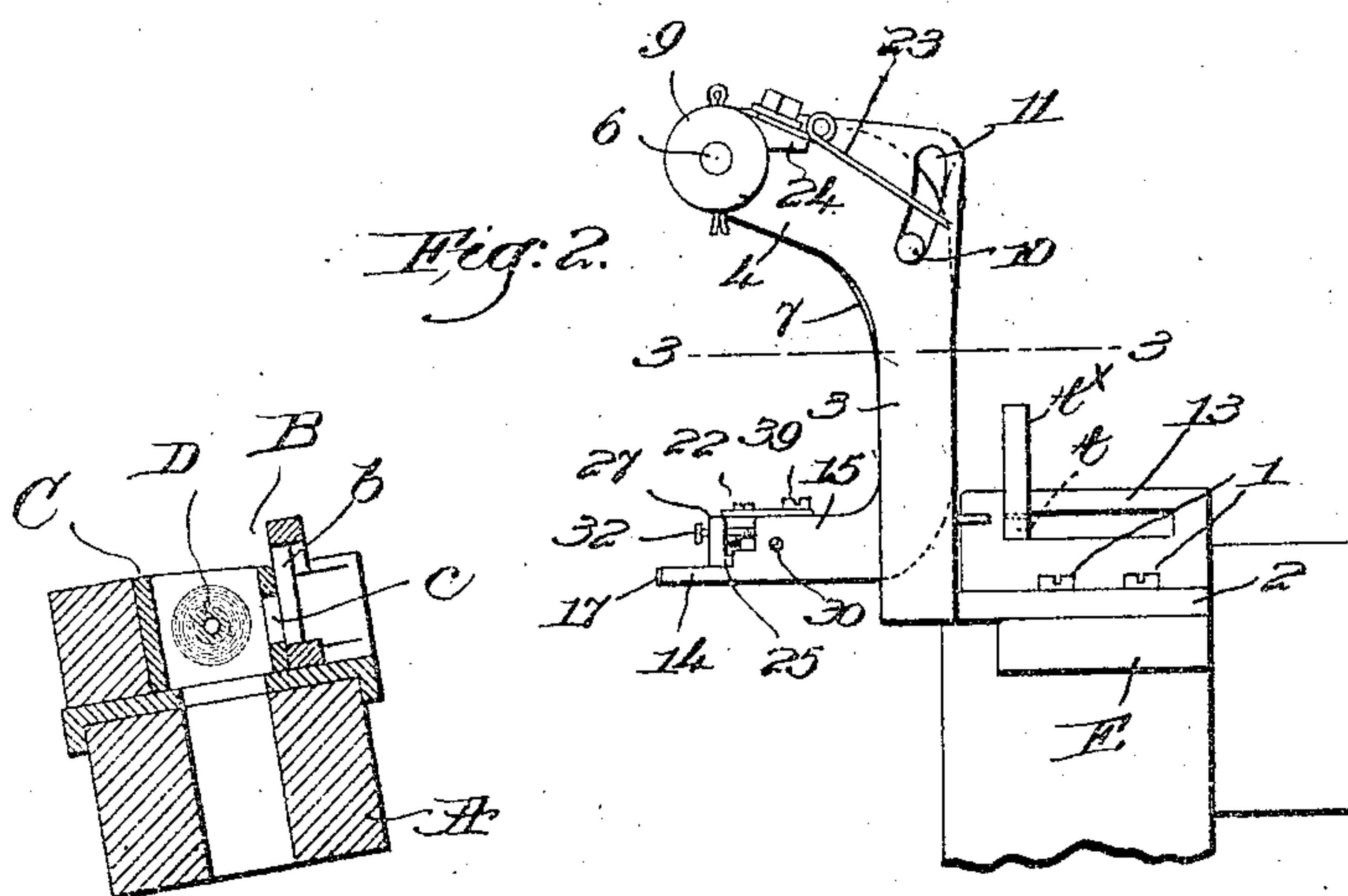
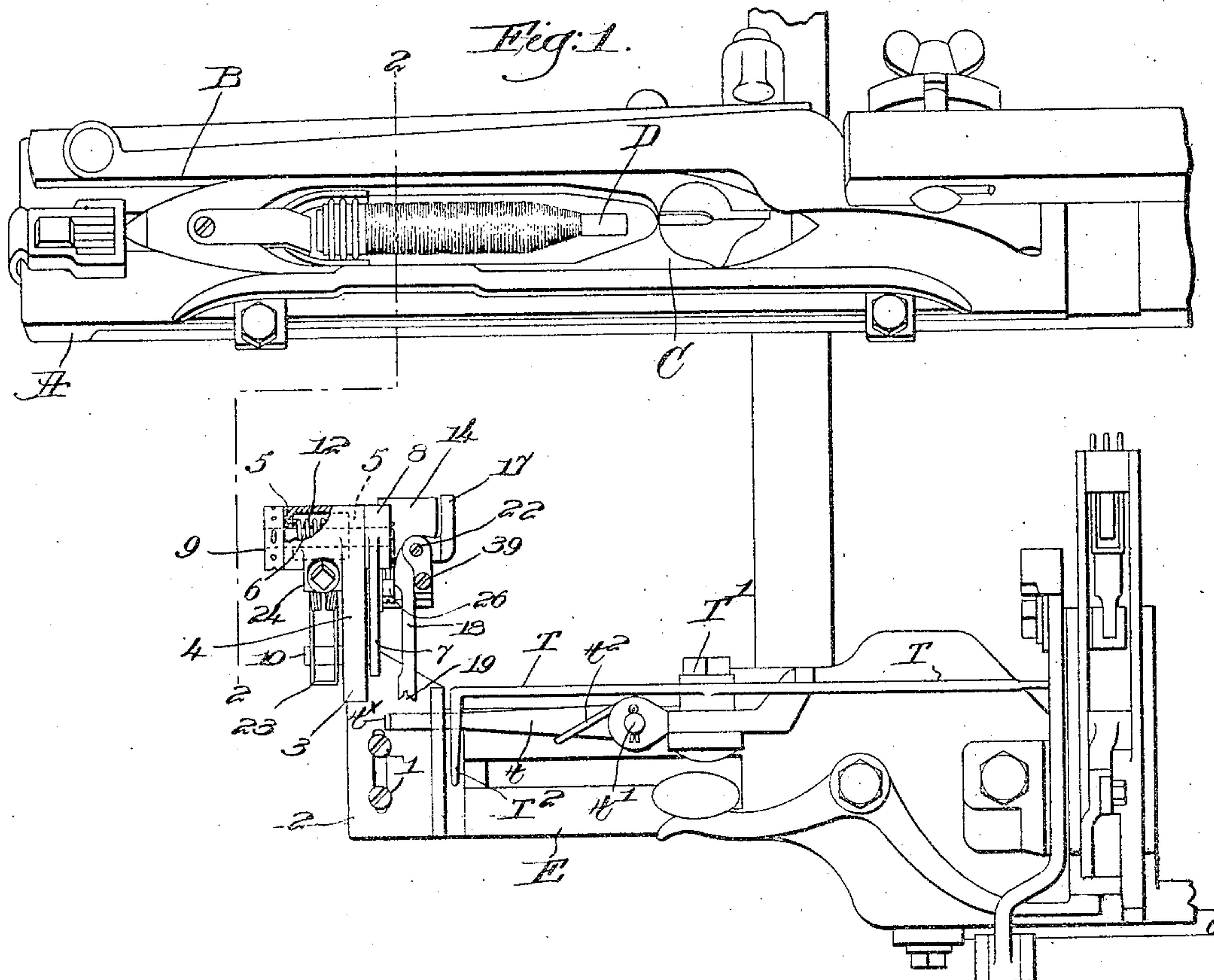


