No. 859,541. PATENTED JULY 9, 1907.

J. W. CARR & C. R. SCHOLES.

WEFT REPLENISHING LOOM.

APPLICATION FILED AUG. 26, 1904.

4 SHEETS—SHEET 1.

Fig. 1.

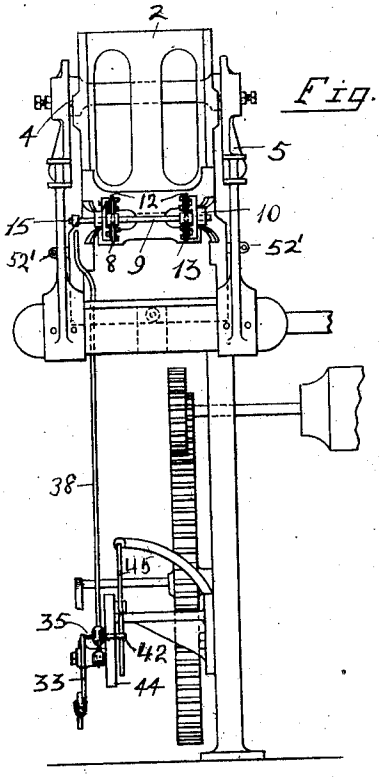


Fig. 2.

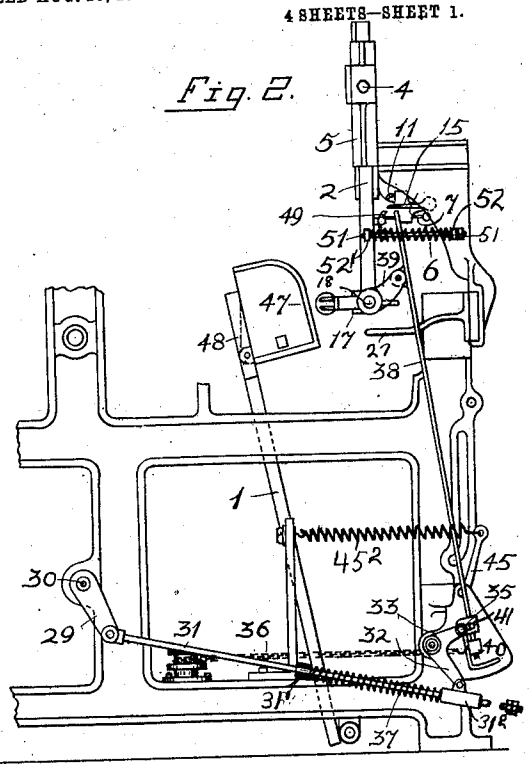


Fig. 3.

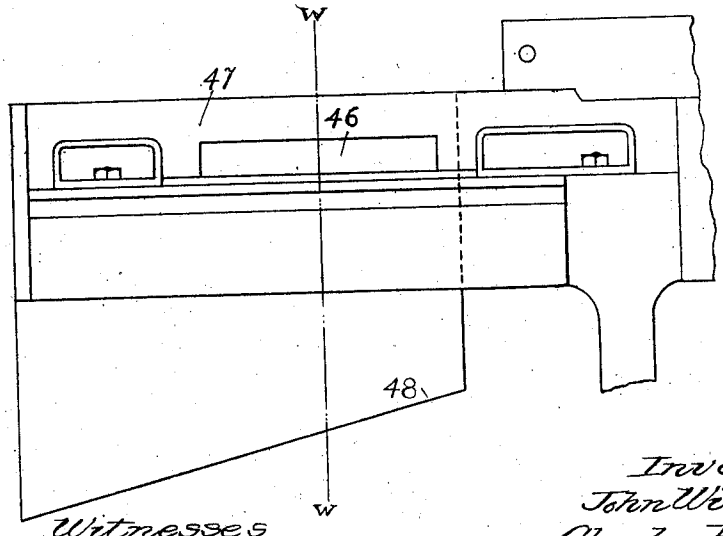
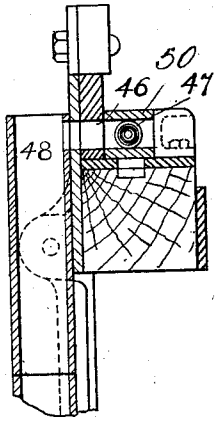


Fig. 4.



