No. 689,550. Patented Dec. 24, 1901.

J. H. KLERX.

MECHANISM FOR CONTROLLING LOOMS BY THE QUANTITY OF WEFT IN THE SHUTTLES.

(Application filed May 22, 1901.)

(No Model.) 3 Sheets—Sheet 1.

Fig. 1,

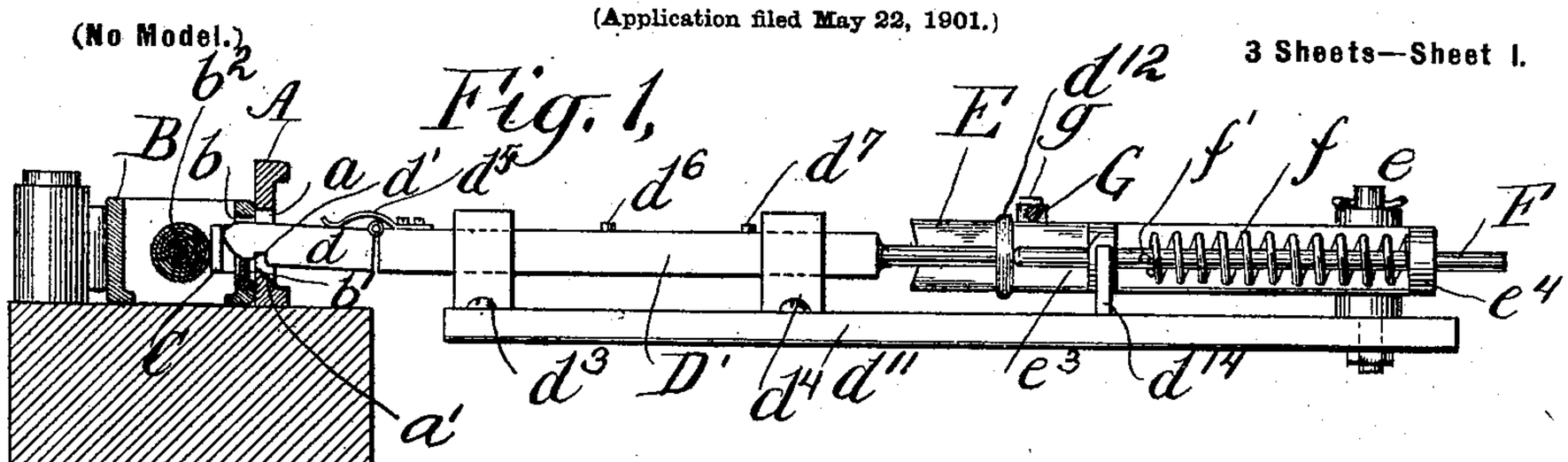

