

BEST AVAILABLE COPY

J. & R. HARLING.

AUTOMATIC WEFT REPLENISHING MECHANISM OF LOOMS FOR WEAVING.

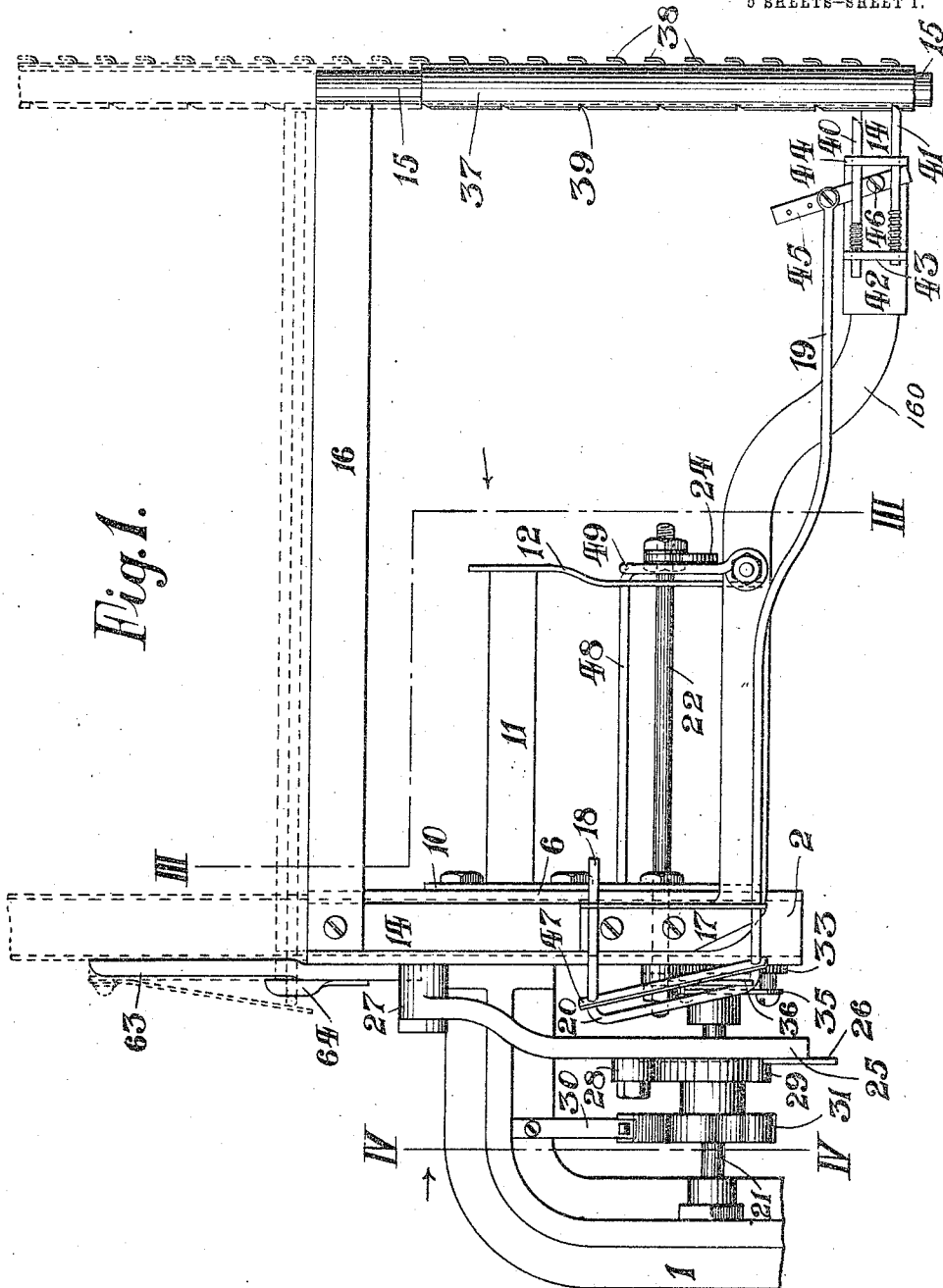
APPLICATION FILED JUNE 17, 1911.

Patented June 4, 1912.

5 SHEETS-SHEET 1.

1,028,456

Fig. 1.