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4 SHEETS—SHEET 2.

Fig. 5.

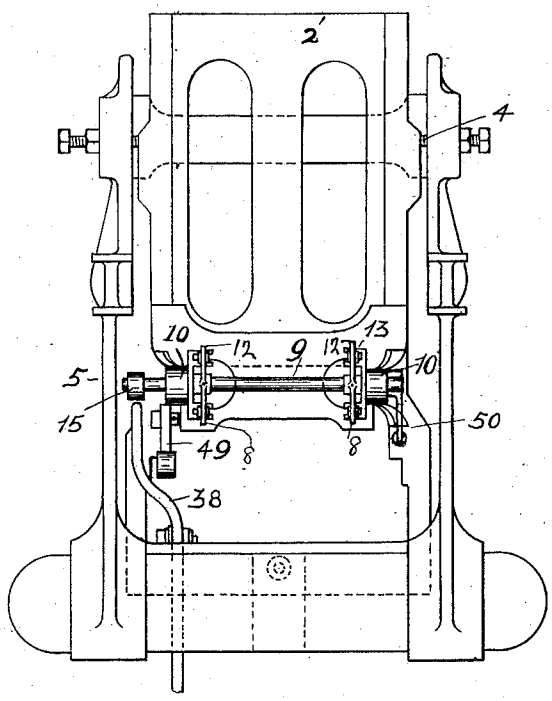
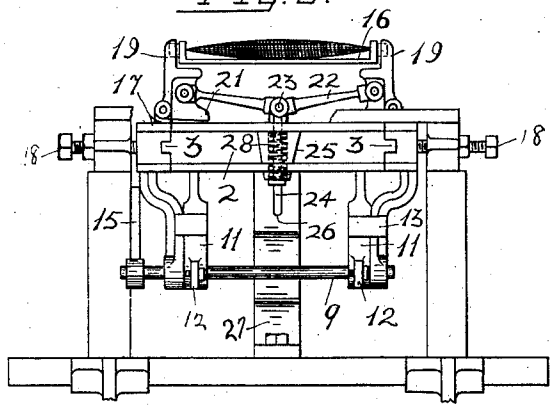


Fig. 6.



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4 SHEETS—SHEET 3.

Fig. 7.

