

No. 624,197.

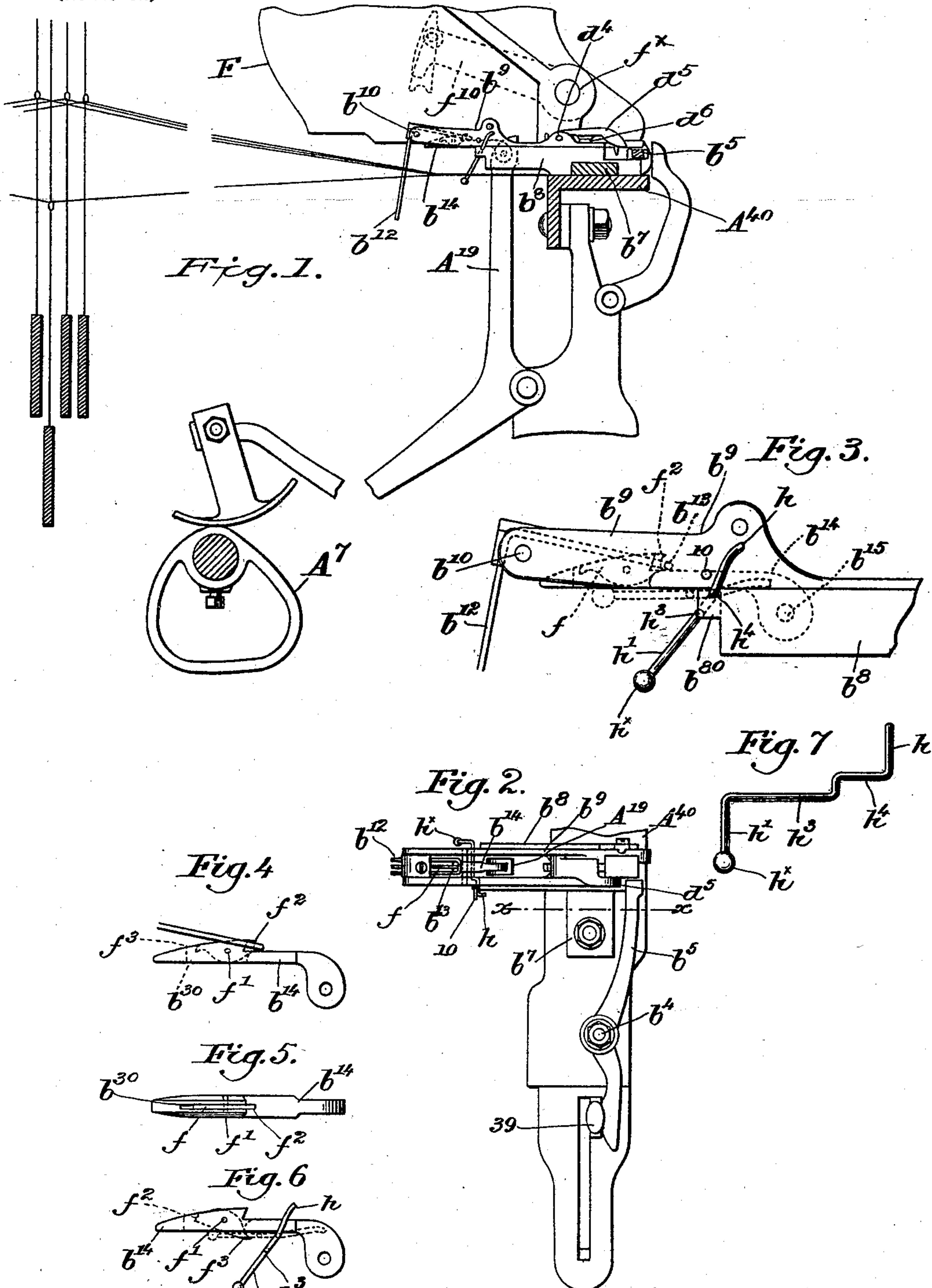
Patented May 2, 1899.

W. G. EATON.

LOOM.

(Application filed June 16, 1898.)

(No Model.)



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# UNITED STATES PATENT OFFICE.

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## LOOM.

SPECIFICATION forming part of Letters Patent No. 624,197, dated May 2, 1899.

Application filed June 16, 1898. Serial No. 683,595. (No model.)

