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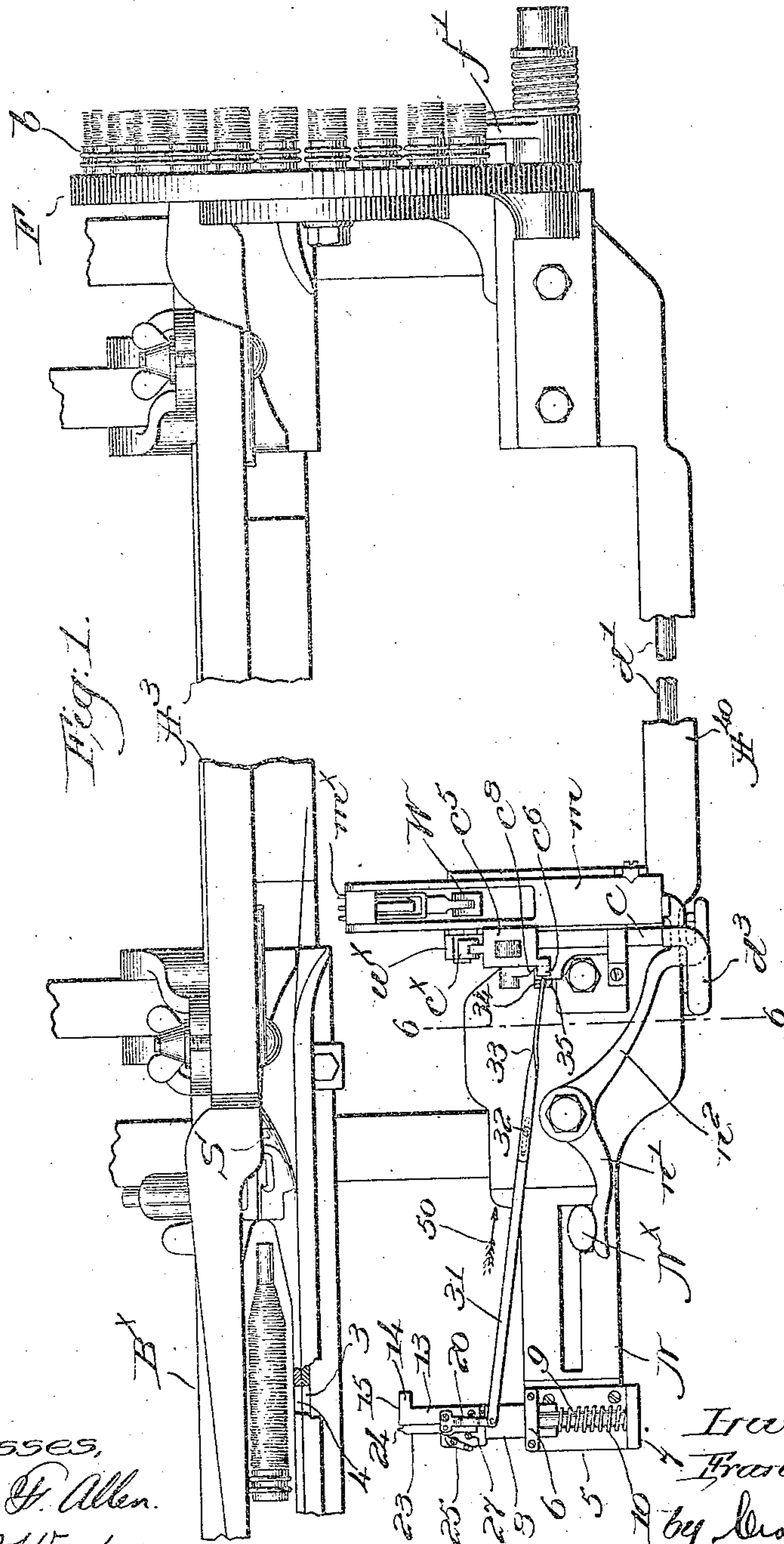
PATENTED JUNE 16, 1908.

F. ALLEN.

FILLING EXHAUSTION INDICATING MECHANISM FOR LOOMS.

APPLICATION FILED OCT. 19, 1907.

2 SHEETS—SHEET 1.



Witnesses,
Edward F. Allen.
Joseph M. Ward.