A. E. RHOADES.  
 FILLING EXHAUSTION INDICATING MECHANISM FOR LOOMS.  
 APPLICATION FILED AUG. 26, 1908.

912,264.

Patented Feb. 9, 1909.  
 2 SHEETS—SHEET 1.



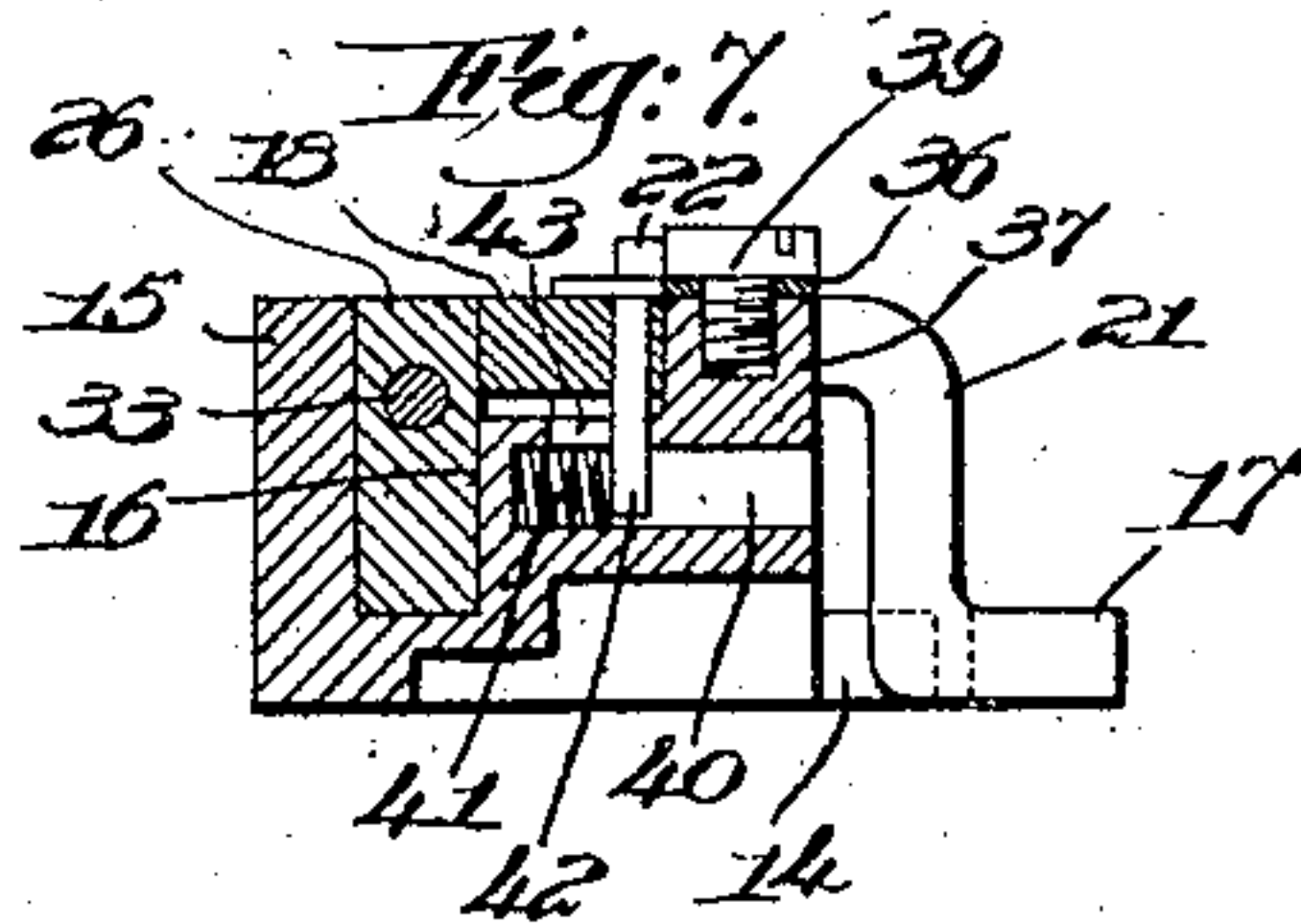
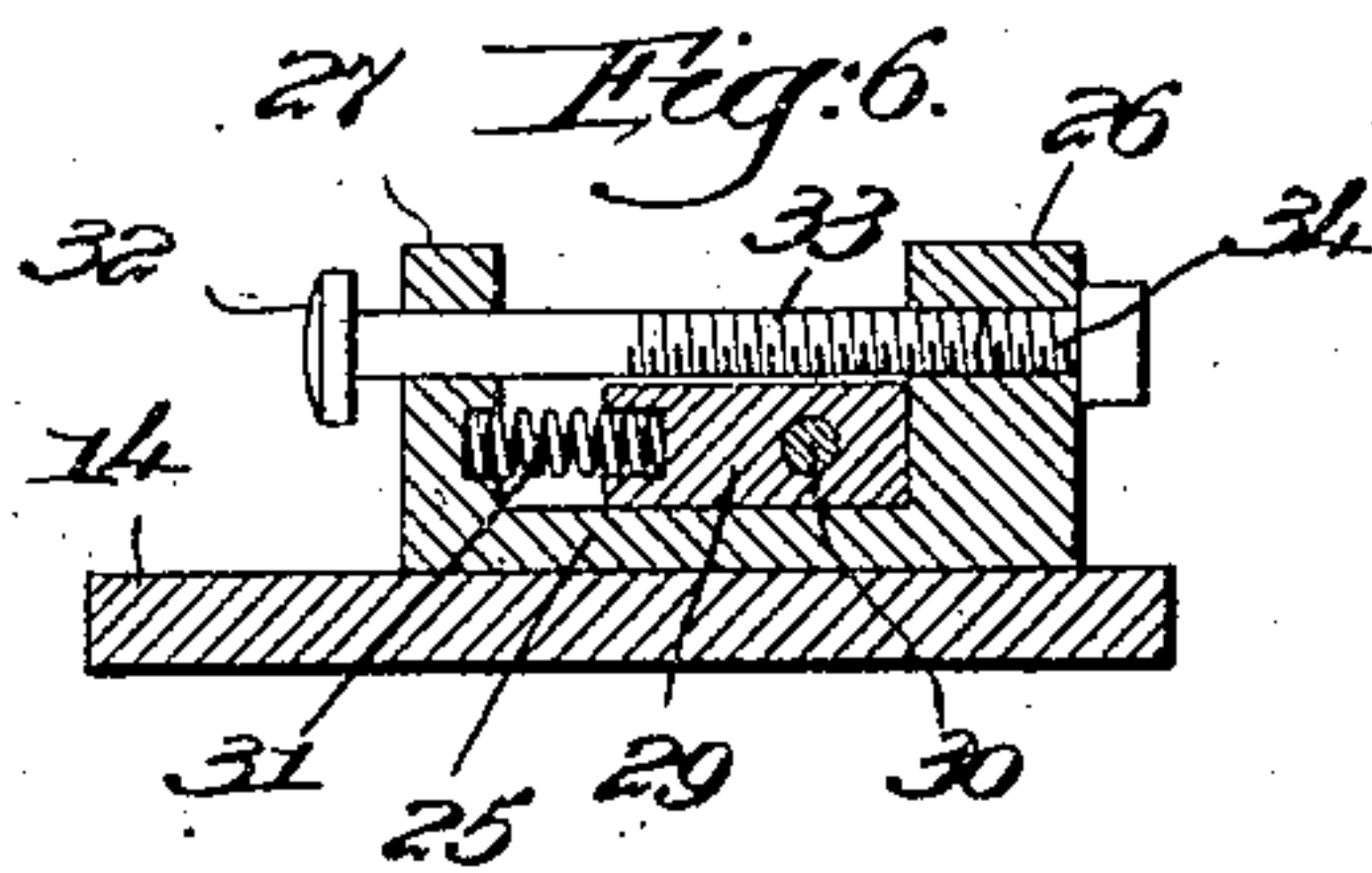
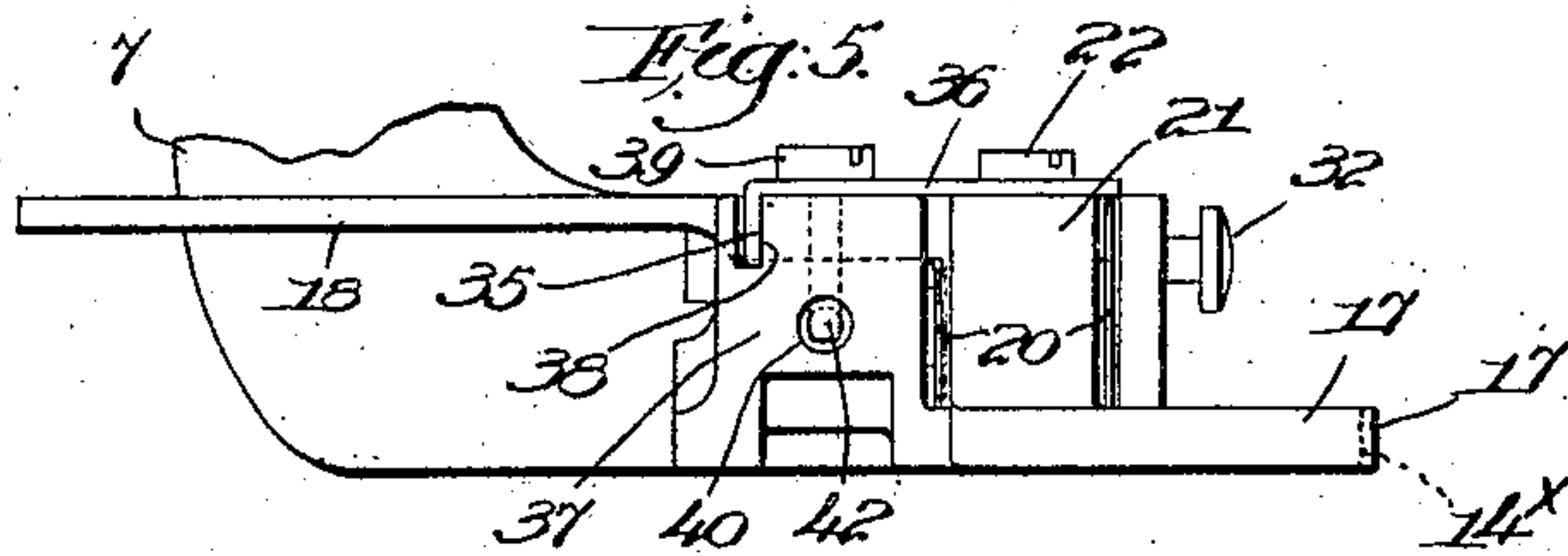
