No. 626,187. Patented May 30, 1899.

J. H. NORTHROP.

LOOM.

(Application filed Oct. 10, 1898.)

(No Model.) 2 Sheets—Sheet 1.

Fig. 1.

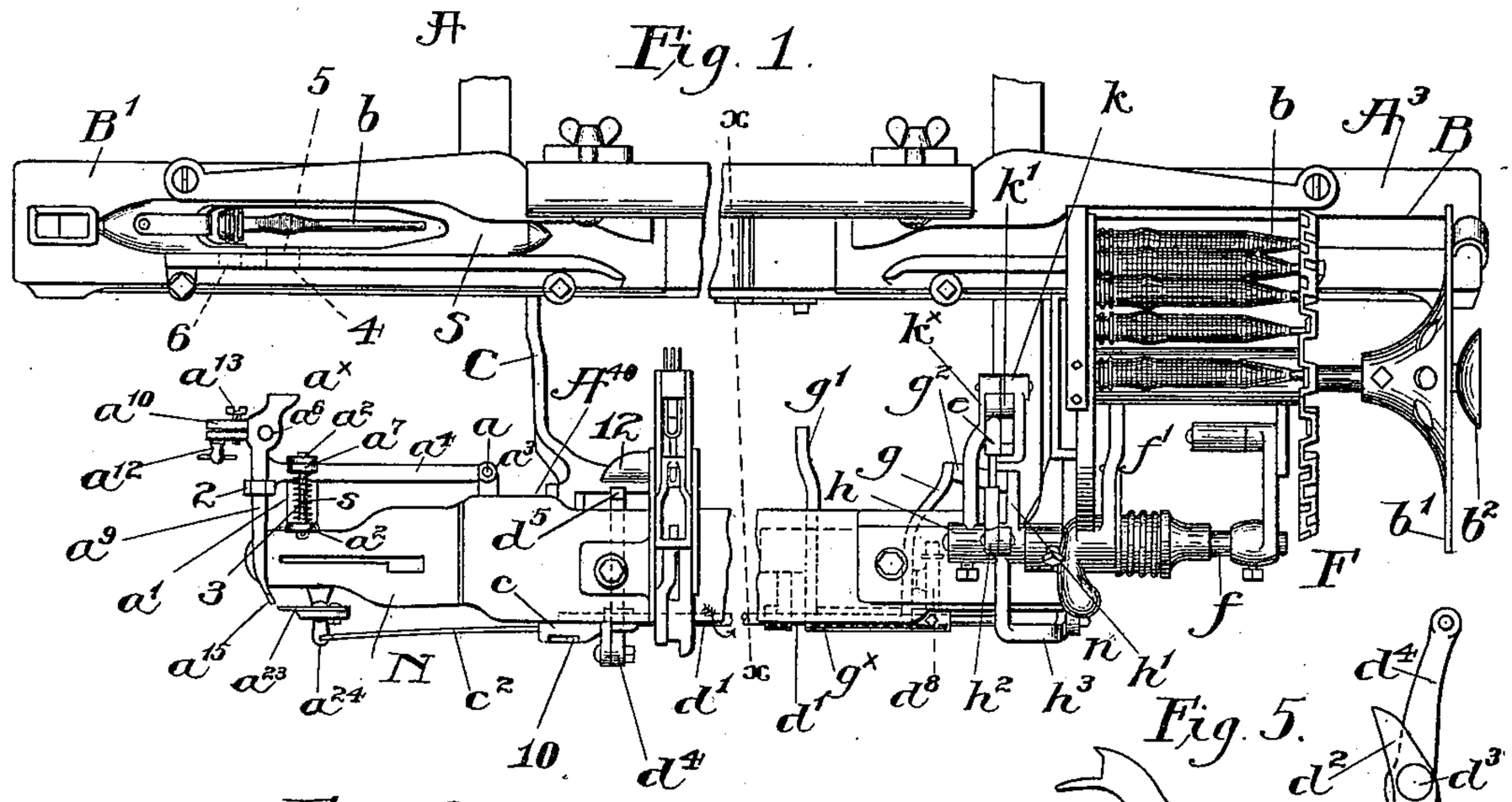


Fig. 5.

Fig. 6.

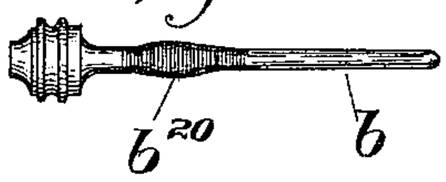


Fig. 2.

