

No. 660,986.

Patented Oct. 30, 1900.

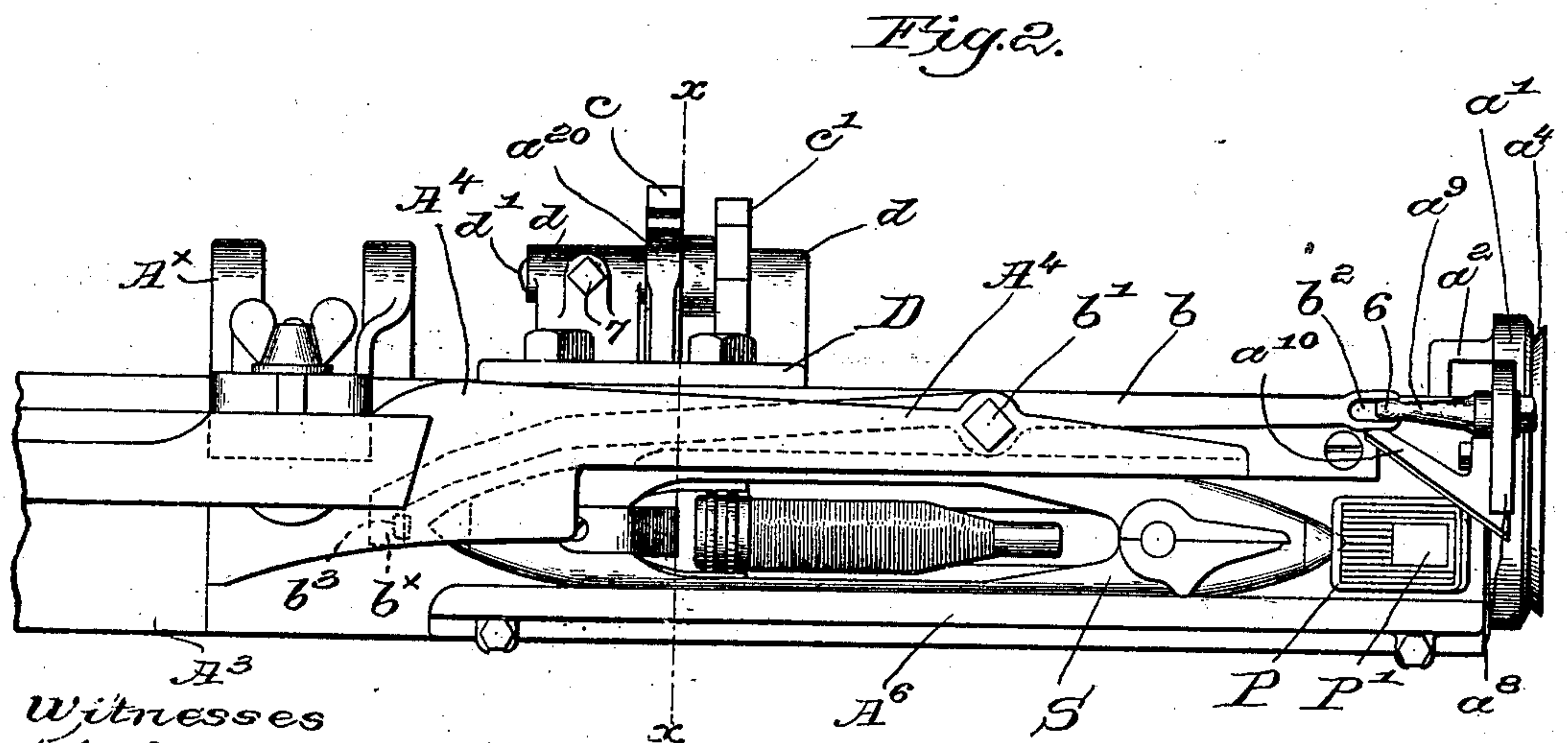
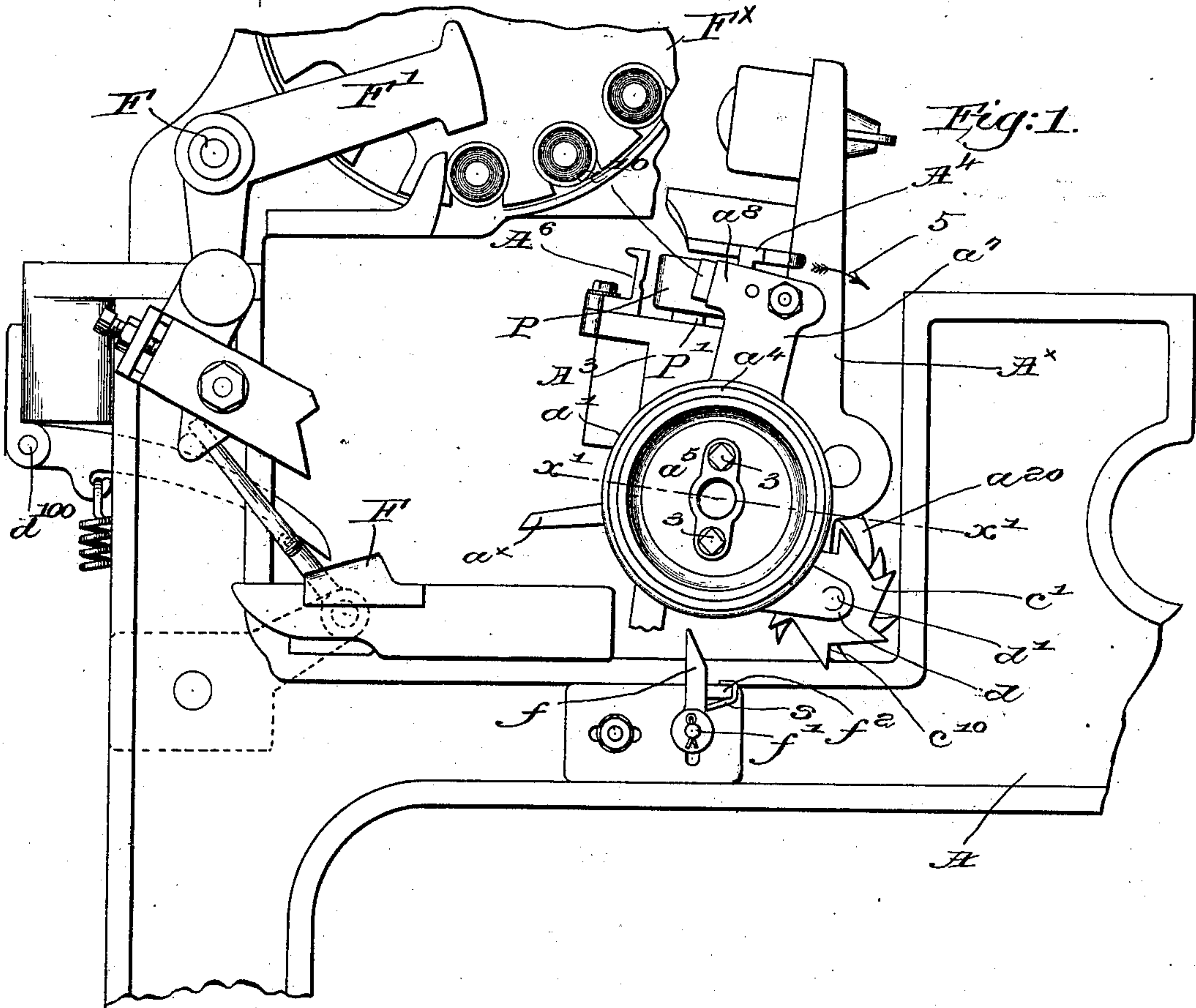
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SHUTTLE POSITIONING MECHANISM FOR LOOMS.