Fig. 2,

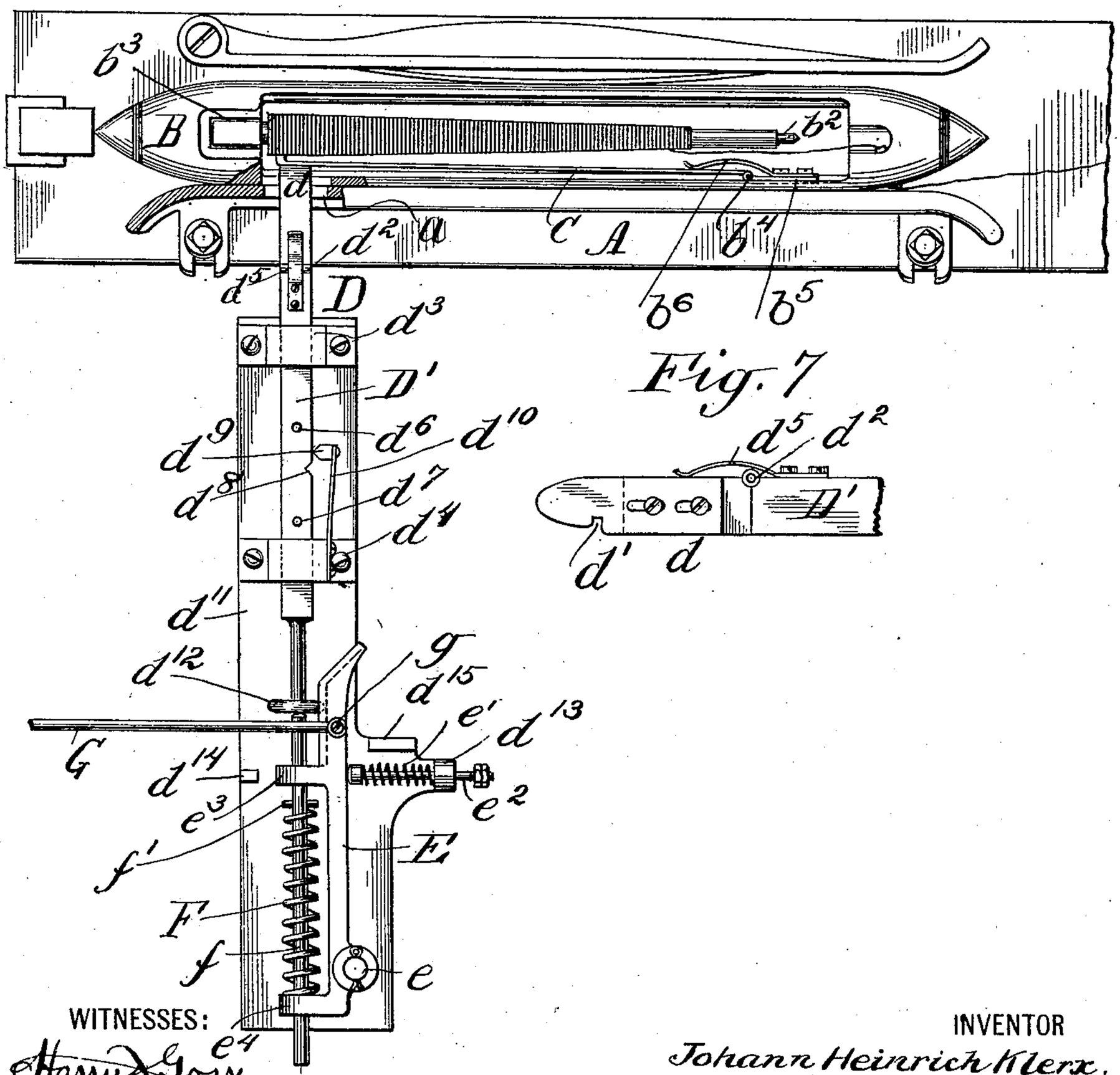

Fig. 7

WITNESSES:

Harry A. Goss.

Geo. C. Crosby.

INVENTOR

Johann Heinrich Klerx.

BY

Dickerson, Brown & Baldwin

HIS ATTORNEYS

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Fig. 3.