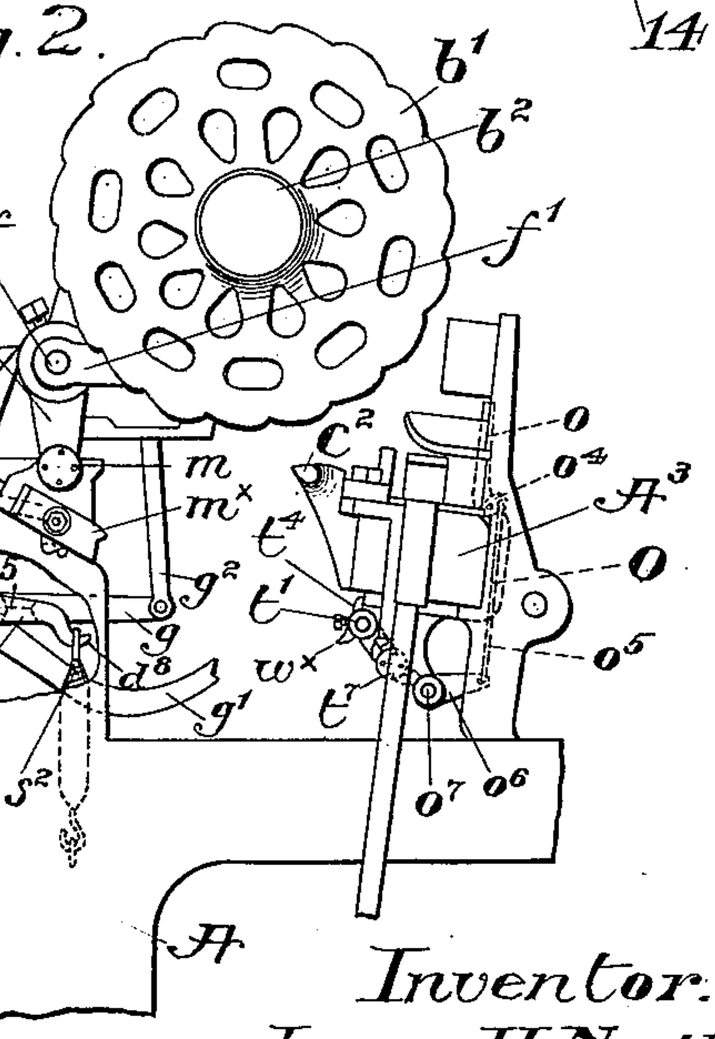
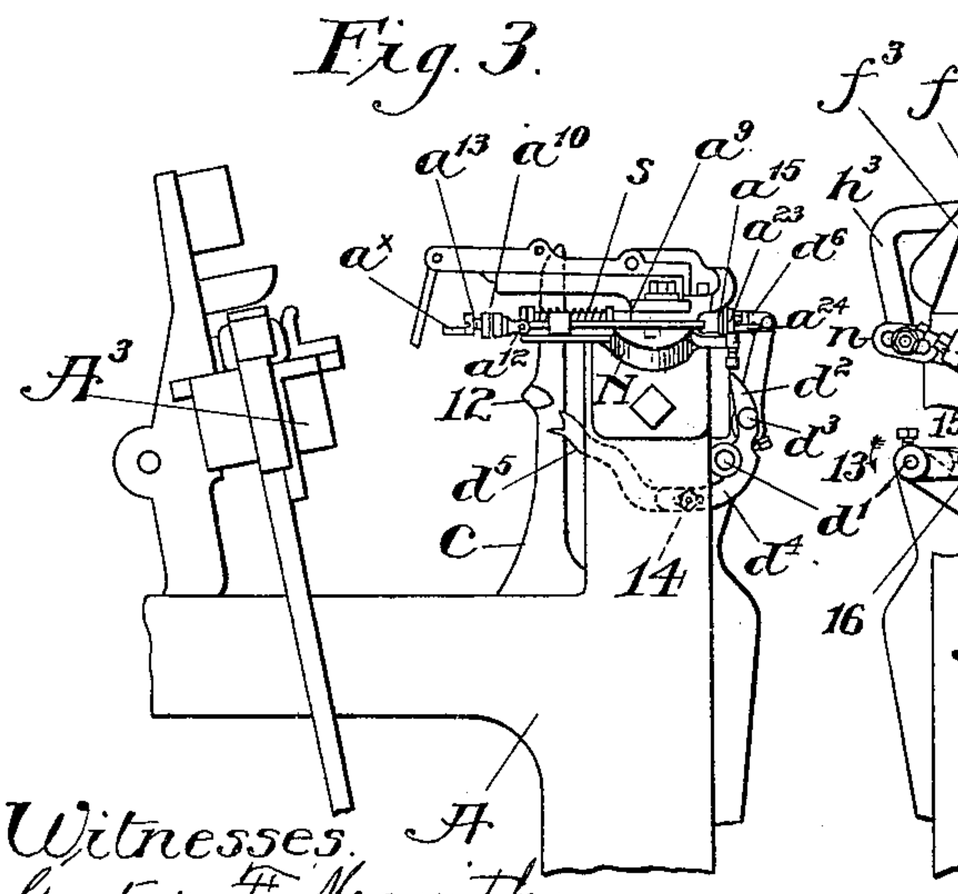


Fig. 3.



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No. 626,187. Patented May 30, 1899.

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LOOM.

(Application filed Oct. 10, 1898.)

(No Model.) 2 Sheets—Sheet 2.