Witnesses:
Am. H. Bates
James M. Kear

Inventors:
James Harling, and
Ralph Harling
by Robert W. Jenner, Attorney.

J. & R. HARLING.

AUTOMATIC WEFT REPLENISHING MECHANISM OF LOOMS FOR WEAVING.

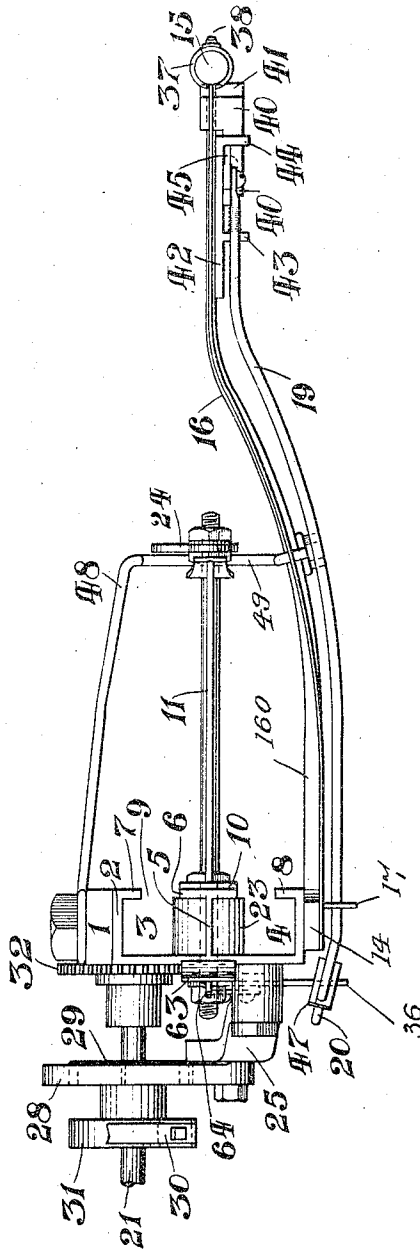
APPLICATION FILED JUNE 17, 1911.

1,028,456.

Patented June 4, 1912.

5 SHEETS--SHEET 2.

Fig. 2.



Witnesses:
Wm. H. Bates
James M. Spear

Inventors:
James Harling, and
Ralph Harling
by Herbert W. Jenner
Attorney

J. & R. HARLING.

AUTOMATIC WEFT REPLENISHING MECHANISM OF LOOMS FOR WEAVING.

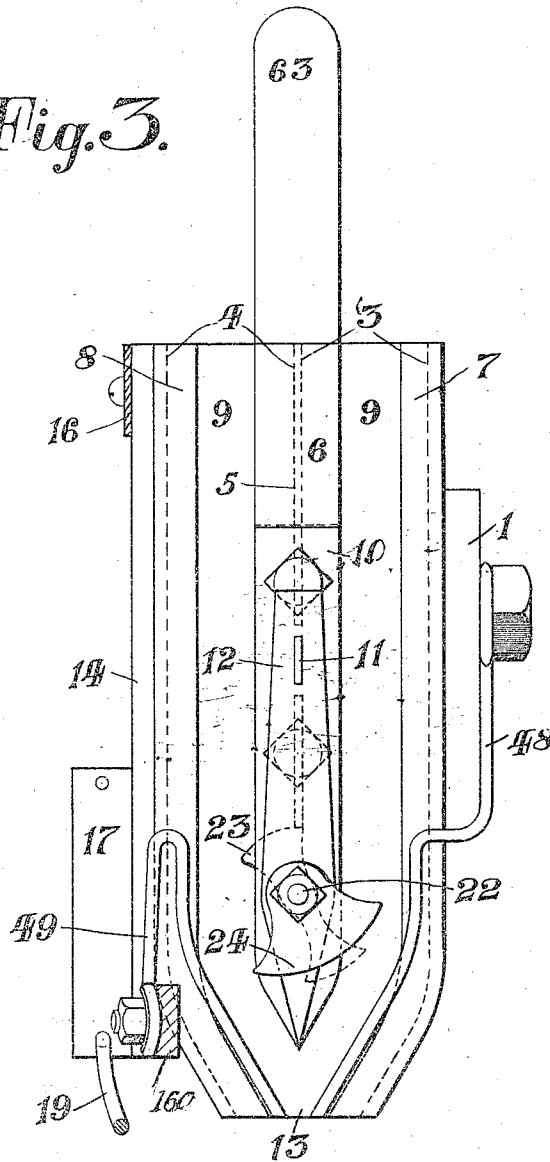
APPLICATION FILED JUNE 17, 1911.