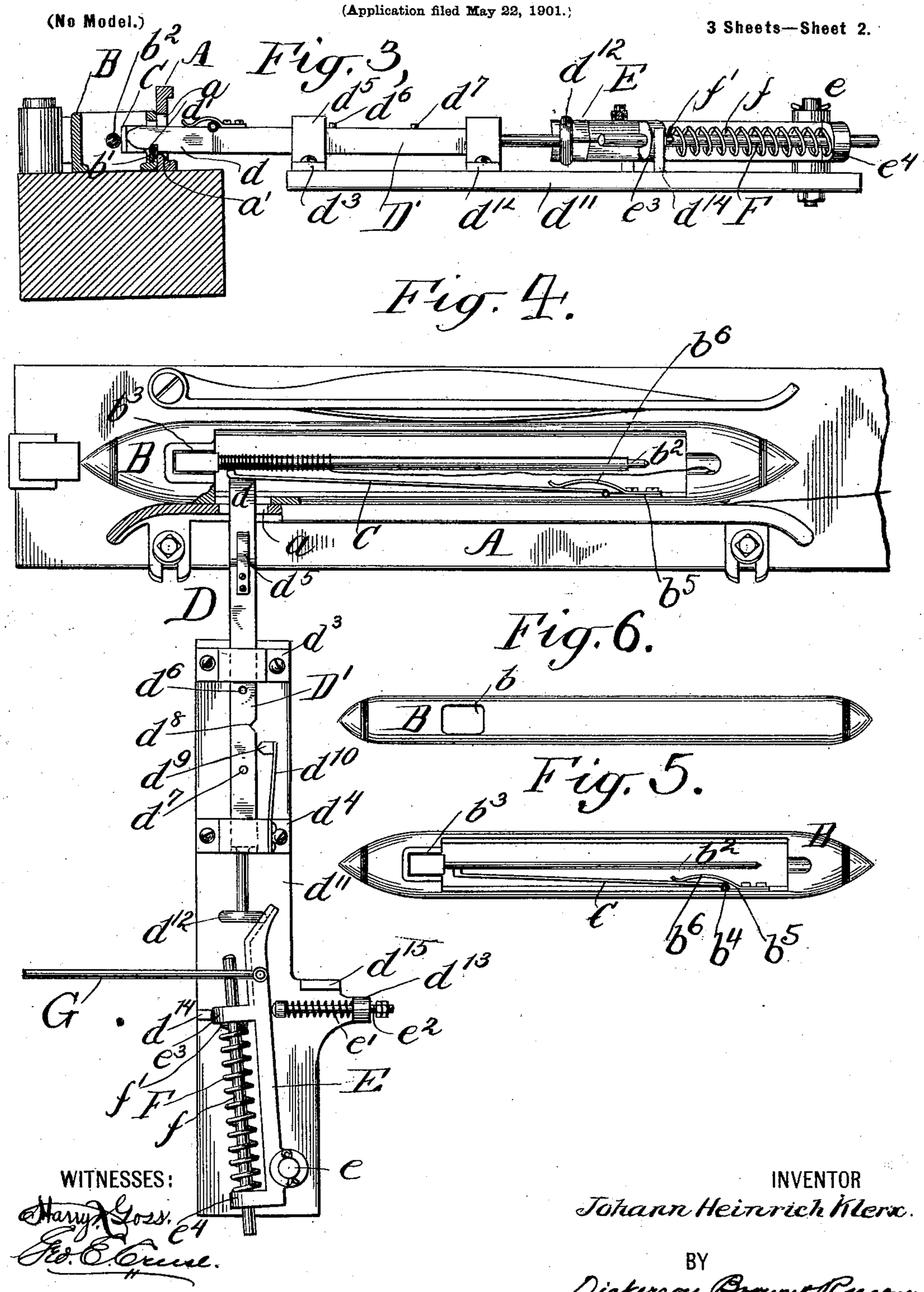

Fig. 4.

Fig. 6.

Fig. 5.

WITNESSES:

Harry X. Goss.

Ed. E. Crane.

INVENTOR

Johann Heinrich Klerx.

BY

Dickerson, Brown & Baldwin

HIS ATTORNEYS

No. 689,550. Patented Dec. 24, 1901.

J. H. KLERX.

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(No Model.) (Application filed May 22, 1901.) 3 Sheets—Sheet 3.

