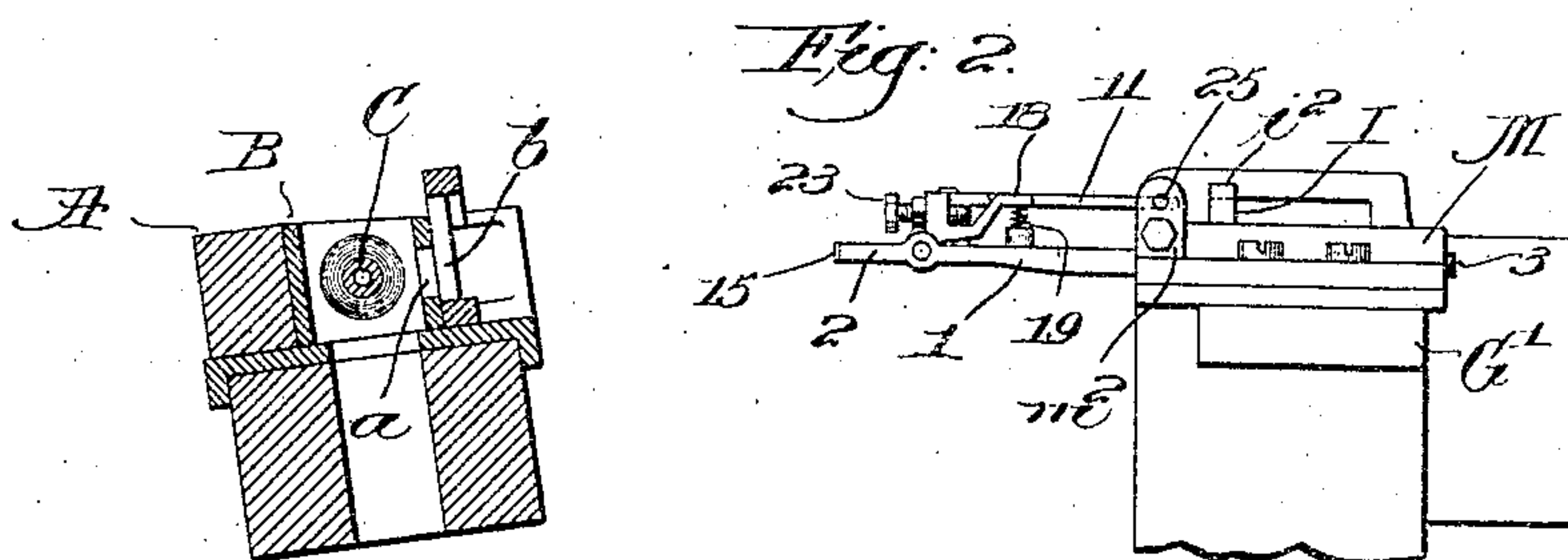
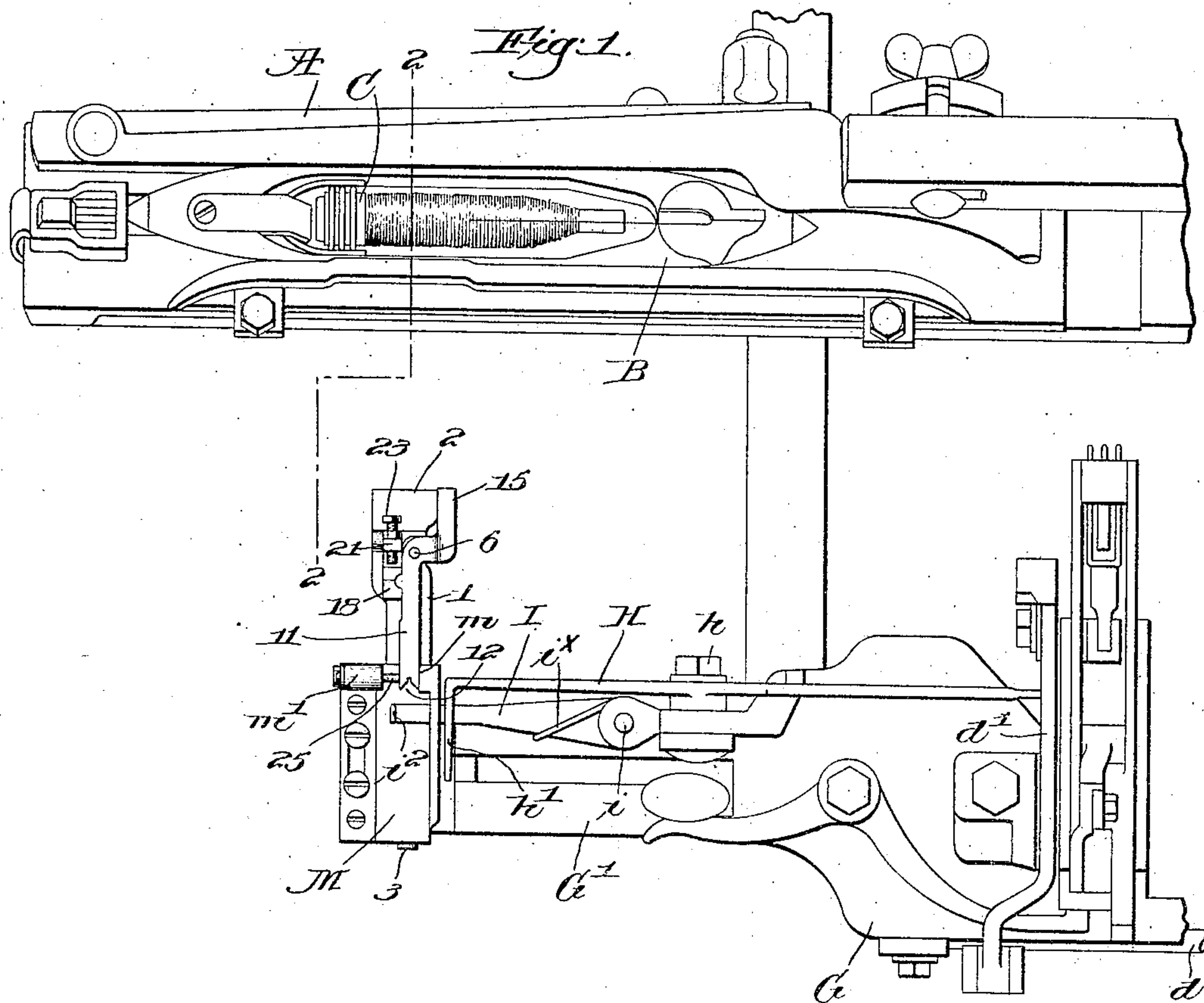