1,028,456.

Patented June 4, 1912.

5 SHEETS—SHEET 3.

Fig. 3.



Witnesses:

Wm H Bates

James M. Allen

Inventors:

James Harling, and
Ralph Harling.
by Herbert W. Jenner.
Attorney.

J. & R. HARLING.

AUTOMATIC WEFT REPLENISHING MECHANISM OF LOOMS FOR WEAVING.

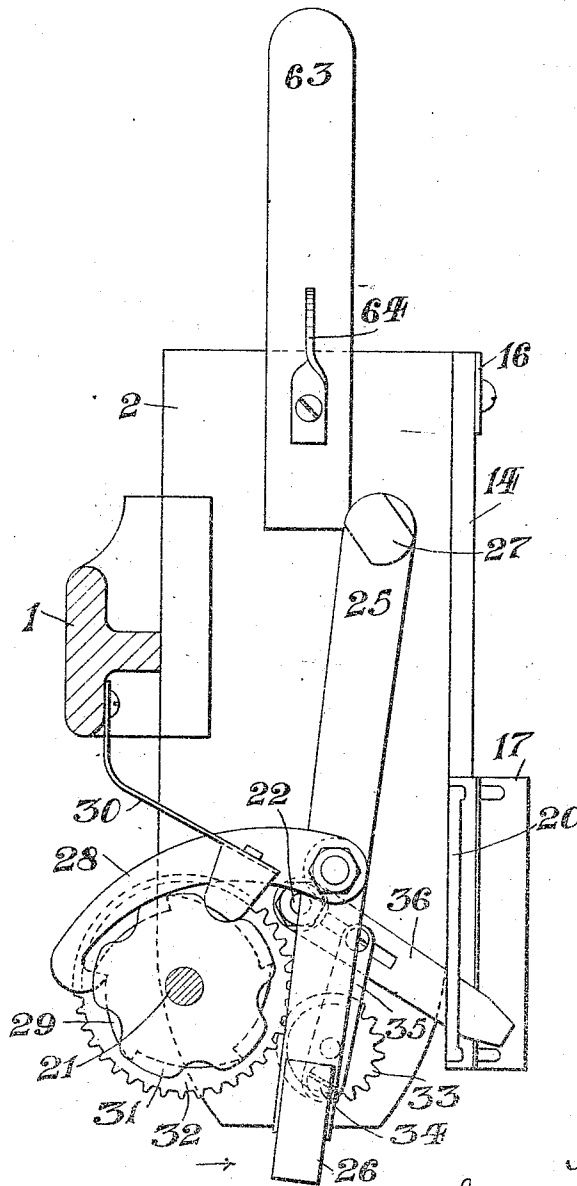
APPLICATION FILED JUNE 17, 1911.

1,028,456.

Patented June 4, 1912.

5 SHEETS—SHEET 4.

Fig. 4.



Witnesses:
Wm H Bates
James M. Shaw

Inventors:
James Harling, and
Ralph Harling.
by Herbert W. Jenner.
Attorney

J. & R. HARLING.

AUTOMATIC WEFT REPLENISHING MECHANISM OF LOOMS FOR WEAVING.

APPLICATION FILED JUNE 17, 1911.

1,028,456.

Patented June 4, 1912.