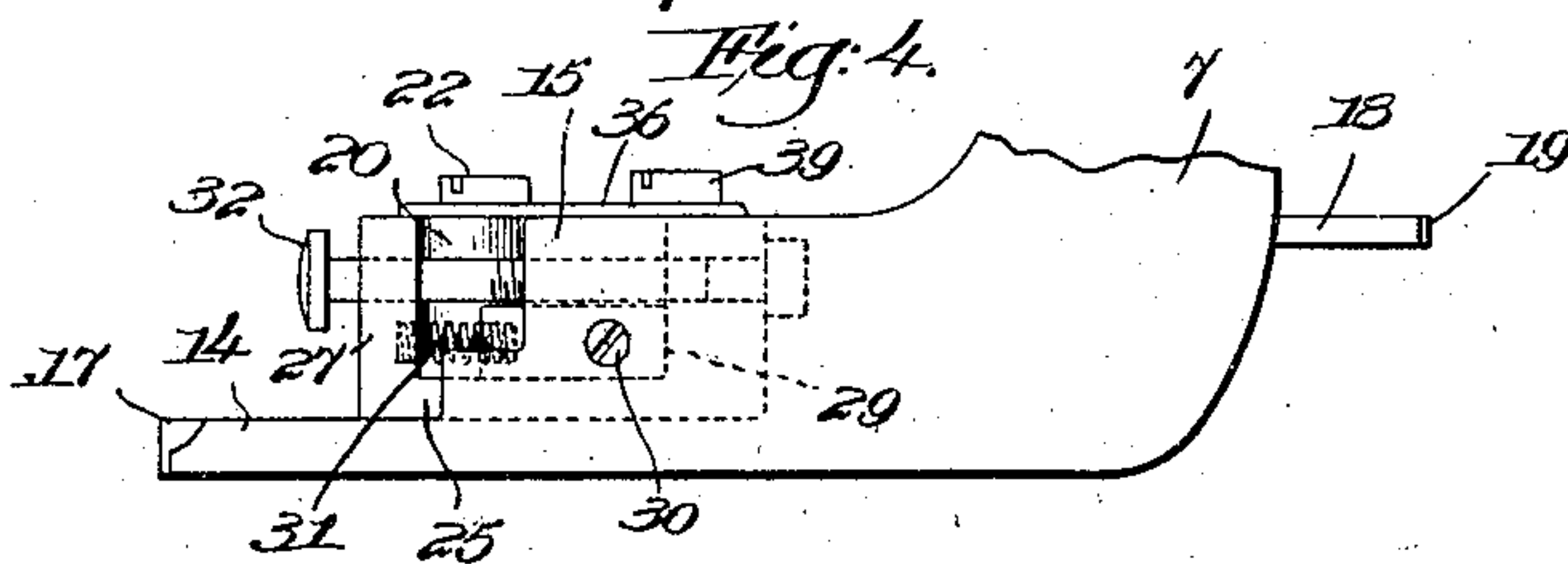
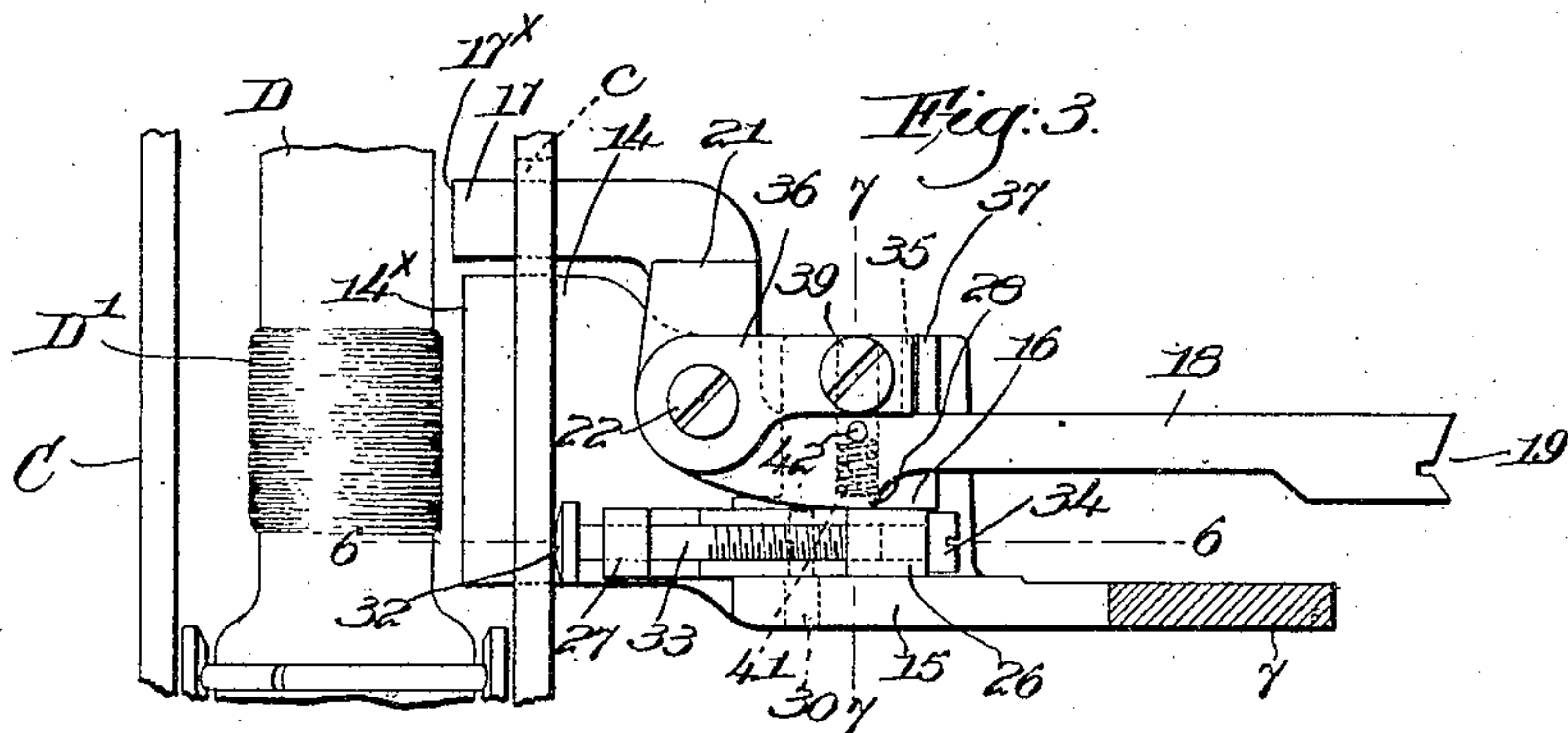
Witnesses,  
 Edward H. Allen  
 James F. Ward.