*To all whom it may concern:*

Be it known that I, WILLIE G. EATON, of Nashua, county of Hillsborough, State of New Hampshire, have invented an Improvement  
5 in Looms, of which the following description, in connection with the accompanying drawings, is a specification, like letters and numerals on the drawings representing like parts.

In weaving cloth the warp-threads are controlled by two or more harnesses, by which  
10 sheds are formed for the introduction of a filling-thread. The absence of filling in the shed, due to breakage or exhaustion of the filling, is detected by the well-known or usual  
15 filling-fork, and on a common loom absence of filling effects stoppage of the loom in order that the weaver may piece up or insert a fresh supply of filling in the shuttle. On the automatic loom, such as the "Northrop" type,  
20 a fresh supply of filling is automatically inserted in the shuttle without stopping the loom, a loom of such type being shown and described in United States Patents Nos. 529,940 and 529,943, dated November 27, 1894.

25 In cloth made with more than two harnesses if the filling fails and is not thereafter introduced into the proper shed a defect is apparent in the cloth and very noticeable in certain classes of goods; and this invention has  
30 for its object the production of means for obviating such defects.

I have herein shown my invention as adapted to coöperate with a four-harness weave, though it is not restricted thereto, for the  
35 same principle of operation may be used with other numbers of harnesses.

Figure 1 is a cross-sectional view of a portion of a loom, showing the filling-fork and coöperating devices, including a part of filling-supplying mechanism, with one embodiment of my invention illustrated in position on the loom, the section being taken on the line *xx*, Fig. 2. Fig. 2 is a top or plan view of some of the parts of the loom shown in  
40 Fig. 1, omitting the filling-supplying mechanism and the cam for operating the weft-hammer. Fig. 3 is an enlarged detail view, in side elevation, of the filling-fork and a part of the coöperating mechanism shown in  
45 Fig. 1 to be described. Figs. 4, 5, and 6 are enlarged detail views of the hook which co-

operates at times with the filling-fork, showing the operation of my invention; and Fig. 7 is a detail in plan of the setting-dog.

It will be understood that herein, as in the  
55 patents referred to, the filling-supplying mechanism is located at one side of the loom (the right-hand side for convenience) and the filling-fork is located at or near the opposite or left-hand side of the loom. At the left-  
60 hand side of the loom, then, near the usual shipper-handle 39, is pivoted at *b*<sup>4</sup> a knock-off lever *b*<sup>5</sup>, normally resting close to or against the shipper-handle, the free end of the lever being acted upon by the filling-fork mechanism. A stand *b*<sup>7</sup> is mounted on the breast-  
65 beam *A*<sup>40</sup> and has a suitable guideway *b*<sup>8</sup>, in which is adapted to reciprocate a slide *b*<sup>9</sup>, upon which is pivoted, at *b*<sup>10</sup>, the filling-fork *b*<sup>12</sup>, having a tail *b*<sup>13</sup> adapted to be engaged by  
70 a hook *b*<sup>14</sup>, pivoted at *b*<sup>15</sup> on the upper end of the weft-hammer *A*<sup>19</sup>, the latter being operated by a cam *A*<sup>7x</sup>, Fig. 1. The slide *b*<sup>9</sup> has pivoted upon it at *d*<sup>4</sup> a latch *d*<sup>5</sup>, having at its under side a cam or lump, the free end of the  
75 latch being turned down and adapted to coöperate with the knock-off lever *b*<sup>5</sup>, and a wedge *d*<sup>6</sup> is mounted in the filling-fork slide to control the latch *d*<sup>5</sup>, and the parts herein-  
80 before described may be and are substantially as shown in said Patent No. 529,943, referred to, like parts herein having corresponding reference letters and numerals and operating as in said patent, it being understood that the filling-fork will operatively de-  
85 tect absence of the filling at every other pick or beat of the lay.

In Fig. 1 I have shown a part of the filling-supplying mechanism, designating the filling-feeder as *F*, with the transferrer *f*<sup>10</sup> (shown  
90 in dotted lines) mounted on the stud *f*<sup>x</sup>, said mechanism operating to transfer a fresh supply of filling to the shuttle when in the shuttle-box of the lay adjacent the feeder *F*, while the feeler mechanism, located at the other  
95 side of the loom, controls the transfer of filling, all substantially as shown in United States Patent No. 529,940, referred to.