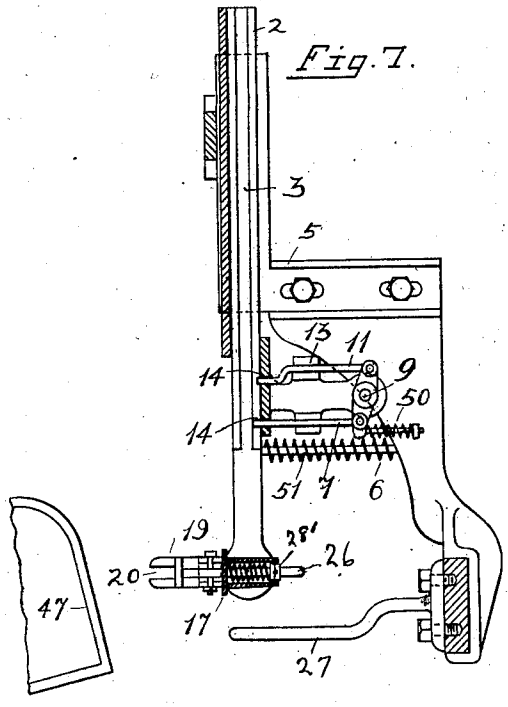


Fig. 8

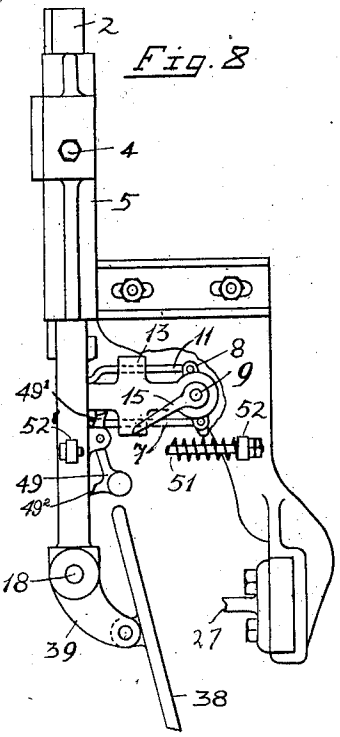


Fig. 9.

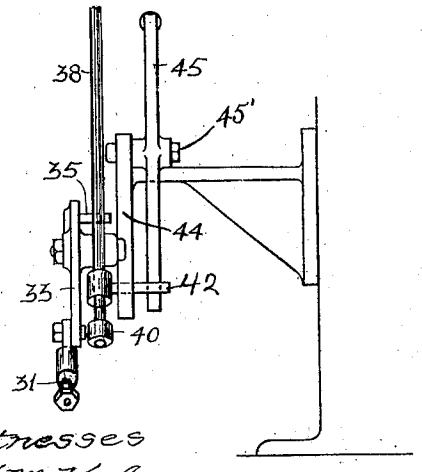
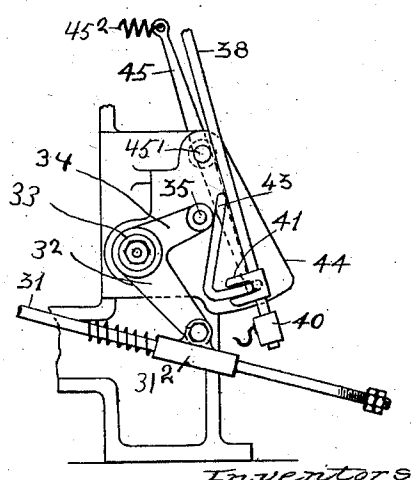


Fig. 10.



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4 SHEETS—SHEET 4.

Fig. 11.

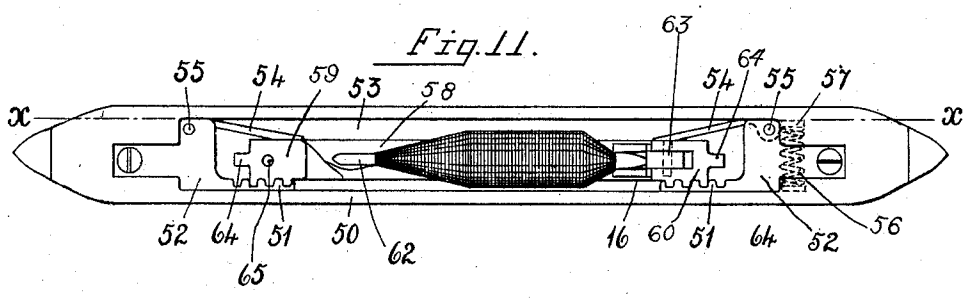


Fig. 12.

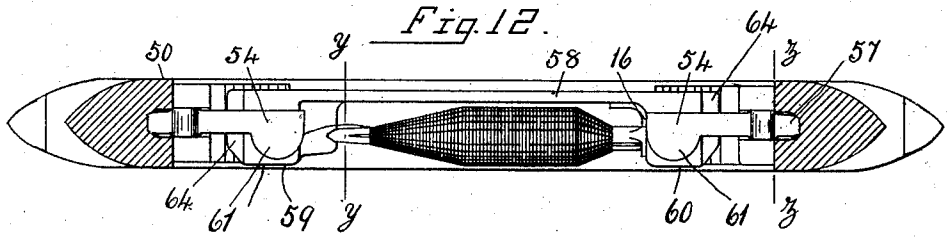


Fig. 13.

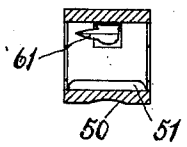


Fig. 14

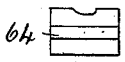
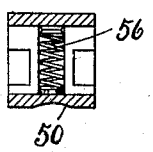


Fig. 15.