A. E. RHOADES.  
 FILLING EXHAUSTION INDICATING MECHANISM FOR LOOMS.  
 APPLICATION FILED OCT. 21, 1908.

912,265.

Patented Feb. 9, 1909.

2 SHEETS—SHEET 1.



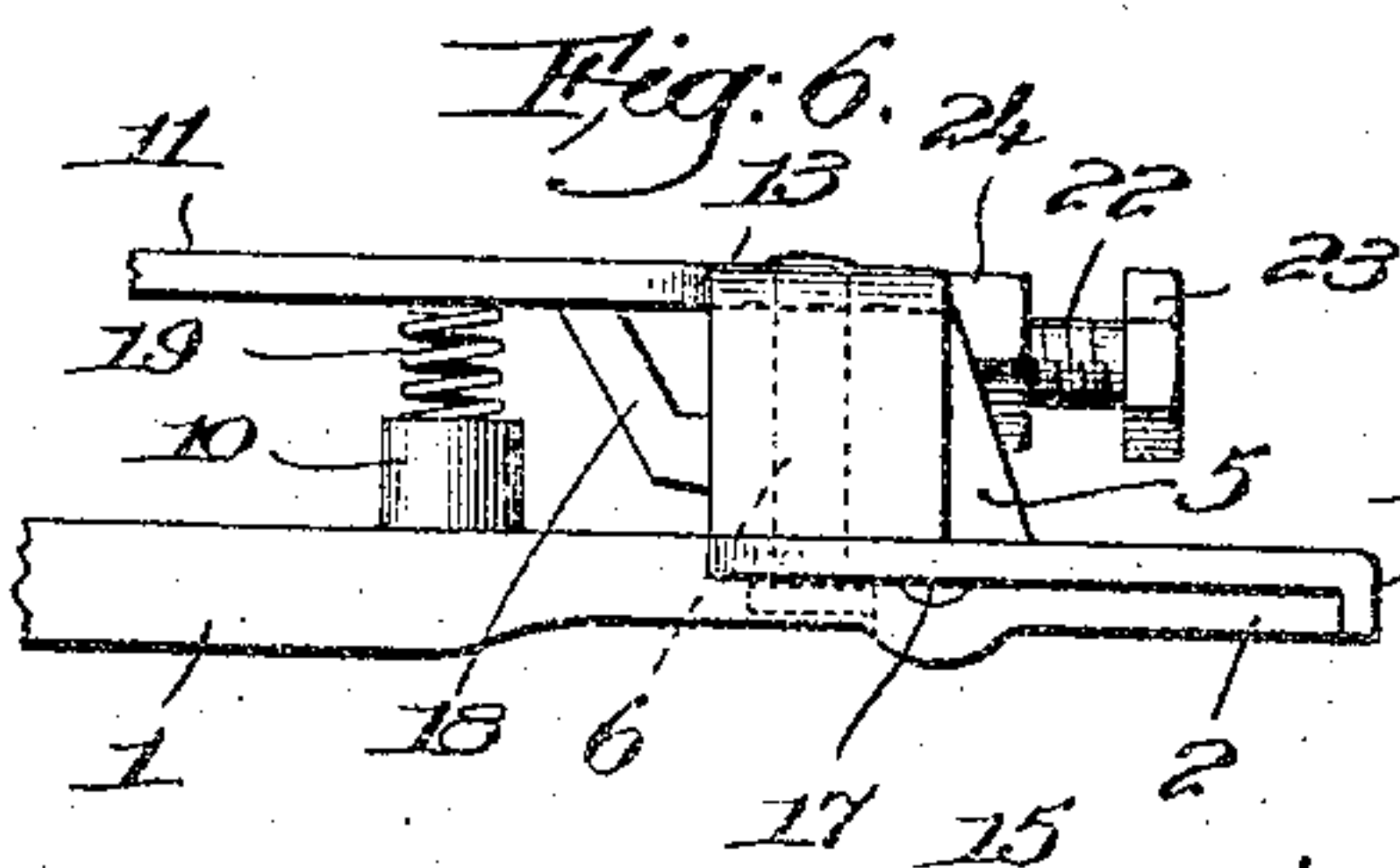
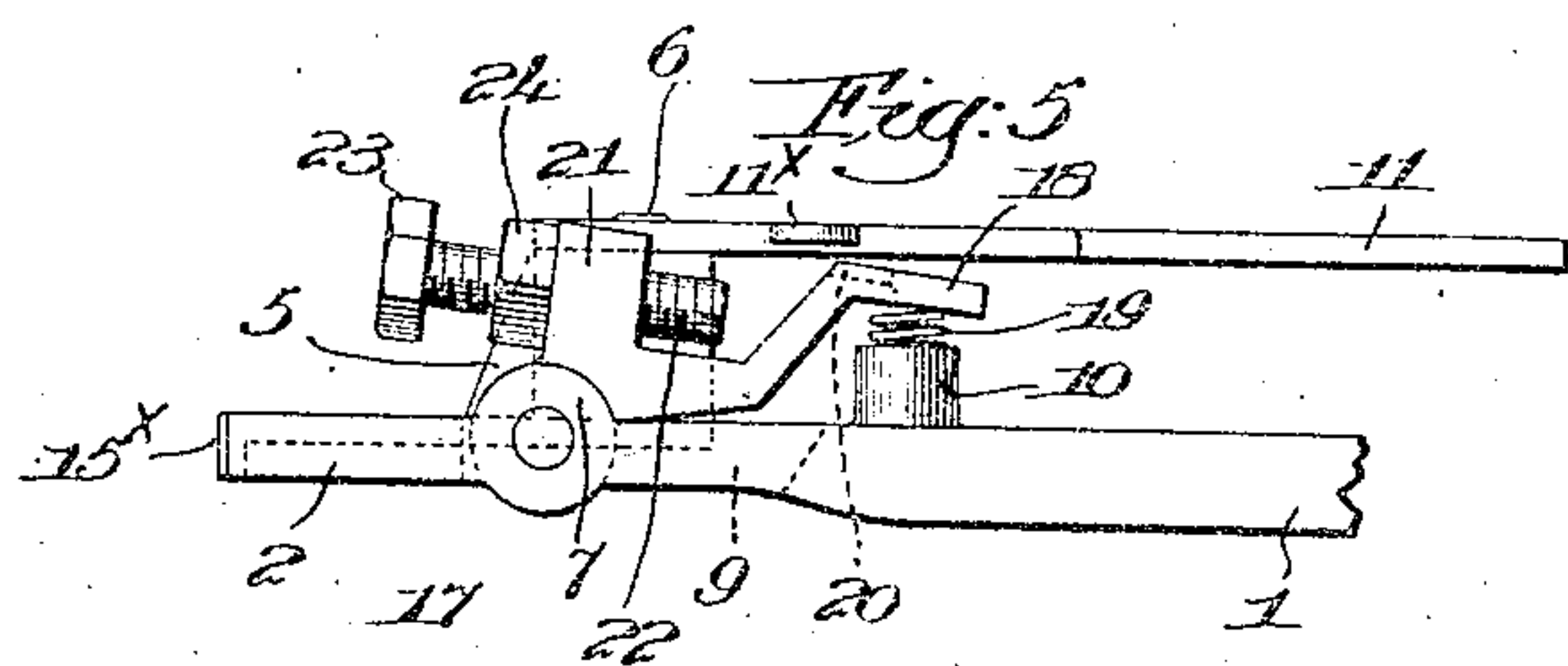
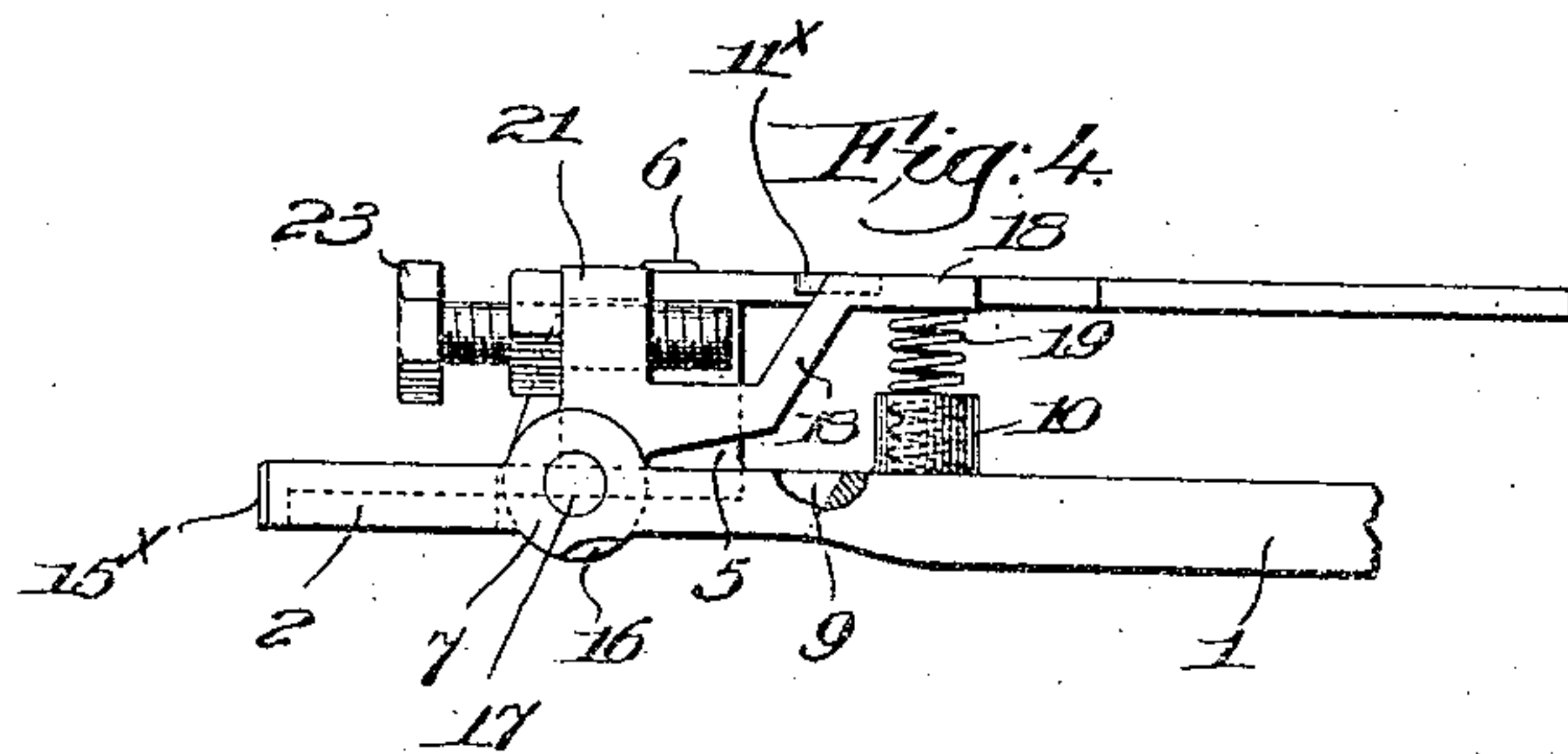