Fig. 8,

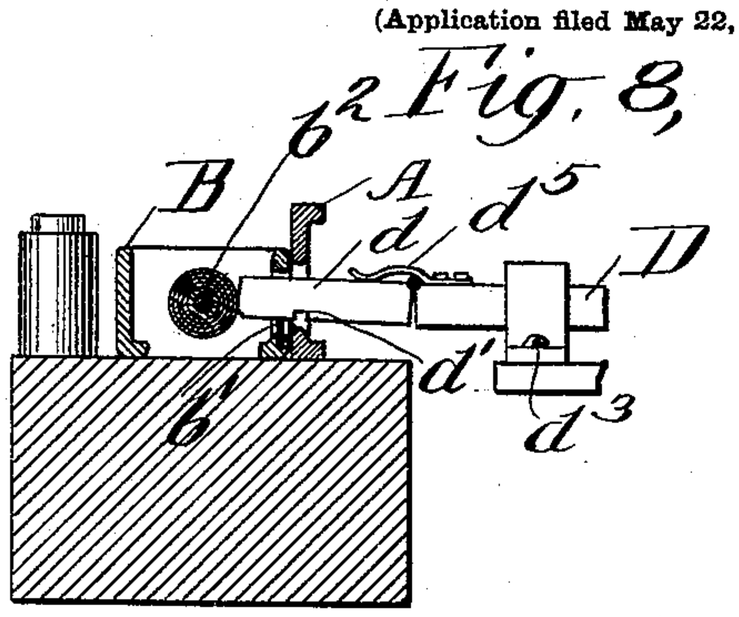

Fig. 9,

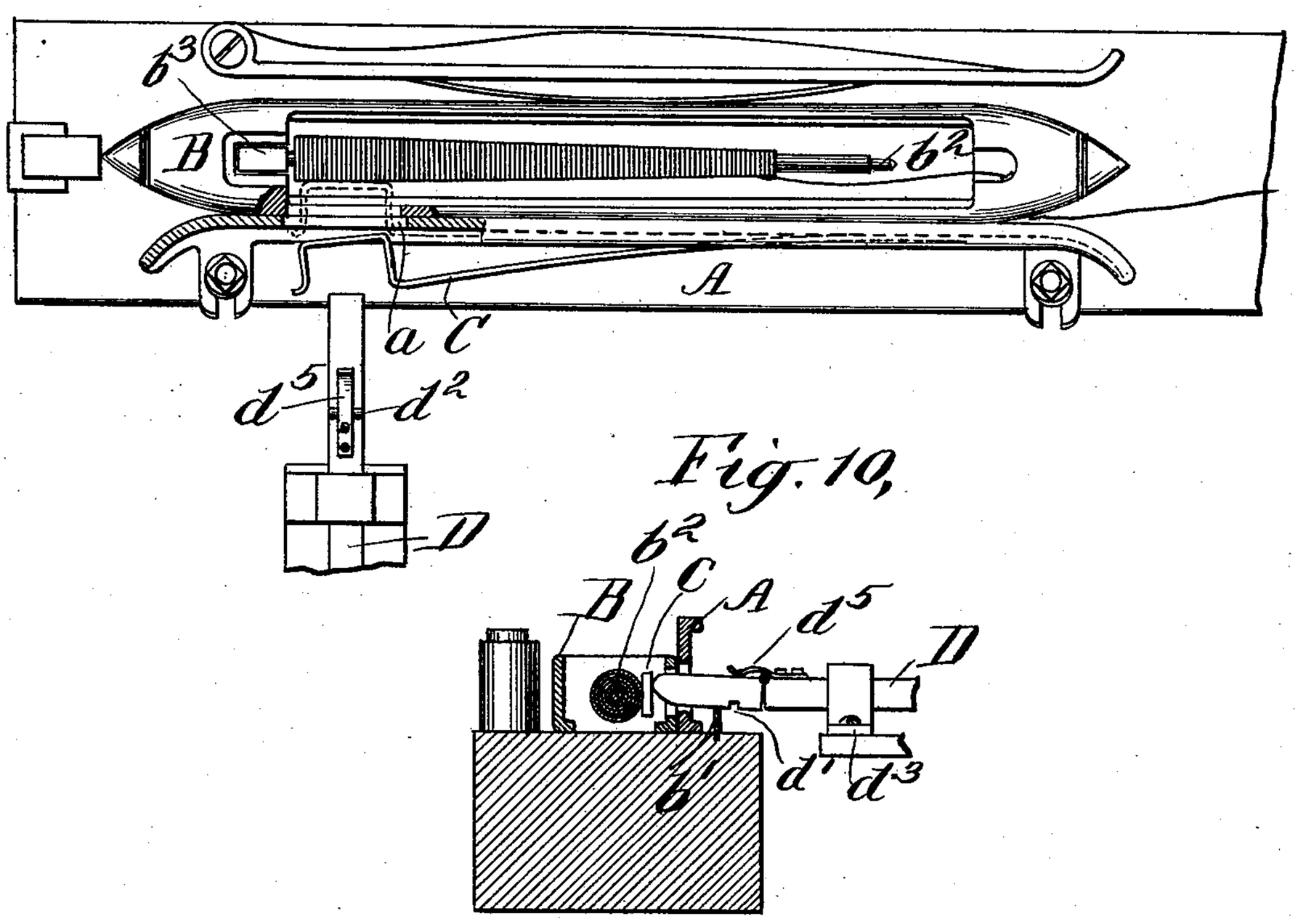

Fig. 10,

WITNESSES:
Harry L. Goss.
Donald Campbell

INVENTOR
Johann Heinrich Klerx

BY
Dickerson, Brown & Cargeen
HIS ATTORNEYS

UNITED STATES PATENT OFFICE.

JOHANN HEINRICH KLERX, OF SUNBURY, PENNSYLVANIA, ASSIGNOR TO SUSQUEHANNA SILK MILLS, OF SUNBURY, PENNSYLVANIA, A CORPORATION OF PENNSYLVANIA.

MECHANISM FOR CONTROLLING LOOMS BY THE QUANTITY OF WEFT IN THE SHUTTLES.

SPECIFICATION forming part of Letters Patent No. 689,550, dated December 24, 1901.

Application filed May 22, 1901. Serial No. 61,380. (No model.)

To all whom it may concern:

Be it known that I, JOHANN HEINRICH KLERX, of Sunbury, Pennsylvania, have invented a new and useful Improvement in Mechanism for Controlling a Loom by the Quantity of Weft in the Shuttle, of which the following is a specification.

I will describe a mechanism embodying my improvement and then point out the novel features in the claims.

In the accompanying drawings, Figure 1 is a side view of the mechanism comprised in my improvement, and it also shows in transverse section a shuttle-box and shuttle. Fig. 2 is a top view of the same with the parts in the same position as in Fig. 1. Fig. 3 is a view similar to Fig. 1, but showing the parts in different positions. Fig. 4 is a view similar to Fig. 2, but showing the parts in the same positions as they are shown in Fig. 3. Fig. 5 is a top view of the shuttle. Fig. 6 is a side view of the shuttle. Fig. 7 is a detail view illustrating a device for engaging the shuttle and adjustable in length. Figs. 8, 9, and 10 illustrate modifications of the construction of Figs. 1 to 4.

Similar letters of reference designate corresponding parts in all the figures.

A designates one shuttle-box of a loom, mounted upon and carried by the lay of the loom, as usual. This shuttle-box is provided on that side which is toward the breast-beam of the loom with an opening a, shown as having an inclined lower surface a', the inclination being upwardly from the outside to the inside of the shuttle-box.

B designates a shuttle, which may be of ordinary form, except that it is provided at one side with an opening b, having a rib b' projecting upwardly from its lower surface. The upper portion of this rib may advantageously be rounded or inclined at that side which is toward the interior of the shuttle. Preferably this rib will be made of a metal plate. The spindle b^2 of the shuttle may be of ordinary form and is shown as hinged at one end to the body of the shuttle by means of a pin b^3. Its pivoted end fits in a mortise, and the bottom of the mortise prevents the spindle from being swung down into the body of the shuttle below a horizontal position. As usual, a spring may be employed for holding the spindle in a horizontal position, but so as to permit it to be swung upwardly when necessary.