WITNESSES

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JOHN WILLIAM CARR, OF MANCHESTER, AND CHARLES ROBERT SCHOLES, OF BURY, ENGLAND.

WEFT-REPLENISHING LOOM.

No. 859,541. Specification of Letters Patent. Patented July 9, 1907.

Application filed August 26, 1904. Serial No. 222,357.

To all whom it may concern:

Be it known that we, JOHN WILLIAM CARR and CHARLES ROBERT SCHOLES, subjects of the King of Great Britain and Ireland, and residents, respectively, of Manchester and Bury, in the county of Lancaster, England, have invented new and useful Improvements in Weft-Replenishing Looms for Weaving, of which the following is a specification.

This invention relates to those kinds of looms for weaving in which when the filling breaks or runs out, a fresh cop is automatically inserted into the shuttle from the front and the spent cop ejected at the back of the shuttle, without removing the shuttle itself, and consists in improved arrangements and combinations of mechanism for effecting this change of cops, the object of the invention being to obtain a reliable and simple apparatus which will allow the change to be effected without having to reduce the present high speed of looms and which is applicable to all kinds of looms having only one shuttle running at the time, at small expense and without alteration of the usual working parts of the loom.

In connection with this invention a shuttle is used having a horizontal slot through the same from the front to the back and the front and the back of the shuttle box are likewise formed with slots allowing the cop carrier to be pushed through them into and out of the shuttle. The shuttle box has a chute fixed thereto behind the slot therein adapted to receive the ejected cop carriers and to direct them clear of the loom.

A vertical hopper is arranged opposite to the off or left hand side of the slay in which the cop carriers are placed with their open sides down and the lowest is supported normally by bars which release it when it is to be seized so as to be ready to be transferred to the shuttle, two other bars supporting the pile of carriers above until the one seized is disposed of.

For seizing the cop carriers and transferring them one by one to such a position that upon the breakage of the weft the shuttle will receive and retain one upon the forward movement of the slay, a pair of jaws carried by a swiveling plate or tumbler adapted to move through about ninety degrees is used which when in the horizontal position retains the carrier until the shuttle is forced on to it.

The cop changing mechanism is set in motion by the filling fork lever drawing the tumbler motion in the path of a lever working continuously in connection with the second motion shaft of the loom.

The cop carriers used consist preferably of a flat bar with turned up ends one of which has a cop spindle hinged thereto and the carrier when in the shuttle rests upon its side. The construction of this cop carrier does not form part of this invention.

The drawings attached hereto illustrate the application of our improved cop changing motion to an overpick loom.

Figure 1 represents a front elevation and Fig. 2 represents a side elevation of that part of a loom to which our invention is applied; Fig. 3 represents a front elevation and Fig. 4 a cross section on line *w—w* of Fig. 3 of the shuttle box; Fig. 5 represents an enlarged front elevation of the hopper; Fig. 6 a plan of the same; Fig. 7 a sectional side elevation and Fig 8. a side elevation of the hopper. Figs. 9 and 10 represent two different views of the mechanism for operating the tumbler. Fig. 11 is a side view of the shuttle with cop and carrier inclosed. Fig. 12 is a top view of the same with the shuttle partly in section along line *x—x* of Fig. 11. Fig. 13 is a cross section of the shuttle at *y—y* of Fig. 12. Fig. 14 is an end view of the cop carrier. Fig. 15 is a cross section at *z—z* of Fig. 12.

Referring now to the drawings opposite to the off side of the slay 1 a hopper 2 is arranged having grooves 3 in the sides in which a number of cop carriers hereinafter described with reference to Figs. 11 and 12 are placed one above the other with the open sides or cops at the lower side. The hopper is shown mounted upon horizontal pivots 4 carried by the frame 5 and the lower portion is pushed by the springs 6 in the direction of the slay for the purpose of taking up the shock upon the changing of a cop carrier and obviating the necessity for minute adjustments of the slay in relation thereto. These springs are each threaded upon a rod 51, passing through lugs 52 52^1 upon the hopper 2 and the frame 5, the rod being allowed to slide in one of the lugs as the spring is compressed. The rod 51 may be a bolt with a head at one end and a nut at the other end as shown in Fig. 8.