5 SHEETS—SHEET 5.

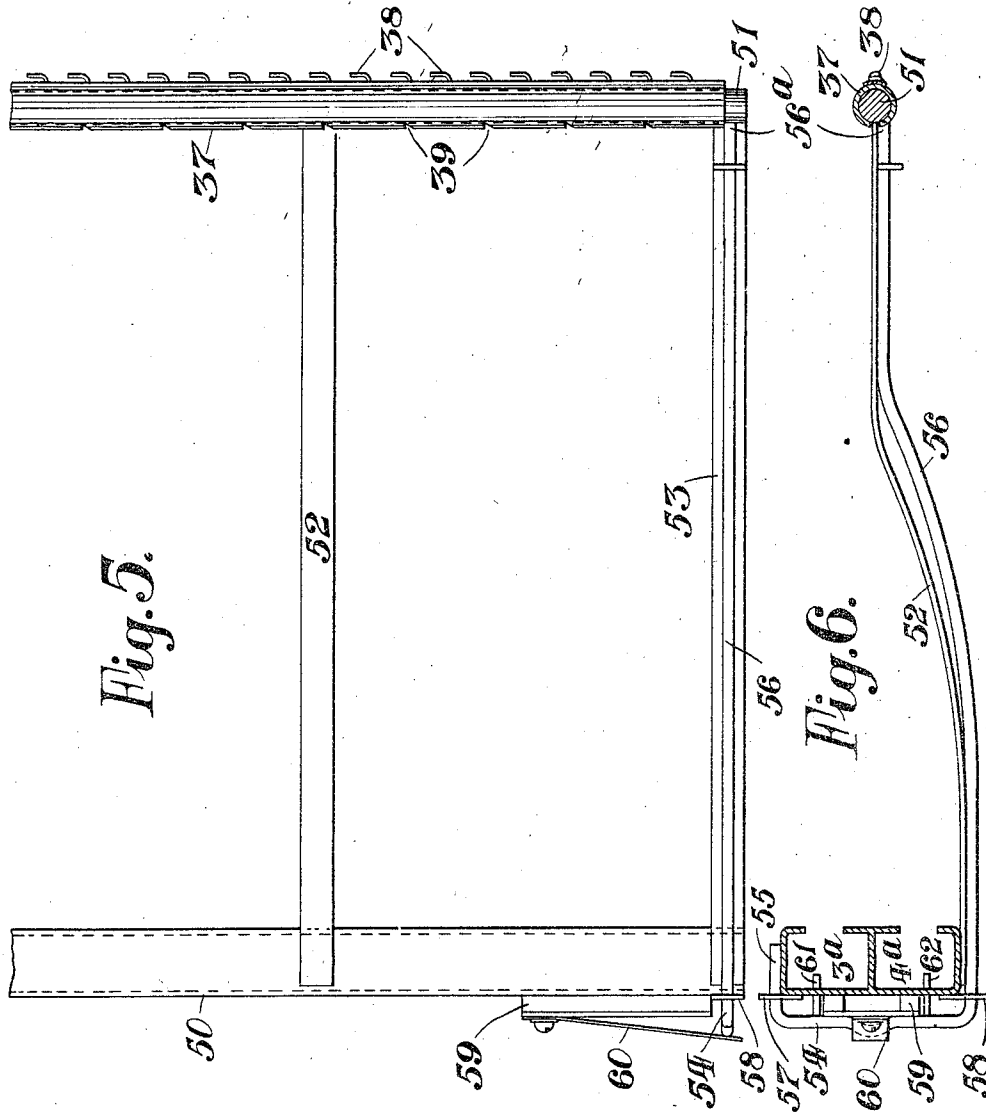


Fig. 5.

Fig. 6.

Witnesses:

Wm H Bates

James M. Sloan

Inventors:

James Harling, and
Ralph Harling.

by Herbert W. Jenner.
Attorney.

UNITED STATES PATENT OFFICE.

JAMES HARLING AND RALPH HARLING, OF ROSEGROVE, NEAR BURNLEY, ENGLAND.

AUTOMATIC WEFT-REPLENISHING MECHANISM OF LOOMS FOR WEAVING.

1, 28,456.

Specification of Letters Patent.

Patented June 4, 1912.

Original application filed November 11, 1910, Serial No. 591,866. Divided and this application filed June 17, 1911. Serial No. 633,763.

To all whom it may concern:

Be it known that we, JAMES HARLING and RALPH HARLING, residing at Rosegrove, near Burnley, in the county of Lancaster, England, have invented certain new and useful improvements in Automatic Weft-Replenishing Mechanism of Looms for Weaving; and we do hereby declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to pirn hoppers of automatic looms of the type in which, upon the exhaustion or breakage of the weft, the cop or pirn is ejected from the shuttle and a new cop or pirn from a hopper or magazine inserted therein.