The hook *b*<sup>14</sup> is slotted from top to bottom at *b*<sup>30</sup>, Figs. 3 to 6, inclusive, and in said slot  
100 is pivoted at *f*<sup>1</sup> a tumbler *f*, having a shoulder *f*<sup>2</sup> at one end and a beak *f*<sup>3</sup> at its other



end, the shouldered end of the tumbler being the heavier, so that the tumbler normally rests on the end of the slot  $b^{30}$ , nearer the pivot of the hook, as shown in Figs. 3 and 4, with the shoulder extending beyond the barb of the hook.

Supposing that the filling is absent and the fork is not tilted as the lay comes forward, then the tail  $b^{13}$  of the filling-fork will drop behind the shoulder  $f^2$  of the tumbler, and as the weft-hammer moves the hook  $b^{14}$  to the right, Figs. 1 and 3, the tumbler  $f$  will be tipped on its pivot  $f'$  and completely turned over into the position shown in Fig. 6, casting off the filling-fork without causing any movement of the slide  $b^9$ —that is, the tumbler acts as a cast-off to disconnect or release the filling-fork from operative engagement with the slide  $b^9$  and the filling-supplying mechanism actuated by or through movement of the slide will not be operated to insert fresh filling into the shuttle. On the next detecting pick, however, the cast-off being in inoperative position, the tail of the fork will engage the hook and the slide  $b^9$  will be operated, as in the Patent No. 529,943 referred to, and a fresh supply of filling will be inserted in the shuttle, to be laid on the shed at the next succeeding pick. Now supposing that a four-harness weave is operating, with the filling-supplying mechanism at the right-hand side of the loom and the filling-fork at the left-hand side, if the filling fails as the shuttle goes from right to left the fork would ordinarily operate so that the shuttle, running for one pick without any filling, would obtain a new supply for the next pick, leaving the shed at the first pick with part of a filling and the shed at the second pick without any filling whatever, the fresh filling being laid in the wrong shed, resulting in an imperfection in the cloth. By my invention, however, the fork will not operate at the first pick, owing to the operation of the cast-off or tumbler. The shuttle returns to the right-hand side of the loom at the second pick, but receives no supply of filling, and it goes back empty at the third pick; but this time the fork will operate in usual manner, and on the fourth pick the shuttle is automatically supplied with filling when it enters the shuttle-box at the right-hand end of the lay. This retardation of the operation of the filling-fork enables the harness-cams to go through the first, second, third, and fourth movements or a complete cycle, so that at the first pick of the next cycle the same shed will be opened for the introduction of filling as has a partial length of filling therein. As a consequence this shed will have a partial and an entire length of filling therein; but the presence of two threads in a shed does not make a very noticeable change in the cloth, and the partial length of filling therein is no great disadvantage. Should the filling fail, with the shuttle passing from left to right, there will be a partial length of filling in that shed, and

the mechanism will operate to effect the insertion of the new filling on the next cycle of operation in the shed next following the one which corresponds to the shed with the partial length of filling. It will thus be seen that the operation of my invention will either permit a shed to have at least a partial length of filling or a partial and a full length of filling therein; but in no case will there be an entire shed empty.

It will be remembered that the cast-off or tumbler  $f$  has been turned over into abnormal position, as in Fig. 6, and it must be set or returned to normal position, and I have provided means to set or return the cast-off into operative position as the filling-fork slide moves. For this purpose I mount in the guide  $b^8$  a dog, (shown separately as a bent rod in Fig. 7,) the oppositely-turned ends  $h$  and  $h'$  being connected by parallel offset portions  $h^3$  and  $h^4$ , the end  $h'$  being weighted, as at  $h^x$ . The part  $h^4$  is loosely extended transversely through a hole in a projecting ear  $b^{80}$  of the guide  $b^8$ , with the tail  $h$  upturned in the path of a pin or projection 10 on the side of the slide  $b^9$ , while the part  $h^3$  extends across the under side of the hook  $b^{14}$ . After the cast-off has been turned over its beak  $f^3$  extends below the hook  $b^{14}$ , and when thereafter the hook engages the tail of the fork the slide is moved to the right, Fig. 3, by the weft-hammer and the projection 10 strikes the finger  $h$  and tips the setting-dog into dotted-line position in said Fig. 3. This brings the part  $h^3$  up into the path of the beak  $f^3$  of the cast-off, and as the slide completes its movement the beak engages and is detained by the part  $h^3$  of the dog, throwing the heavier shouldered end of the cast-off over dead-center, so that it will resume its normal position, the return movement of the slide releasing the tail  $h$  of the setting-dog, the weight  $h^x$  returning the dog to normal position, and the parts are ready to again operate as described.