Inventor,  
 Alonzo E. Rhoades,  
 by  
 Leroy & Guyon  
 Attys.

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2 SHEETS—SHEET 2.



Witnesses,  
Edward F. Allen  
Joseph M. Ward.

In witness whereof,  
Alonzo E. Rhoades,  
by Stanley Gregory  
attys.



# UNITED STATES PATENT OFFICE.

ALONZO E. RHOADES, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY,  
OF HOPEDALE, MASSACHUSETTS, A CORPORATION OF MAINE.

## FILLING-EXHAUSTION-INDICATING MECHANISM FOR LOOMS.

No. 912,264.

Specification of Letters Patent.

Patented Feb. 9, 1909.

Application filed August 26, 1908. Serial No. 450,308.

*To all whom it may concern:*

Be it known that I, ALONZO E. RHOADES, a citizen of the United States, and resident of Hopedale, 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 applies particularly to looms provided with mechanism to replenish automatically the filling in the running shuttle prior to its complete exhaustion, in order that there shall be no blank or short picks in the cloth being woven, the invention having for its object the production of certain novel features of construction and arrangement in the so-called "feeler" mechanism, which by its intermittent coöperation with the filling in the running shuttle effects the change in the operation of the loom such as the replenishment of the running filling.

In my present invention my improvements are embodied in that type of feeler mechanism wherein a feeler and a feeler-governor are provided, both of which enter the shuttle to coöperate with the filling therein, the feeler being movable with and also relatively to the feeler-governor, a feeler-lock acting normally to lock the feeler from relative movement until about the time filling replenishment is called for.

The broad combination of the feeler and feeler-governor, and a feeler-lock to normally lock the feeler from its functional movement, is not claimed by me as the same is not of my invention.

The various novel features of my invention will be fully described in the subjoined specification and particularly pointed out in the following claims.