(Application filed July 28, 1900.)

(No Model.)

2 Sheets—Sheet 1.



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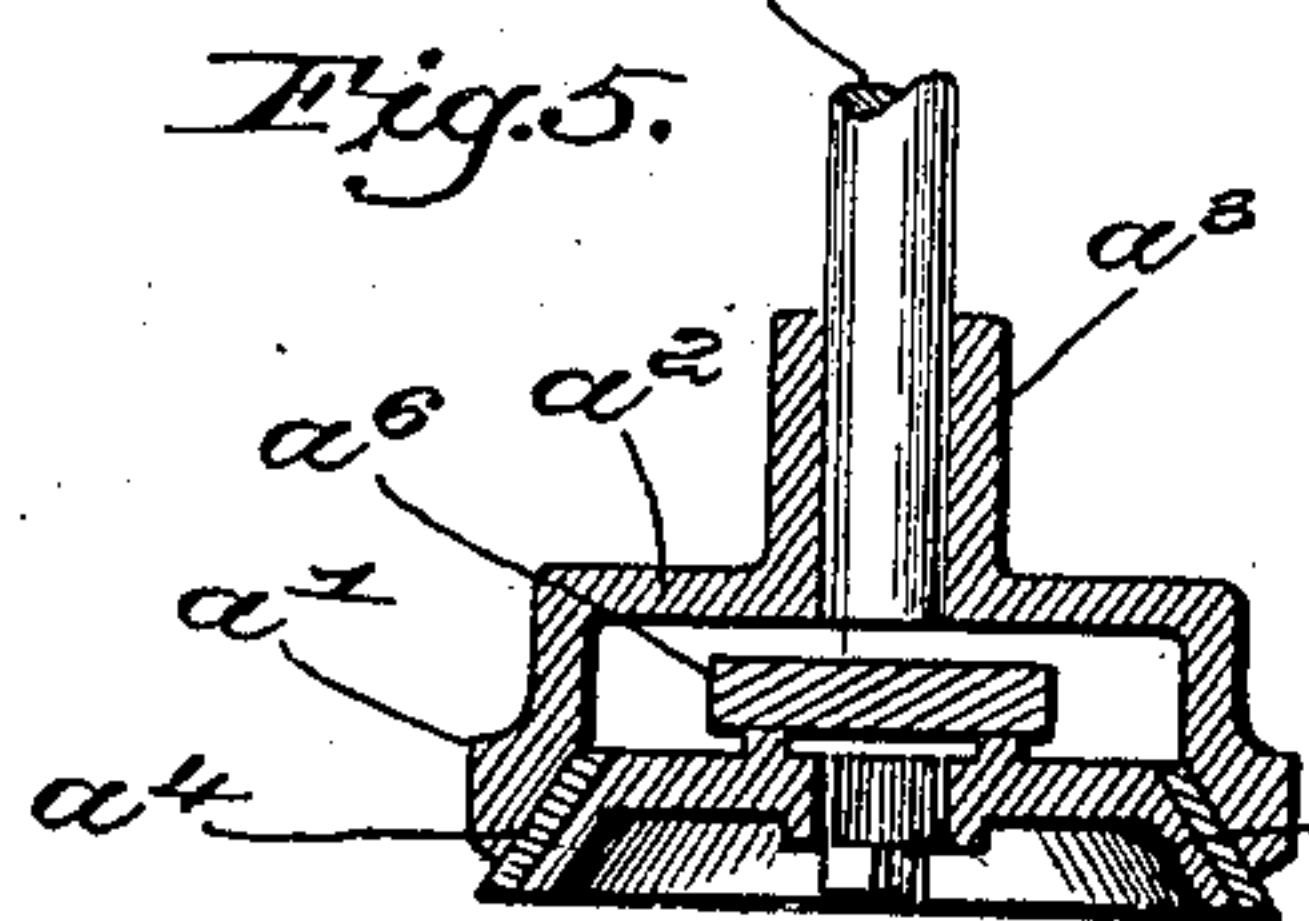