The lowest carrier is supported by a pair of horizontal sliding bars 7 connected to the free ends of two arms 8 which are mounted on a cross shaft 9 supported in bearings 10 at the back of the hopper, two similar sliding bars 11 being connected to the free ends of two similar arms 12. The sliding bars are carried in forked guides 13 and their noses pass through holes in the front 14 of the hopper 2, and while the loom is working normally the upper bars 11 are in their backward position and support the cop carriers above, a light spring 50 fixed to a lever 50′ on the cross shaft 9 holding them in this position.

Below the bars 7 and 11 and the grooves 3 in the hopper sides, a cross plate 17 herein-after called "rocking plate," is supported on pivots 18 Figs. 2 and 6 in the sides of the hopper and is normally held in a horizontal position as indicated in Fig. 2. Upon the rocking plate two pivoted upright levers or arms 19 are mounted one at each side, the upper ends of which have grooves 20 adapted for receiving and supporting

a cop carrier dropped into them from the hopper, and the lower ends have each a heel 21 to limit the inward movement, and while the loom is weaving, a carrier rests in these levers or arms which are hereinafter called "grippers." The grippers 19 are connected by a toggle 22 to the central pivot 23 of which a pin 24 is connected passing through a bush 25 on the rocking plate. The end 26 of this pin bears against a cross plate 27 forming a stationary cam fixed to the hopper frame when the rocking plate is in its normal horizontal position, causing the grippers 19 to be pushed slightly apart so that the cop carrier represented by 16 rests loosely in them and as the rocking plate 17 is turned over, the pin 24 leaves the cam and the spring 28 in the bush 25 which bears against a collar 28^1 Fig. 7 on the pin 24 and thereby causes the grippers to close in and to clip the cop carrier, and after its transfer to the shuttle and the return of the rocking plate another carrier can drop freely into the grippers from the hopper.

Referring now to Figs. 11 to 15 the shuttle is represented by 50 and the cop carrier by 16. The shuttle is provided with transverse corrugations 51, preferably formed upon a metal piece 52 inserted thereinto; near to each end of its slot 53 and upon the bottom side, each metal piece 52 carries a spring finger 54 which is pivoted upon a pin 55 and pressed downwards by means of a spring 56 bearing against a tongue 57 of the finger upon the opposite side of its pivot. The cop carrier 16 consists of a light frame constituted by a bar 58 and two block ends 59 and 60 projecting forwards. Preferably they have projections 64 at the ends, which enter jaws on the grippers when the carrier drops from the hopper. The ends 59 and 60 are corrugated transversely so as to correspond with the corrugations 51 of the pieces 52 and are pushed into the shuttle between the said corrugations 51 and the fingers 54, the latter having their ends extended forward and beveled at the front as shown at 61 Fig. 13, while the back of the fingers is nearly vertical. The ends 59 and 60 have recesses on their tops of the same shape as the ends of the fingers, which are lifted when the cop carrier is pushed into the shuttle and then engage into these recesses. In consequence of the shape of the fingers and recesses the carrier is drawn out of the grippers, in which it is only held by a sliding friction when the slay moves backwards. In the end 60 the peg 62 is hinged at 63 in a similar manner to that of an ordinary shuttle, and the other end 59 has a hole 65 through which the filling thread passes.

We fix a crank 29 to the end of the tappet shaft 30. and one end of a connecting rod 31 thereto, the other end being connected to one arm 32 of a bell crank lever 33 the other arm 34 of which has a stud 35 upon it. While the loom is weaving, the crank 29, connecting rod 31 and bell crank lever 33 are in continuous motion and upon the filling fork coming into action, the cop changing motion is brought into connection with the stud 35 by which the changing action is completed. The connection of the filling fork lever with the cop changing motion is preferably a chain 36 which passes from the attachment 40 at the lower end of the rod 38 over suitably arranged guide pulleys and its other end is connected to the weft fork carrier in the well known way and when the filling fork is moved forward on the failure of the filling the cop changing motion is brought into action by means of the stud 35 of the bell crank lever 33.