According to our invention, the upper portion of the pirn hopper, which is preferably of such a capacity as to hold, when filled, a day's supply of pirns and is capable of attachment to and detachment from the lower portion of the hopper, comprises a vertical spindle carrying a sleeve provided with hooks or the like each adapted to engage the weft end of one of the pirns, the number of the said hooks in such case corresponding with the full number of pirns which the said upper portion of the hopper is adapted to contain. By this means the detachable portion of the hopper can be filled with pirns, and the weft ends of such pirns placed in engagement with the hooks, say in a separate room distant from the weaving shed, from which obvious advantages result. Our invention also comprises means, as hereinafter described, for releasing the sleeve carried by the upper detachable portion of the hopper and the pirns contained therein, and thus feeding the lower part of the hopper (which carries a spindle to receive the sleeve), immediately the attachment of the said upper portion to the lower fixed portion of the hopper has been effected; and means for releasing the pirns from the lower part of the hopper one at a time as required, and for moving the sleeve carrying the weft ends, each time a pirn is discharged into the pirn carrier, a distance equal to that between any one hook on such sleeve and the next hook.

The accompanying drawings illustrate by way of example the construction of a mechanism by means of which our invention may be put in practice.

Figure 1 is an elevation of the lower or fixed portion of the hopper, hereinafter referred to as the fixed hopper. The dotted lines at the top of this figure indicate the operative position of the upper or detachable portion of the hopper, hereinafter referred to as the detachable hopper. Fig. 2 is a plan of the fixed hopper. Fig. 3 is a sectional elevation of the fixed hopper taken on the line III-III in Fig. 4. Fig. 4 is a sectional elevation of the fixed hopper taken on the line IV-IV in Fig. 1. Fig. 5 is an elevation of the lower part of the detachable hopper. Fig. 6 is a plan of the portion of the detachable hopper represented in Fig. 5.

The numeral 1 indicates a bracket bolted to a convenient part of the loom frame, and to this bracket 1 is bolted the fixed hopper 2, which comprises two vertical compartments 3, 4, of oblong or other suitable section, divided by a partition or midfeather 5. On this partition is formed or secured a wall or plate 6, between which and the internal portions 7, 8, of the main casing of the hopper are slots 9, through which slots the pegs of the pirns protrude when the rear ends of the pirns are placed in the compartments 3, 4. On the outside of the wall 6 is bolted a plate 10 carrying a rail 11 from the outer end of which rail depends a spacing piece 12. The sides of the casing of the hopper converge at the bottom as shown in Fig. 3, and the wall 6 and plate 10 have a corresponding convergence or in other words are tapered or curved to a point, so that the compartments 3 and 4 have a common outlet 13. At one side of the hopper is a bracket 14 for supporting a vertical spindle 15, and to the top of this bracket 14 is secured a rail 16 connected to the top of the said spindle 15. To the bottom of the said bracket 14 is secured a bearing 17 having two perforations through which work the two members 18, 19, of a bent rod or wire lever 20, for purposes hereinafter described. A shaft or spindle 21 is journaled in the hopper 2 and the loom bracket 1, and a spindle 22 passes through the hopper and the spacing piece 12; on this spindle 22 are mounted two cams 23, 24, which respectively support the rear ends of the pirns and the noses of the pirns, and control their descent. The spindles 21 and 22 and other operative mechanism of the hopper are actuated by the oscillating lever 25 in the following:

manner:—At the lower end of the lever 25 is a projection 26 adapted to be engaged by the ordinary or other pirn carrier, (which as usual is employed to transfer the pirns from the magazine or hopper to the shuttle) when the said pirn carrier (not shown) is moving in the direction of the arrow in Fig. 4. The lever 25 is thus rocked on its pivot at 27, causing the pawl 28 to rotate the ratchet wheel 29 on the spindle 21 to the extent of one tooth, overcoming the resistance of the spring brake 30 acting on the brake wheel 31. On the same spindle 21 is a spur wheel 32 gearing with a spur pinion 33 mounted on a short stud on the back of the hopper 2, on which pinion 33 is an eccentric pin 34 connected by a link 35 to a lever 36 secured on the spindle 22. Owing to the eccentricity of the pin 34, the partial rotation of the ratchet wheel 29 thus causes the lever 36 to rise and fall alternately, and the spindle 22 and cams thereon are thus rocked alternately to right and left.