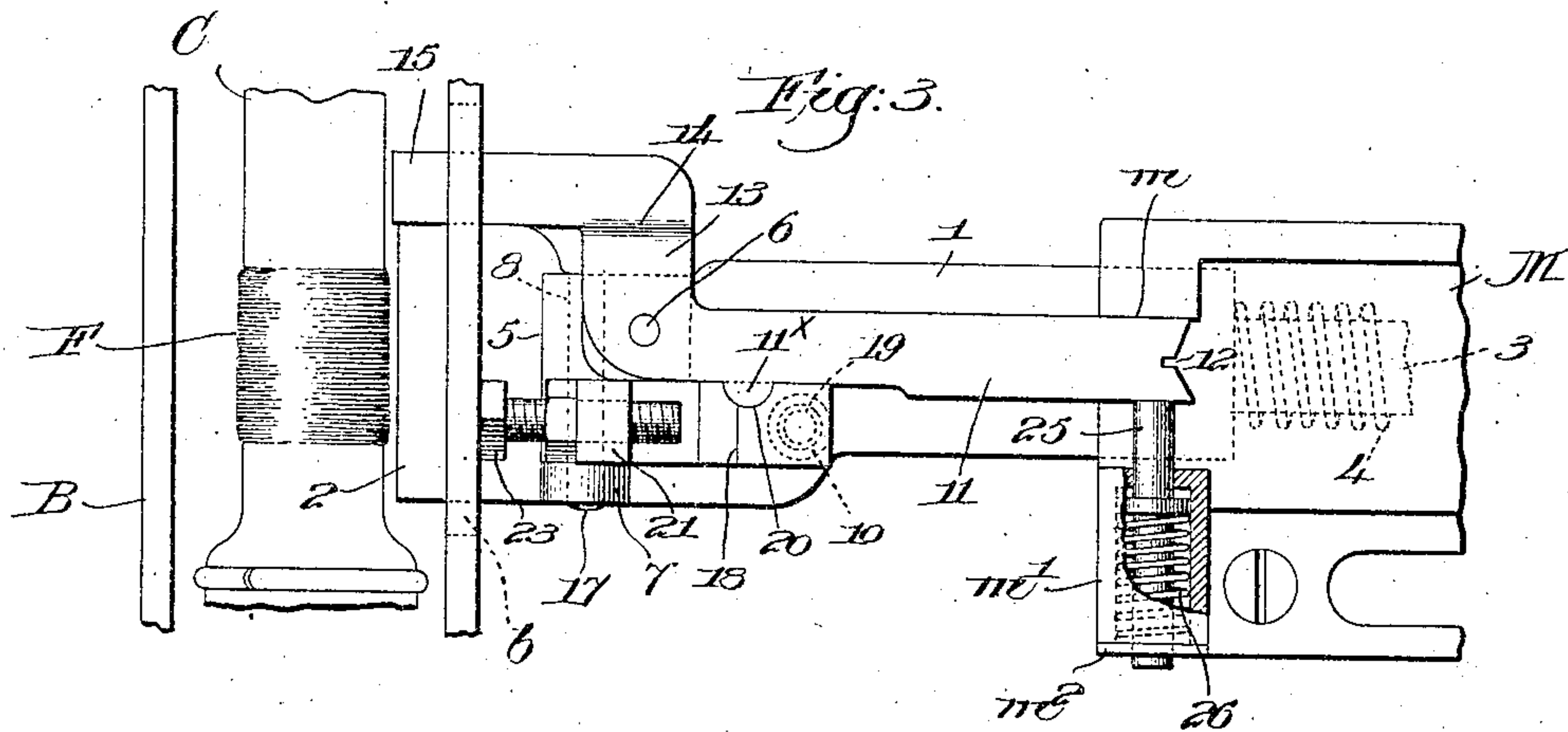
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# UNITED STATES PATENT OFFICE.

