion of the relatively fixed hinge member 77 and engages within a spring catch 81 which is permanently connected to the more or less vertically extending part of the hinge 78. A hole or opening 82 in the hinge member 78 serves to permit entry of the stud 80 for engagement with its spring catch.

In each of the forms of the invention the general construction is similar, although details vary to an extent. The guard serves automatically to position itself whenever the loom is started and, since the snap fasteners are so constructed that relatively small force is required to effect their engagement, the weight of the parts and the inertia thereof acquired as they fall, assures that the guard will become latched in active position. Of course, the operator may merely tip the shuttle guard downwardly before starting the loom and effect its active positioning in that manner. The force required to disengage the snap fasteners, although not sufficient to require an excessive amount of strength on the part of the weaver when he desires to lift the shuttle guard, does however, make certain that any improper action of the shuttle will not throw it clear of the loom.

One common fault of shuttle guards as heretofore constructed, some of which have had conventional latches effective to hold them in position is that these latches or other retaining means become worn and very noisy. Since the spring

catches engage the ball studs with a resiliently applied pressure and since the ball studs always tend to position the catches in the same relative place, there is little wear and no loosening of parts or shake resulting after a long period of usage.

The construction of each of these shuttle guards permits light metal such as aluminum alloys to be employed and therefore the weight added to the vibrating lay is not great. This is a decided advantage since the lay parts are relatively heavy and it has always been considered desirable to cut down that weight if possible. Additions thereto have been undesirable, and for that reason shuttle guards are not too generally employed. The weight added by employing the shuttle guard herein described is not sufficient to make any particular difference in the inertia forces set up by the oscillating lay and its attendant parts.

In this description and in the claims the term "snap fastener" is used to include all those fasteners employing a ball or similar enlarged portion of a stud which becomes detachably engaged by the spring clips or the like, of a catch. Many of these are commercially available and that herein shown is known as a Tinnerman fastener. The designations "active" and "inactive" refer to the lower shuttle guarding position and the raised positions, respectively, of the guard. These fasteners are usually engageable "axially" or generally so, but it is to be understood that fairly wide variation is possible and that type of fastener may be so engaged that the angle of divergence from "axial" is quite appreciable.

While one preferred embodiment and certain modifications of the invention have been disclosed, it is to be understood that the inventive concept may be carried out in a number of ways. This application is, therefore, not to be limited to the precise details described, but is intended to cover all variations and modifications thereof falling within the spirit of the invention and the scope of the claims.

I claim:

1. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means including relatively fixed and relatively movable hinge parts by which said member is attachable to the hand rail to be swung to and from active and inactive positions, and a mounting means for attaching said relatively fixed hinge parts to the hand rail which comprises means upon which the said hinge parts are slidable vertically of the rail and also angularly movable independently of the said slidable adjustment.

2. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means by which said member is attachable to the hand rail to be swung to and from active and inactive positions, and mounting means for said hinge means comprising arcuately faced washers, a slot in one of said washers through which attaching means may be threaded into the hand rail, said hinge means being similarly arcuate in form and slotted for movement relatively to said washers, said hinge means thereby being vertically adjustable and angularly movable to position the shuttle confining means.

3. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means by which said member is attachable to the hand rail to be swung to and from active and inactive positions, said hinge means comprising relatively fixed and movable hinge members, said relatively fixed hinge member having an arcuately formed part thereof by means of which it may be clamped to said hand rail, abutting means, one at either side of said arcuately formed portion of said hinge means and between which the hinge means may be positioned at relatively different angles with respect to the lay and reed of a loom, a slot in one of said abutting means, and a threaded attaching member passed through said slot for clamping the parts in an adjusted position.

4. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means by which said member is attachable to the hand rail to be swung to and from active and inactive positions, said hinge means comprising relatively fixed and relatively movable parts one of which is hingedly pivoted to the other, a snap fastening means between said hinge parts for retaining them in one extreme position, and an adjustable connection between said relatively fixed hinge parts and a supporting portion of the loom lay assembly which comprises means permitting vertical adjustment of the hinge means and shuttle confining member, and independently thereof, an angular movement of the relatively fixed hinge member thereby to vary the angle of the shuttle confining member with respect to the lay and reed.

5. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means including relatively fixed and movable parts by which said member is attachable to the hand rail to be swung to and from active and inactive positions, and a mounting means for said relatively fixed hinge means on which it may be independently moved both vertically and angularly with respect to the lay, and axially engageable snap fastening means for retaining the shuttle confining member in an active position.

6. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means by which said member is attachable to the hand rail to be swung to and from active and inactive positions, said hinge means comprising relatively fixed and relatively movable parts one of which is hingedly pivoted to the other, said relatively fixed hinge parts being attachable to the hand rail and the said relatively movable hinge parts having attached thereto the shuttle confining member, means for releasably latching the relatively movable hinge parts to retain the shuttle confining member in its active position, and said hinge pivots being so disposed with respect to the latching means and shuttle confining member that the movable parts are moved throughout a considerable angle beyond a dead center position before the shuttle confining member reaches its active position so that as a shuttle tends to escape from its intended pathway, pressure thereof against the shuttle confining member tends to retain the parts more tightly in their latched position.

7. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said

lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means including relatively fixed and movable hinge members, the said relatively fixed hinge members being attachable to the hand rail and the movable hinge members being pivoted to the fixed members to permit the shuttle confining member to be swung to and from active and inactive positions, latching means comprising a snap fastener for retaining the movable hinge members and shuttle confining means carried thereby in an active position, the said shuttle confining means, snap fastener and the hinge pivot being so relatively positioned with respect to the lay and reed of the loom that pressure of a shuttle against the shuttle confining member as it tends to escape from its intended pathway urges the shuttle confining member and movable hinge means into a more tightly latched position.

8. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means comprising relatively fixed and movable hinge parts by which said member is attachable to the hand rail to be swung to and from active and inactive positions, a portion of said relatively fixed hinge part extending into overlapping relationship to said relatively movable hinge part, and means for releasably retaining said shuttle confining member in active position which comprises an axially engageable snap fastener the engagement and disengagement of which is confined to a plane normal to the axis about which the hinge parts pivot, said snap fastener comprising two elements which offer greater resistance to disengagement than to engagement, one said element being fixed to the movable hinge part and the other to the overlapping extending portion of the said relatively fixed hinge part.

9. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means each of which comprises two articulate hinge parts by which said member is attachable to the hand rail to be swung to and from active and inactive positions, and means for releasably retaining said shuttle confining member in active position which comprises an axially engageable fastening member including a ball stud fixed to one hinge part and a spring catch axially engageable with said ball stud and fixed to the other hinge part.

10. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means each of which comprises two articulated hinge parts by which said member it attachable to the hand rail to be swung to and from active and inactive positions, and mounting means for said hinge means upon which it may be vertically and angularly adjusted, and means for retaining the movable parts of said hinge means and the shuttle confining member attached thereto in an active position which comprises a snap fastener including a ball stud fixed to one hinge part and a spring catch axially engageable with said ball stud and fixed to the other hinge part.

11. For a fly shuttle loom having a lay, a reed, a hand rail and a shuttle movable along said lay, a shuttle guard attachable to said hand rail and comprising a shuttle confining member and hinge means comprising two articulated hinge parts, one of which is relatively fixed and the other of which is relatively movable, by which said member is attachable to the hand rail to be swung to and from active and inactive positions, and mounting means for said hinge means upon which it may be vertically and angularly adjusted, said mounting means comprising an arcuate web portion of the relatively fixed hinge part attachable to the hand rail and complementary convex and concave abutting members through one of which is passed attaching means and upon which the said arcuate portion of the hinge part may be moved to vary the angle thereof with respect to the lay when said connecting means is loosened, and snap fastening means by which said movable hinge parts and the shuttle confining means are retained in active position, said snap fastening means including a ball stud attached to one hinge part and a spring catch attached to the other, said ball stud and spring catch being axially engageable upon movement of the said shuttle confining member to active position and releasable by the application of an axially applied force.

12. Mounting means for attaching a shuttle guard to the hand rail of a loom comprising hinges including relatively fixed and movable hinge parts, each said relatively fixed hinge part having an arcuate web portion by which it is clamped in a fixed, adjusted position, abutting means complementary to said arcuate web portion comprising washers one of which has a concave surface and the other of which has a convex surface, an attaching threaded means passing through said washers, an elongated slot in one washer through which the said attaching means is passed and against the face of which it bears for urging the parts into clamping engagement.

13. Mounting and retaining means for a shuttle guard for looms comprising hinges including relatively fixed and relatively movable hinge members, pivot means between said hinge members and a slot in each relatively fixed hinge member through which connecting means is passed and by means of which vertical adjustment of the shuttle guard may be effected, and latching means for retaining the relatively movable hinge members and that portion of the shuttle guard for confining the shuttle within its intended pathway, in an active position, including a snap fastener, said snap fastener comprising a ball stud fixed to one hinge member and a spring catch fixed to the other and positioned for axial engagement of said ball stud.

PAUL C. CONSOLETTI.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
145,763	Stevens	Dec. 23, 1873
171,416	Parker	Dec. 21, 1875
1,596,267	Holmes	Aug. 17, 1926
2,322,643	Jones	June 22, 1943
2,396,780	Gill et al.	Mar. 19, 1946
2,439,000	Hasenzahl	Apr. 6, 1948
2,480,645	Gourlay	Aug. 30, 1949

FOREIGN PATENTS

Number	Country	Date
25,516	Great Britain	of 1908