On the spindle 15 is a loose sleeve 37, slotted vertically so that it can freely pass the rails 16, and 160 which sleeve is provided with hooks 38, each adapted to engage the end of the weft on one of the pirns. On the other side of the sleeve are notches or recesses 39 opposite every second hook, these notches being adapted to be engaged by the spring catches 40, 41. The plate 42 secured to the rail 160 which is also secured to the bracket 14 carries a pair of brackets 43, 44, through which the spring catches 40, 41 work freely when reciprocated in opposite directions by the lever 45 pivoted at 46 and connected to the arm 19 of the lever or bent rod 20, the said spring catches being slotted or recessed to engage the said pivoted lever.

Close to the rear end of the lever 20 is fastened an inclined bar 47, so arranged as to form with the inclined back of the lever itself a slot through which passes the lever arm 36, which, as before mentioned, has an alternate rising and falling movement. The inclination of the slot causes this movement to be converted into an alternate backward and forward movement of the arms 18 and 19 through the bearing 17, and the consequent rocking of the lever 45 at each stroke disengages one of the spring catches 40, 41, from a notch 39, allowing the sleeve to drop so that either the same notch or the notch above is engaged by the other spring catch; that is, if the catch 40 is disengaged, the catch 41 engages the same notch, but when the catch 41 is disengaged, the catch 40 engages the notch above, so that the sleeve falls a distance equal to the pitch of the hooks 38 at each reciprocation of the spring catches.

Guides 48 and 49 are provided to guide the weft between the pirns and the hooks 38.

The detachable hopper 50 (see Figs. 5 and 6) has vertical compartments 3^a and 4^a, the

outlets of which are of similar size and shape to the inlets of the compartments 3 and 4, and is provided with a vertical spindle 51 supported by rails 52, 53. At the rear of this hopper is a cross-bar 54 having arms 55, 56, capable of sliding in brackets 57, 58. On a bracket 59 is a flat spring 60 which presses on the crossbar, and normally holds it in the position shown in Figs. 5 and 6 with the end 56^a of the arm 56 in contact with the spindle 51 and supporting the sleeve 37. Projections 61, 62, on the crossbar pass through slots at the back of the hopper, one of such projections entering each compartment and serving to retain the pirns in position, the lowest pirn of each stack resting upon the projection in its respective compartment.

The bracket 59 forms a socket in which registers the upwardly extending bolt 63 on the fixed hopper (shown in Fig. 1) and on this bolt 63 is a wedge or other projecting part 64. When the socket is being passed over the bolt 63, the wedge 64 engages and presses outwardly the crossbar 54, drawing the projections 61, 62, on which the pirns normally rest, out of the compartments of the detachable hopper, thereby allowing the said pirns to drop on to the pirns, if any, contained in the fixed hopper; or, if there are no pirns in the fixed hopper, to the bottom thereof on to the cams 23 and 24. At the same time the arm 56 is by the outward movement of the crossbar 54 withdrawn from supporting the sleeve 37 on the spindle 51, so that the said sleeve drops on to the top of the sleeve, if there be any such sleeve, on the spindle 15, or, if not, to the bottom of the said spindle, where the aforesaid spring catches engage it. The top of the spindle 15 may be provided with a key or projection which registers in a recess in the foot of the spindle 51 when the detachable hopper is placed in position.

The action of the apparatus is as follows: Assuming the fixed hopper 2 to be empty, the spindle 15 clear, the lever 36, cams 23 and 24, and spring catches 40 and 41, all in the positions shown in Figs. 1 to 4, and the detachable hopper 50 (which may be of any desired height) full of pirns with their weft ends over the hooks 38 on its sleeve 37, the hopper 50 is placed on top of the hopper 2 with the spindle 51 resting on the spindle 15; the wedge 64 presses out the crossbar 54, withdrawing support from the pirns, and from the sleeve, which drops until the catch 41 engages the lowest notch 39. Those pirns in the compartment 4^a fall down the compartment 4 until the lowest pirn is stopped by the operative nose of the upper member of the cam 23, and those pirns in the compartment 3^a fall through the compartment 3 a slightly greater distance, the lowest coming to rest upon the lower member of the

cam 23. Upon the projection 26 on the lever 25 being struck by the pin carrier and the lever 25 oscillated thereby, through the connections 28, 29, 32, 33 and 35, the lever 36 is lifted. The lever 20 rocks the lever 45, withdrawing the catch 41, and the sleeve 37 drops till the catch 40 engages the next superior notch 39. The spindle 22 is, by the aforesaid lifting of the lever 36, turned in the direction of the arrow in Fig. 4, so that the lower member of the cam 23 is withdrawn from under the lowest pin in the compartment 3, which pin therefore passes through the outlet 13 into the pin carrier, the upper member of the said cam interposing between the said pin and the next pin in the same compartment. The cam 24 is simultaneously rocked to release the nose of the pin which had been resting on its horizontal upper edge. At the same time the lowest pin in the compartment 4 passes the receding upper member of the cam 23 and is received on the lower member thereof.