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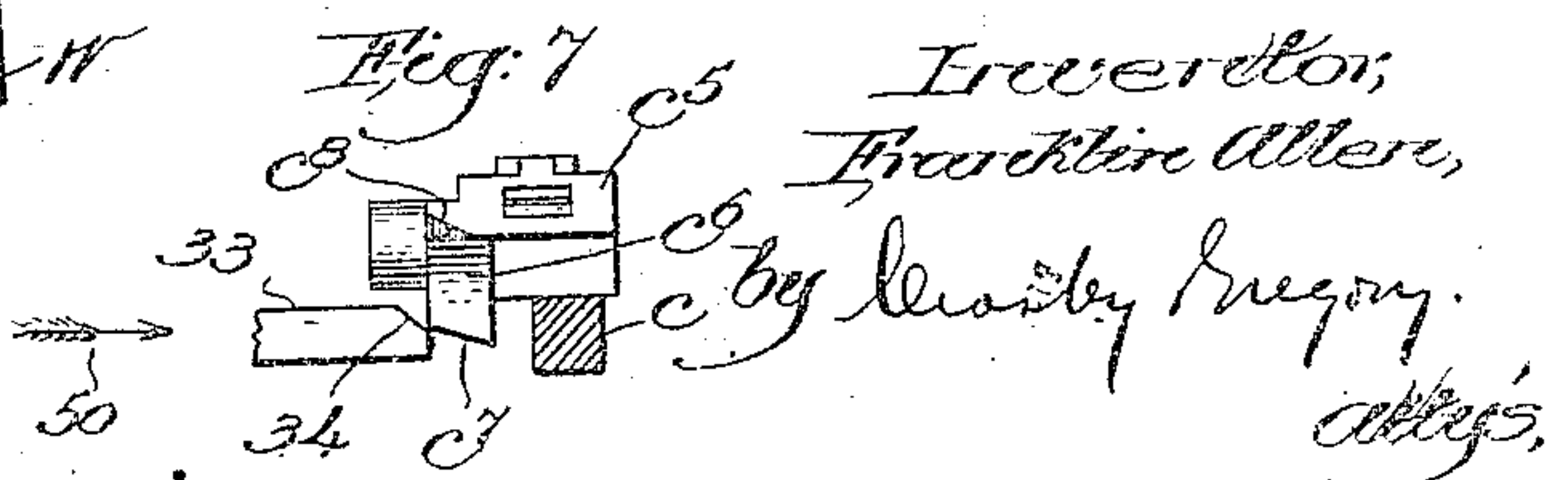
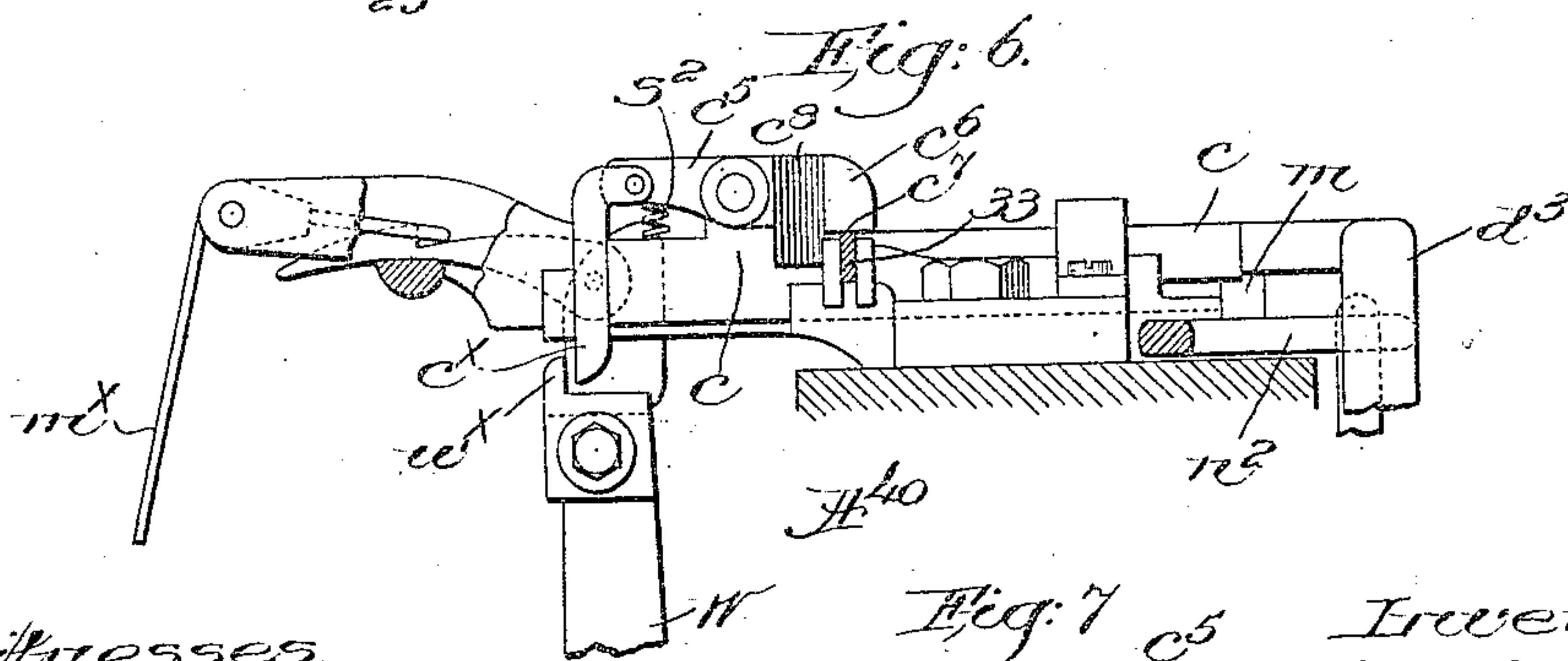