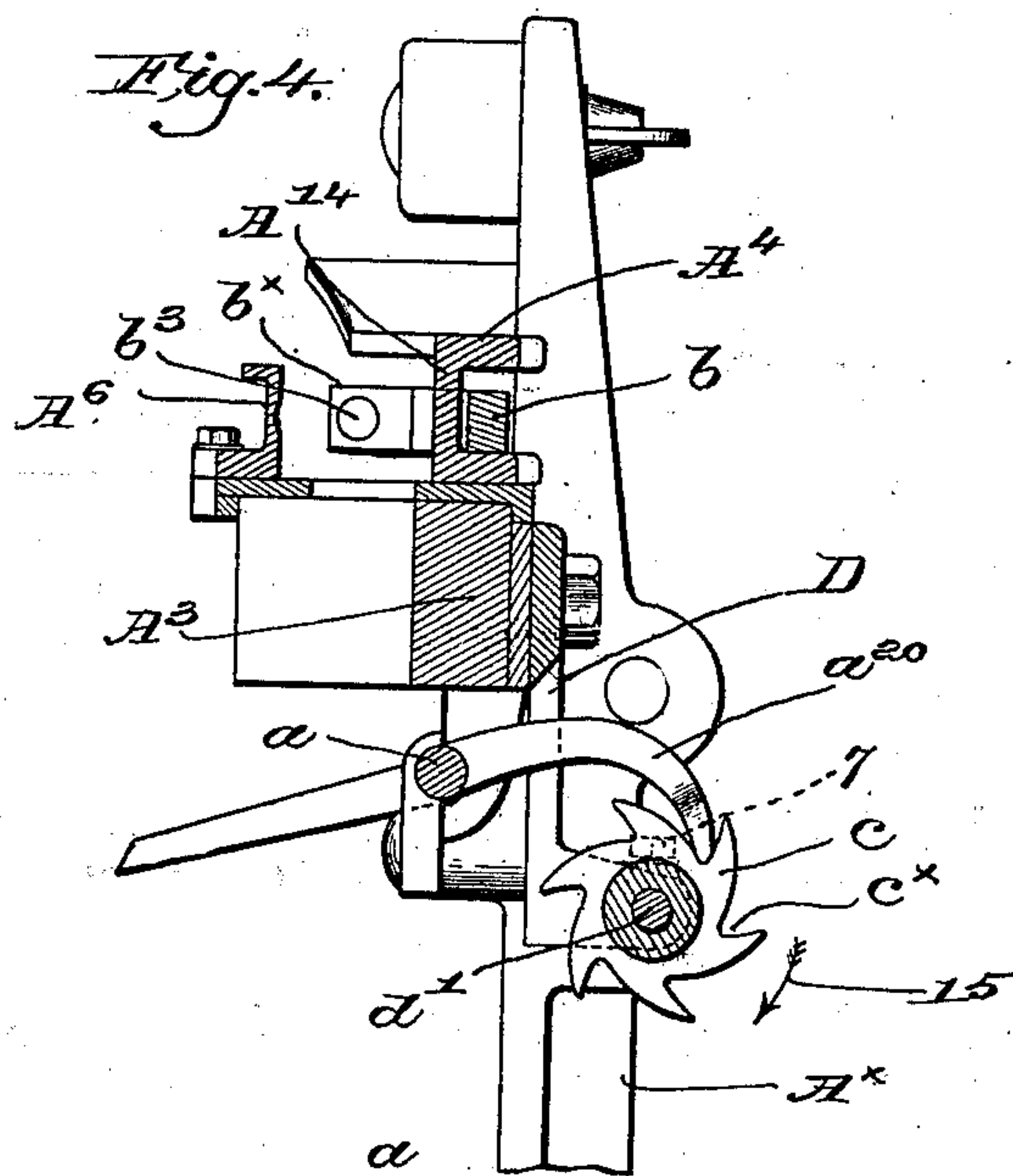
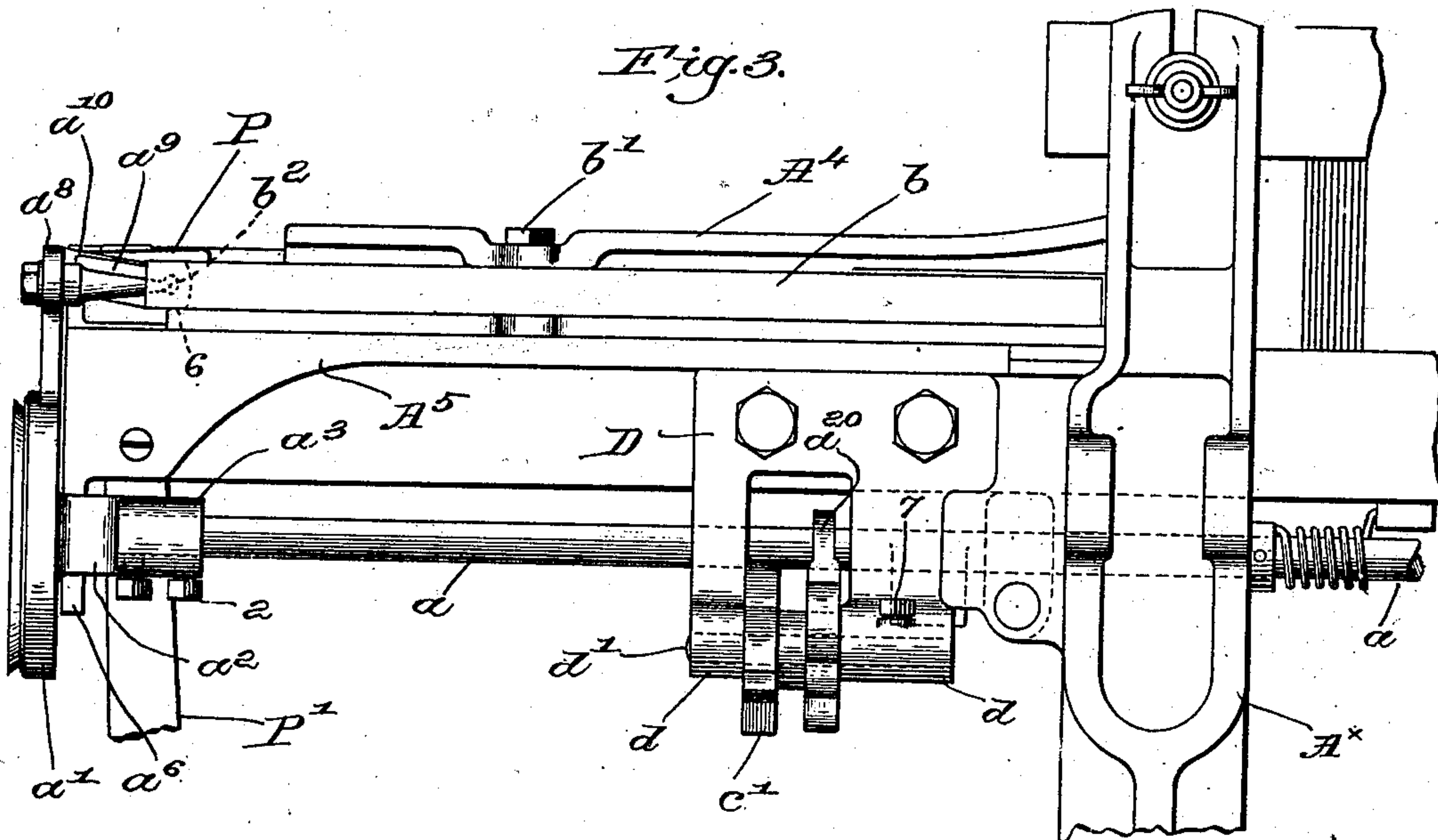
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UNITED STATES PATENT OFFICE.

