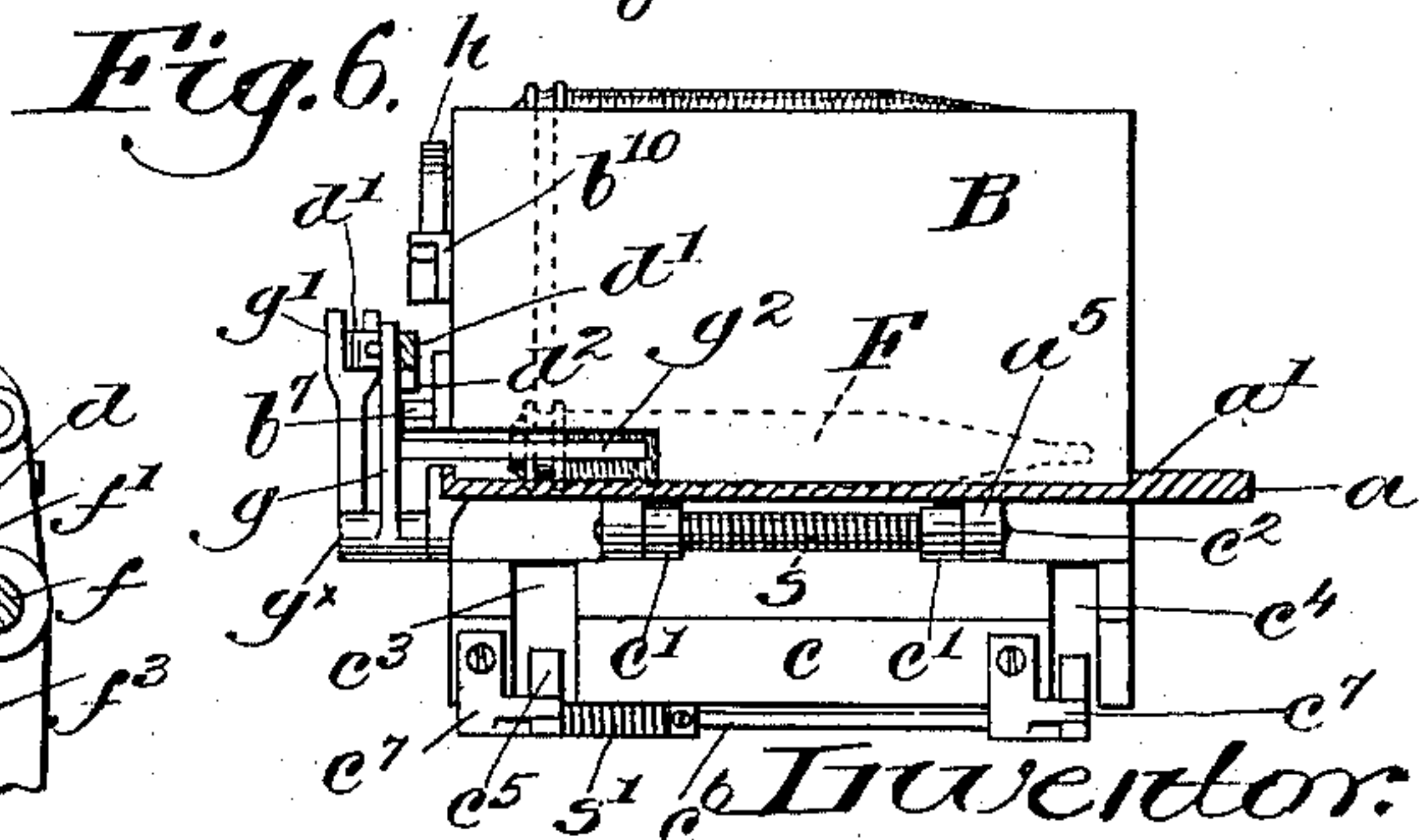
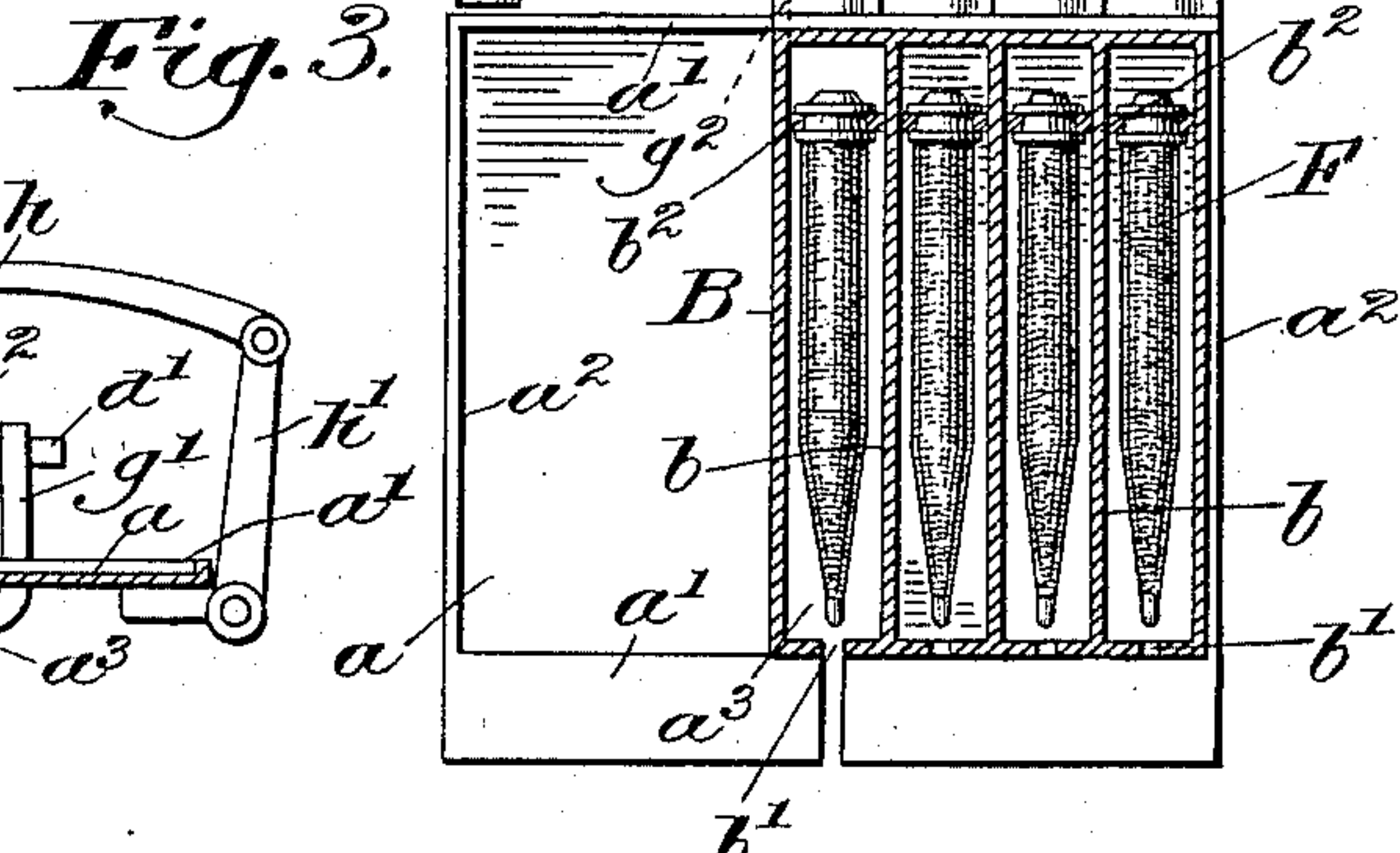
