(No Model.)

J. H. NORTHROP.

LOOM.

No. 568,455. Patented Sept. 29, 1896.

Fig: 1.

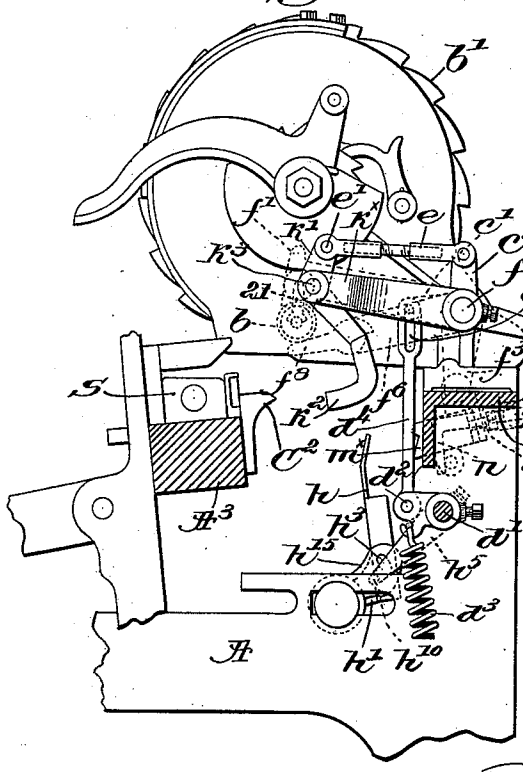


Fig: 2.

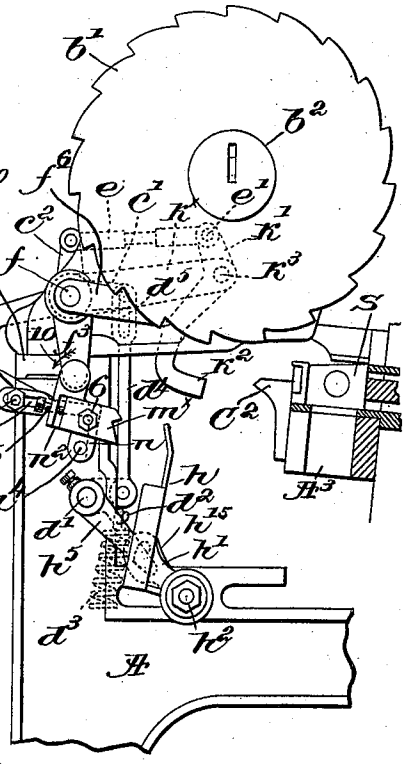


Fig: 3.

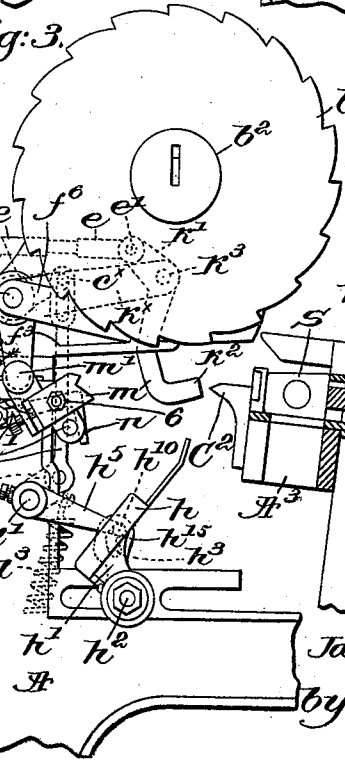


Fig: 4.

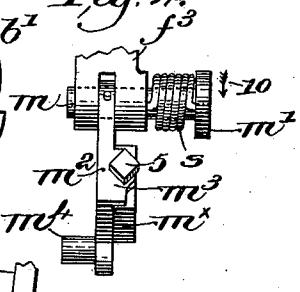


Fig: 5.

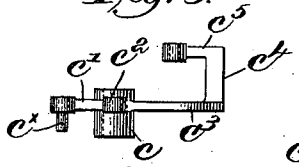


Fig: 6.

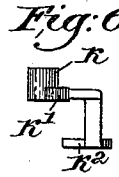
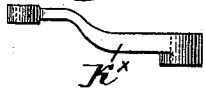


Fig: 7.



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UNITED STATES PATENT OFFICE.

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LOOM.

SPECIFICATION forming part of Letters Patent No. 568,455, dated September 29, 1896.

Application filed June 17, 1896. Serial No. 595,857. (No model.)