The connecting rod 31 is preferably attached to the bell crank lever 33 in a flexible manner so that a spring buffer 37 consisting of a compression coil spring threaded upon the rod 31 between the collar 31^1 and a sleeve 31^2 hinged to the end 32 of the bell crank lever, takes up any undue shock and causes the said lever to dwell upon the compression and reaction of the spring. The connection between the rocking plate 17 and the part which is pulled into action with the bell crank lever by the filling fork lever upon failure of the filling consists of a vertically disposed rod 38 which is hinged to an arm 39 on the rocking plate near its upper end and its lower end is provided with an attachment 40 for the chain 36 from the filling fork lever and a slotted jaw 41 adapted to engage with the stud 35 on the bell crank lever. The lower end of the rod has also a stud 42 which is adapted to slide in a slot 43 in a guide plate 44 provided for the purpose of controlling its movement. The slot 43 is preferably curved and vertically disposed at its upper part while its lower part recedes therefrom. A spring controlled presser 45 bears against the stud and disengages the rod from the bell crank lever upon the release of the filling fork mechanism this presser consists of a lever of the first order pivoted at 45^1 on the guide plate 44, its lower end pressing against the stud 42 and tending to force it outwards along the receding part of the slot 43, the upper end being connected to one end of a tension spring 45^2 whose other end is attached to the frame of the loom. The plate 17 is turned by the movement of the rod 38 and lever 33 by a quarter turn or thereabout, so that the cop carrier 16 held in the grippers is brought opposite to the slot 46 in the shuttle-box 47 and shuttle (not shown) and as the slay beats up is inserted into the shuttle, thereby ejecting the spent cop carrier, which is pushed into a chute 48 along which it slides into a receptacle at the side of the loom. As the rocking plate is being turned over, the pin attached to the center of the toggle slides out of contact with the cross plate, and causes the spring acting on the grippers to press them inwards so that they grip the cop carrier during its movement. When the cop carrier has been pushed into the shuttle, it is gripped by springs in the shuttle and drawn out of the grippers and remains in the shuttle. The downward movement of the rod 38 then turns the grippers 19 up again ready to receive a fresh cop carrier and the spring controlled arm 45 pushes the lower end of the said rod back in the receding slot and holds it disengaged from the bell crank lever 33. The upward movement of the vertical rod 38 likewise causes a fresh cop carrier to drop into the grippers. Its end encounters in its upward movement the arm 15 on the cross shaft at the front of the hopper and lifts it so that the upper sliding bars 11 are drawn out and the lower ones 7 pushed in allowing the cop carrier to drop down upon the latter. When the arm 15 is being raised its end wipes past the head 49^1 of the weighted catch 49 which lies in the path of said arm and moves back as the latter passes it, and after the arm has cleared the catch the latter assumes its normal position which will prevent the return of the said arm by supporting it. The catch is disengaged by the

gripper plate on its return movement when it has almost reached its normal position by striking the catch 49 at 49^2 and the latter then allows the cross shaft to return to its original position. The upper sliding bars are thereby pushed in between the lowest and second cop carriers in the hopper and support the latter and those above it, while the lower bars are drawn out and allow the said lowest carrier to drop into the grippers ready for the next change.

The sides of the hopper may be fixed to the breast beam or frame of the loom, but preferably they with their attachments are arranged to swing on pivots as hereinbefore described. Other adjustable abutments may be attached to the slay bottom or the hopper so arranged that when the grippers have placed the fresh cop carriers into its exact position in the shuttle, the abutments push back the hopper, whereby the minute adjustment of the movement of the slay necessary with other motions to prevent shocks and breakages is obviated.

The details of the mechanism described may be varied; the essential part of the invention being the arrangement of grippers adapted to receive the cop carriers from the hopper while in a vertical position and then to be turned into a horizontal position to transfer the cop carriers to the shuttle.