Fig. 7

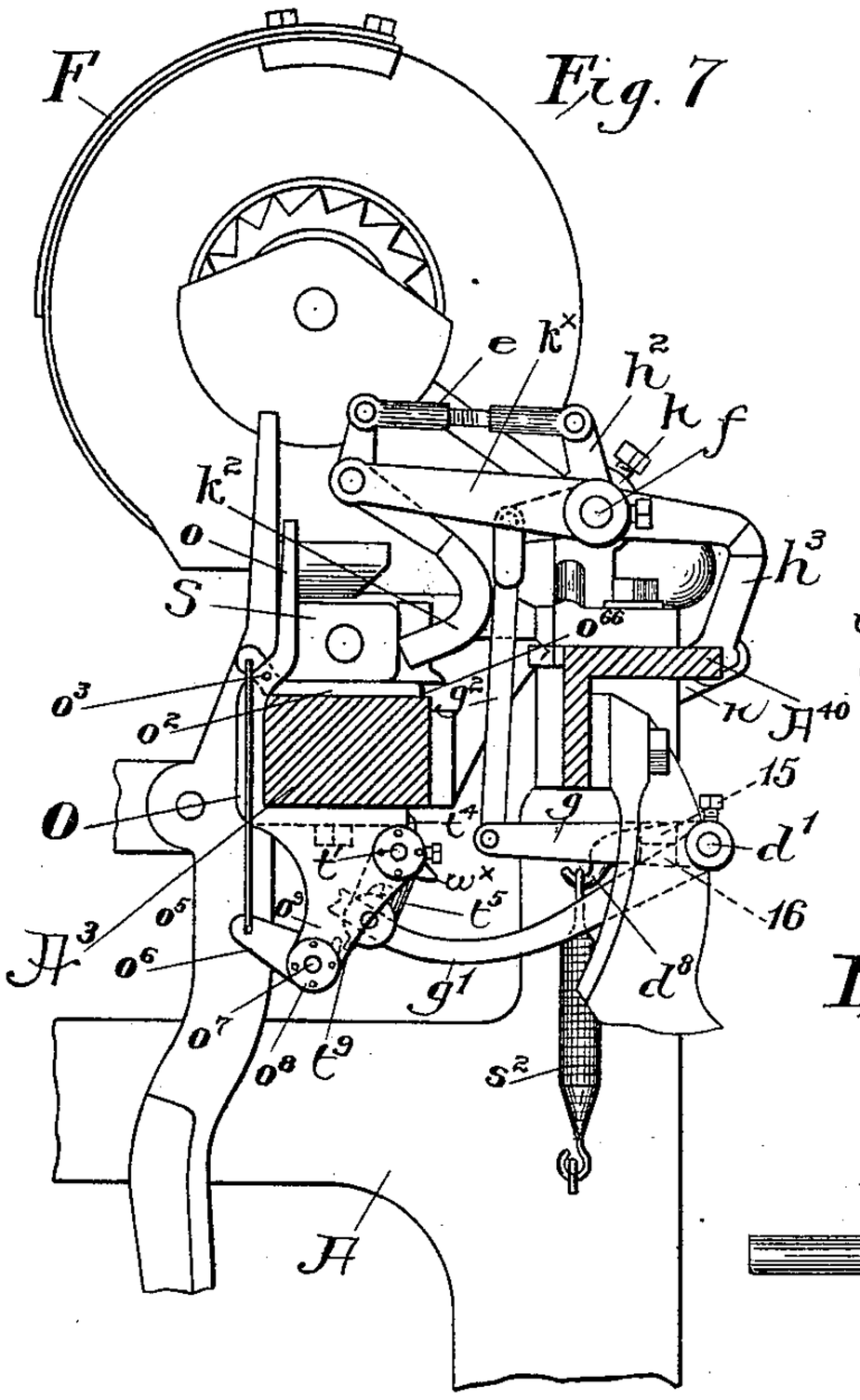


Fig. 8.