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## FILLING-EXHAUSTION-INDICATING MECHANISM FOR LOOMS.

No. 912,265.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed October 21, 1908. Serial No. 458,768.

*To all whom it may concern:*

Be it known that I, ALONZO E. RHOADES, a citizen of the United States, and resident of Hopdedale, county of Worcester, State of Massachusetts, have invented an Improvement in Filling-Exhaustion-Indicating Mechanism for Looms, of which the following description, in connection with the accompanying drawing, is a specification, like characters on the drawing representing like parts.

This invention relates to looms wherein the filling is replenished automatically prior to complete exhaustion of the filling in the running shuttle, the operation of the replenishing mechanism being brought about by a feeler device which at intervals contact with the filling in the shuttle, and when such filling has reached a predetermined point of exhaustion the functional operation of the feeler device occurs.

Various types of feeler mechanism have been devised, all having the object of causing the automatic replenishment of the running filling prior to exhaustion thereof, and my present invention is of a recent type wherein a feeler-governor and a feeler movable relatively thereto are arranged to enter the shuttle and contact with the filling, a feeler-lock normally locking the feeler but releasing it when replenishment of filling is called for, to permit the functional movement of the feeler.

I have provided various features and details of construction and arrangement whereby the mechanism is improved and simplified, no claim being made by me to the broad features of the invention.

Figure 1 is a plan view of one end of the lay of a loom, and the filling-exhaustion-indicating mechanism at the same side of the loom, embodying my present invention; Fig. 2 is a transverse section and side elevation of some of the parts shown in Fig. 1, on the line 2—2, looking toward the right; Fig. 3 is an enlarged top plan view of the novel parts of the feeler mechanism, partly broken out, and showing the feeler and feeler-governor in juxtaposition to the filling-carrier in the shuttle, just as the feeler is to be unlocked; Fig. 4 is a side elevation of the feeler, feeler-governor and feeler-lock, the latter in locking position; Fig. 5 is a similar view but showing the feeler-lock in position to release or unlock

the feeler; Fig. 6 is an opposite side elevation of the head or filling-engaging end of the feeler, and adjacent parts.

