No. 709,911. Patented Sept. 30, 1902.

J. H. KLERX.

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

(Application filed Dec. 10, 1901.)

(No Model.) 2 Sheets—Sheet 1.

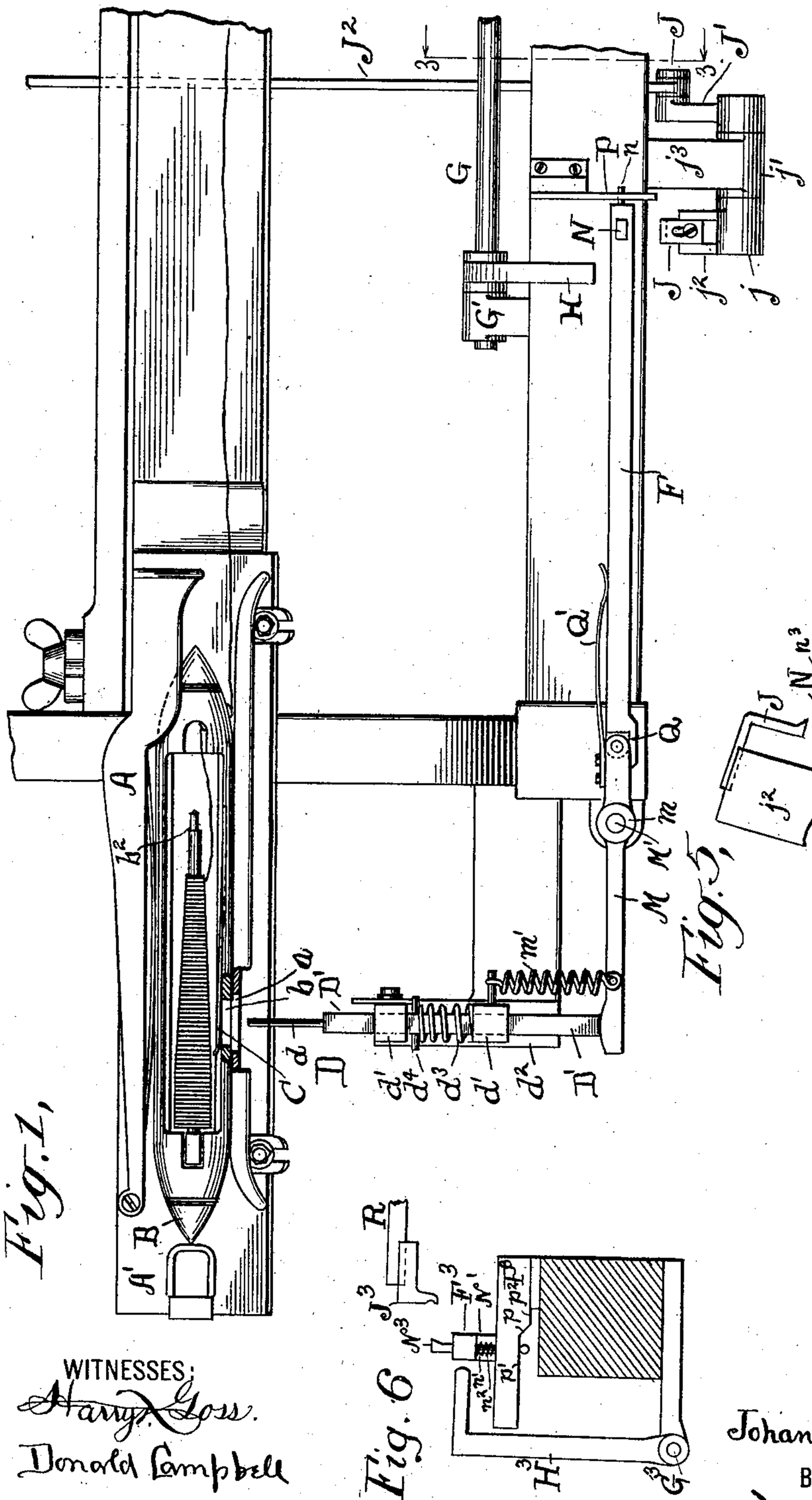

Fig. 1.