Figure 1 is a top plan view of one end of the lay of a loom with a shuttle-box thereon, with filling-exhaustion-indicating mechanism embodying my invention, the parts being shown in normal condition and with the lay about to beat up; Fig. 2 is a left-hand side elevation of the mechanism shown in Fig. 1, and partly in section on the line 2—2, Fig. 1; Fig. 3 is an enlarged plan view of the feeler mechanism shown in Fig. 1, but

below the line 3—3, Fig. 2; Fig. 4 is an inner side elevation of the mechanism shown in Fig. 3. Fig. 5 is an outer side elevation of such mechanism; Fig. 6 is a longitudinal sectional detail of the feeler-lock and the bearing therefor, on the line 6—6, Fig. 3; Fig. 7 is a transverse section taken on the line 7—7, Fig. 3, looking toward the left, through the feeler-lock, feeler, and the adjacent part of the feeler-governor.

A is the lay, having a shuttle-box B in which is shown a shuttle C, Fig. 1, provided with a removable filling-carrier or bobbin D, and in Fig. 3 the filling D' is shown as approaching exhaustion.

The shuttle has a slot *c* in its front wall, Fig. 2, to register with the aperture *b* in the front plate of the box B when the shuttle is boxed, the feeler and feeler-governor entering the aperture and slot to coöperate with the filling in the shuttle as the lay beats up.

Upon the extension E of the breast-beam is securely bolted at 1 the slotted foot 2 of an upturned bracket 3 rearwardly extended at its upper end to form an overhanging portion 4 having parallel cheeks 5, see Fig. 1, which provide a horizontal bearing for a fulcrum or pivot-pin 6, secured to or forming a part of an upturned arm 7.

At the inner side of the bracket the arm is provided with a boss 8 and at the outer side of the bracket a disk 9 is fastened to the pin 6, to hold the same in its bearing, the pin being located above and in parallelism with the shuttle path, see Figs. 1 and 2. A laterally extended stop lug 10 on the arm enters loosely a segmental slot 11 in the bracket, to thereby limit the forward and back swinging movement of the arm and the parts movable therewith. The backward movement of said arm is effected by a coiled spring 12, Fig. 1, secured at one end to the pin 6 and at its other end fixed to the bracket, the winding of the spring being such that forward movement of the arm and attached parts is against the stress of the spring.

A transmitter T is mounted on a horizontal fulcrum T' on the extension E, the outer end of the transmitter having a forwardly extended slotted cam-portion T<sup>2</sup>, all substantially as in United States Patent No. 789471, granted to Wood & Northrop May 9, 1905.



Rocking of the transmitter by the operation of the feeler device causes the actuation of a filling-replenishing mechanism, as in said patent, such mechanism and its operation being well known in the art and requiring no further description or illustration herein.

A controller  $t$  pivoted at  $t'$  to swing in a substantially horizontal path, is extended at its outer end through the slotted cam portion  $T^2$  of the transmitter and is normally maintained in its rearward position, Fig. 1, by a spring  $t^2$ , as in the patent referred to, the controller extending through a slotted guide 13 on the bracket foot 2, and being provided at its free end with an upturned and rather long beveled lug  $t^x$ . When the outer end of the controller is moved forward by the operation of the feeler device, as will be explained it acts through the part  $T^2$  to rock the transmitter on its fulcrum  $T'$ , and thereby cause replenishment of filling in the running shuttle, as in the Wood & Northrop patent referred to.

The upturned arm 7 forms part of a carrier or feeler-governor upon which the feeler is mounted, the lower part of the arm being laterally and rearwardly extended, as at 14, to constitute a feeler-governor which is adapted to enter the shuttle and cooperate with the filling therein, the arm at its base extending rearward part way toward the extremity of the part 14, as at 15, and forming one side of a bearing, the other side of the bearing being formed at 16, Fig. 7, by a part of the casting constituting the carrier.

Herein I have shown the feeler as a lever having a short, rearwardly extended arm 17, a long and forwardly extended arm 18 provided with a V-shaped notch 19 in its front end, and a depending hub 20, Fig. 5, the arms being in different parallel planes and laterally offset, and connected by the part 21. The feeler is conveniently made as a forging, and it is pivotally mounted on the carrier by means of an upright fulcrum stud 22 extended down through the hub 20 and screwed into the portion 14 of the feeler-governor or carrier, so that the feeler is movable therewith and also relatively movable thereto on the stud 22 as a fulcrum.

When the feeler is swung on such fulcrum from its normal position, Figs. 1 and 3, into position to register with the lug  $t^x$ , the bodily forward movement of the feeler with the overhead-suspended carrier will effect the operation of the controller  $t$ , the length of the lug  $t^x$  maintaining engagement with the feeler arm 18 as the latter rises with the forward swing.

The impinging faces of the feeler-governor and feeler are indicated at  $14^x$ ,  $17^x$ , Fig. 3, the latter face projecting farther back than the face  $14^x$  when the feeler is locked.

The action of the filling in the working

shuttle upon the feeler device effects the forward swing of the carrier and the parts thereon, against the stress of the spring 12, and as the momentum of said parts might produce an undesirable shock or jarring I provide an auxiliary spring 23, Figs. 1 and 2, made in the form of a long loop with spring coils, and fixedly attached to an ear 24 of the bracket, the free end of the loop extending above the stop lug 10. As the carrier swings forward the lug hits the loop of the auxiliary spring, the latter thus acting in addition to the spring 12 to resist the forward swing, and taking up any shock, preventing the stop lug 10 from being brought up with a sudden jerk against the upper end of the slot 11. On the return or backward swing the auxiliary spring acts only during the first part of such movement, as will be obvious from Fig. 2.