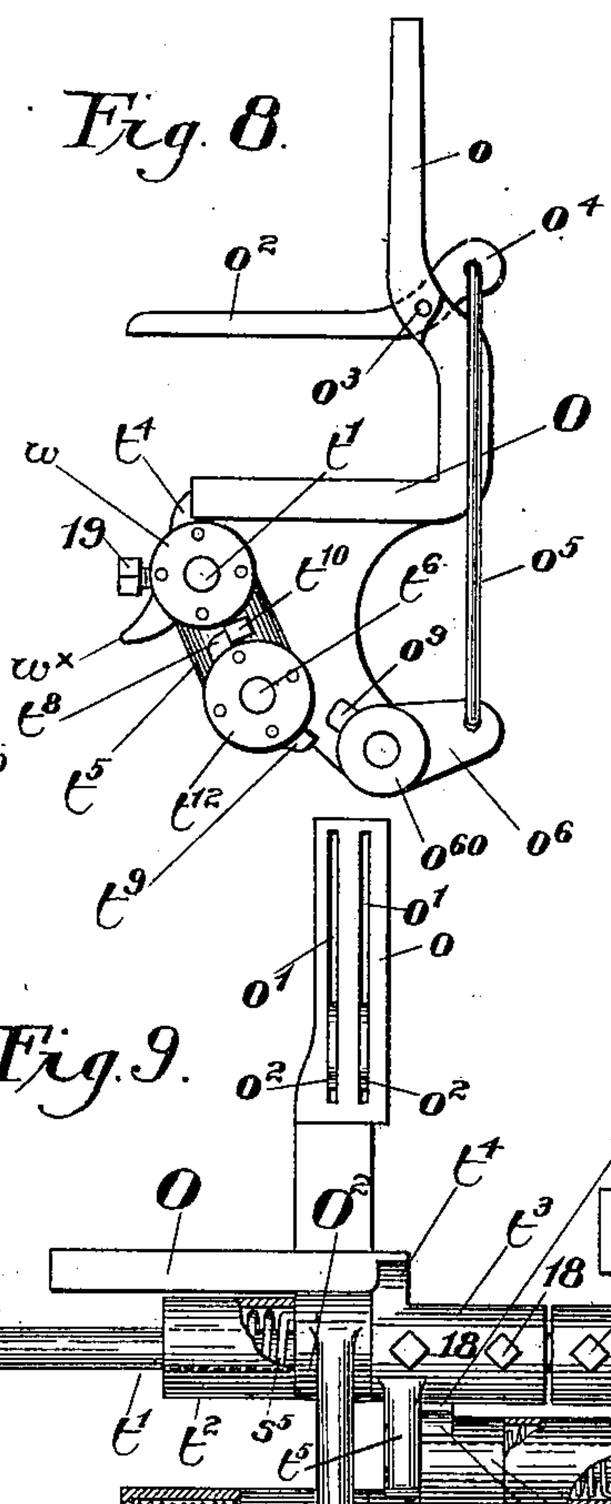
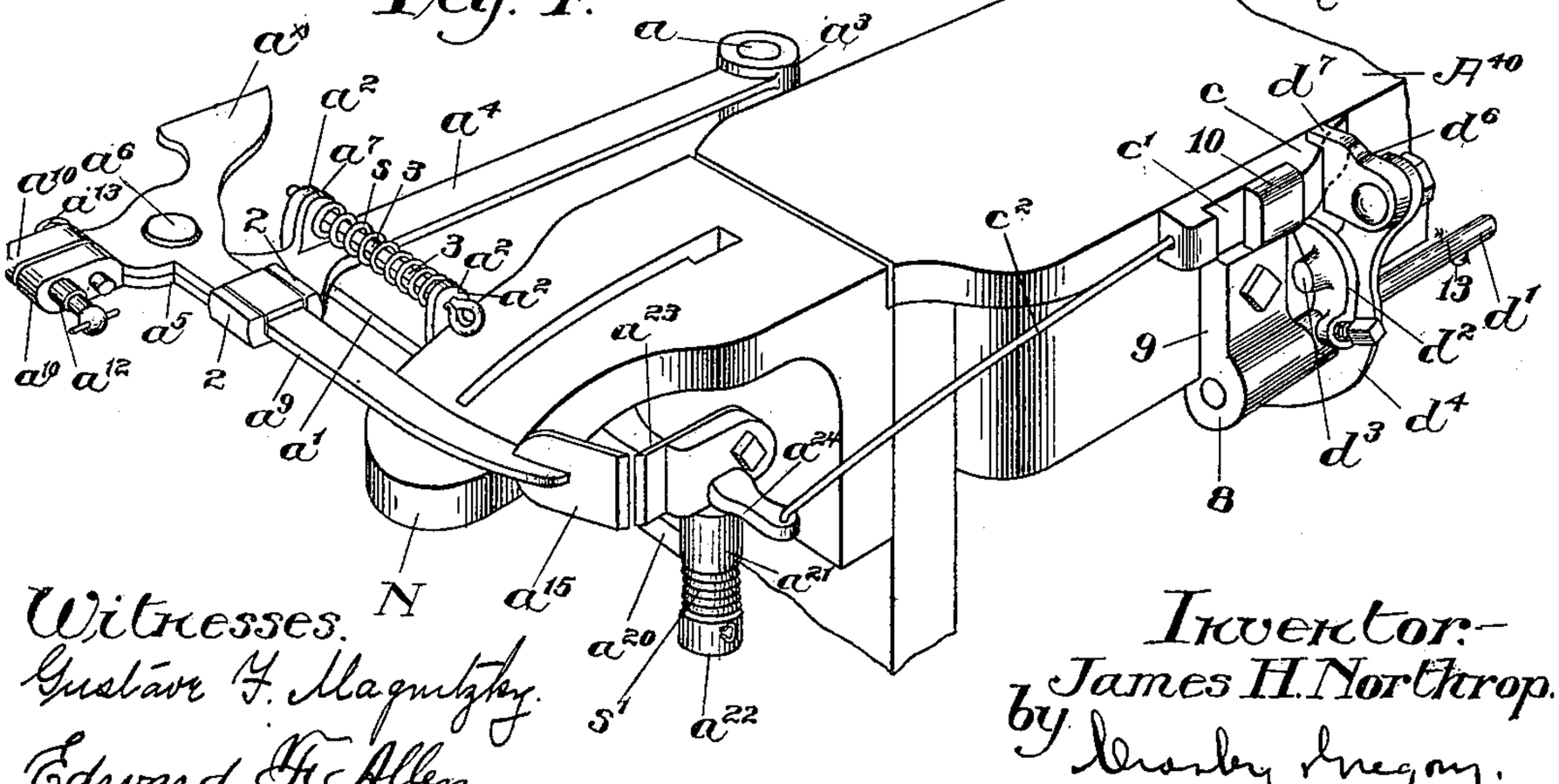


Fig. 9.

Fig. 4.



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UNITED STATES PATENT OFFICE.

JAMES H. NORTHROP, OF HOPEDALE, MASSACHUSETTS, ASSIGNOR TO THE DRAPER COMPANY, OF SAME PLACE AND PORTLAND, MAINE.

LOOM.

SPECIFICATION forming part of Letters Patent No. 626,187, dated May 30, 1899.

Application filed October 10, 1898. Serial No. 693,084. (No model.)

To all whom it may concern:

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

This invention relates to looms provided with automatic filling-supplying mechanism—such, for instance, as shown and described in United States Patent No. 529,940, dated November 27, 1894—and in looms of this type it has been found necessary in practice to provide for the change of filling before the complete exhaustion of the filling then in the shuttle, the filling-supplying mechanism being for this purpose controlled as to its operation by a feeler or detector coöperating with the filling in the shuttle. Thread-severing means is necessary in connection with such an apparatus to sever the thread from the ejected filling-carrier.

An apparatus comprising one embodiment of such mechanisms as hereinabove referred to forms the subject-matter of United States Patent No. 600,016, granted to me March 1, 1898, and my present invention, while of the same general character or scope, comprehends a number of novel features of construction and arrangement tending to increase the accuracy and precision of operation of the apparatus in its individual parts and as an entirety.

Figure 1 is a top or plan view, centrally broken out, of a sufficient portion of a loom to be understood with my present invention applied thereto. Fig. 2 is a partial right-hand side elevation of the apparatus shown in Fig. 1 with the loom-frame broken away to show clearly some of the mechanism. Fig. 3 is a partial left-hand side elevation of the loom. Fig. 4 is an enlarged perspective view of the filling-feeler and coöperating mechanism. Fig. 5 is a detail of a portion of the devices intermediate the feeler and bunter. Fig. 6 is an enlarged view of one of the filling-carriers with substantially the initial winding of filling thereupon to be described. Fig. 7 is a vertical sectional view of the loom, on an enlarged scale, taken on the line x x, Fig. 1, looking toward the right, with the lay forward and the shuttle improperly positioned in the shuttle-box. Fig. 8 is an enlarged side elevation of the thread-severing mechanism; and Fig. 9 is a front elevation thereof, partially broken out.