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SHUTTLE-POSITIONING MECHANISM FOR LOOMS.

SPECIFICATION forming part of Letters Patent No. 660,986, dated October 30, 1900.

Application filed July 28, 1900. Serial No. 25,113. (No model.)

To all whom it may concern:

Be it known that I, ARTEMAS B. EDMANDS, a citizen of the United States, and a resident of Milford, county of Worcester, State of Massachusetts, have invented an Improvement in Shuttle-Positioning Mechanism for Looms, of which the following description, in connection with the accompanying drawings, is a specification, like characters on the drawings representing like parts.

This invention has for its object the production of novel means for positively preventing rebound of the shuttle when it enters the shuttle-box of a loom, while at the same time the shuttle is free to move to a limited extent in the box, the usual binder being entirely dispensed with. Should the shuttle fail to be properly positioned in the shuttle-box, I have provided means for automatically stopping the loom, and by means of my invention I render unnecessary the use of a separate feeler to indicate whether or not the shuttle is properly boxed.

My invention is particularly well adapted to use on automatic looms or those in which the filling is replenished automatically when necessary—as, for instance, in the type of loom shown in United States Patent No. 529,940—but, as will be manifest hereinafter, my invention is not restricted to such use.

Various novel features of my invention will be hereinafter described, and particularly pointed out in the following claims.

Figure 1 is a right-hand side elevation of a portion of a loom with one embodiment of my invention applied thereto, a portion of the filling-supplying mechanism being shown. Fig. 2 is a top or plan view of the shuttle-box and shuttle-controlling devices adjacent thereto at the right-hand end of the lay. Fig. 3 is a rear elevation of the right-hand end of the lay, showing the mechanism illustrated in Fig. 1. Fig. 4 is a vertical sectional view on the line $x x$, Fig. 2, looking to the left, the shuttle being omitted; and Fig. 5 is a sectional view on the line $x' x'$, Fig. 1, of the friction device to be described, which forms a part of the shuttle-controlling means.

The loom-frame A, lay A^3 , slotted at the

part forming the bottom of the shuttle-box, as at A^{10} , Fig. 1, lay-swords A^x , and the shuttle-box cover A^4 may be and are of any well-known or usual construction in looms, and it is to be understood that while I have herein shown only one of the shuttle-boxes on the lay both shuttle-boxes will be provided with positioning devices herein shown and to be described.