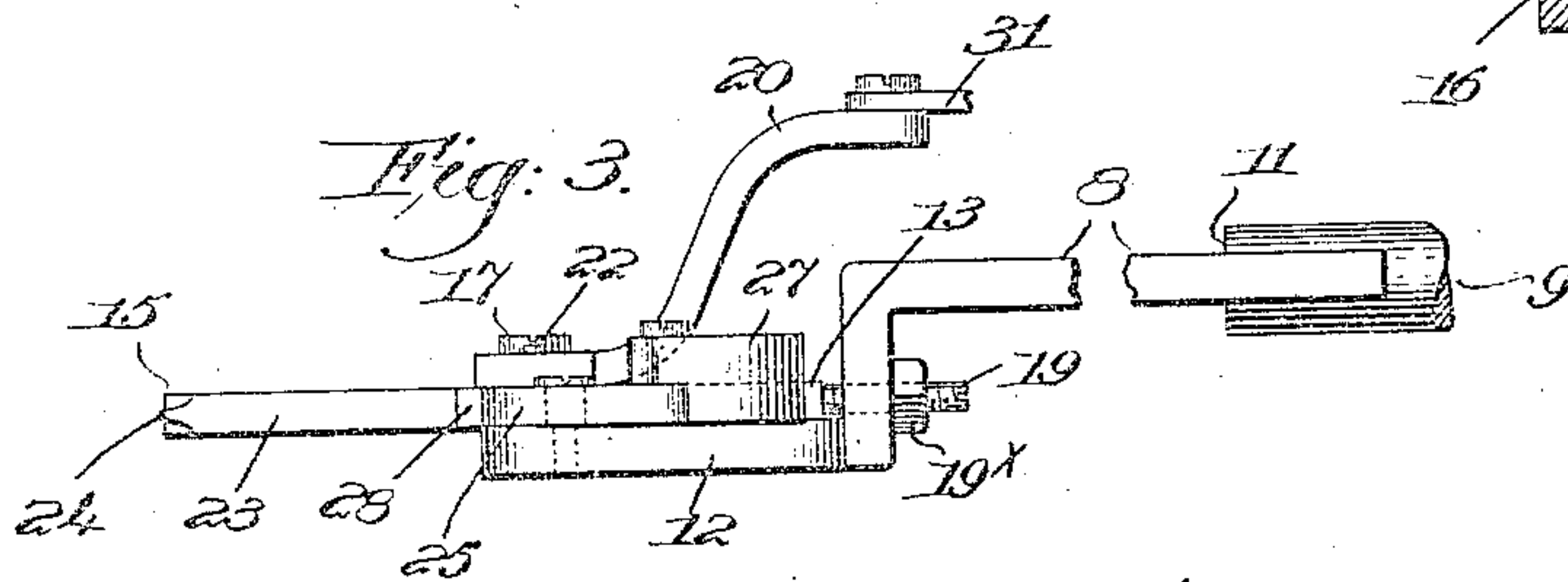
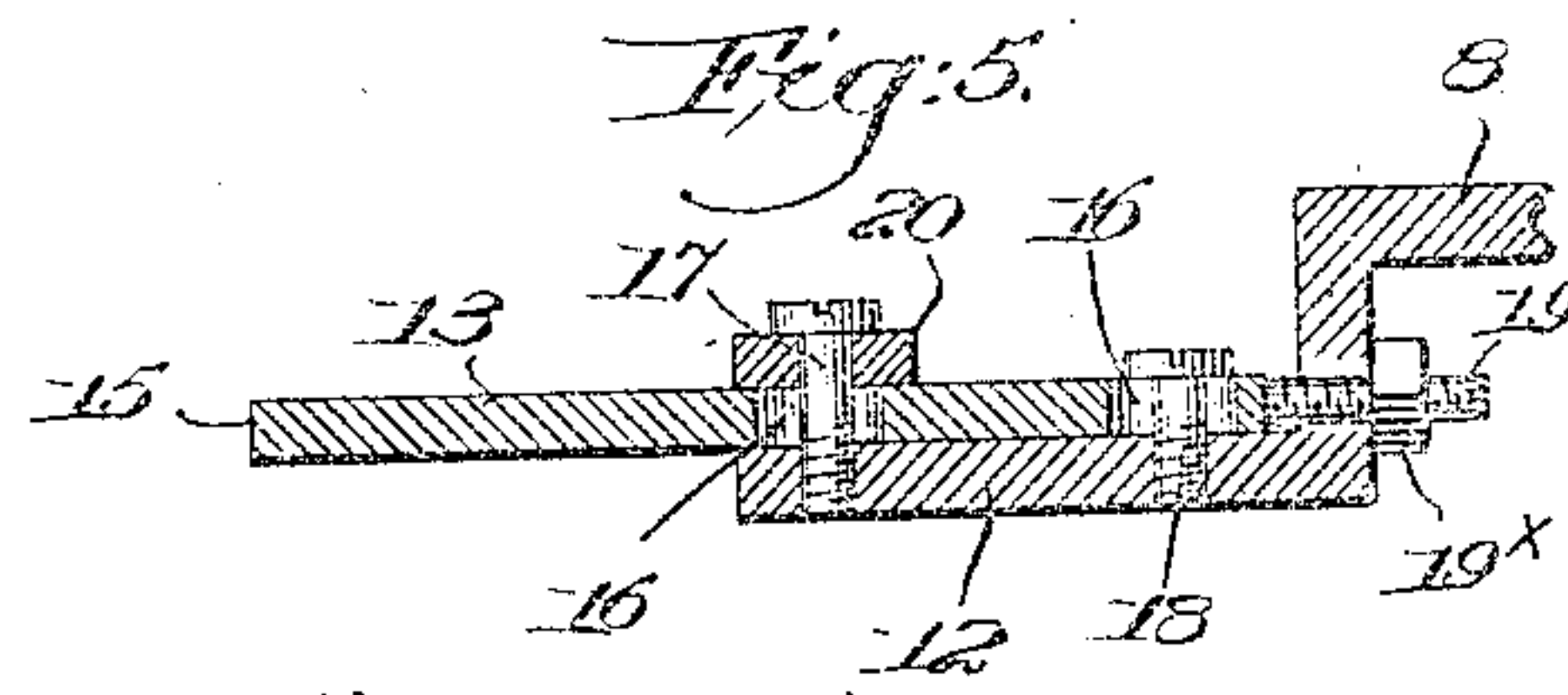
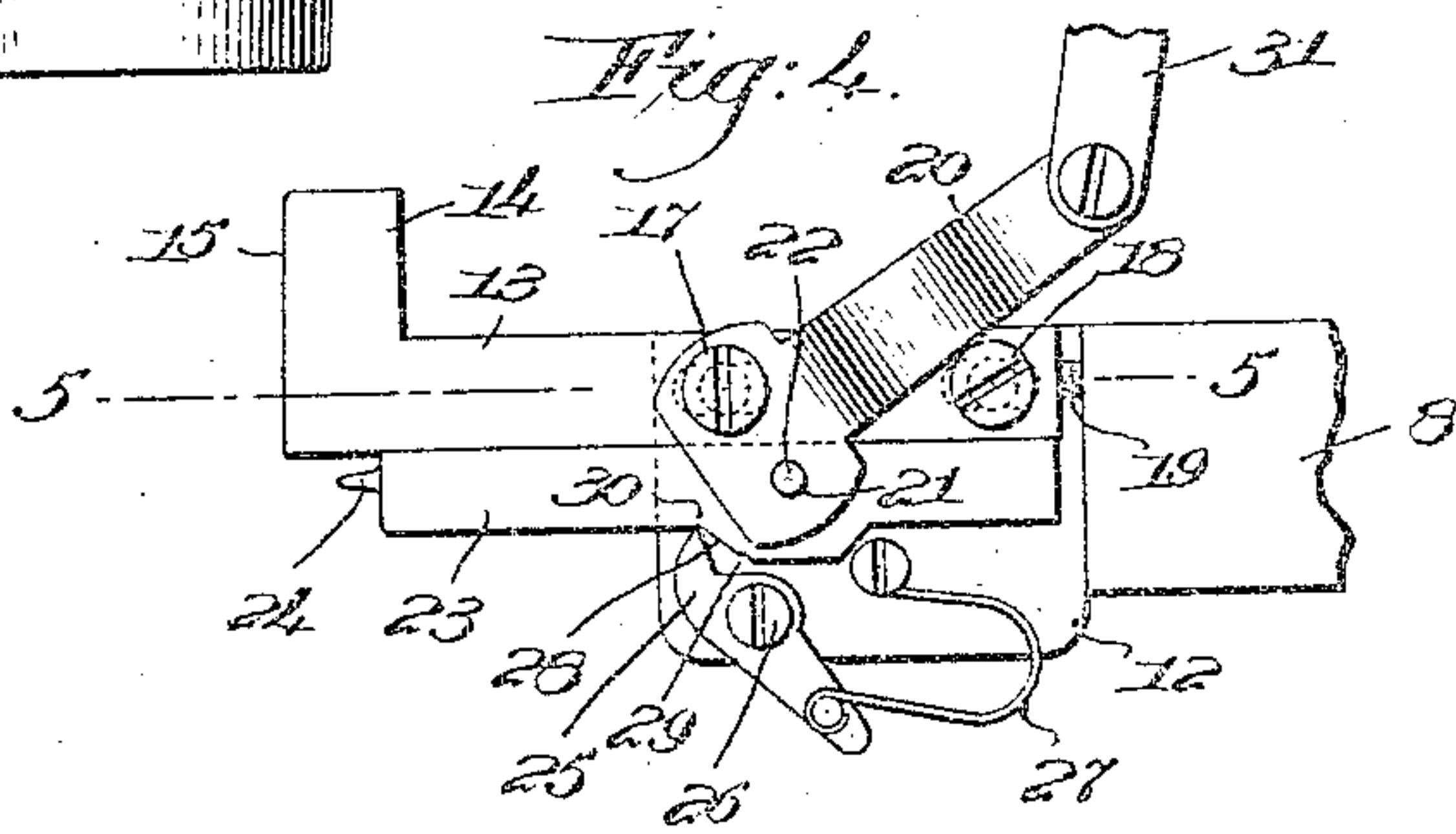