The loom-frame A, breast-beam A^{40}, the lay A^3, having the bottom of one of its shuttle-boxes cut away below the self-threading shuttle S, the rotatable filling-feeder comprising connected and suitably-shaped plates to receive the ends of the filling-carriers b, the thread-supporting plate b', filling end holder b^2, stud f, transferrer f', mounted thereon and having the depending end f^3, and the shaft d', adapted to be rocked by movement of the filling-fork in the absence of the filling, may be and are all of well-known construction, like reference letters and numerals being herein used to designate like parts shown in Patent No. 600,016 referred to.

The filling-feeder (indicated by the letter F) is shown at one side of the loom and adapted to transfer a fresh supply of filling to the shuttle when in the shuttle-box B, the feeler mechanism located at the other side of the loom operating when the shuttle is in the box B'.

An upright stud a is attached to the inner side of the breast-beam, substantially opposite the shuttle-box B', and, as herein shown, a stand a' is attached to and projects rearwardly from the usual holding-plate N, Figs. 1 and 4, provided with upturned parallel ears a^2, and on the stud a is mounted loosely the hub a^3 of a substantially L-shaped feeler-carrier a^4, the head a^5 having at its outer end upturned lugs or stops 2 2. A suitable spring s bears at one end against the outer ear a^2 of the bracket a' and at its other end against a perforated lug a^7 on the feeler-carrier to normally maintain the latter in the position shown in Figs. 1 and 4, the inner ear a^2 serving as a limiting-stop for the lug a^7, a pin 3, supported in said ears and passing loosely through the lug a^7, maintaining the spring in position. The inner end of the head a^5 is flat and somewhat enlarged to form a stable support for an arm a^9, mounted to swing laterally on a vertical pivot a^6 in the feeler-carrier, said arm passing between the two stops 2 2

and toward the front of the loom, slight play of the arm being permitted between said stops. At one side of the pivot a^6 the arm is rearwardly extended to form the filling-feeler $a^\times$, preferably elongated in the direction of the length of the breast-beam, and adapted to pass through an aperture 4 in the front wall of the shuttle-box B′ (see dotted lines, Fig. 1) when the lay beats up. If the shuttle be properly boxed, the feeler will pass through a slot 5 in the side wall of the shuttle and will bear upon the filling on the filling-carrier or bobbin b at each beat of the lay until exhaustion of the filling to a predetermined point, the pressure on the feeler tending to swing the arm a^9 on its fulcrum a^6 to the left, Figs. 1 and 4, against the outer stop 2, after which the feeler-carrier and arm will be swung bodily on the center a toward the front of the loom.

At the opposite side of the fulcrum-stud a^6 from the feeler the arm a^9 is laterally extended and enlarged to present two slightly-separated ears a^{10}, (see Figs. 1 and 4,) which form a split bearing, in which a threaded stud a^{13} is adjustably held, a clamp-screw a^{12} drawing the ears or parts a^{10} of the bearing together to securely grip the stud a^{13} and maintain it in adjusted position, the stud entering an aperture 6 in the wall of the shuttle-box when the lay beats up, so that the head of the stud will bear against the shuttle-wall when the shuttle is in the box.

Inasmuch as the feeler projects beyond the stud a^{13}, the former will normally engage the filling before the latter engages the side of the shuttle; but as the filling is drawn off and the wound mass decreases in diameter both stud and feeler will finally engage simultaneously, and when the filling has been exhausted to a predetermined amount the stud will engage first, so that the arm a^9 will be swung to the right, Fig. 1, bringing a blade-like dagger a^{15}, carried thereby at its forward end, into operative position.

Referring to Fig. 4, an arm a^{20}, which may be a part of the bracket a', provides an upright bearing a^{21} for a vertical headed stud a^{22}, having at its upper end, above the bearing, a blade a^{23} and an outwardly-extended arm a^{24}, the blade being so located that normally the dagger a^{15} will pass beyond its upright edge when the feeler-carrier a^4 is swung on its pivot a, a suitable spring s' normally maintaining the blade and arm a^{24} in the position shown in Figs. 1 and 4; but when the arm a^9 is swung to the right, as just described, the dagger a^{15} will engage the blade a^{23} and rock the stud a^{22} against the stress of the spring s' as the lay completes its forward stroke. The movement thus imparted to the arm a^{24} is effected by swinging of the feeler-carrier, due to engagement of the stud a^{13} with an unyielding object, as the shuttle-wall, obviating any possibility of improper operation, which might occur were the movement dependent upon engagement of the feeler with the filling or filling-carrier, as the latter might yield under the stress.

I prefer to provide the filling-supply in the form of a bobbin, as b, on which a bunch b^{20} of the yarn is wound near the beginning of the spinning operation, such bunch forming a well-defined projection for the feeler to work against, thereby enabling the feeler to operate more closely or in a more delicate manner, for the feeler is prevented by the bunch from moving into operative position until the latter commences to wind off, insuring a very small percentage of waste on the ejected bobbin. The bunch contains sufficient yarn to extend at least once across the lay after enough has been wound off to effect operation of the feeler, so that when the feeler acts there will be enough yarn remaining on the filling-carrier to extend across the lay as the shuttle returns to the shuttle-box opposite the one adjacent to which the feeler is located. The feeler is arranged to act by adjustment of the stud a^{13}, when the main portion of the filling-carrier is bare of filling, while a sufficient portion of the bunch b^{20} yet remains to form a projection for the feeler to engage, and a very accurate and delicate determination can thus be effected of the time at which filling transfer shall take place. It is to be understood, however, that the mechanism herein described can also operate in conjunction with the form of filling-carrier shown in Patent No. 600,016 referred to.