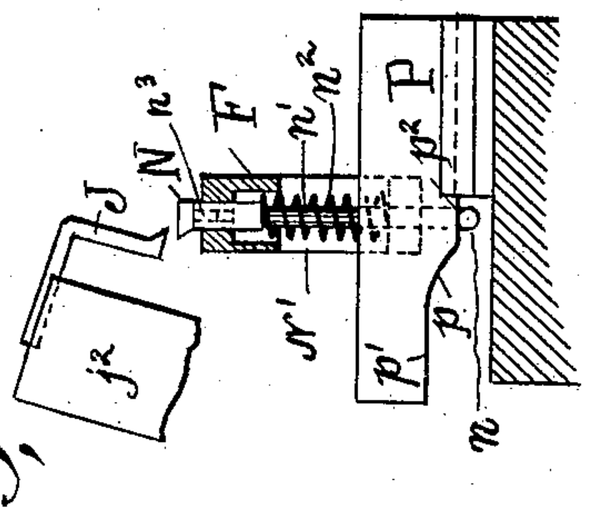

Fig. 5.

Fig. 6.

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Fig. 3.

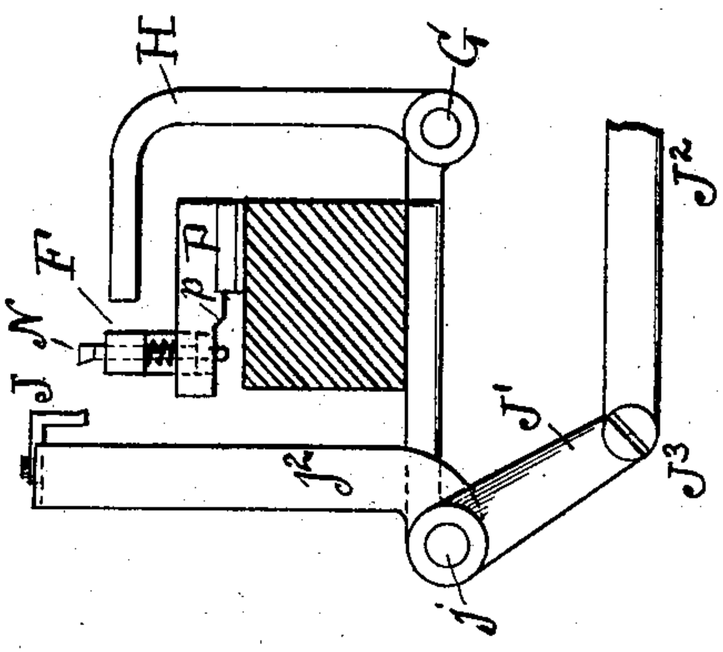


Fig. 4.