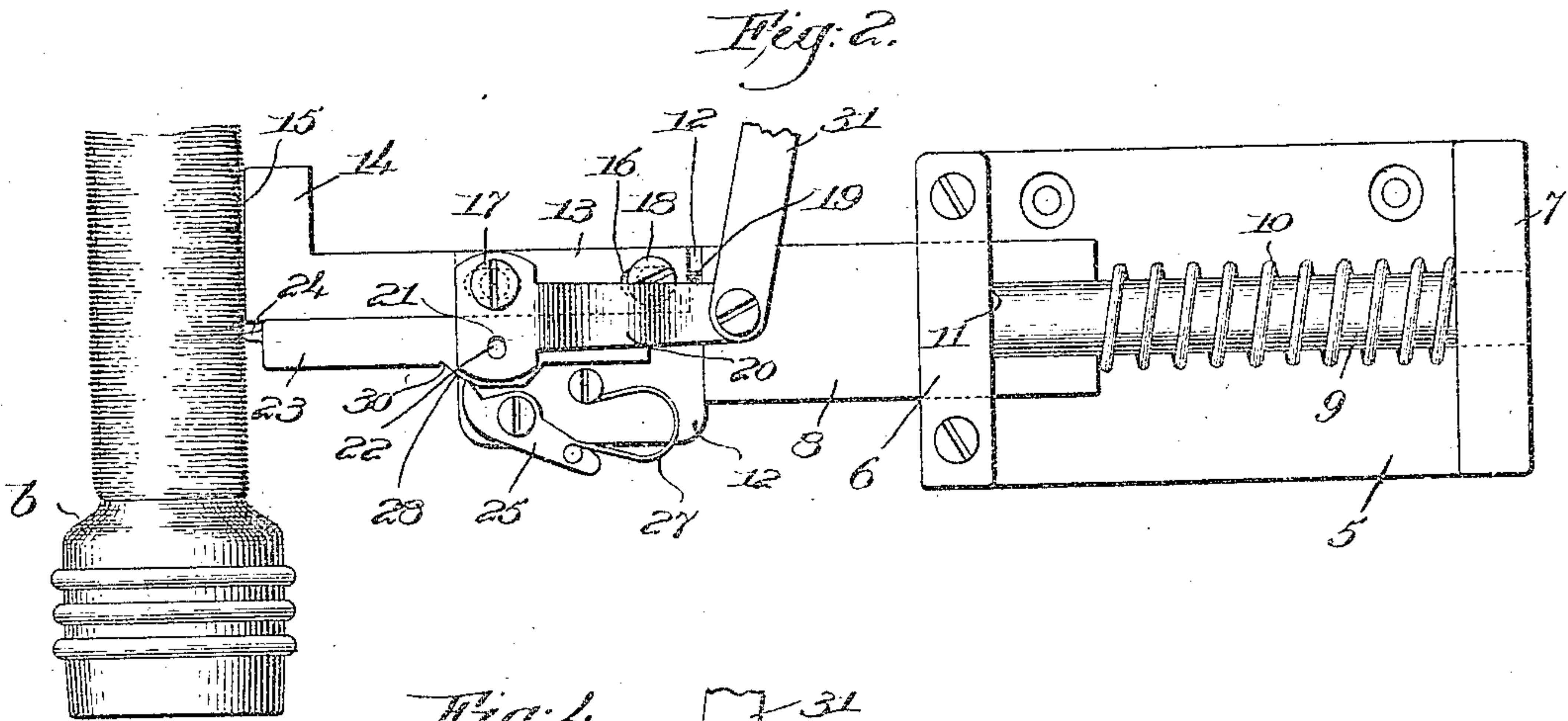
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APPLICATION FILED OCT. 19, 1907.