Referring to Fig. 1, the shuttle-box A at one end of the lay is shown as containing a shuttle B provided with a filling-carrier C, the front shuttle-wall having a slot *a* and the front plate of the shuttle-box a registering aperture *b*, Fig. 2, through which the feeler and feeler-governor may enter as the lay beats up. The breast-beam G has an extension G' constituting also the notched holding-plate for the shipper, as usual, said extension carrying the transmitter H through which the action of the feeler is transmitted to the automatic filling-replenishing mechanism, which is not illustrated herein as it constitutes no part of my present invention and may be of any convenient form, such as is set forth in United States Patent No. 789471, granted May 9, 1905 to Wood & Northrop. In said patent a transmitter is shown corresponding to the transmitter H herein, the latter acting through the latch *d'* and operating rock-shaft *d*, Fig. 1, to effect the operation of the replenishing mechanism as in said patent. The transmitter is mounted to rock on a horizontal pivot *h* and its outer end is bent forward at *h'* and in practice provided with a cam-slot, (not shown) as in said patent, through which cam-slot extends a controller I pivoted at its inner end on a vertical stud *i*, said controller being normally maintained in the position shown in Fig. 1 by a suitable spring *i'*. When the upturned finger *i''* on the outer end of the controller is engaged by a long arm or prolongation of the feeler, at the time the latter detects the approaching exhaustion of the filling, the outer end of said controller is moved forward and acts upon the cam piece *h'* to swing the transmitter H on its stud *h* and effect automatic replenishment of the filling, substantially as in the patent referred to.

The feeler-governor, which also constitutes a carrier for the feeler, is conveniently made as a casting, and herein comprises a flat, elongated body 1 having at its rear end a laterally wide impinging portion or head 2, and at its front end is provided with a shank 3, the feeler-governor being mounted to reciprocate in a holder or casing M of suitable construction, fixedly mounted on the



outer end of the extension G'. A spring 4, see dotted lines Fig. 3, within the casing acts to move the feeler-governor rearwardly, its forward movement being effected by  
 5 impingement of the filling on the head 2 as the lay beats up. Upon the body of the feeler-governor is formed an upright boss 5 upon the top of which the feeler is seated, said boss supporting a substantially ver-  
 10 tical pivot or fulcrum pin 6, the boss being located adjacent the head at its inner side.

At the outer edge of the body 1 is formed an upright, circular enlargement 7 apertured in alinement with a hole 8, see dotted lines  
 15 Fig. 3, in the lower part of the boss, transverse to the feeler-governor and at right angles to the pivot 6, for a purpose to be described. Between the boss and said enlargement the body of the feeler-governor  
 20 is open, as at 9, and forward of the opening a tubular spring-seat 10 is formed on the body, all of the parts being made as an entity when the feeler-governor is cast, insuring cheapness and strength and re-  
 25 ducing machining to a minimum.

The feeler may be conveniently made of plate metal, stamped out and shaped by suitable dies, and comprises a substantially  
 30 L-shaped body the long arm 11 thereof being prolonged forwardly and having a V-shaped notch 12 in its front end, the short, lateral arm or portion 13 resting on the top of the boss 5 and being pivotally connected there-  
 35 with by the pivot 6, so that the feeler may swing in a lateral plane relatively to the feeler-governor. The portion 13 is bent down at 14 and then horizontally and ex-  
 40 tended rearward to form the impinging portion or head 15, adjacent the inner side of the head 2 of the governor, to enter the shuttle and impinge upon the filling. The broad flat top of the boss 5 affords a firm and extended seat for the feeler and with the  
 45 pivot 6 prevents any twisting or distortion of the feeler at any time.

The feeler is normally prevented from swinging on its pivot by a feeler-lock, comprising a hub 16 pivotally connected with  
 50 the feeler-governor by a pin 17 mounted in the hole 8 and the aperture of the bearing 7, and a forwardly extended, upturned tail 18 on the hub, acted upon by a coiled spring 19 to normally lie against the outer edge of the long arm 11 of the feeler forward of its  
 55 pivot 6. As shown in Figs. 4-6, the spring is seated in the spring-seat 10 and its free upper end bears against the under side of the tail to operatively position the feeler-lock, a socket 20 in the upper face of the tail  
 60 receiving a lateral projection or stop 11<sup>x</sup> on the feeler, to limit spring-induced movement of the lock. The hub 16 enters the opening 9 and being held on the pivot 17 between the bearing 7 and the boss 5 pre-  
 65 vents any lateral displacement of the lock

and insures a firm and secure locking action upon the feeler, the feeler-lock rocking on an axis at right angles to the axis 6 on which the feeler may swing. An upturned head 21 is formed integral with the hub 16, 70 threaded to receive the screw-shank 22 of a shuttle-bunter 23, which is adjustable by rotating it in one or the other direction, the adjustment being maintained by a check-nut 24. When the front wall of the shuttle  
 75 engages the bunter, as filling exhaustion approaches, the feeler-lock is rocked and its tail 18 is depressed against the stress of the spring 19 into unlocking position, Fig. 5, the upper end of the tail being thereby  
 80 lowered out of the path of movement of the feeler arm 11, so that the feeler is free to swing on its pivot 6. The head 15 of the feeler extends rearwardly farther than either the head 2 of the feeler-governor or  
 85 the bunter 23 of the feeler-lock, at all times except when the feeler is swung on its pivot.