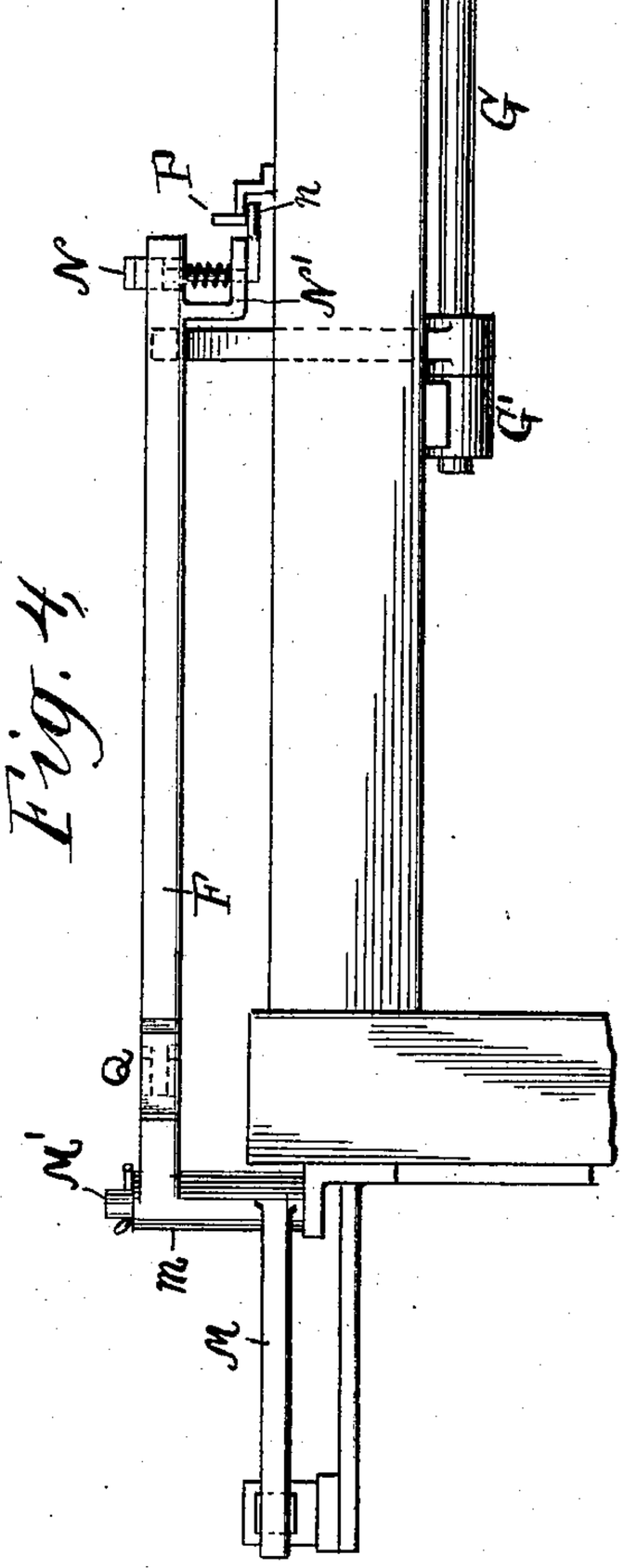
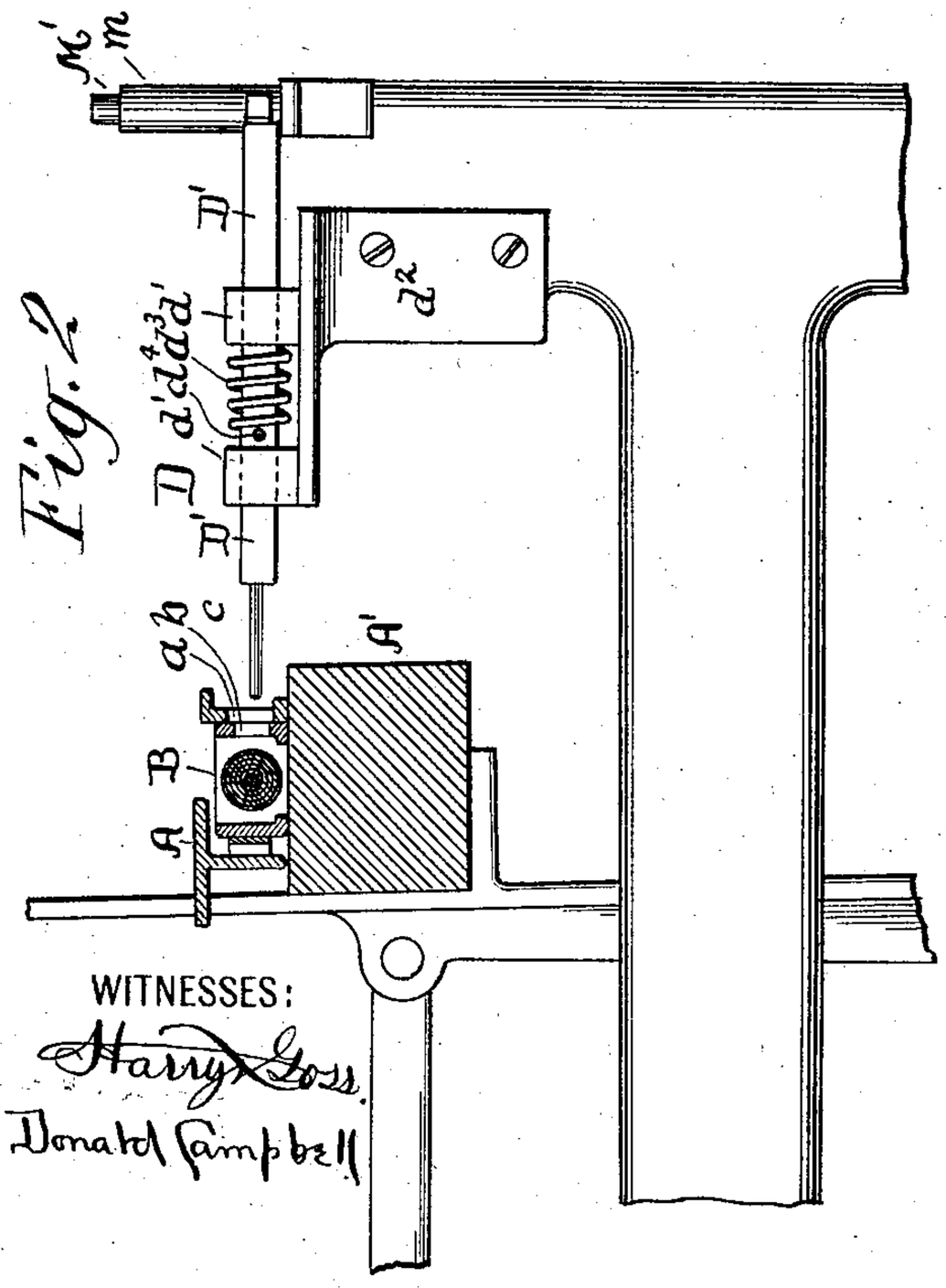