To all whom it may concern:

Be it known that I, JAMES H. NORTHROP, of Hopedale, in the county of Worcester and 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 on the drawings representing like parts.

This invention has for its object the production of a loom wherein means are provided to detect the shuttle when it has been improperly positioned in the shuttle-box and to automatically prevent the transfer of a fresh supply of filling to the shuttle when in improper position.

My invention is particularly adapted to that class of looms wherein a plurality of filling-carriers are supported in a filling-feeder, from which the filling-carriers are automatically transferred one by one to the shuttle upon failure of the filling, such a loom being shown in United States Patents Nos. 529,940 and 529,942, granted to me November 27, 1894. The transfer of the fresh filling-carrier to the shuttle is effected while the shuttle is in the shuttle-box, and, obviously, if the shuttle is improperly positioned therein it will be impossible to properly effect the transfer of the filling-carrier, and the mechanism is liable to break or smash.

In another United States patent, No. 529,943, I have shown one form of mechanism for detecting the improper position of the shuttle in the shuttle-box; but in my present invention I have simplified the construction of the mechanism, and I have also mounted the shuttle-detector on the transferrer-support so that it preserves the same relative position to the shuttle as do the other working parts of the feeder.

Other features of my invention will be hereinafter fully described, and particularly pointed out in the claims.

Figure 1 is a transverse section of a sufficient portion of a loom to be understood, with my invention applied thereto, looking toward the inner end of the filling-feeding mechanism located at the right-hand side of the loom. Fig. 2 is a partial end elevation of the mechanism shown in Fig. 1 and viewed from the right-hand side of the loom. Fig. 3 is a similar view with the parts in position to effect the transfer of a fresh filling-carrier to the shuttle if the latter is properly positioned in the shuttle-box, and Figs. 4, 5, 6, and 7 are detached deta l views to be referred to.

The loom-frame A, the breast-beam A^{40}, the lay A^3, having the bottom of its shuttle-box cut away below the self-threading shuttle S, the filling-feeder comprising connected rotatable plates suitably shaped to receive the ends of the filling-carriers *b*, one of which is shown in dotted lines, Fig. 1, the weft-thread-supporting plate *b'*, the weft-end holder b^2, the stud *f*, the pusher *f'*, mounted thereon and having the forked depending end f^3 and a projection 21, the arm f^6, having thereon the tip-supporting device f^8, (see dotted lines, Fig. 1,) and the shaft *d'*, adapted to be rotated by the movement of the weft-fork in the absence of the filling, are and may be all as represented in said Patent No. 529,942, wherein like letters are used to designate like parts, the parts hereinbefore referred to being operated in practice substantially as therein provided for.

The chute *h*, secured to a spring-controlled arm *h'*, pivoted on a stud h^2, and the arm h^5, connected to the rock-shaft *d'* and having a pin h^{10} to enter a cam-slot h^3 in an arm h^{15} on the stud h^2, coöperating with the arm *h'* to control the movement of the chute and position it ready to receive the filling-carrier ejected from the shuttle, are also substantially as shown and described in said Patent No. 529,942 referred to.

The rock-shaft *d'* has secured thereto an arm d^2, connected to one end of a spring d^3, the other end of the spring being connected to the loom-frame, and a link d^4 is jointed at its lower end to the arm d^2, the upper end of said link having a longitudinal slot d^5, entered by a pin or stud $c^\times$ on one of the arms *c'* of a sleeve or hub *c*. (Shown separately in Fig. 5.) Thus hub *c* is rotatably mounted on the stud *f*, and a second upturned arm c^2 is pivotally connected to one end of an adjustable link *e*, the other end of the said link being jointed at *e'* to an arm *k'* of a hub *k*, provided with a downwardly and laterally bent arm k^2, which forms the shuttle feeler or detector. The link *e* comprises a rod

threaded at each end in the same direction and screwed into the threaded end pieces, which latter are pivoted to the arms c^2 and k', respectively, the link being adjusted to the proper length when the loom is first set up.

It sometimes happens that loom attendants will tamper with the mechanism in such a way as to throw it out of adjustment, and by the construction herein shown the length of the link cannot be changed without removing it from the loom.

An arm $k^\times$, rigidly secured to the stud f, as herein shown, is provided with a laterally-extended pin or stud k^3, (see dotted lines in the drawings,) upon which the hub k is pivotally mounted, the detector-arm k^2 being bent, as shown in Figs. 1 and 6, to clear the adjacent parts of the mechanism as it operates, the lower end of the arm being turned toward the lay to engage the shuttle if the latter is improperly positioned in the shuttle-box.