C designates a detector or feeler secured within the body of the shuttle and in such manner as to be free to swing toward and from the spindle b^2 of the shuttle. It has a tendency to move toward the spindle, and its movement in that direction is controlled or determined by the quantity of filling or weft upon the spindle. As the filling or weft is exhausted in weaving the detector C moves progressively toward the spindle and its purpose is to cause the operation of mechanism for replenishing filling or weft when the supply upon the spindle b^2 is exhausted to a certain extent.

The detector C may be made resilient throughout the whole or any suitable portion of its length, and then it may be secured by having screws passed through its end portion and under the body of the shuttle; but I have shown it as connected by a hinge b^4 to a plate b^5, which is secured by screws or otherwise to the body of the shuttle, and when thus combined with the body of the shuttle a spring b^6 may be employed to give it a tendency to move toward the spindle of the shuttle, or it may derive movement in that direction from a part coacting with it.

D designates a device for engaging the rib b' of the shuttle B, and hereinafter it will for convenience be called an "engaging" device. It is shown so formed that it will constitute a hook or catch, and in this particular example of my invention it consists of a member comprising a bar D' and an end plate d, rounded or inclined on the under side, so that it may slide easily over the upper edge of the rib b' in the shuttle B and rise slightly in so doing. A certain distance from this end a notch d' is formed in the under side. That side of the notch which is toward the rounded or inclined extremity of the plate d is preferably rounded or inclined toward that end of the plate. The plate is connected at or near the top by means of a hinge d^2 with the bar D', which is supported in bearings d^3 d^4, so that it may reciprocate longitudinally. A spring d^5 may advantageously be

combined with the bar D′ and the plate d to depress the latter into line with the bar D′ after deflection from the line of said bar.

The reciprocation of the bar D′ is limited by a suitable stop or stops. In the present instance a stop-pin d^6 is inserted in the bar to coact with the bearing d^3 for the purpose of limiting the reciprocation of the bar D′, and consequently of the plate D, in one direction, and a similar stop-pin d^7 is inserted into the bar D′ to coact with its bearing d^4 for the purpose of limiting reciprocation in the reverse direction. The bar D′ and the plate d are not, however, under the necessity of reciprocating to the full extent permitted by the stop-pin d^6. In other words, the stop-pin d^6 is employed simply to determine the maximum amount of reciprocation of the bar D′ and plate d in one direction.

To prevent any undesirable recoil or bouncing of the bar D′ after contact of its stop-pin d^7 with the bearing d^4, it is advantageous to provide a spring-detent for engaging the bar D′. I have therefore shown the bar D′ as provided in one edge with a notch d^8 and combined with it a detent d^9, actuated by a spring d^{10}, which is shown as also having the function of carrying it. The spring d^{10} is shown as being fastened by a screw to one side of the bearing d^4. Its resilience is of course such as to cause the detent d^9 to enter the notch d^8 of the bar D′.

The bearings d^3 d^4 extend upwardly from the breast-beam of the loom. For convenience they may advantageously be fastened to a plate d^{11}, and the latter will then be secured by screws or otherwise to the breast-beam of the loom.