Normally, while there is ample filling in the shuttle, the filling impinges upon the head of the feeler as the lay beats up and the  
 90 feeler, feeler-governor, and feeler-lock are moved forward as a unit, with the lay, and are returned by the spring 4 as the lay swings back, the coöperation of the lock with the feeler preventing any swinging move-  
 95 ment of the latter. This action continues until the filling has been so far depleted that it does not encounter the feeler, and as illustrated in Fig. 3 the filling-carrier C is bare  
 100 opposite the impinging portion or head 15 of the feeler. Now the remaining filling F will impinge directly upon the head 2 of the feeler-governor, preventing contact between the feeler-head and the bare body of the fill-  
 105 ing-carrier and the feeler-governor and parts therein will be reciprocated, by the lay and the spring 4, until the filling has been woven off sufficiently to permit the shuttle-body to engage the bunter 23 of the feeler-lock, this  
 110 condition being shown in Fig. 3. Thereupon the lay, when it beats up, will cause the shuttle-body first to hit the bunter 23, the blow rocking the feeler-lock into the position  
 115 shown in Fig. 5, thereby unlocking the feeler, and then the filling F, Fig. 3, encounters the feeler-governor and all the parts are moved forward, but as the feeler does not yet im-  
 120 pinge upon anything it remains idle and does not swing on its pivot, though unlocked. This action continues until further depletion  
 125 of the filling permits the feeler to impinge on the bare body of the filling-carrier prior to impingement of the filling upon the feeler-governor, and as the feeler is unlocked it will  
 130 be swung on its pivot to bring its notch 12 behind the finger I<sup>2</sup> of the controller. Then as the feeler-governor and feeler are moved forward, with the feeler in such abnormal position relatively to the governor, the arm 11 of the feeler engages the controller finger and



the controller I is swung forward on its pivot i, swinging transmitter H and therethrough effecting replenishment of the filling.

It will be manifest that the effective or functional action of the feeler is dependent simply upon the difference in the diameters of the residue of filling on the filling-carrier and the adjacent bare or denuded body of such filling-carrier.

The operation has been given somewhat in detail in order that the mechanism as a whole may be clearly understood.

The spring 19 which operatively positions the feeler-lock is light in comparison to the spring 4 which effects the return or backward stroke of the feeler-governor and its adjuncts, so that the blow of the shuttle-body on the bunter will cause a quick movement of the feeler-lock into inoperative position unlocking the feeler. As the feeler is made of relatively thin plate metal I have shown the rear end of the head bent down, at 15°, to increase the thickness of the impinging face thereof.

By adjustment of the bunter 23 the unlocking of the feeler is hastened or retarded, according to circumstances, and also to accommodate shuttles of different widths, as will be obvious.

I have aimed herein to provide a firm, strong and durable structure, which can be readily manufactured at a relatively low cost, and so arranged that the relative movement of the various parts is smooth, easy and true, the various bearings or pivotal connections being constructed with that end in view.

The casing M has an abutment *m* thereon across which the inner edge of the feeler arm 11 slides while the feeler is locked, and the opposite or outer edge is engaged by a plunger 25 slidably mounted in a housing *m'*, on the casing and acted upon by a rather light coiled spring 26, Fig. 3, the outer end of the housing being closed by a cover-plate *m*<sup>2</sup>. This plunger acts, when the feeler is unlocked but idle, to prevent any swinging movement of the feeler which might occur due to vibration or jarring of the loom, and also to return the feeler to its normal position after its functional operation heretofore described. When the feeler is unlocked the tail 18 of the feeler-lock is depressed below the path of movement of the long feeler arm 11, as shown in Fig. 5, and the said arm is swung over above the tail when the effective or functional action of the feeler occurs. Were it not for the spring-controlled plunger 25 the feeler might and probably would remain in abnormal position after filling-replenishment for an indefinite time, which would be objectionable. As it is the plunger promptly restores the feeler to normal position when the spring 4 moves the feeler-governor and its adjuncts back after filling

replenishment, so that the parts of the feeler mechanism are reset automatically in readiness for subsequent operation.

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

1. A loom having a reciprocating feeler-governor and a feeler movable therewith and relatively thereto, an upright pivot on the former, on which the latter may swing laterally, a feeler-lock normally cooperating with the feeler to lock it from swinging movement, a pivotal connection between the feeler-governor and the feeler-lock, parallel to the plane in which the feeler swings, and an adjustable shuttle-bunter mounted on the feeler-lock and rendering the latter inoperative when the shuttle engages the bunter.

2. A loom having a reciprocating feeler-governor and a feeler movable therewith and relatively thereto, an upright pivot on the former, on which the latter may swing laterally, a feeler-lock normally cooperating with the feeler to lock it from swinging movement, a pivotal connection between the feeler-governor and the feeler-lock, at right angles to the feeler pivot, a spring to move the feeler-lock into operative position, and a bunter on said lock, to rock the latter into inoperative position by engagement with the shuttle.