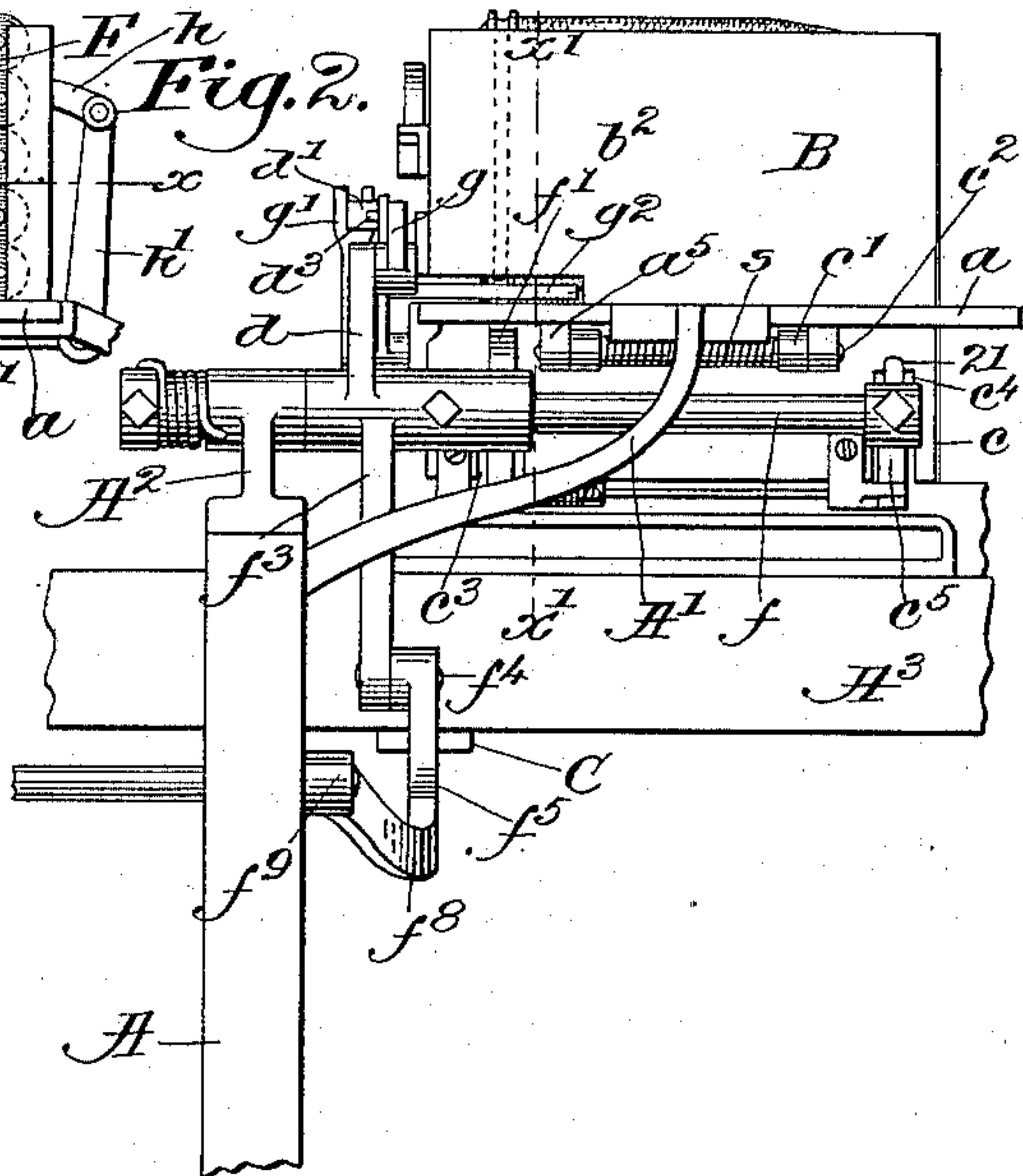