With the bar D′ is combined a lever E, fulcrumed upon a pin e, rising from the plate d^{11}. The lever E is thus free to swing horizontally. At its end which coacts with the bar D′ this lever is preferably concaved transversely, and it is inclined longitudinally at its extremity, and the contiguous end of the bar D′ is preferably provided with a circular disk d^{12}, rounded upon its edge, the diameter of the disk and the curvature of the concaved end of the lever E being such that the two will work well together and permit of the reciprocation of the bar D′, acting upon the lever E like a cam, to produce a swinging motion of the lever in a direction away from the axis of the bar D′. A spring of some suitable kind resists this movement of the lever E and moves the lever in the reverse direction whenever permitted to do so by the bar D′. For this purpose there may be advantageously used a spring e', surrounding a pin e^2, fitted to slide in a bracket d^{13}, rising from the plate d^{11}, the pin being provided with a head at the end, which coacts with the lever E, and the spring being coiled around the pin between its head and the bracket d^{13}. The swinging motion of the lever E is preferably limited by means of stops d^{14} d^{15}, extending upwardly from the plate d^{11}.

The bar D′ has combined with it a spring for moving it outward, or, in other words, in that direction which will carry the plate D farther away from the bearing d^3. A convenient form of spring is a helical spring F. Such a spring is shown as surrounding a rod f, which is fitted to slide in bearings e^3 e^4, extending from the lever E.

The spring F contacts at one end with the bearing e^3 of the rod f and at the other end with a pin f', extending through the rod f.

The swinging motion of the lever E will not interfere with the coaction between the spring F and the bar D′, because the disk d^{12} of the bar D′ is so large as to prevent the rod f from being carried out of contact with the disk d^{12} by the swinging of the lever E.

The lever E is intended to cause the operation of stop mechanism or the operation of mechanism which will supply filling or weft. Its function is of course to be fulfilled when the shuttle in use in the loom is exhausted to a predetermined amount.

During the operation of the loom the reciprocation of the lay causes the detector C to contact with the adjacent end of the engaging device D and move it backward, or, in other words, against the resistance of the spring F. When the lay reverses its movement, the spring F will cause the bar D′ and engaging device D to move in the same direction as the lay, this being the receding movement of the lay, or, in other words, the movement backward in the direction of the reed to beat the filling or weft in the shed.

Prior to the time that the filling or weft in the shuttle is exhausted to such an extent as to make it desirable to replenish the supply the detector C prevents the engaging device D from engaging with the rib b' of the shuttle; but whenever the filling or weft has been exhausted to such an extent as to make it desirable to replenish the supply the position of the detector C will be such as to permit the notch d' of the engaging device D to drop down and engage with the rib b' of the shuttle. The engaging device being thus fastened to the shuttle, the receding or backward movement of the lay will cause the bar D′ to be pulled so far that its disk d^{12} will be carried toward the extremity of the adjacent end of the lever E. This will permit the spring e' to swing the lever E to its full extent. After the reverse or backward movement of the lay is continued sufficiently the further movement will cause a disengagement of the shuttle from the engaging device D. This will be facilitated because of the rounded or inclined inner edge or side of the rib b' and the rounded or inclined coacting side of the notch d' in the engaging device D.

With the lever E a rod G is pivotally connected by means of a pin g. When the lever E is swung over by the spring e', this rod G will be pushed longitudinally and will then set in operation either the stop mechanism or the mechanism for replenishing the filling or

weft, as may be desired, or it may do both. Obviously a weight could be used instead of a spring e', and either would constitute means for causing the operation of stop mechanism or mechanism for replenishing the filling or weft.

It is possible to dispense with the detector C and permit the extremity of the engaging device d to coact directly with the filling or weft. If so used, it would be advantageous to broaden the extremity, so as to prevent it from indenting the filling or weft. Such construction is illustrated in Fig. 8.

Instead of dispensing with the detector C it might be used in the shuttle-box and organized to enter the shuttle periodically through a side opening. Such modification is illustrated in Fig. 9.

Instead of having the rib or projection b' upon the shuttle it may be upon the shuttle-box or upon the lay—for example, in the manner shown in Fig. 10—and broadly defined it is only necessary that it should be a part vibrating with the lay.

I have shown in Fig. 7 that the extremity of the engaging device D may be made adjustable in length. This will adapt it for use with shuttle quills or bobbins of different sizes.