At the next actuation of the lever 25, the pinion 33 again makes half a revolution, the lever 36 is lowered, the catch 40 is retired and the catch 41 enters the notch in the sleeve 37 which has thus been disengaged, and the rocking of the cam 23 enables the lowest pin to be taken from the compartment 4. In like manner the pins are taken alternately from one compartment and from the other, until the detachable hopper is emptied and the sleeve 37 falls off the spindle 15 into a stand or receptacle placed to receive it; or, if the detachable hopper be removed when all its pins have entered the fixed hopper, and full detachable hoppers successively substituted, pin will follow pin and sleeve follow sleeve as long as the loom continues weaving.

It will be observed that there are two stages in the descent of the lowest pin in each compartment, between which it is retained within the concave side of the cam 23, the object of this arrangement being to prevent the exit of more than one pin at a time.

We may arrange, if found expedient, for two weft ends to be engaged by one hook on the sleeve, instead of for each hook to engage the weft end of one pin as above described.

Claims:—

1. The combination, with a stationary pin hopper, and a stationary guide spindle secured thereto; of a removable hopper and an upper guide spindle secured to it and adapted to register with the stationary guide spindle when the removable hopper is connected to the stationary hopper, a sleeve slidable on the two said spindles and provided with a series of supports for the weft, catches for supporting the pins in the re-

movable hopper and for supporting the sleeve when on the upper spindle, and a projection secured to the stationary hopper and operating to retract the said catches and release the pins and the sleeve simultaneously when the removable hopper is connected to the stationary hopper.

2. The combination, with a removable pin hopper, and a guide spindle secured to it; of a sleeve slidable on the said spindle and provided with a series of supports for the weft, and a retractable spring-actuated rod provided with catches at its respective end portions which normally support the pins in the hopper and the sleeve on the spindle.

3. The combination, with a pin hopper having converging side portions at its lower end which form an outlet for the pins, of a partition secured in the upper part of the hopper directly over its outlet and dividing it into two lateral compartments, a cam pivoted in the lower part of the hopper in line with and between its said partition and outlet, and means for oscillating the cam to permit the pins to pass from the said compartments alternately through the said outlet.

4. The combination, with a pin hopper provided with a partition which divides it into two lateral compartments, of a cam pivoted directly under the said partition, and means for oscillating the cam to release the pins alternately from the said compartments.

5. The combination, with a pin hopper provided with two compartments arranged side by side, of a shaft journaled between the said compartments and in the lower part of the hopper, a cam secured on one end portion of the shaft inside the hopper, a second cam secured on the other end portion of the shaft and adapted to support the projecting end portions of the pins, and means for oscillating the said shaft and its cams to release the pins alternately from the said compartments.

6. The combination, with a pin hopper, and a guide spindle secured to it; of a sleeve slidable on the said spindle and provided with a series of supports for the weft, two slidable catches arranged side by side and supported adjacent to the said spindle, a lever for sliding the said catches simultaneously in opposite directions to permit the said sleeve to slide step by step, and driving mechanism for oscillating the said lever.

7. The combination, with a pin hopper, two rails secured at one end to the pin hopper, and a guide spindle secured to and extending between the free end portions of the said rails; of a sleeve provided with a longitudinal slot and sliding over the said spindle and the end portions of the rails, said sleeve having a series of supports for the

weft, two slidable catches arranged side by side and supported by one of the said rails adjacent to the said spindle, a lever for sliding the catches simultaneously in opposite
5 directions to permit the said sleeve to slide step by step, and driving mechanism for oscillating the said lever.

In testimony whereof we affix our signatures, in presence of two witnesses.

JAMES HARLING
RALPH HARLING

Witnesses:

LEONARD H. CROSSLEY,
WILLIE IDESON.