Patented July 26, 1898.

(No Model.)

(Application filed Dec. 3, 1897.)



*c<sup>7</sup> c<sup>5</sup> s<sup>1</sup> c<sup>6</sup> Inventor:*  
*Charles A. Littlefield*  
*by Wesley Gregory attys.*



# UNITED STATES PATENT OFFICE.

CHARLES A. LITTLEFIELD, OF LOWELL, MASSACHUSETTS, ASSIGNOR TO THE  
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## LOOM.

SPECIFICATION forming part of Letters Patent No. 607,937, dated July 26, 1898.

Application filed December 3, 1897. Serial No. 660,600. (No model.)

*To all whom it may concern:*

Be it known that I, CHARLES A. LITTLEFIELD, of Lowell, county of Middlesex, State of Massachusetts, have invented an Improvement in Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters and figures on the drawings representing like parts.

10 This invention relates to that type of loom wherein means are provided for automatically transferring a fresh supply of filling to the shuttle upon breakage or exhaustion of the filling in the shuttle.

15 One of the objects of my present invention is to simplify the construction of the filling feeder or hopper and facilitate the loading thereof, while greatly increasing its capacity for holding the filling-supply.

20 Other objects of my invention are such as are attendant upon the construction, operation, and arrangement of the construction hereinafter described and embodying the invention.