Referring now to Fig. 4, the rock-shaft d' has attached securely thereto, near its left-hand bearing 8, the hub of an upturned finger d^2, which normally rests against the front face of the breast-beam and has pivotally mounted upon it at d^3 a bent arm d^4, extended beneath the breast-beam and provided with a latch d^5, Figs. 3 and 5. A dog d^6, attached to the upper end of the bent arm d^4, rests against a sliding cam c, which is supported, as herein shown, by the top of the stand 9, which sustains the bearing 8, an upturned lug 10 on the stand entering a cut-away portion c' of the cam to retain it against the breast-beam, while an overhanging lip d^7 on the dog d^6 prevents the cam from jumping out of its support. The sliding cam is connected by a link c^2 with the arm a^{24}, and when the stud a^{22} is rocked by the dagger a^{15}, as described, the cam c will be moved to the right, Figs. 1 and 4, and acting on the dog d^6 rocks the arm d^4 on its fulcrum d^3, to thereby elevate the inner end of the latch d^5 into position to be engaged by a projection 12 on the usual weft-hammer C. The forward movement of the latter in turn swings the arm d^4 on the dog d^6 as a fulcrum, and consequently the finger d^2 is thrown out, to thereby rock the shaft d' in the direction of arrow 13, Fig. 4.

It is important to note that the immediate result of the engagement of the dagger and blade a^{23}, due to the detecting action of the feeler, is merely to slide the cam c into operative position, and as the latch-carrying

arm d^4 is free to swing on its pivot d^3 the work required of the cam-actuating devices is only the comparatively slight effort necessary to move the latch into operative position or set it. This setting having been effected, the further movement of the arm d^4 by the weft-hammer or vibrator and consequent rocking of the shaft d' is entirely independent of and separate from the devices immediately controlled and operated by or through the feeler, there being no positive connection between them. There is thus no chance that the quick movement of the cam c might by its momentum throw the rock-shaft d' into operative position, and thereby subject the purposely delicate parts of the feeler mechanism to improper strain, and, furthermore, there is no possibility of the movement of the vibrator or weft-hammer affecting the feeler mechanism at all. The latch d^5, its carrier-arm d^4, and the finger d^2 are clearly shown on an enlarged scale in Fig. 5, the latch and arm being preferably adjustably connected by a set-screw 14. When the latch is moved into position to be engaged by the projection 12 on the vibrator C, the engagement will be at about the height of the pivot d^3 above the rock-shaft d', so that the latter can be readily rocked when the finger d^2 is swung outward. As best shown in Figs. 2 and 7, a hooked arm d^8, fast on the rock-shaft d', has attached to it a strong spring s^2, the other end of the spring being secured to the loom-frame, the spring tending to turn the rock-shaft oppositely to the arrow 13. A lug 15 on the hooked arm is above and coöperates with a lug 16 on an arm g, having a hub $g^\times$, Fig. 1, loosely mounted on the rock-shaft, said hub having also fast thereon a normally-inoperative dagger g' to actuate the thread-severing mechanism, as will be described.

As best shown in Fig. 7, the arm g is pivotally connected by a link g^2, jointed to an arm h' of a sleeve h, rotatably mounted on the stud f, a second upturned arm h^2 being pivotally connected by a link e with an arm k' on a hub k, (see Fig. 1,) pivotally mounted on a rigid stand $k^\times$, a downwardly and laterally bent arm k^2 on the hub k forming the shuttle-feeler, the lower end of the latter being turned toward the lay to engage the shuttle when improperly boxed. As in my patent referred to, a spring-controlled rocker-stud m is mounted in the depending end f^3 of the transferrer, a notched dog $m^\times$, carried by the stud, being turned by the spring into position to be engaged by a bunter C^2 on the lay when a filling-carrier is to be transferred to the lay, provided the shuttle is properly boxed. A third arm h^3 of the hub h is adjustably connected with a downturned finger n, which controls the position of the dog and maintains it depressed when the loom is running properly, the link g^2 at such time being drawn down by its connection with the rock-shaft d'.

It will be obvious from the foregoing description that the mechanism controlled by the feeler will operate upon exhaustion of the filling to a predetermined point, and upon such exhaustion of the filling the rock-shaft d' will be turned, as described, to raise the link g^2, depress the arm h^3, and permit the dog $m^\times$ to be brought into operative position to be acted upon by the bunter C^2 to effect transfer of a filling-carrier from the filling-feeder to the shuttle when the latter is properly boxed. When the shaft d' is rocked, as before described, the dagger g' will also be moved to actuate the thread-severing mechanism (to be described) to sever the thread between the ejected filling-carrier and the cloth. If, however, the shuttle is improperly positioned, a fresh filling-carrier will not be transferred thereto, and it is desirable that the thread-severing mechanism shall not operate.

Referring to Fig. 7, it is supposed that the shuttle is improperly boxed, so that it engages the shuttle-feeler k^2 and prevents elevation of the arm g, and even though the rock-shaft d' may be turned only the hooked arm d^8 will be elevated against its spring s^2, and as the arm g is not elevated the dagger g' will remain inoperative. The lay has secured to its rear side a bracket O, provided with an upright o, vertically slotted at its upper end at o', Fig. 9, to receive, as herein shown, one or more knives or cutting-blades o^2, fulcrumed at o^3 and upturned, as at o^4, Fig. 8, said blades normally resting in a transverse recess o^{66}, Fig. 7, in the raceway of the lay, the shuttle laying the filling-thread above the blades. A link o^5 connects the rear ends of the blades with a rocker-arm o^6, the hub o^{60} of which is fast on a short shaft o^7, extended laterally loosely through a bearing O', depending from the bracket, a sleeve o^8, fast on the shaft, having secured to it one end of a spring s^4, whose other end is attached to the bearing O', the spring normally retaining the arm o^6 in the position shown in Fig. 8, with the blades depressed in inoperative position. A second bearing O^2 on the bracket forms the inner bearing for a comparatively long shaft t', its outer bearing O^{10}, Fig. 9, forming part of a stand attached to the lay, a spring s^5, Fig. 9, being connected at one end to the bearing O^2 and at its other end to a sleeve t^2, fast on the inner end of the shaft t' adjacent the bearing O^2, said spring controlling the rocking movement of the shaft. A sleeve t^3 is secured by set-screws 18 on the shaft t', at the outer end of the bearing O^2 adjacent thereto, and beyond it the hub w of a projecting dog $w^\times$ is secured on said shaft by set-screws 19, the dog being located opposite the dagger g' and adapted to be engaged and moved thereby to rock the shaft t' in opposition to its spring s^5 when the dagger has been moved into operative position, as described. By means of a stop t^4 on the sleeve t^3 bearing against a part of the bracket O the rotative movement of the shaft t', due to its spring s^5, is limited. The said sleeve t^3 has a depending arm t^5, pro-