What I claim as my invention, and desire to secure by Letters Patent, is—

1. In a loom, the combination with a part vibrating with the lay, of a device which reciprocates in harmony with the vibration of the lay under control of the filling or weft in the shuttle, and constructed to engage mechanically with the part that vibrates with the lay.

2. In a loom, the combination with a part vibrating with the lay, of a device which reciprocates in harmony with the vibration of the lay under control of the filling or weft in the shuttle, and constructed to engage mechanically with the part that vibrates with the lay, said device being self-disengaging after fulfilling its function.

3. In a loom, the combination with a part vibrating with the lay and independent of the filling or weft in the shuttle, of a device which reciprocates in harmony with the vibration of the lay under control of the filling or weft in the shuttle, and constructed to engage with the part that vibrates with the lay.

4. In a loom, the combination with a part vibrating with the lay, of a device having a notch, and which reciprocates in harmony with the vibration of the lay under control of the filling or weft in the shuttle, and is capable of engaging with the part that vibrates with the lay.

5. In a loom, the combination with a part vibrating with the lay, of a device comprising a bar, a piece hinged to said bar and provided with a notch, and which reciprocates in harmony with the vibration of the lay under control of the filling or weft in the shuttle, and is capable of engaging with the part that vibrates with the lay.

6. In a loom, the combination with a part vibrating with the lay, of a device comprising a bar, a piece hinged to said bar and provided with a notch and a spring depressing the said piece, and which device reciprocates in harmony with the vibration of the lay under control of the filling or weft in the shuttle and is capable of engaging with the part that vibrates with the lay.

7. In a loom, the combination with a part vibrating with the lay, of the bar D′ and engaging device D, having a notch d' and an inclined or rounded extremity d, which reciprocate in harmony with the vibration of the lay under control of the filling or weft in the shuttle and are capable of engaging with the part that vibrates with the lay.

8. In a loom the combination with a shuttle having a transverse opening and a rib or projection vibrating with the lay and adjacent to said opening, of a reciprocating device for engaging said rib or projection under control of the filling or weft in the shuttle.

9. In a loom the combination of means for operating a stop mechanism or mechanism for replenishing filling or weft and a device controlling the same and reciprocating under control of the filling or weft in the shuttle and in harmony with the vibrations of the lay, and a hook or catch intermediate the lay and said reciprocating part.

10. In a loom the combination of means for operating a stop mechanism or mechanism for replenishing filling or weft, a device controlling the same and constructed to engage mechanically with a part vibrating with the lay and reciprocating under control of the filling or weft in the shuttle, and said part vibrating with the lay.

11. In a loom, the combination of a part vibrating with the lay, a device constructed to mechanically engage the same and reciprocated in harmony with the vibration of the lay, a lever controlled by said engaging device for causing the operation of stop mechanism or mechanism for replenishing filling or weft, and means for operating said lever.

12. In a loom the combination of a part vibrating with the lay, a device for engaging the same and reciprocating in harmony with the vibrations of the lay, and a spring-operated lever controlled by said engaging device for causing the operation of stop mechanism or mechanism for replenishing filling or weft.

13. In a loom the combination with a part vibrating with the lay, of the engaging device D, coacting with said part vibrating with the lay, and comprising the bar D′, the spring F for actuating said bar, the lever E coacting with said bar, and a spring e' for actuating said lever.

14. In a loom the combination of a part carried by the lay, an engaging device capable of engaging mechanically with said part,

whereby the receding movement of the lay may draw said engaging device out of normal position and means controlled by said engaging device for operating a loom-stopping or weft-renewing mechanism.

15. In a loom a part for entering a shuttle, the amount of weft or filling in the shuttle controlling the extent of entry thereof into the shuttle, a hook or catch mounted on said part, and a part for engaging said hook or catch when the weft is exhausted to a predetermined point.

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

JOHANN HEINRICH KLERX.

Witnesses:
GEO. E. CRUSE,
P. H. E. STARR.