2 SHEETS—SHEET 2.



Witnesses,
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UNITED STATES PATENT OFFICE.

FRANKLIN ALLEN, OF WALTHAM, MASSACHUSETTS, ASSIGNOR TO DRAPER COMPANY, OF
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FILLING-EXHAUSTION-INDICATING MECHANISM FOR LOOMS.

No. 890,749.

Specification of Letters Patent.

Patented June 16, 1908.

Application filed October 19, 1907. Serial No. 398,236.

To all whom it may concern:

Be it known that I, FRANKLIN ALLEN, a citizen of the United States, and resident of Waltham, county of Middlesex, 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 letters on the drawing representing like parts.

This invention has for its object the production of novel filling-exhaustion indicating mechanism for looms whereby the detection of substantial exhaustion of filling in the running shuttle is made effective to cause a change in the operation of the loom, such for instance as its stoppage automatically or the automatic replenishment of the running filling.

The operation of the mechanism embodied in my present invention is based upon the relative penetrability of the filling mass and the material of which the filling carrier or bobbin is composed and upon which the filling is wound, and while broadly this principle is found in United States Patent No. 821,123 granted May 22, 1906 to C. F. Roper, the construction and operation therein is very different from the invention forming the subject matter of this application. Herein the feeler device comprehends two members one of which impinges against and the other penetrates the filling mass in the running shuttle, said members moving in unison until substantial filling exhaustion is reached. Thereupon the penetrating member is moved, by engagement with the filling-carrier, relatively to the impinging member, such initial relative movement releasing the members, which up to that time have been locked together. When unlocked a secondary or effective relative movement is imparted to the penetrating member, causing the desired change in the operation of the loom through a suitable instrumentality. Until the secondary movement is effected the feeler device is "dead" or inactive with respect to the instrumentality which causes the change in the operation of the loom, an actuator remaining inoperative throughout the time the feeler device is dead and being operatively positioned and rendered active only when the effective movement of the members of the feeler device occurs. In this respect my

present invention is wholly different from the apparatus disclosed in the Roper patent aforesaid, wherein an actuator is inoperatively positioned on each detecting pick until the predetermined filling exhaustion is reached, such positioning of the actuator being effected by a relative movement of the feeler members while sufficient filling is present in the shuttle.