As shown in Fig. 1, the hopper or feeder F^x and transferrer F' , mounted on the stud F , form part of the automatic filling-supplying mechanism, and the shaft d^{100} , adapted to be rocked by or through the action of a feeler (not shown) upon predetermined exhaustion or failure of the filling in the shuttle are constructed and operate substantially as in United States Patent No. 641,792, dated January 23, 1900, a fresh filling-carrier when conveyed from the feeder to the shuttle S acting to expel the spent filling-carrier through the open bottom of the shuttle and out through the opening A^{10} in the lay. As in said patent, the top of the shuttle-box is open to permit the entrance of the filling-carrier when transferred by the transferrer F' to the shuttle then in the box.

The usual rock-shaft a of the protector mechanism, mounted in suitable bearings beneath the lay and provided with a dagger a^x , (see Figs. 1 and 4,) is provided at each extremity with one member of a friction device (shown as a ring or annulus a') connected by a yoke a^2 with a hub a^3 , rigidly secured, as by set-screws 2, to the rock-shaft, the inner face of the annulus being beveled, as shown in Fig. 5, to engage a correspondingly-beveled and preferably non-metallic ring a^4 on a disk a^5 , forming the other member of the friction device.

The plate A^5 , secured to the lay and forming the bottom of the shuttle-box, has a downturned extension a^6 , which passes between the yoke-arms a^2 and to which the disk a^5 is secured by suitable bolts 3, so that the disk forms the fixed member of the friction device.

The ring or movable member a' is provided with an upturned arm a^7 , having a laterally-

extended head a^8 and provided with a stud a^9 , extended from its inner side, the upper end of the said arm swinging beyond the outer end of the shuttle-box when the protector-shaft a is rocked, as will be described.

The picker P , mounted on the picker-stick P' , is of usual construction, forming a part of the picking mechanism to throw the shuttle from the box and to receive the impact of the outer end of the shuttle when the latter enters the box in any usual manner.

The laterally-extended head a^8 of the arm a^7 is provided with a cam a^{10} , secured thereto in suitable manner and best shown in Fig. 2, the face of the cam being beveled inwardly from the outer end of the lay and so located that when the picker-stick is thrown outward by the impact of the shuttle the picker will engage the cam and will rock the arm a^7 in the direction of the arrow 5, Fig. 1, and into the position best shown in Fig. 2, the shuttle S being therein shown as properly positioned in the shuttle-box.

The front plate or wall A^6 of the shuttle-box may be of usual construction; but it will be noted that there is no binder in the present construction.

A lever b , fulcrumed at b' on the top plate A^4 to swing in a horizontal plane, is extended inward along the back A^{14} of the shuttle-box and behind the same to a point adjacent the entrance of the shuttle-box, and the inner end of the lever is bent forward, as at b^x , (see Fig. 2,) to form a stop, said stop being movable into and out of the entrance of the shuttle-box to lock the shuttle in the shuttle-box or to release it. In the position shown in Fig. 2 and also in Fig. 4 the stop of the locking means is in operative position in the path of the shuttle and prevents the latter from rebounding from the box, while the absence of the binder permits a free though limited movement of the shuttle within the box. This is particularly desirable in looms provided with automatic filling-replenishing mechanism, as the shuttle is permitted to position itself as the new filling-carrier is transferred from the hopper or feeder to the shuttle. The outer end of the lever b is bifurcated or forked at b^2 to embrace the rounded end 6 of the stud a^9 , and from the foregoing description and from the drawings it will be manifest that when the arm a^7 is rocked in the direction of the arrow 5, Fig. 1, by or through the impact of the shuttle the lever b will be turned on its fulcrum to cause the stop b^x to enter the entrance of the shuttle-box and prevent the shuttle from rebounding. The lock or stop may, if desired, be provided with a pad b^3 , of leather or other non-metallic material, to prevent any injury to the point of the shuttle should the latter rebound violently.