Fig. 2



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

SPECIFICATION forming part of Letters Patent No. 709,911, dated September 30, 1902.

Application filed December 10, 1901. Serial No. 85,330. (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 Looms by the Quantity of Weft in the Shuttles, of which the following is a specification.

My invention relates to mechanism for controlling a loom by the quantity of weft in a shuttle thereof, and more particularly to mechanism intended for effecting or bringing about the operation of a loom-stop mechanism upon the failure or substantial exhaustion of the weft.

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

In the accompanying drawings, Figure 1 is a top view of a mechanism embodying my invention, together with a sufficient portion of a loom to illustrate its application thereto. Fig. 2 is an end view of the mechanism shown in Fig. 1, the shuttle, shuttle-box, and lay-beam shown in section. Fig. 3 is a sectional view of certain parts, taken on the plane 3 3 of Fig. 1 looking from the right. Fig. 4 is a front view of the parts carried upon the breast-beam of the loom. Fig. 5 is a detail view similar to Fig. 3, showing certain parts in different position. Fig. 6 is a view similar to Fig. 3 of a modified arrangement.

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

A designates one shuttle-box of the loom, of usual type and mounted, as usual, upon the lay-beam A′ of the lay. The lay and concomitant parts, as well as the shuttle-box, being of well-known construction need not be further described here. Any usual forms may be employed, as these parts are not of the essence of my invention.