The forked depending end f^3 of the pusher f' has mounted therein a rocker-stud m, (clearly shown in Fig. 4,) provided with a disk-like head m', and one end of a spring s, surrounding the stud between the head and the end f^3, is secured to said head, the other end of the spring being secured to the end f^3, the spring normally tending to turn the stud in the direction of the arrow 10, Figs. 2, 3, and 4. An arm m^2 is secured to the stud m and has on one side an ear m^3, on the opposite side, near its extremity, a lug or projection m^4, while a notched dog $m^\times$ is adjustably secured to the arm m^2 by set-screws 5 and 6. The dog $m^\times$ is moved into position, as will be described, to be engaged by a bunter C^2 on the lay when a filling-carrier is to be transferred from the filling-feeder to the shuttle by the pusher f', provided the shuttle is properly positioned in the shuttle-box.

The hub c (see Fig. 5) has a third arm c^3, extended oppositely to the arm c', downturned and bent laterally at c^4, and then down and inwardly, as at c^5, and to the part c^5 is rigidly attached a downturned finger n, the base of said finger being preferably slotted at n' to receive the bolt $n^\times$, connecting it to the part c^5 of the arm c^3, in order that the finger may be adjusted thereon. The finger n extends down over the lug m^4 on the arm m^2 and at times controls the latter, as will now be described.

In Figs. 1 and 2 the parts are shown in the position they occupy when the loom is running properly, and it will be noticed that the dog $m^\times$ is depressed, so that its notched end is not in the path of the bunter C^2. It will be noticed that the link d^4 is held in its lowered position by its connection with the rock-shaft d', and the said link, acting on the arm c' of the hub c, depresses said arm, thereby holding the bent arm c^3 of said hub elevated and with the finger n toward the front of the loom. This finger, acting upon the projection $m^\times$ on the arm m^2, swings the latter forward, turning the stud m against the force of the spring s, such position of the arm m^2 maintaining the dog $m^\times$ in inoperative position and forming a detent therefor. If, however, the filling should fail for any reason, the rock-shaft d' will be turned, as in United States Patent No. 529,940, elevating the link d^4, and thereby allowing the hub c, with its arms, to turn on the stud f'. The spring s immediately acts to turn the stud m in the direction of the arrow 10, Figs. 2, 3, and 4, to throw the dog $m^\times$ up into operative position, Fig. 3, into the path of and to be engaged by the bunter C^2 when the lay next comes forward. As the spring swings the arm m^2, its lug m^4 acts upon the finger n, moving it inward and thereby depressing the arm c^3, so that the arm c^2 is swung outwardly into the position shown in Fig. 3. The link e in consequence pulls the upper end of the arm k' over and throws the shuttle feeler or detector k^2 into the position shown in Fig. 3, and if the shuttle is properly positioned in the shuttle-box the said feeler will not be engaged thereby, and the bunter, acting upon the dog $m^\times$, will swing the end f^3 of the pusher f' to depress the latter and transfer the filling-carrier to the shuttle. The direction of the pressure exerted by the bunter upon the dog is in a direction upwardly inclined toward the forked end f^3, so that the said end will be moved with the dog instead of having the effect of swinging the dog relatively to said forked end, as would be the case if the pressure was in a downward direction.

If the shuttle is improperly positioned in the shuttle-box it will meet the feeler k^2 in the forward movement of the lay and will swing it on its pivot k^3, thereby moving the arm k' in the opposite direction and, through the link e and arm c^2, turning the hub c to swing the arm c^3 outwardly. This movement of the arm c^3 causes the finger n to engage the lug m^4 and thereby swing the arm m^2 to rock the stud m in the direction opposite to the arrow 10 to depress the notched face of the dog m^4 and move it out of the path of the movement of the bunter C^2, the said dog being moved into substantially the position shown in Figs. 1 and 2. This movement of the dog relative to the forked end f^3 of the pusher is effected because the pressure applied to said dog is exerted altogether below the pivotal point of the arm m^2, and inasmuch as the pusher is only operated when the dog is engaged by the bunter the pusher will not be operated to transfer a filling-carrier to the shuttle when the latter is improperly positioned.

When a filling-carrier has been properly inserted into the shuttle, the rock-shaft d' returns to its normal position, as in the patent referred to, and through the link d^4 restores the parts to normal position occupied when the loom is running properly.