vided with a lateral stud t^6, on which is loosely mounted eccentrically to the shaft t' a latch t^7, (see Fig. 9,) having ears t^8 t^9, the former being normally held against a lug t^{10} on the arm t^5 by a spring s^6, one end of which is attached to the latch and the other end to a sleeve t^{12}, fast on the stud t^6, while the ear t^9 is adapted to engage a lug o^9 on the hub o^{60} (see Fig. 8) when the arm t^5 is swung toward the back of the lay, such movement being effected by the engagement of the dagger g' with the dog $w^\times$. When the arm t^5 is thus swung, the ear t^9 of the spring-latch t^7 engages the lug o^9 and depresses the rocker-arm o^6, thereby swinging the cutting-blades upward on their fulcrum to sever the filling between the blades and the slotted part of the upright o. The lug t^{10} prevents rotative movement of the latch t^7 when the arm swings inward, and the rocker-arm o^6 will be depressed until the ear t^9 can slide over the lug o^9, suddenly releasing the rocker-arm and permitting its controlling-spring s^4 to return it to normal position, with the blades below the path and out of the way of the shuttle, after severing, as described, the filling-thread of the filling-carrier to be ejected. As the lay moves back and disengages the dog $w^\times$ and dagger g' the spring s^5 will return the arm t^5 to normal position, and during such movement the spring s^6 will permit the ear t^9 of the latch t^7 to snap past the lug o^9.

Obviously the operation of the thread-severing mechanism will take place only when the shuttle is properly boxed, and it will also be obvious that the said mechanism will be operated just before a fresh filling-carrier is inserted in the shuttle, the thread of the filling-carrier to be ejected being severed.

Referring to Fig. 9, it will be seen that the shaft t' projects inwardly some distance beyond the sleeve t^2 and that the dog $w^\times$ and the other devices for operating the thread-severing mechanism are separate or independent. This construction enables the severing mechanism to be very readily adjusted when weaving narrow webs, it being desirable to cut the thread as close to the edge of the cloth as can be conveniently done, and to effect this the cutting-blades must be shifted along the lay. By shifting the bracket O the blades and the various parts supported by the bracket can be moved as desired, loosening of the set-screws 18 permitting the sleeve t^3 to be slid along the shaft t' toward its inner end without disturbing the location of the dog $w^\times$ opposite the dagger g', the recess o^{66} being of sufficient extent laterally to permit such adjustment or movement of the blades. The adjustment referred to can thus be very readily effected with small expenditure of time and labor.

The filling-supplying mechanism comprehends the filling-feeder, the transferrer, the dog $m^\times$, and the bunter C^2, such mechanism being controlled as to its operation by or through the stud a^{13}, the dagger a^{15} and its support, and the connective devices between the dagger and the filling-supplying mechanism, so that generically the stud, dagger, and connective devices referred to may be designated as "controlling means" for the filling-supplying mechanism, the stud a^{13} being for convenience termed the "primary actuator" for such controlling means, governed by the feeler, the latter, in conjunction with the quantity of filling remaining on the filling-carrier, determining when the initial or partial operation of the controlling means shall be effected by engagement of the shuttle-body with the actuator a^{13}.

The connective devices referred to include the rock-shaft d', the connections between it and the dog $m^\times$ to govern the latter by angular movement of the rock-shaft, and the connections between the rock-shaft and the dagger a^{15}. (Clearly shown in Figs. 1 and 4.) The sliding cam is a member of the latter connections, and it is actuated by or through the dagger a^{15} when the filling in the shuttle has been exhausted to a predetermined extent, said cam serving in the initial operation of the controlling means to place or set the latter in condition to have its final or complete operation effected by the weft hammer or vibrator, and said cam may for the purposes of this invention be termed a "setting member" or "cam."

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

1. In a loom, a shuttle containing a supply of filling wound to form a preliminary annular bunch located between the ends of the filling-carrier and having sufficient yarn to extend at least across the lay, filling-supplying mechanism, controlling means therefor, and a filling-feeler to govern the operation of said controlling means when the filling has been exhausted to expose the preliminary bunch to engagement by the feeler.

2. In a loom, a shuttle containing a supply of filling, filling-supplying mechanism, controlling means therefor, including a setting-cam to place said means in condition for operation, and a filling-feeler to govern the operation of said cam and, through the controlling means, to actuate the filling-supplying mechanism upon exhaustion of the filling in the shuttle to a predetermined extent.

3. In a loom, a shuttle containing a supply of filling, filling-supplying mechanism, and controlling means therefor including an actuator, a dagger to effect the operation of the filling-supplying mechanism, and a setting-cam actuated by the dagger to place said controlling means in condition for operation, combined with a feeler to coöperate with the filling and permit operative movement of the actuator upon exhaustion of the filling therein to a predetermined extent.