We claim as our invention:—

1. In a loom, the combination of a slay having a shuttle-box and a straight-through slot through the front and back thereof, a shuttle having a through-slot from front to back, adapted to contain a cop carrier, a rocking plate carrying grippers adapted to receive a cop carrier from the hopper and hold it while said rocking plate and grippers are turned and mechanism operated on the failure of the filling and adapted to turn the rocking plate and grippers so as to bring the cop carrier held by them into the path of the spent cop carrier in the shuttle as the slay beats up.

2. In a weft replenishing loom, a vertical hopper having two slides one above the other adapted to support cop carriers in the hopper, in combination with mechanism operated on the failure of the filling so as to draw back the upper slide and allow the cop carriers to drop upon the lower slide, and after the change of cops in the shuttle has been effected, to draw back the lower slide and push in the upper one, so as to allow the lowest cop carrier to drop, and grippers adapted to receive this cop carrier.

3. In a selfacting weft replenishing loom, a vertical hopper having two slides one above the other adapted to support cop carriers in said hopper, a horizontal rocking shaft mounted on said hoppers, two-armed levers fixed on said rocking shaft connected to both said slides, a third lever fixed on said rocking shaft, in combination with mechanism adapted to operate said third lever on the failure of the weft so as to push in the lower slide and draw back the upper one and to reverse these positions after the change of cops in the shuttle has been effected.

4. In a selfacting weft replenishing loom, a vertical hopper adapted to contain a number of cop carriers, pivots at the side of said hopper near to its top end, a frame fixed to the loom frame adapted to support said pivots and hopper, the spring adapted to press the lower end of said hopper towards the loom slay, and means adapted to limit the movement of the hopper in this direction.

5. In a loom, the combination of a slay having a shuttle-box with a horizontal through-slot through the front and back thereof, a shuttle having a through-slot from front to back adapted to contain a cop carrier, a rocking plate mounted on pivots on a resilient hopper adapted to to contain a number of cop carriers; grippers on said rocking plate adapted to receive a cop carrier from said hopper and hold it while said rocking plate and grippers are turned, two pairs of slides on said hopper one above the other adapted to support the cop carriers, in combination with mechanism operated on the failure of the filling so as to draw back the upper slides and push in the lower ones, and simultaneously to turn the rocking plate and grippers so as to bring the cop carrier held by them into the path of the spent cop carrier in the shuttle as the slay beats up, and to turn back the rocking plate and grippers and to draw back said lower slide and push in the upper ones after the change of cops in the shuttle has been effected.

6. In a loom the combination of a slay having a shuttle-box and the shuttle with a horizontal through slot from front to back in each of them, a rocking plate mounted on pivots on a hopper, grippers mounted on pins on said rocking plate toggle links connected to said grippers, a pin connected to the central toggle joint and adapted to slide in said rocking plates, a spring adapted to press said pin so as to draw said grippers towards each other by means of said toggle links, a cam plate fixed to the loom frame and adapted to press said pin upwards when the grippers are in a vertical position and thereby push them apart and to release the pin when the grippers are turned into a horizontal position.