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, centrally broken out, of a sufficient portion of a loom, with one embodiment of my present invention applied thereto; Fig. 2 is an enlarged top plan view of the feeler device in normal condition, with a filling-carrier and filling mass thereon, the filling being shown as reduced to such an extent that the feeler device is just about to be operated to cause a change in the operation of the loom; Fig. 3 is a side elevation of the feeler device, viewing it from the left hand side of the loom, the parts being in the condition shown in Figs. 1 and 2; Fig. 4 is a view similar to Fig. 1 but showing the feeler members after they have been moved relatively to operatively position the actuator; Fig. 5 is a longitudinal sectional detail on the line 5-5, Fig. 4; Fig. 6 is an enlarged detail on the line 6-6, Fig. 1, looking toward the right, and Fig. 7 is a detail of the front end of the latch-carrier and the feeler-controlled lifter to cooperate therewith.

The breast-beam A^{40} , lay A^3 , filling-feeder F of the replenishing mechanism to hold the filling-carriers or bobbins b on which the mass of filling is wound, the transferrer f' and the controlling rock-shaft d' are and may be of well known construction in automatic filling-replenishing looms, the shipper N^x and its notched holding-plate N , the knock-off lever n' , n^2 and the shuttle S , Fig. 1, having a slot 4 in its side to register with an aperture 3 in the front wall of the shuttle-box B^x on each detecting pick, being substantially as in United States Patent No. 693,558 granted to Marcoux February 18, 1902.

Referring to Figs. 1 and 6 a latch c^x (forming a member of the controlling means for the replenishing mechanism) is pivotally mounted on a latch-carrier c^5 fulcrumed on a

slide c adjacent the guide for the slide m of the usual fork m^x , the weft-hammer W acting to move the slide outward upon filling failure, to thereby operate the knock-off lever n' , n^2 and release the shipper.

The latch-carrier has a foot c^6 , to be referred to hereinafter, and a spring s^2 , Fig. 6, normally acts to elevate the latch c^x above the path of a shoulder w^x on the weft-hammer, the structure described being substantially as shown in the Marcoux patent, but operating in a slightly different manner. That is, in the patent a device is intermittently moved beneath and away from the foot c^6 until predetermined filling exhaustion is reached, and at such time said device remains beneath the foot when the weft-hammer W moves forward to effect engagement between the shoulder w^x and the latch c^x , but herein the foot c^6 remains down and the latch up until filling replenishment is called for, and then the foot is lifted, as will be described, to lower the latch into operative position.

When so lowered the shoulder w^x engages the latch c^x and the slide c is moved outward, rocking an upturned arm d^3 fast on the rock-shaft d' , turning the latter and effecting the operation of the replenishing mechanism in well known manner.

Upon the outer end of the plate N I secure a stand 5 having bearings 6, 7 to receive and slidably support a carriage 8 having a cylindrical shank 9, a spring 10 coiled about the shank between the bearing 7 and the forward end of the carriage acting to move the latter rearward, such movement being limited by engagement of the rear end 11, Fig. 3, of the shank with the bearing 6, as shown in Fig. 2.

The rear end of the carriage is shown in Figs. 3 and 5 as set down, at 12, to form a seat for the impinging member of the feeler, said member being shown as substantially L-shaped and comprising an elongated, flat body 13 and a lateral, broad head 14, which presents a face 15 to intermittently enter the shuttle and impinge upon the filling mass therein.

The body 13 is provided with longitudinal slots 16, see Fig. 5 through which are extended screws 17 and 18, into the part 12 of the carriage, the screw 18 clamping the feeler member 13 to the carriage while longitudinal movement of said member is permissible, a stop-screw 19 and check-nut 19^x helping to maintain the adjustment and also to effect a fine adjustment when the clamping screw 18 is slightly loosened.

The screw 17 is made long enough to extend through and form a fulcrum for an actuator, shown as an arm 20, mounted to swing laterally above the feeler member 13, said actuator being bent upward as shown in Fig. 3.

The end of the actuator adjacent its ful-

crum is widened laterally and provided with a slot 21, to receive a leg 22 extended upward from the penetrating member 23 of the feeler device, shown as an elongated and flat metal bar having at its rear end a prong 24.

The penetrating member is slidably supported on the part 12 of the carriage, against the adjacent upright and longitudinal edge of the body 13 of the impinging member, and is held against it by means of a latch 25 fulcrumed at 26 on the part 12 of the carriage, and acted upon by a suitable spring 27, the spring at all times acting to press the toe of the latch against the side of the penetrating member 23. Said member has on its outer side a cam portion 28, and slight notches 29 and 30 are formed in its edge at the opposite ends of the cam surface 28.