25 Figure 1 is a partial right-hand side elevation of a loom with my invention embodied therein. Fig. 2 is a front elevation of the mechanism shown in Fig. 1. Fig. 3 is a horizontal sectional view of the hopper or feeder on the line  $x x$ , Fig. 1. Fig. 4 is a vertical section through the hopper and delivery-throat thereof on the line  $x' x'$ , Fig. 2, looking toward the left. Fig. 5 is an inner side elevation of the mechanism shown in Fig. 1; and Fig. 6 is a sectional view thereof on the line  $x^2 x^2$ , Fig. 5, looking toward the left.

30 The loom side A has secured thereto a rearwardly and outwardly bent overhanging bracket A', upon which is rigidly supported a shelf or hopper-bottom  $a$ , having at its sides and ends ribs or ledges  $a'$ , Fig. 3, and an opening  $a^3$  therein parallel with the breast-beam A<sup>x</sup>, the shelf  $a$  forming a hopper-support. A box B, open at top and bottom and having longitudinal vertical division-walls  $b$ , forms a hopper or magazine adapted to rest and slide upon the shelf  $a$  from rear to front between and being guided by the ribs  $a'$ . The outer end wall of the hopper is vertically slotted from top to bottom, as at  $b'$ , between each pair of longitudinal walls, (see Figs. 1

and 3,) and the latter walls have near the inner end of the hopper vertical ribs or projections  $b^2$ , oppositely located. Each of the pockets formed by the walls  $b$  is adapted to receive a number of superposed filling-carriers F, the lowermost one of each series being normally supported by the hopper-bottom  $a$ .

The loom side has thereon a stand A<sup>2</sup>, in which is mounted a spring-controlled shaft  $f$ , upon which is mounted the hub of a transferrer  $f'$ , having a portion 20 to act upon the head of a filling-carrier and a finger 21 to act upon the tip of the filling-carrier to effect the transfer of the latter at the proper time to the shuttle S, Fig. 1, in the shuttle-box S' of the lay A<sup>3</sup>. The depending arm  $f^3$  of the transferrer-hub has jointed thereto at  $f^4$  a dog  $f^5$ , to be at times engaged by a bunter C on the lay to operate the transferrer, substantially as shown in United States Patent No. 529,940, dated November 27, 1894, to which reference may be had. The dog  $f^5$  is moved into operative position upon failure of the filling by an arm  $f^8$  on a rock-shaft  $f^9$ , the latter being rocked by the weft-hammer H in usual manner when the weft or filling fork H', Fig. 1, is not tipped, owing to absence of the filling.

Beneath the opening  $a^3$  of the shelf or hopper-support  $a$  I have mounted a throat or chute  $c$ , having lugs  $c'$ , through which is extended a rod  $c^2$ , Fig. 2, having its bearings in ears  $a^5$  on the shelf and controlled by a spring  $s$ , the spring normally acting to maintain the upper end of the throat  $c$  against the hopper-bottom or shelf  $a$ . The lower end of the throat is adapted to extend above and in close proximity to the shuttle-box when the lay is forward, the spring  $s$  permitting slight swinging movement of the throat to accommodate itself to the final movement of the lay as it beats up. At its front side the throat is cut away at  $c^3 c^4$ , Figs. 2 and 6, to permit the entrance of the transferrer  $f'$  and the finger 21 to engage a filling-carrier held in the lower end of the throat by spring-controlled convexed detents  $c^5$ , mounted on a shaft  $c^6$ , having stop-bearings  $c^7$  on the throat, the spring  $s'$  normally holding the detents in the position shown in Fig. 4. When the lower-



most filling-carrier in the throat is transferred to the shuttle, the detents are moved aside to open the mouth of the throat, the next filling-carrier being held in place by the transferrer and finger 21 until the detents spring back to place after the transferred filling-carrier has passed beyond them. When the hopper is moved, so that one of the pockets is above the opening  $a^3$ , the filling-carriers in such pocket will slide down into and fill the throat, as in Figs. 1 and 4, the ends of filling being led from the carriers through the slot  $b'$  and a slot  $c^8$  in the outer end of the throat, said ends being held by or secured to a fixed part of the loom. When the filling-carriers in one pocket have been exhausted by transfer to the shuttle, the hopper is moved automatically to bring the next full pocket into operative position relative to the throat  $c$ .