The part 14 of the feeler-governor and the arm 17 of the feeler lie side by side and intermittently enter the shuttle as the lay beats up, the filling on the bobbin impinging upon the normally locked feeler and moving it and the feeler-governor forward as a unit, there being no relative movement of the feeler until the filling in the shuttle approaches exhaustion.

The feeler-lock is herein shown as a slide-bar 25, Fig. 6, having upturned ends 26, 27 and mounted to slide longitudinally in the bearing on the feeler-governor formed between the walls 15, 16, the end 26 being normally engaged by the lateral extension 28 on the feeler arm 18, as clearly shown in Fig. 3.

A downhold 29 is secured by screw 30 to the wall 15 above the bar 25, to hold the feeler-lock in position and also to support one end of a spring 31, Fig. 6, the other end of the spring bearing against the rear end 27 of the lock, and operating to return the latter to its operative position.

The feeler-lock carries an adjustable shuttle-bunter, shown as a head 32 having a shank 33 threaded to enter a threaded hole in the front end 26 of the lock and passing freely through a hole in the rear end 27, a setting screw 34 serving to hold the bunter in adjusted position.

The head of the bunter is adapted to impinge upon the front wall of the shuttle when the filling is approaching exhaustion, and before the filling is engaged by the feeler-governor, to move the feeler-lock forward relatively to the governor and far enough to carry the upturned end 26 beyond the extension 28 on the feeler, thereby unlocking the latter so that it may swing on its pivot and perform its functional movement.

When the feeler is locked it will be manifest that it can have no movement on its pivot 22 relatively to the feeler-governor to bring the notch 19 into register with the lug  $t^x$  on the controller  $t$ , and its movement in



the other direction is prevented by a stop 35. Said stop is shown as the downturned end of a plate 36 pivoted on the fulcrum stud 22 of the feeler above the latter and projecting across a raised part 37 of the casting forming the governor or carrier, the part 37 having a slot 38 into which the stop loosely enters, see Fig. 5.

A set-screw 39 passes loosely through a hole in the plate 36 and into the part 37 of the casting, the upright edge of the stop 35 bearing against the inner edge of the feeler arm 18. By loosening the set-screw the plate can be moved to cause the stop 35 to take up any wear between the part 26 of the feeler-lock and the extension 28 of the feeler which coöperates therewith, the set-screw retaining the adjustment when made.

The casting part 37 has a transverse, horizontal hole 40, Fig. 7, to receive a spring 41, the free end of which bears against a pin 42 depending from the feeler arm 18 and through a slot 43 into the hole 40, the spring serving to return the feeler to normal position when free to act.

If the filling on the bobbin D is in front of the feeler the face 17<sup>x</sup> thereof will impinge upon the filling so that the face 14<sup>x</sup> of the feeler-governor cannot impinge, as will be apparent from an inspection of Fig. 1, and this relative relation of the impinging parts is maintained at all times except when the feeler is unlocked and swung on its fulcrum to perform its functional movement.

While there is ample filling in the shuttle it impinges upon the locked feeler as the lay beats up, and the feeler, feeler-governor and feeler-lock are swung forward, with the lay, about the pin 6 as an overhead fulcrum, the springs 12 and 23 acting to return the parts as the lay retreats. This action continues until the filling has been so far exhausted that it does not impinge on the feeler, as shown in Fig. 3, and now the feeler-governor impinges upon the filling at D' while the feeler is idle, but still locked, there being enough filling to prevent contact of the feeler with the bare bobbin. The bunter 32 on the feeler-lock is also held from engagement with the shuttle body until the denudation of filling has progressed so far that the feeler should be unlocked, but when this point is reached the shuttle-body hits the bunter and moves the feeler-lock forward, relatively to the feeler-governor, to release or unlock the feeler, after which the filling D' impinges upon the governor and moves all the parts forward. This continues until the filling at D' is so reduced that the feeler hits the bare bobbin before the face 14<sup>x</sup> of the feeler-governor impinges on the filling, whereupon the unlocked feeler is swung upon its fulcrum 22, its notched arm 18 is brought into coöperation with the lug t<sup>x</sup>, and then as the parts are

swung forward about the overhead fulcrum 6 the controller t is swung forward, the transmitter T is rocked, and the desired change in the operation of the loom is effected.

By adjusting the bunter on the feeler-lock the instant it hits the shuttle may be hastened or retarded, so that the unlocking of the feeler may be adjusted as desired, to accommodate the changes in the width of shuttles, to take up wear, etc.

The adjustable stop 35 for the feeler is readily manipulated and it enables me to prevent lost motion due to wear between the feeler and feeler-lock, and to maintain the parts in the most efficient coöperation.

By sustaining the feeler mechanism to swing backward and forward upon an overhead pivot parallel to the shuttle path I get a very easy movement and one which is effected with a minimum pressure on the filling in the running shuttle.

By loosening the bolts 1 the bracket 3, 4 and all of the parts suspended therefrom can be adjusted toward or from the lay.

When the functional movement of the feeler has been effected the backward movement of the lay releases the feeler from engagement with the bobbin, and the spring 41 returns the feeler to normal position while the spring 31 effects return of the feeler-lock to its locking position, as well be readily understood.

The feeler-lock is strong and durable, and I have provided a firm and steady bearing therefor by the construction herein shown and described.