It is necessary to withdraw the stop from the box-entrance before the shuttle is thrown, the friction device hereinbefore described operating to hold the parts in the position shown in the drawings after the impact of the shut-

tle has closed the entrance to the box, and for this purpose I have devised simple means for effecting the withdrawal of the stop. A bracket D , bolted to the back of the lay below the shuttle-box, is provided with bosses d , in which is mounted a stud d' , held in place by a suitable set-screw 7, Fig. 3, said stud having rotatably mounted upon it between the bosses a star-cam c and a connected ratchet c' , a finger a^{20} , fast on the rock-shaft a , coöperating with the tooth-like surface of the star-cam, as clearly shown in Fig. 4. When the end of the finger a^{20} is in the bottom of one of the notches or spaces c^x of the cam, the dagger a^x is elevated sufficiently above the usual frog F , Fig. 1, to prevent engagement of the frog and dagger, to thereby effect the stoppage of the loom, said frog, dagger, and rock-shaft a forming part of well-known stopping mechanism, the other portions of which are not herein illustrated, as forming no part of my invention. When the star-cam is rotated in the direction of the arrow 15, Fig. 4, the high part of a tooth will act upon the finger and will rock the shaft a to depress the dagger into operative position. A pawl f (see Fig. 1) is pivotally mounted at f' on the loom side and is normally held by a spring s against a stop f^2 , the said pawl being in the path of the ratchet as the latter is moved forward when the lay beats up. As the lay beats up the pawl yields until the ratchet passes beyond it and then is swung back into position against its stop by or through the spring s , so that when the lay swings back the straight face of the pawl will engage one of the radial faces c^{10} of the ratchet and will turn the latter and the star-cam c in the direction of the arrow 15, to thereby lift the finger a^{20} and depress the dagger into operative position. At the same time, however, the rocking of the protector-shaft a will operate to swing the arm a^7 opposite to the arrow 5, Fig. 1. The inner end of the lever b will be swung rearwardly, withdrawing the stop b^x from the path of the shuttle. The movement of the arm a^7 to withdraw the stop, thereby releasing the locking means, takes place as the picker moves forward to throw the shuttle from the box, such forward movement of the picker permitting the cam a^{10} to move forward into position to be engaged by the picker the next time the shuttle enters that particular box. When the shuttle is thrown across the lay, it enters the opposite shuttle-box and strikes the picker, the latter operating against the adjacent cam a^{10} , as has been described, rocking the arm connected therewith, and the protector-shaft a is thereby turned far enough to elevate the dagger a^x into inoperative position. Should the shuttle fail to properly enter the box, either the impact of the shuttle upon the picker will be insufficient to turn the rock-shaft a or the movement of the stop into the entrance of the shuttle-box will be prevented by the projecting end of the

shuttle, and in either case the dagger a^x will remain in operative position to engage the frog and effect the operation of the stopping means to stop the loom, the mechanism herein described thus performing the function of a shuttle-feeler without necessitating a separate device therefor.

The friction device is employed to retard the rotative movement of the protector rock-shaft sufficiently to maintain it in one position or another until positively removed therefrom. Inasmuch as the operation of the shuttle positioning and retaining device takes place by or through the action of the shuttle entering the box, as herein shown and described, it will be manifest that variation in the feed will not affect the running of the loom, provided, however, the picking action is strong enough to properly box the shuttle. If the shuttle is not boxed properly, then the loom will be stopped, as hereinbefore described.

The timing of the devices for returning the rock-shaft and arm a^7 to normal position is such that it will be effected substantially simultaneously with the inward or active movement of the picker-stick to throw the shuttle across the lay.

My invention is not restricted to the precise construction and arrangement herein shown, as I have shown one practical embodiment of my invention, modifications of which may be made by those skilled in the art without departing from the spirit and scope of my invention.

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

1. In a loom, the lay having a shuttle-box, a shuttle, a stop movable into and out of the entrance of the shuttle-box, means controlled by impact of the shuttle when properly positioned in the shuttle-box to effect the movement of the stop into the entrance, and independent means to positively withdraw the stop from the path of the shuttle before the latter is thrown.

2. In a loom, the lay having a shuttle-box, a shuttle, means to automatically close the entrance of the shuttle-box when the shuttle is properly boxed, stopping mechanism for the loom, and devices between said mechanism and the box-closing means, to effect the operation of the former when the shuttle is improperly boxed.

3. In a loom, stopping means, including a protector rock-shaft, the lay having a shuttle-box, a shuttle, means to close the entrance of the shuttle-box when the shuttle is properly positioned therein, connections between said means and the rock-shaft, to turn the latter into inoperative position when said means is operated, and independent mechanism to rock said shaft in the opposite direction to open the shuttle-box entrance.

4. In a loom, stopping means, including a protector rock-shaft, the lay having a shuttle-box, a shuttle, means to close the entrance

of the shuttle-box when the shuttle is properly positioned therein, connections between said means and the rock-shaft, to turn the latter into inoperative position when said means is operated, independent mechanism to rock said shaft in the opposite direction to open the box-entrance, and a friction device to retard the rotative movement of the rock-shaft.