The hub of the transferrer has thereon an upturned arm  $d$ , on which is mounted a pawl  $d'$ , having a tooth  $d^2$ , Fig. 5, said pawl being supported at its free end by the bifurcated arm  $g'$  of a yoke  $g$   $g'$ , fulcrumed at  $g^x$  on the shelf  $a$ . The outer arm  $g$  is provided with a laterally-extended pin  $g^2$ , which projects into the hopper beneath the inner end wall thereof, which, as shown in Figs. 4 and 5, does not extend down to the shelf  $a$ , the pin resting against a filling-carrier in the pocket of the hopper then above the throat  $c$ . A plate  $b^6$ , having teeth  $b^7$  thereon, one for each pocket, is shown as secured to the outer face of the inner end wall of the hopper, said teeth being engaged singly by the pawl when the hopper is to be moved.

Every time the transferrer  $f'$  is moved, the pawl  $d'$  is moved longitudinally toward the back of the loom; but while the yoke is held in normal position by engagement of the pin  $g^2$  with a filling-carrier the arm  $g'$  will maintain the pawl out of engagement with teeth  $b^7$  on the hopper, the pin  $g^2$  serving as a feeler or detector to detect the emptying of a hopper-pocket.

When the last filling-carrier has left the pocket, the detector  $g^2$  has no support and the yoke will rock on its fulcrum  $g^x$  when the pawl moves in, permitting the latter to drop sufficiently to bring its tooth  $d^2$  into engagement with one of the hopper-teeth  $b^7$ . Then the outward movement of the pawl will slide the hopper along its bottom  $a$  to bring a full pocket over the hopper-opening, a stud  $d^3$  on the pawl engaging the yoke-arm  $g$  and returning the yoke to normal position, it being held there by the engagement of the detector  $g^2$  with a filling-carrier in the full pocket. This operation is repeated until the hopper has been moved step by step to bring all of its pockets into position above the throat, the pawl and the teeth with which it coöperates forming a step-by-step mechanism to move the hopper.

The plate  $b^6$  is shown in Figs. 4 and 5 as notched along its under edge at  $b^8$  to permit

free movement of the detector  $g^2$  when the yoke is rocked, said yoke serving as a pawl-controller.

In order to prevent the hopper from moving out of position, I have mounted a detent  $h$  on a fixed arm  $h'$ , the free end of the detent entering one of a series of depressions  $b^9$  in a holding-plate  $b^{10}$  on the inner end wall of the hopper and preventing any accidental displacement of the hopper due to motion of the loom. The vertical ribs  $b^2$  on the walls of the hopper-pockets enter the grooves in the heads of the filling-carriers, Fig. 3, and guide the latter into proper position to enter the throat  $c$ .

It will be obvious that the hopper may have any convenient number of pockets and may be of a height to receive a number of filling-carriers in each pocket. When the last pocket has been emptied, the hopper may be drawn back and refilled by an attendant, the detent  $h$  being thrown out for the purpose and then pushed forward on the hopper-bottom  $a$  until the first pocket registers with the throat-opening, the detector  $g^2$  resting against one of the filling-carriers in such pocket.

The filling of the hopper is easily and rapidly effected, and the entire mechanism is simple, effective, and not liable to get out of order and needing no careful watching on the part of the attendant.

My invention is not restricted to the precise construction and arrangement shown, as I have illustrated one practical mode of carrying out my invention.

Having described my invention, what I claim, and desire to secure by Letters Patent, is—

1. In a loom, an open-bottom hopper having compartments to receive superposed filling-carriers, a throat into which the carriers pass by gravity from a compartment, a detector to detect the exit of the last carrier from such compartment, and means controlled by the detector to move the hopper and bring a full compartment into delivery position.

2. In a loom, the lay having a shuttle-box, a shuttle open at top and bottom, a movable hopper having compartments for the filling-carriers, and a delivery-throat, combined with a transferrer to transfer a filling-carrier from the throat to the shuttle, and means, operatively connected with the transferrer, to move the hopper intermittently, to bring one compartment after another into position relative to the delivery-throat.