B designates a shuttle, which may also be of ordinary form, except that it is provided with a side opening at *b* on that side which is toward the breast-beam of the loom to permit the entry into the shuttle of a feeler device, hereinafter to be described. The shuttle-box is provided with a corresponding opening at *a*. The form of shuttle I have illustrated is provided with a cop-holding spindle b^2, hinged at one end of the shuttle-body by means of a pin, the hinged end of the spindle fitting into a mortise in the shuttle-body and the bottom of the mortise preventing the spindle from being swung down into the shuttle-cavity 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 member which may sometimes be employed in connection with the feeler device hereinafter described. It is secured, preferably, 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. I preferably employ spring action tending to move the member C inwardly or outwardly, and for this purpose have here made it resilient for some portion of its length and secured it to the shuttle at that end which is farthest from the opening *b*, the free end of the member C being adjacent to said opening. The feeler device already referred to is adapted to enter periodically into the shuttle, so as to contact and press the member C when employed toward the weft upon the spindle. As the filling or weft is exhausted in weaving the innermost position or limit of the member C progressively advances toward the spindle.

D represents a feeler device. Its purpose is through its movement toward the weft in the shuttle and the regulation thereby afforded in accordance with the amount of weft in the shuttle to bring about or control the operation of mechanism for replenishing filling or weft when the supply thereof is exhausted to a predetermined extent or to bring about the operation of a loom-stop mechanism. In this particular example of my invention the feeler device D is shown to consist of a part D′, fitted to move to and fro, as by sliding, and for this purpose bearings are provided in upward projections d' d' from a bracket d^2, that is secured to a fixed part of the loom. The movement of the part D′ is toward and from the lay. To move it toward the lay for convenience, a spring d^3 is employed, which acts upon one of the bearings d' and upon a stop d^4, connected to the

part D', and said stop by contacting the other bearing d' limits the movement toward the lay.

d represents a part forming an extension of and suitably connected with the part D' of the feeler device D, and it is constructed to enter the shuttle and press upon the weft therein through the medium of the member C when that member is employed. This occurs on every second beat up of the lay, and the effect is to cause the feeler device on each second beat up to move in a direction opposite to that in which it is moved by the action of spring d^3. When the lay recedes, the feeler device is returned to the normal position of Figs. 1 and 4 through said spring. In this way the feeler device is made to vibrate in harmony with the lay, and, as we have shown, under control of the weft or filling in the shuttle—that is, the extent to which the feeler device is moved on any beat-up will obviously depend upon the thickness or amount of weft or filling in the shuttle and will gradually decrease as the weft or filling becomes exhausted. When the weft or filling is exhaused to a predetermined extent, the extent of movement of the feeler device will have diminished to a corresponding point, upon which it is intended that a filling, renewing, or loom-stop mechanism be operated through the means now to be described.

Fixed upon the breast-beam or other stationary part is a vertical pin M', forming a fulcrum for what may be termed a "lever," such lever comprising the sleeve part m, the short arm M, and the long arm F. The end portion of arm M is located adjacent the extremity of the slide D' of the feeler device. By suitable connecting means between these two parts oscillations of the arm M may be effected that will be in harmony with the vibrations of the lay, and since, as explained, the movements of slide D' are under control of the weft or filling in the shuttle in play so will the oscillations of the arm M upon the sleeve m be under control of the weft or filling.

m' represents a spring attached, respectively, to arm M, and for convenience to one of the stationary bearings d', whereby the arm may be held in contact with and move in unison with the feeler device in the manner set forth.

It is obvious that the long arm F will also vibrate in harmony with the vibrations of the lay, and the extent or amplitude of its movements vary with and under control of the amount of weft or filling in the shuttle in play. At or near the extremity of and carried by arm F is a vertically-movable block N, that is preferably inclined outwardly or notched at its upper front surface, as in the manner clearly illustrated in Fig. 5. To this block I preferably connect a downwardly-extending rod n', passing through an L-shaped support N', fast upon arm F and then turning outwardly and projecting beyond said support N', as at n. n^2 represents a coil-spring tending to elevate the block N above the surface of arm F.