My invention is not limited to the precise construction or arrangement of parts herein described, as the same may be modified or

rearranged without departing from the spirit and scope of my invention.

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

1. In a loom, the lay having a slotted shuttle-box; a filling-carrier feeder; a transferrer for the filling-carriers; a dog pivotally mounted on said transferrer and a spring to move the dog into operative position; a bunter; a controller for and to normally retain the dog in inoperative position against the action of its spring; means actuated by failure of the weft to release the dog; a shuttle-feeler mounted on a fixed fulcrum above the lay and adjacent the transferrer; and connections between said feeler and the dog-controller, to thereby move the dog into inoperative position when the shuttle to be supplied with filling is not in proper position in the shuttle-box, substantially as described.

2. In a loom, the lay having a slotted shuttle-box; a filling-carrier feeder; a filling-carrier transferrer; a dog supported thereby and a spring to move it into operative position; a coöperating bunter; means actuated by failure of the weft to release the dog to the action of the spring; a shuttle-feeler pivotally mounted on a fixed fulcrum above the path of the lay, and connections between the feeler and the dog, whereby the dog is moved into inoperative position when the shuttle to be supplied with filling is not in proper position in the shuttle-box, substantially as described.

3. In a loom, the lay having a slotted shuttle-box, a filling-carrier feeder; a transferrer for the filling-carriers, an actuating-dog pivotally mounted on said transferrer and a spring to move the dog in one direction; a coöperating bunter; a fixed support extended adjacent the transferrer; a shuttle-feeler pivoted thereon and extended therefrom; means controlled by failure of the weft to move the dog and the shuttle-feeler into operative position, and direct connections between said dog and shuttle-feeler, including a rocking arm having a finger to engage the dog, whereby the dog is moved into inoperative position when a shuttle is improperly positioned in the shuttle-box, substantially as described.

4. In a loom, the lay having a slotted shuttle-box; a filling-carrier transferrer; a pivotally-mounted dog operatively connected therewith a spring to move it into operative position; means actuated by failure of the weft to release the dog; a bunter; a shuttle-feeler fulcrumed above the path of the lay, and positive connections between said feeler and the dog, to control the position of the latter in opposition to the action of the spring, substantially as described.

5. In a loom, the lay; a filling-carrier transferrer having a depending end; a dog pivoted thereon; means actuated by failure of the weft to release the dog; a bunter; a spring to move the dog into operative position; a shuttle-feeler; a rocking arm provided with a finger to engage and move said dog against the actuating-spring; and connections between the feeler and arm to move the latter; substantially as described.

6. In a loom, the lay having a slotted shuttle-box; a filling-carrier transferrer having a depending end; a spring-actuated dog pivoted thereon; means actuated by failure of the weft to release the dog, a bunter; a controlling device for the dog, mounted to rock on the transferrer-support to move said dog against the spring; a rigid support extended above the path of the lay; a shuttle-feeler pivoted thereon, and a link connecting said feeler and the dog-controlling device, substantially as described.

7. In a loom, the lay having a bunter; a filling-carrier transferrer; a spring-actuated dog pivotally mounted thereon; a pivoted controlling device for the dog, to move it against the action of the spring, and a pivoted shuttle-feeler, connected to rock simultaneously; a rock-shaft governed by failure of the weft, and a connection between said shaft and the controlling device, whereby upon failure of the weft the dog is moved into the path of the bunter, and the shuttle-feeler into operative position, substantially as described.

8. In a loom, the lay having a bunter; a filling-carrier transferrer having a depending end; a rocker-stud mounted therein, an actuating-spring for the stud; a dog secured to the stud and having a projection; means actuated by failure of the weft to release the dog; a shuttle-feeler pivotally mounted above the path of the lay; a controlling-finger to engage the projection on the dog and move it against the action of the spring, and connections between the feeler and the finger, to govern the operation of the latter, substantially as described.

9. In a loom, a filling-carrier feeder; a transferrer to transfer a filling-carrier therefrom to the shuttle; the lay having a slotted shuttle-box; a bunter; a spring-actuated coöperating dog pivotally mounted on the depending end of the transferrer; a detent for said dog, to normally hold it in inoperative position; controlling means for said detent, whereby when the weft fails the dog will be released; a shuttle-feeler pivoted above the path of the lay, and connections between it and the detent, to positively move the dog into inoperative position when the shuttle to be supplied with filling is not in proper position in the shuttle-box, substantially as described.

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

JAMES H. NORTHROP.

Witnesses:
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