From the foregoing description it will be obvious that while I have shown one practical embodiment of my invention it may be embodied in other forms of apparatus without departing from the spirit and scope of my invention, the gist of the invention residing in the provision of means to retard the normal operation of the filling-fork for a predetermined extent, according to the exigencies of the case.

It may be stated that the usual take-up mechanism is arranged to let back one or more picks, and in a loom provided with my invention the take-up mechanism will be adjusted to let back the proper number of picks to accord with the retardation of the normal operation of the filling-fork.

The invention is herein shown as practically adaptable to four-harness goods, but obviously the same principle of operation may be utilized to adapt the invention for use with other numbers of harnesses. For



instance, the filling-fork may be placed at the same side of the loom as the hopper of the filling-supplying mechanism or two forks may be employed, one at each side of the loom, with the proper connecting and coöperating mechanisms.

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

1. In a loom, a detector to detect the absence of filling, means to control the operation of the loom, actuated by or through the operation of the detector, and means to retard the effective operation of the detector itself to a predetermined extent after it has detected the absence of filling.

2. In a loom, a detector to detect the absence of filling, means to control the operation of the loom, actuated by or through the operation of the detector, means normally in condition to operate to retard the effective operation of the detector itself to a predetermined extent after it has detected the absence of filling and an independent device to restore said means to normal position upon the operation of the detector.

3. In a loom, a filling-fork to detect the absence of filling, means to control the operation of the loom, actuated by or through the operation of the filling-fork, a hook adapted to engage the filling-fork upon absence of the filling and thereby effect the actuation of said means, and a cast-off to retard operative engagement of the hook and filling-fork.

4. In a loom, means to control the operation thereof, a filling-fork and coöperating mechanism by or through which the actuation of said means is effected upon absence of the filling, said mechanism including a hook to engage the filling-fork when it detects absence of filling, and a cast-off mounted on said hook and acting to retard operative engagement of the hook and filling-fork.

5. In a loom, a filling-fork to detect absence of filling, a slide upon which said fork is mounted, an actuating-hook to engage the fork when the filling is absent and thereby move the slide, a cast-off to retard or delay the operative engagement of the hook and fork, and means to automatically set or return the cast-off to normal position upon operative engagement of the hook and filling-fork.

6. In a loom, a filling-fork to detect absence of filling, a slide upon which said fork is mounted, an actuating-hook to engage the fork when the filling is absent and thereby move the slide, a tilting cast-off mounted on the

hook and normally in position to engage the fork upon absence of the filling, movement of the hook thereafter tilting the cast-off to release the fork, and means to engage and restore the cast-off to normal position upon subsequent engagement of the hook and fork.

7. In a loom, a filling-fork to detect the absence of filling, filling-supplying mechanism actuated by or through the detecting operation of the filling-fork, and means to retard to a predetermined extent the effective operation of the filling-fork and thereby the actuation of the filling-supplying mechanism governed by said fork.

8. In a loom, a filling-fork to detect the absence of filling, filling-supplying mechanism actuated by or through the detecting operation of the filling-fork, means, including a cast-off to act upon the filling-fork, to retard or delay the actuation of said mechanism, whereby the fresh filling will be laid on a predetermined pick, and means to restore the cast-off to normal position upon detecting operation of the filling-fork.

9. In a loom, a filling-fork to detect the absence of filling, filling-supplying mechanism actuated by or through the detecting operation of the filling-fork, a slotted vibrating hook to engage the filling-fork when the filling is absent, a pivotally-mounted cast-off movable in said slot and having a shoulder normally extended beyond the barb of the hook, to engage the fork upon the first detecting movement thereof and release the fork from the hook, the cast-off being thereby tilted to uncover the barb of the hook, and a setting-dog to engage and return the cast-off to normal position upon engagement and movement of the filling-fork by the hook.

10. In a loom, means to detect the absence of filling in the shed, filling-supplying mechanism actuated by or through the detecting operation of said means to provide the shuttle with a fresh supply of filling, and a retarding device normally in condition to operate to delay the effective detecting operation of said means and thereby delay the actuation of said filling-supplying mechanism to a predetermined extent, whereby the fresh filling will be laid in a particular shed.

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

WILLIE G. EATON.

Witnesses:

C. D. PARKER,  
H. G. CHASE.