P represents a stationary cam for coacting with the part n of pin n'. Referring to Figs. 3, 5, and 6, it will be seen that cam P comprises an incline cam-surface p, connecting an upper and lower cam portion, both preferably horizontal, which are designated by the characters p' and p^2, respectively. The cam P is preferably so located that the pin n normally engages the upper cam-surface p', as shown in Fig. 3, the spring n^2 serving to hold it in contact therewith. The arm F, carrying the pin n, we have seen, oscillates with every second beat of the lay. When the shuttle is well supplied with weft or filling, this oscillation is sufficient to carry the pin n beyond the incline p of cam P, thereby depressing the pin n and the block N, connected thereto. As the weft or filling is consumed the extent or amplitude of movement of the arm F, we have seen, gradually decreases until a point is reached where the pin n will fail to pass the incline p, but will remain in engagement with the horizontal portion p' of cam P. The incline p will be so located as to cause this action upon a predetermined exhaustion of weft. The result will be that upon the attainment of the predetermined extent of exhaustion of weft or filling the block N will thereafter remain in its elevated position above the arm F and will not be periodically depressed, as before.

J represents a bunter constructed and fitted to engage the block N upon arm F. Preferably this bunter operates once for every second beat of the lay, and for convenience it may be located forward of the arm F and moved toward said arm and the lay by any usual means. Such means may comprise an arm j^2, carrying said bunter and fixed to a short shaft j, turning in a bearing j', that is carried on a stationary bracket j^3. At the other end of shaft j is fixed a short arm J', to which is pivoted at J^3 a link J^2, that extends to a suitable shaft or other part of the loom from which it derives its motion. The bunter J is timed to operate about the time the lay has fully beaten up, at which time, we have seen, the block N normally is depressed, whereby it permits the bunter to pass over it in the manner illustrated in Fig. 5. This is the ordinary operation of the loom. When, however, the weft is exhausted to a predetermined point and the block N remains elevated, the bunter J at the next operation will engage the inclined or notched top portion of block N and will carry said block, and consequently the arm F, with it until the arm F strikes a lever H, fast upon a shaft G, so as to oscillate said shaft. Shaft G is fitted to rotate in bearings, one of which is shown at G', and the shaft is for the purpose of bringing about or controlling the operation of a loom-stop or filling-renewing mechanism. Such mechanism is most conveniently located at that side

of the loom opposite to the weft or filling exhaustion detecting devices hereinbefore described, and therefore the shaft G is preferably made to extend to such side of the loom, at which point may be provided suitable means for returning the shaft G and lever H to the normal position of Fig. 1. The arm F is shown as being hinged at Q by a hinge which permits oscillation only in one direction, and a stiff spring Q′, provided to oppose such oscillation, makes the arm F in effect solid. The purpose of the hinge is to permit the described movement of arm F when actuated by the bunter J. It is obvious that when the bunter J acts on block N to carry arm F over sufficiently to engage the lever H on shaft G the pin *n*, Fig. 3, will pass into engagement with the low portion p^2 of cam P, and would consequently tend to effect the premature disengagement of bunter J and block N. To avoid this, a convenient construction is the following: The block N is separated on a horizontal plane near its top and the upper part provided with a square pin n^3, (shown in dotted lines in Fig. 5,) which passes into a corresponding recess in the lower part, whereby the upper part may slightly rise to retain an engagement once made with the bunter J.

A modified and perhaps preferable construction and arrangement of the parts just described is that shown in Fig. 6, from which it will be clearly understood. In such construction the bunter J^3, corresponding to the before-described bunter J, is arranged to act from that side upon which the lay is located, and it may conveniently be connected to a slide R, oscillated in a usual manner or from the lay. The arm H^3 on the rock-shaft G^3, that brings about or controls the operation of a weft-renewing or loom-stop mechanism, will then be located forwardly of the lay-beam, as shown. The notch or incline at the top of block N^3, corresponding to the before-described block N, will be on the side next the bunter J^3, and the separated construction of said block may be dispensed with. The hinge in arm F^3 will obviously be required to be reversed from the position shown at Q, Fig. 1. In other respects arm F^3 and cam P^3 are in correspondence with arm F and cam P, before described.