4. In a loom, a shuttle containing a supply of filling, filling-supplying mechanism, and controlling means therefor including an actu-

ator, a dagger to effect the operation of the filling-supplying mechanism, a sliding setting-cam to place the controlling means in condition for operation, and a vertically-pivoted rocker-arm connected with said cam and actuated by the dagger, combined with a feeler to coöperate with the filling and govern the operation of the actuator by or through engagement with the shuttle-body.

5. In a loom, a shuttle containing a supply of filling, a transferrer to transfer a fresh supply of filling to the shuttle, controlling means therefor including a dagger having connected therewith an actuator, moved by engagement with the shuttle-body, a setting-cam to place the controlling means in condition for operation when the filling in the shuttle is exhausted to a predetermined extent, and a vertically-pivoted, spring-controlled blade connected with the cam and actuated by engagement with the dagger, and a filling-feeler to govern the position of the actuator according to the amount of filling in the shuttle.

6. In a loom, a shuttle containing a supply of filling, filling-supplying mechanism, controlling means therefor including a feeler-carrier, a dagger pivotally mounted thereon and having its inner end enlarged to form a feeler on one side of the pivot and split to form a bearing at the other side of the pivot, a threaded actuator mounted in said bearing, a clamp-screw to close the bearing on said actuator when adjusted, and stops to limit swinging movement of the dagger relatively to the feeler, combined with a setting-cam for said controlling means, moved by the dagger into operative position when the actuator is permitted by the feeler to engage the shuttle-body.

7. In a loom, a shuttle containing a supply of filling, a feeler to coöperate with the filling in the shuttle, filling-supplying mechanism, controlling means therefor, including a dagger controlled as to its position by the feeler, a rock-shaft mounted in fixed bearings, a finger fast on said rock-shaft, a bent arm fulcrumed on the finger between its tip and the rock-shaft, and a setting-cam moved by or through the dagger to tip said arm on its fulcrum into operative position when the filling in the shuttle is exhausted to a predetermined extent, and a vibrator to engage said arm when in operative position and thereby swing the finger to turn the rock-shaft.

8. In a loom, a shuttle having a slotted side and containing a supply of filling; filling-supplying mechanism located at one side of the loom; a filling-feeler pivotally mounted at the other side of the loom and adapted to enter the slot in the shuttle and coöperate with the filling; and an actuator controlled by the feeler and operated by engagement with the shuttle-body, combined with an operating rock-shaft for said filling-supplying mechanism; connections between the rock-shaft and said mechanism, means, including a vibrator, to rock said shaft, and a setting-cam for the said means, moved by or through the operation of the actuator when engaged by the shuttle-body.

9. In a loom, a shuttle having a slotted side and containing a filling-carrier provided with filling wound to form a preliminary annular bunch; filling-supplying mechanism; a swinging feeler-carrier; a dagger pivotally mounted thereon and provided with a connected filling-feeler and an actuator, engagement of the latter by the shuttle-body when the feeler engages the annular bunch on the filling-carrier acting to swing the dagger into operative position and thereafter to move it bodily with the feeler-carrier as the lay beats up, and operating connections, including a sliding setting-cam, between the filling-supplying mechanism and the dagger, forward movement of the dagger when in operative position moving the setting-cam.

10. In a loom, filling-supplying mechanism, and controlling means therefor including an operating rock-shaft and a dagger thereon, combined with filling-severing mechanism, including a rocker-shaft moved in one direction by a spring, a sleeve fast on said shaft and having a rocker-arm provided with a lug, an eccentrically-mounted spring-controlled latch on said arm, to engage the lug when moved in one direction and thereby operate the said mechanism, and to snap over said lug on the return movement, a second sleeve fast on the rock-shaft and provided with a dog, to be at times engaged by the dagger and to rock said spring-controlled shaft in opposition to its spring, a feeler adapted to contact with the filling, and connections between the feeler and the operating rock-shaft, to move the latter and its dagger when a filling-thread is to be severed, said severing mechanism being laterally adjustable bodily relatively to the rock-shaft, independently of the sleeve having the dog.

11. In a loom, filling-supplying mechanism, controlling means therefor, and a dagger governed by said means, combined with filling-severing mechanism including a supporting-bracket and an actuating rock-shaft having a bearing on said bracket, a second independent bearing for the rock-shaft, a dog fixed on the latter, the dagger at times engaging said dog to rock the shaft, a feeler adapted to contact with the filling, and connections between the feeler and the controlling means for the filling-supplying mechanism, to operate the latter and move the dagger into active position when a filling-thread is to be severed, the filling-severing mechanism being laterally adjustable bodily relatively to said rock-shaft and independently of the actuating-dog thereon.

12. In a loom, a shuttle containing a supply of filling, filling-supplying mechanism, controlling means therefor including an actuator, a dagger to effect the operation of the filling-supplying mechanism, and a setting-

cam actuated by the dagger to place said controlling means in condition for operation, combined with a feeler to coöperate with the filling and permit engagement and movement of the actuator by the shuttle-body upon exhaustion of the filling therein to a predetermined extent.

13. In a loom, a shuttle containing filling, filling-supplying mechanism, and controlling means therefor, including a setting member, and a device positioned according to the quantity of filling in the shuttle, to push the setting member into operative position upon exhaustion of the shuttle-contained filling to a predetermined point, and thereby render said filling-supplying mechanism operative to insert a fresh supply of filling into the shuttle.

14. In a loom, a shuttle containing filling, filling-supplying mechanism, and controlling means therefor, including a sliding setting member, and a disconnected device positioned according to the quantity of filling in the shuttle, to effect sliding movement of the setting member into operative position upon exhaustion of the shuttle-contained filling to a predetermined point and thereby render said filling-supplying mechanism operative.

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

JAMES H. NORTHROP.

Witnesses:
GEO. OTIS DRAPER,
ALBERT H. COUSINS.