Referring to Fig. 2, the normal relative position of the impinging and penetrating members of the feeler device is shown, the toe at such time entering the notch 29, and holding the penetrating member from any movement relative to the impinging member, and at such time the prong 24 extends slightly beyond the contact face 15 of the impinging member. On every alternate pick, when the shuttle is in the shuttle-box B^x , Fig. 1, the feeler members enter the shuttle through the apertures 3 and 4, Fig. 1, and cooperate with the mass of filling on the filling-carrier or bobbin b , and the face 15 of the impinging member impinges upon the filling, while the prong 24 slightly penetrates or sinks in to the filling, and as the lay completes its forward movement, the pressure of the filling upon the impinging member moves it forward against the action of the spring 10, and the penetrating member 23 is moved forward in unison, as the softness of the filling penetrated by the prong 24 is insufficient to disengage or release the latch 25. As the filling is woven off, the diameter of the mass of filling gradually decreases and the impinging and penetrating members gradually approach the barrel of the filling-carrier or bobbin. So long as there is a sufficient thickness of filling to act upon the impinging member of the feeler device, and prevent the prong of the penetrating member from contacting with the wood of the filling-carrier there will be no change in the relative position of the two members of the feeler device, and they will remain locked together by the latch 25. When, however, the thickness of the remaining filling mass is so slight that the prong 24 engages the carrier b before the face 15 impinges on the filling, then the penetrating member 23 will have imparted to it an initial forward movement relative to the impinging member sufficient to disengage the latch from the notch 29. The members of the feeler device are now unlocked, and the spring 27 acts through the latch to press its toe against the cam surface 28, thereby ef-

fecting an amplified and secondary movement of the penetrating member 23 into the position shown in Fig. 4. This secondary movement acts through the lug 22, which is eccentric to the stud 17 of the actuator 20, to swing the actuator into operative position, as shown in Fig. 4. When the secondary movement of the penetrating member is completed, the latch toe enters the notch 30, and serves to hold the penetrating member from further forward movement relative to the impinging member. A link 31 is connected at its outer end with the upturned free end of the actuator 20 and at its inner end has adjustably connected with it by a clamp screw 32, see Fig. 1, a tip-piece 33, the free end of which is longitudinally movable between upright guides 35, see Figs. 1 and 6, adjacent the foot c^6 of the latch-carrier. The upper edge of the tip 33 is beveled at 34, see Fig. 7, to pass under and cooperate with the corresponding beveled under face c^7 of the foot c^6 . When the actuator 20 is operatively positioned, as has been described, the link is moved in the direction of the arrow 50, Figs. 1 and 7, the incline or cam 34 passing under the foot c^6 , and lifting it to rock the latch-carrier c^5 into the position shown in Fig. 6. Thereby the latch c^8 is positioned in the path of the shoulder w^x on the weft hammer, and the forward movement of the latter acts to effect a change or replenishment of filling by cooperation of the slide c with the arm d^3 .

From the foregoing it will be obvious that so long as there is sufficient filling present in the shuttle to permit the penetrating member to penetrate the filling mass without engaging the filling-carrier, there will be no relative movement between the two members of the feeler device, and said members will move back and forth in unison, but as soon as the filling is sufficiently exhausted to permit the engagement of the penetrating member with the filling-carrier, the initial relative movement of the feeler members will be effected to unlock them, and the amplified and secondary relative movement is effected automatically to operatively position the actuator and effect a change in the operation of the loom, such change being herein shown as a replenishment of filling.

To reset the feeler mechanism after filling-replenishment I have provided the side of the latch-carrier c^5 with an upright, beveled or cam face c^8 , which wipes across the end of the tip 33 of the link as the slide c is moved forward, and pushes the tip and link 31 outward oppositely to the arrow 50, to swing back the actuator 20 from the position shown in Fig. 4 to that shown in Figs. 1 and 2, the toe of the latch 25 being thrown into engagement with the notch 29 by the action of the spring 27, so that the parts are thus reset automatically, and without any attention on the part of the loom-attendant.

The structure is simple and direct acting, it is readily adjusted to as small an amount of filling as may be desired by means of the clamp screw 18, and adjusting screw 19, the amount by which the tip of the prong 24 normally extends beyond the face 15 of the impinging member being equivalent to the thickness of the layer or layers of filling upon the filling-carrier at the time the feeler device acts to operatively position the actuator 20.

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

1. In filling-exhaustion indicating mechanism for looms, two adjacent and relatively movable members one of which is adapted to penetrate, and the other to impinge against, the filling mass in the shuttle until substantial exhaustion of the filling causes the penetrating member to engage the carrier for the filling and be moved relatively to the impinging member, a device to connect said members to move in unison until substantial filling exhaustion, and means operated by or through relative movement of said members to control the operation of the loom.

2. In filling-exhaustion indicating mechanism for looms, a member to impinge intermittently upon the filling mass in the shuttle, an adjacent member to penetrate the filling mass and move in unison with the impinging member until substantial exhaustion of the filling, a latch to connect said members for unison movement, means to engage and effect an initial relative movement of the penetrating member when substantial filling exhaustion occurs, to release the latch, means acting through the latter when released to amplify such relative movement of the impinging and penetrating members, and filling-replenishing mechanism operated by or through such amplified movement.

3. A controlling mechanism for looms, having two relatively movable members one being adapted to intermittently impinge against and the other to penetrate the filling mass in the shuttle, to effect unison movement of the members until substantial filling exhaustion, means other than the filling to thereupon effect a differential movement of said members, and means operated by such differential movement to cause the actuation of the controlling mechanism.

4. In a loom, a shuttle with a carrier having a mass of filling wound thereon, filling-replenishing mechanism, and means to control the time of its operation, including two adjacent and yieldingly-mounted, relatively movable members one of which is adapted to penetrate and the other to impinge against the filling mass, a device to connect said members to move in unison until substantial filling exhaustion permits the penetrating member to engage the carrier, such engagement disconnecting the members, and means

to thereupon effect an amplified differential movement of said members to cause the operation of the controlling means.