The operation of the first-described and modified arrangements will now be understood. The oscillation about pivot M′ of arm F through arm M and feeler device D and in harmony with the vibrations of the lay and under control of the quantity of weft or filling remaining in the shuttle in play serves, as stated, to ordinarily depress the block N at that period in each oscillation when the bunter J passes by to prevent the engagement of the block and bunter. When the exhaustion of weft or filling has proceeded to a predetermined extent, the extent or amplitude of vibration of the arm F will have diminished sufficiently to permit the pin *n*, connected with block N, passing the incline *p* of cam P, and at this stage the block N will not be depressed, but will remain in the path of to be struck by the bunter J. This will cause the arm F to turn on its hinge in unison with the bunter and in doing so to strike the lever H on rock-shaft G, thereby oscillating the latter and bringing about the operation of a weft or filling renewing mechanism or loom-stop mechanism.

What I claim as my invention is—

1. In a loom the combination with the lay of a lever device fitted to oscillate, means under control of the filling or weft in the shuttle in play, for effecting oscillations of said lever device in harmony with the vibrations of the lay, whereby such oscillations will be diminished in extent or amplitude in accordance with the quantity of weft or filling in the shuttle, a member for bringing about or controlling the operation of a loom-stop or filling-renewing mechanism, a bunter for actuating said member, through the medium of said lever device, and means connected with said lever device for controlling the actuation of said member, whereby on the failure or substantial exhaustion of the weft in the shuttle in play, the operation of the loom-stop or filling-renewing mechanism may be effected.

2. In a loom the combination with the lay of a lever device fitted to oscillate in harmony with the vibrations of the lay, means coacting with the weft or filling in the shuttle in play for effecting oscillations in said lever device in accordance with the quantity of weft or filling in the shuttle, a pivot contained in said lever to permit part thereof to be intermittently displaced independently of the main portion, a bunter adapted to effect such intermittent displacement, a member for bringing about or controlling the operation of a loom-stop or filling-renewing mechanism, said member adapted to be actuated by said lever device when the latter is displaced by the said bunter, and means controlled by the oscillation of said lever device to prevent its engagement with either the bunter or with the said controlling member until the failure or substantial exhaustion of the weft or filling, and for then permitting such engagement.

3. In a loom the combination with the lay of a shuttle-box, a movable feeler device, constructed and fitted to enter the shuttle in the shuttle-box when the lay beats up, whereby the movement of the feeler device is under control of the weft or filling in the shuttle, a lever device operatively connected with said feeler device so as to oscillate in harmony with the vibration of the lay under control of the weft or filling in the shuttle, a member for bringing about or controlling the operation of a loom-stop or filling-renewing mechanism, and operative means including said lever device, intermediate of said member and a moving part of the loom, said means being under control of the said lever device,

whereby a loom-stop or filling-renewing mechanism may be operated upon failure or substantial exhaustion of the weft or filling.

4. In a loom the combination with the lay, of the shuttle-box carried on the lay, of a feeler device D constructed to enter the shuttle in the shuttle-box to coact with the weft or filling and fitted to move to and fro in harmony with the vibrations of the lay, whereby the extent or amplitude of movement of the feeler device will depend upon the quantity of weft or filling in the shuttle in play, a lever device M F actuated by and in unison with said feeler device, a bunter J, a block N carried on said lever device adapted to be engaged by said bunter, a lever H connected with a controlling-shaft and adapted to be actuated upon the engagement of said bunter and block N, and a stationary cam H adapted to effect the removal periodically of said block from the path of the bunter until with the consumption of weft or filling the oscillations of the lever device are diminished in extent to a predetermined point, whereby until such time the engagement of said bunter and block is avoided.

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

JOHANN HEINRICH KLERX.

Witnesses:
T. J. PURDY,
GEO. E. DEPPEN.