7. In a loom the combination of a slay, a shuttle box thereon having a slot through the back and front thereof, a shuttle having a through-slot from front to back and adapted to contain a cop carrier, a hopper adapted to contain a number of cop carriers, pivots at the sides of the hopper a frame fixed to the loom frame adapted to support said pivots and hopper, a spring adapted to press said hopper towards the loom slay, and stops adapted to limit the movement of the hopper in this direction, a rocking plate having pivots mounted on said hopper, grippers mounted on pivots on said rocking plate and adapted to receive and hold a cop carrier, toggle links connecting said grippers, a pin connected to the center of the toggle joint, and adapted to slide in said rocking plate, a spring adapted to press said pin so as to draw the grippers towards each other by means of said toggle links, a fixed cam plate adapted to press said pin upwards when the grippers are in a vertical position and thereby push them apart and to release the pin when the grippers are turned into a horizontal position, two pairs of slides on said hopper one above the other adapted to support the cop carriers, a rocking shaft and levers fixed thereon adapted to move said pairs of slides simultaneously in opposite directions, a third lever fixed on said rocking shaft, another lever fixed on one of the pivots of said rocking shaft, another lever fixed on one of the pivots of said rocking plate, a vertical rod connected to said lever and adapted to turn it and said third lever on the rocking shaft when moved upwards in combination with mechanism operating on the failure of the filling adapted to move said rod upwards and thereby simultaneously to turn said grippers into a horizontal position so as to bring the cop carrier contained therein into the path of the cop carrier contained in said shuttle, and to push in the lower slides and draw back the upper ones, and after the change of cops has been effected to return the rocking plate into a vertical position, and a weighted lever adapted to actuate the rocking shaft when released by said rod so as to draw back the lower slides and push in the upper ones.

8. In a loom the combination of a slay, a shuttlebox thereon having a slot through the back and front thereof, a shuttle having a through slot from front to back and adapted to contain a cop carrier a hopper adapted to contain a number of cop carriers, pivots at the sides of the hopper, a frame fixed to the loom frame adapted to support said pivots and hopper, a spring adapted to press said hopper towards the loom slay, and stops adapted to limit the movement of the hopper in this direction, a rocking plate having pivots mounted on said hopper, grippers mounted on pivots on said rocking plate and adapted to receive and hold a cop carrier, toggle links connecting said grippers, a pin connected to the center of the toggle joint and adapted to slide in said rocking plate, a spring adapted to press said pin so as to draw the grippers towards each other by means of said toggle links, a fixed cam plate adapted to press said pin upwards when the grippers are in a vertical position and thereby push them apart and to release the pin when the grippers are turned into a horizontal position, two pairs of slides on said hopper one

above the other adapted to support the cop carriers, a rocking shaft and levers fixed thereon adapted to move said pairs of slides simultaneously in opposite directions, a third lever fixed on said rocking shaft, another lever fixed on one of the pivots of said rocking plate, a vertical rod connected to said lever and adapted to turn it and said third lever on the rocking shaft when moved upwards a fork near the lower end of said rod, a bracket fixed to the loom frame and containing an L shaped slot, a pin on said fork engaging into said slot, a lever and a spring connected thereto adapted to press said pin against the end of the horizontal part of said slot, a bell crank lever mounted on a stud on said bracket, a pin on its horizontal limb adapted to engage with said fork, a bush hinged to the end of the vertical limb of said bell crank lever, a rod sliding in said bush, a crank fixed on the tappet shaft and adapted to actuate said sliding rod and bell crank lever, a chain attached to the vertical rod and adapted to be operated by means of the filling fork on the failure of the filling so as to pull the said rod and fork thereon so as to engage the pin on the horizontal limb of the bell crank lever.

9. In a weft replenishing loom, the combination of a slay having a shuttle box and a through-slot through the front end and back thereof, a shuttle having a through slot from front to back, a plate with transverse corrugations fixed in the slot at each end and the bottom thereof, a vertical extension to each plate, a finger hinged to each said extension at the top, having inclines at their undersides at the front and a nearly vertical back, a backward extension on said fingers and a spring adapted to press the said extension upwards and the fingers downwards.

10. In a weft replenishing loom, the combination of a slay having a shuttle box and a through-slot through the front and back thereof, a shuttle having a through slot from front to back, plates with corrugations fixed at the ends of the slot and fingers above them pressed downwards by springs, the ends of the fingers being inclined on their under sides and at the front and vertical at the back, a cop carrier consisting of a bar with a block at each end, each of said blocks having transverse corrugations on its underside and a longitudinal groove in its top adapted to fit the end of one of said fingers, a cop spindle hinged to one of said blocks and a perforation for the weft yarn in the other block.

In testimony whereof we have hereunto affixed our signatures in the presence of two witnesses.

JOHN WILLIAM CARR.
CHARLES ROBERT SCHOLES.

Witnesses:
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RIDLEY G. URQUHART.