3. A loom having a reciprocating feeler-governor and a feeler, both of which enter the shuttle to cooperate with the filling therein, a pivotal connection between the feeler and governor, at right angles to its path of movement, a feeler-lock normally cooperating with the feeler and preventing movement thereof relatively to the feeler-governor, and a pivotal connection between the latter and the feeler-lock, transverse to the feeler-governor and parallel to its path of movement, rocking of the feeler-lock to release the feeler being effected by engagement of said lock with the shuttle.

4. A loom having a reciprocating feeler-governor, a feeler pivotally mounted thereon and movable relatively thereto in a lateral path, a feeler-lock pivotally connected with the governor at right angles to the feeler pivot and having a tail to normally engage the side of the feeler and prevent lateral movement thereof, a stop on the feeler to cooperate with and limit spring-induced movement of the lock, a spring to operatively position the feeler-lock, and a shuttle-bunter on the latter, to engage the shuttle and rock the feeler-lock into inoperative position when the filling in the shuttle is exhausted to a predetermined extent.

5. A loom having a reciprocating feeler-governor provided with an upturned boss, a laterally swinging feeler supported on the boss, a vertical pivot for the feeler, mounted



in the boss, a rocking feeler-lock, a spring cooperating therewith to retain it normally in engagement with the feeler and prevent swinging movement of the latter, a horizontal pivotal connection between the governor and the feeler-lock, and a spring-controlled plunger mounted independently of the feeler-governor and feeler, cooperating with the latter to restore it to normal position after it has made its functional movement.

6. A loom having a feeler-governor and a feeler movable relatively thereto, both of which enter the shuttle to cooperate with the filling therein, in combination with a rocking feeler-lock which normally locks the feeler, but, when the filling demands replenishment, releases and thereby permits the functional movement of the feeler, and a horizontal pivotal connection between the feeler-lock and feeler-governor, transverse to the latter.

7. An automatic filling-replenishing loom having, in combination, a reciprocating feeler-governor, a feeler pivotally mounted on the feeler-governor to swing laterally relatively thereto, a feeler-lock pivotally mounted on the feeler-governor at right angles to the pivot of the feeler, the feeler-lock normally engaging and locking the feeler to prevent its swinging movement; an adjustable shuttle-bunter on the feeler-lock, normally held out of contact with the shuttle-body by contact between the filling and the feeler; a shuttle apertured for the entrance of the feeler and feeler-governor; replenishing mechanism; and a controller therefor set in action when the feeler swings on the feeler-governor.

8. An automatic filling-replenishing loom having a reciprocating feeler-governor having an upright boss, a feeler seated there upon and having its rear end downturned adjacent the rear end of the governor, both of said parts entering the shuttle to cooperate with the filling therein; a vertical pivot for the feeler, sustained by the boss, to permit lateral swinging movement of the feeler; a feeler-lock to normally lock the feeler and prevent its functional, swinging movement, said feeler-lock having an upturned head; an adjustable shuttle-bunter carried by the head; a spring interposed between the governor and the feeler-lock to operatively position the latter; a horizontal pivotal con-

nection between the lock and governor and transverse to the latter, and a controller for the filling-replenishing mechanism, which is set in action by engagement with the feeler and only when the latter swings.

9. A loom having a reciprocating feeler-governor provided with a flat seat, a laterally swinging feeler supported on the seat, an upright pivot connecting the feeler and the seat and at right angles to the feeler-governor, a feeler-lock to normally lock the feeler from swinging movement, a pivotal connection between the feeler-lock and feeler-governor, transverse to the latter and at right angles to the feeler-pivot, a bunter on the feeler-lock, to be struck by the shuttle-body upon substantial exhaustion of the filling in the shuttle and thereby rock the feeler-lock to release the feeler, a controller to effect a change in the operation of the loom, said controller being set in action by engagement with the feeler only when the latter is swung on its pivot, and a spring-controlled device in sliding engagement with the feeler, to restore the same to normal position after functional movement thereof and also to prevent accidental swinging of the feeler when unlocked.

10. A loom having a feeler-governor and a feeler movable relatively thereto, both of which enter the shuttle to cooperate with the filling therein, in combination with a rocking feeler-lock which normally locks the feeler, but, when the filling demands replenishment, releases and thereby permits the functional movement of the feeler.

11. A loom having a feeler-governor and a feeler movable relatively thereto, to intermittingly cooperate with the filling in the working shuttle, in combination with a feeler-lock which normally locks the feeler, but, when the filling demands replenishment, is rocked to release and thereby permit the functional movement of the feeler, and a horizontal pivotal connection between the feeler-lock and feeler-governor.

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

ALONZO E. RHOADES.

Witnesses:

ROBERT JAMISON,  
EDWARD DANA OSGOOD.