5. In a loom, a shuttle with a carrier having a mass of filling wound thereon, filling-replenishing mechanism, and means to control the time of its operation, including two adjacent and yieldingly-mounted, relatively movable members one of which is adapted to penetrate and the other to impinge against the filling mass, a spring-latch normally connecting said members to move in unison until upon substantial filling exhaustion the penetrating member engages the carrier, thereby releasing the latch, and a cam cooperating with the released latch to effect an amplified differential movement of said members, to cause the operation of the controlling means.

6. In a loom, a shuttle with a carrier having a mass of filling wound thereon, filling-replenishing mechanism, a feeler device comprising a member to impinge and an adjacent member to penetrate the filling mass until substantial filling exhaustion, a lock to cause unison movement of the members until such filling exhaustion permits the penetrating member to engage the carrier and unlock said members, means to automatically effect differential movement of the members when unlocked, and connections between the members and the replenishing mechanism to cause the operation of the latter when their differential movement is effected.

7. The combination, with filling-replenishing mechanism, of a feeler device comprising a yieldingly mounted member to intermittently impinge against the filling mass in the shuttle, a member carried by and movable relatively to the impinging member and adapted to penetrate the filling mass, said penetrating member having a cam thereon and an adjacent notch, a spring-actuated latch carried by the impinging member to enter the notch and prevent relative movement of the penetrating member until substantial exhaustion of the filling permits said member to engage the filling-carrier and be moved to remove the latch from the notch, said latch thereupon acting upon the cam and retracting the penetrating member, and a swinging actuator operatively connected with said member and with the replenishing mechanism to effect its operation when the actuator is swung by retraction of the penetrating member.

8. In a loom, a shuttle provided with a carrier having a mass of filling wound thereon, a feeler device having two relatively movable members adapted respectively to impinge against and penetrate the filling mass and be moved in unison thereby until substantial filling exhaustion, the penetrating member thereupon engaging the filling-carrier and being moved initially thereby relatively to

the impinging member, means to automatically complete such relative movement, and means to change the operation of the loom, actuated by the completed relative movement of the feeler members.

9. In a loom, a shuttle provided with a carrier having a mass of filling wound thereon, means to change the operation of the loom, and a two-part device cooperating with the filling as a unit until substantial exhaustion of the filling combined with means whereby a relative movement of the parts of said device is effected by or through the relative density of the carrier and the filling thereon, such relative movement of the parts causing the operation of said means.

10. In a loom, a shuttle provided with a carrier having a mass of filling wound thereon, and means to automatically change the filling in the shuttle, combined with a device comprising two members intermittently cooperating with the filling and moving in unison until predetermined filling exhaustion, one member of said device thereupon penetrating the remaining filling and engaging the carrier, thereby effecting the actuation of the filling-changing means by relative movement of the two members by or through the relative density of the carrier and the filling remaining thereon.

11. In filling-exhaustion indicating mechanism for looms, in combination, a feeler device comprising a member to intermittently impinge upon the filling mass in the shuttle, a second member to penetrate the filling mass, a locking device to normally cause said members to move in unison, engagement of the filling-carrier by the penetrating member upon predetermined filling exhaustion first unlocking said members and then effecting differential movement of the feeler members by the locking device, and filling-replenishing mechanism the operation whereof is effected by such differential movement.

12. In a loom, in combination, a shuttle adapted to contain a carrier with a mass of filling wound thereon, a feeler device comprising a member to intermittently impinge against and be moved by the filling mass, a member to penetrate the filling mass and movable in unison with the impinging member while sufficient filling remains to prevent engagement of the penetrating member by the carrier in the shuttle, substantial filling exhaustion permitting such engagement and effecting an initial change in the relative position of the feeler members, means to thereupon automatically effect a secondary change in their relation, and filling-replenishing mechanism the operation whereof is caused by such secondary change.

13. In a loom, a feeler device including filling impinging and penetrating members adapted to enter the shuttle and cooperate with the filling therein, combined with a lock

to normally prevent relative movement of said members, engagement of the penetrating member with the filling-carrier when the filling has been exhausted to a predetermined extent effecting release of said member and permitting movement thereof relative to the impinging member.

14. A loom having, in combination, a member having an elongated face to impinge on the filling in the shuttle, an adjacent member to penetrate the filling, a lock to cause said members to move in unison until substantial filling exhaustion permits the penetrating member to engage the filling-carrier and thereby unlock the members, and means to automatically cause relative effective movement of the said members when unlocked.

15. A loom having, in combination, filling-replenishing mechanism, a feeler to effect the operation thereof when filling replenishment is called for, the feeler comprising two members rendered effective by relative movement, a lock normally preventing such movement but which releases said members upon substantial filling exhaustion, and means

acting automatically upon such release to cause the effective relative movement of the feeler members.

16. A loom having in combination, an impinging member and a penetrating member movable first in unison with said impinging member and thereafter relatively thereto, both members intermittently entering the running shuttle to cooperate with the filling therein, means to normally lock said members together until the penetrating member contacts with the filling-carrier upon substantial filling exhaustion, to initially effect relative movement of and unlock said members, and a device acting through the locking means to cause a secondary, effective relative movement of said members after they have been unlocked.

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

FRANKLIN ALLEN.

Witnesses:

L. A. HARVEY,
E. A. WALKER.