3. In a loom, a lay having a shuttle-box, a movable hopper having compartments open at top and bottom, for the filling-carriers, a fixed hopper-bottom having a discharge-throat, a shuttle open at top and bottom, means to transfer a filling-carrier from the throat to the shuttle, a detector to detect the absence of filling-carriers in the hopper-compartment above the throat, and means controlled by said detector to move the hopper when a compartment has been emptied.

4. In a loom, a movable hopper having open-



bottom compartments to receive superposed series of filling-carriers, a supporting-bottom for the hopper, having a delivery-throat, to receive filling-carriers from a hopper-compartment, a transferrer, normally inoperative hopper-moving means actuated at each movement of the transferrer, and a controlling device for said means, said device permitting operative movement of said means upon the exit of all the filling-carriers from a hopper-compartment.

5. A loom containing the following instrumentalities, viz: a lay and its shuttle-box; a shuttle slotted for the passage through it of a filling-carrier; a transferrer; a movable hopper having compartments open at their lower ends and provided with means to engage the heads of and guide a superposed series of filling-carriers in each compartment; a delivery-throat to receive filling-carriers from one compartment after another, and actuating mechanism for the transferrer and hopper, to move the latter intermittently as one compartment after another is emptied of its filling-carriers, and to actuate the transferrer to transfer the filling-carriers singly from the throat to the shuttle.

6. The lay; its shuttle-box, and a transferrer, combined with a movable filling-carrier hopper or feeder, having open-bottom compartments; a delivery-throat; a step-by-step mechanism to move the hopper at the proper time to bring a new compartment above the throat, to discharge its filling-carriers by gravity into said throat, and a detector to govern said step-by-step mechanism, said detector effecting operation of the latter when a hopper-compartment is empty.

7. A movable hopper having upright compartments open at top and bottom, to receive each a series of superposed filling-carriers, and a hopper-support having a discharge-opening and a delivery-throat, said support permitting filling-carriers to pass only from that compartment above the discharge-opening.

8. A movable hopper having upright compartments open at top and bottom, to receive each a series of superposed filling-carriers, one end of each compartment having a vertical slot for the filling end, a hopper-support having a discharge-opening and a depending delivery-throat slotted along one end, and means to move the hopper to bring one compartment after another above the discharge-opening.

9. A movable hopper having compartments open at top and bottom, each to receive a series of superposed filling-carriers, a fixed hopper-support having a discharge-opening, means to move the hopper intermittently, a controlling device for said means, including a detector extended into said hopper near the bottom thereof, to detect the exit of the last

filling-carrier from a compartment and thereupon permit the operation of the means to move the hopper to bring a full compartment into operative position, and a detent to prevent retrograde movement of the hopper.

10. A hopper adapted to receive and hold separated series of filling-carriers, a delivery-throat into which the filling-carriers are discharged, means to bring one series of filling-carriers after another into discharging position, and a controlling device for said means, operative upon discharge of an entire series, to thereby permit movement of a fresh series into discharging position.

11. A hopper adapted to receive and hold separated series of filling-carriers, a delivery-throat into which the filling-carriers are discharged, a detent to normally act upon the lowermost filling-carrier and retain it in the throat, and a transferrer to transfer the lowermost filling-carrier past the detent and remove it from the throat, combined with means operated by said transferrer, to present one series of filling-carriers after another to the throat, to be discharged thereinto, and a controlling device for said means, acting upon discharge of an entire series to permit effective operation of said means.

12. In a loom, the lay having a shuttle-box and a shuttle open at top and bottom, a movable hopper having a plurality of open-bottom compartments adapted each to receive a series of filling-carriers, and a stationary support for and to serve as a bottom for the hopper, said support having a discharge-opening, combined with a yielding throat depending from said support below the opening thereof and adapted to register with the shuttle-box when the lay is forward, a transferrer operative upon failure of the filling, to transfer the endmost filling-carrier from the throat to the shuttle, and means to automatically move the hopper to bring one after another of the compartments thereof above the throat, to discharge its filling-carriers thereinto by gravity.

13. In a loom, a hopper, a support therefor having a discharge-opening for the filling-carriers, a depending throat pivotally mounted on said support, and a controlling-spring therefor, a detent at the delivery end of said throat, a transferrer operative upon failure of the filling to transfer the endmost filling-carrier from said throat, and means to return the detent to operative position after the transfer of said filling-carrier.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

CHARLES A. LITTLEFIELD.

Witnesses:

JOHN C. EDWARDS,  
LAURA MANIX.