5. The lay, a shuttle-box thereon, a lever fulcrumed adjacent said box and having its inner end bent to form a stop movable into and out of the box-entrance, a rocking actuator for and operatively connected with the outer end of the lever, means operated by impact of the shuttle to rock the actuator in one direction and thereby swing the stop into the box-entrance, and a device to rock said actuator in the opposite direction.

6. In a loom, the lay having a shuttle-box and the protector rock-shaft mounted thereon, a shuttle, a finger fast on the rock-shaft, a cooperating star-cam, means to rotate it step by step as the lay swings back, to partly turn the rock-shaft in one direction, means controlled by entrance of the shuttle into the box to prevent its rebound and to turn the rock-shaft in the opposite direction, and connections between said means and the protector-shaft, failure of the shuttle to properly enter the box causing the rock-shaft to assume its operative position.

7. In a loom, the lay having a shuttle-box, a shuttle, stopping mechanism, including a dagger, means to close the entrance to the shuttle-box when the shuttle is properly positioned therein, connections between said means and the dagger, to render the latter inoperative at such time, and setting means to thereafter restore the dagger to operative position and through the connections aforesaid to open the entrance of the shuttle-box.

8. In a loom, the lay having a shuttle-box, a shuttle, stopping mechanism including a rock-shaft having a dagger and a finger, a rotatable star-cam cooperating with the latter, means to close the box-entrance when the shuttle is properly positioned therein, connections between said means and the shaft, to positively rock the latter and turn the cam in one direction, the dagger being also rendered inoperative, and means to partly rotate the cam in the opposite direction at each backward swing of the lay, to thereby rock the shaft correspondingly and place the dagger in operative position, failure of said box-closing means to operate permitting the dagger to effect the operation of the stopping mechanism.

9. An automatic filling-replenishing loom having, in combination, a filling-supplying mechanism which operates automatically to insert a fresh supply of filling in the shuttle and to expel the exhausted filling-carrier from the shuttle, a shuttle-box open to receive the fresh filling and to discharge the exhausted filling-carrier, a lock to lock the shuttle in the shuttle-box in proper position to receive

fresh filling, said lock being automatically operated by the action of the shuttle when entering the shuttle-box, and automatic means independent of the shuttle for effecting the disengagement of the lock from the shuttle preparatory to the ejection of the shuttle from the shuttle-box.

10. An automatic filling-replenishing loom having, in combination, a filling-supplying mechanism which operates automatically to insert a fresh supply of filling in the shuttle and to expel the exhausted filling-carrier from the shuttle, the lay having a shuttle-box open to receive the fresh filling and to discharge the exhausted filling-carrier, a shuttle, a picker-stick, a lock to lock the shuttle in the shuttle-box in proper position to receive fresh filling, means to actuate the lock upon impact of the shuttle as it enters the shuttle-box, and lock-releasing means independent of the picker-stick to release the lock before the shuttle is ejected from the shuttle-box by the picker-stick.

11. An automatic filling-replenishing loom having, in combination, a filling-supplying mechanism which operates automatically to insert a fresh supply of filling in the shuttle and to expel the exhausted filling-carrier from the shuttle, the lay having a shuttle-box open to receive the fresh filling and to discharge the exhausted filling-carrier, a shuttle, a stop

or lock, means to move it in front of the inner end of the shuttle when the latter is properly boxed, and automatic means operative independently of the shuttle to retract said stop or lock from the path of the shuttle preparatory to the ejection of the latter from the shuttle-box.

12. An automatic filling-replenishing loom having, in combination, a filling-supplying mechanism which operates automatically to insert a fresh supply of filling in the shuttle and to expel the exhausted filling-carrier from the shuttle, the lay having a shuttle-box open to receive the fresh filling and to discharge the exhausted filling-carrier, a shuttle, a stop or lock, means operated by or through entrance of the shuttle into the shuttle-box to move said stop or lock in front of the inner end of the shuttle when properly boxed, and automatic means operative independently of the shuttle to effect withdrawal of the stop or lock from the path of the shuttle preparatory to the ejection of the latter from the shuttle-box.

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

ARTEMAS B. EDMANDS.

Witnesses:

GEORGE OTIS DRAPER,
ERNEST W. WOOD.