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

1. A loom having, in combination, a feeler-governor and a feeler both of which enter the working shuttle and coöperate with the filling therein, the feeler being mounted on the feeler-governor and adapted to swing relatively thereto, an upturned arm on the feeler-governor, a fixed support on which said arm is fulcrumed parallel to and above the shuttle path, a spring to move the feeler backward, and a feeler-lock which normally locks the feeler from movement relative to the feeler-governor.

2. A loom having, in combination, an overhead-suspended feeler-governor adapted to swing forward and back, means to limit such movement, a feeler movable with and also relatively to the feeler-governor, both parts entering the working shuttle to coöperate with the filling therein, a feeler-lock which normally locks the feeler from movement relative to the feeler-governor, but which, when filling replenishment is demanded, is operated to release the feeler, and means independent of the filling to cause such operation of the feeler-lock.



3. In a loom, a fixed and stationary overhanging bracket provided with a horizontal bearing at its upper end, a feeler-governor having an upturned arm pivoted in said bearing, to permit forward and back swinging movement of the feeler-governor, a feeler movable with and also relatively to the feeler-governor and carried thereby, a feeler-lock which normally locks the feeler from relative movement, both feeler and feeler-governor entering the shuttle to cooperate with the filling therein, a spring to move the feeler-governor back, and an auxiliary spring to act upon the feeler-governor during the latter part of its forward movement.

4. A loom having, in combination, a swinging carrier movable forward and back at right angles to the shuttle path, a stationary, overhead pivot from which the carrier is suspended, a feeler mounted on the carrier and also movable relatively thereto, to enter the working shuttle and cooperate with the filling therein, and means which normally lock the feeler from relative movement but which unlocks the feeler when filling replenishment is demanded.

5. A loom having, in combination, a swinging carrier movable forward and back at right angles to the shuttle path, and having an upturned arm rigidly connected with it, the rear end of said carrier being prolonged and constituting a feeler-governor to enter the shuttle and cooperate with the filling therein, a stationary, overhead and horizontal pivot on which the upper end of the carrier-arm is fulcrumed, a feeler pivoted on the carrier to swing in a lateral path, said feeler also entering the shuttle to cooperate with the filling therein, and a feeler-lock which normally locks the feeler from pivotal movement on the carrier.

6. A loom having, in combination, a swinging carrier movable forward and back at right angles to the shuttle path, a stationary, overhead pivot from which the carrier is suspended, a feeler mounted on the carrier and also movable relatively thereto, to enter the working shuttle and cooperate with the filling therein, a feeler-lock which normally locks the feeler from movement relative to the carrier, a spring to effect backward movement of the latter, and means to positively limit such movement.

7. A loom having, in combination, a feeler-governor and a feeler both of which enter the working shuttle and cooperate with the filling therein, the feeler being mounted on the feeler-governor and adapted to swing relatively thereto, an upturned arm on the feeler-governor, a fixed support on which said arm is fulcrumed parallel to and above the shuttle path, a spring to move the feeler backward, a bearing on the feeler-governor, and a spring-controlled feeler-lock slidably

mounted in said bearing and which normally locks the feeler from swinging movement relative to the feeler-governor.

8. A loom having, in combination, an overhead-suspended feeler-governor adapted to swing forward and back, a spring to effect backward movement thereof, a feeler movable with and also relatively to the feeler-governor, both parts entering the working shuttle to cooperate with the filling therein, a feeler-lock slidably mounted on the feeler-governor and normally acting to lock the feeler from relative movement, a spring to operatively position the feeler-lock, and an adjustable shuttle-bunter carried by the lock.

9. A loom having, in combination, an overhead-suspended feeler-governor adapted to swing forward and back, a feeler movable with and also relatively to the feeler-governor, both parts entering the working shuttle to cooperate with the filling therein, a bearing on the feeler-governor adjacent the feeler, a feeler-lock slidably mounted in said bearing and having upturned front and back ends, the front end normally engaging and locking the feeler from relative movement, a shuttle-bunter adjustably mounted in the upturned ends of the feeler-lock, to effect unlocking movement of the latter, and a spring to move the feeler-lock into locking position.

10. A loom having, in combination, a feeler-governor and a feeler pivotally mounted thereon and both adapted to enter the working shuttle and cooperate with the filling therein, a feeler-lock which normally locks the feeler from pivotal movement, an angularly movable stop for the feeler, mounted on the pivot of the latter and adjustable toward and from the feeler, and means to hold the stop in adjusted position.

11. In a loom, a stationary overhanging bracket provided at its upper end with a horizontal bearing and having a slot, a feeler-governor having an upturned arm pivoted in said bearing, to permit forward and back swinging movement of the feeler-governor, a stop-pin extended laterally from the arm and entering the slot in the bracket, to limit swinging movement of the feeler-governor, a feeler movable with and also relatively to the feeler-governor, a feeler-lock which normally locks the feeler from relative movement, a spring cooperating with the feeler-governor adjacent its pivot to effect backward movement of the governor, and an auxiliary spring on the bracket and adapted to cooperate with the stop-pin when the feeler-governor is swung forward, to prevent a jerky movement thereof and prevent shock.

12. A loom having, in combination, a feeler-governor and a feeler both of which enter the working shuttle and cooperate with the filling therein, the feeler being carried



by the feeler-governor and movable relatively thereto, a stationary fulcrum parallel to the shuttle path and on which the feeler-governor is mounted to swing forward, and  
5 back, and a feeler-lock carried by the feeler-governor and which normally locks the feeler from movement relatively to the feeler-governor.

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

ALONZO E. RHOADES.

Witnesses:

ALBERT W. EDWARDS,  
EDWARD DANA OSGOOD.