

No. 709,910.

Patented Sept. 30, 1902.

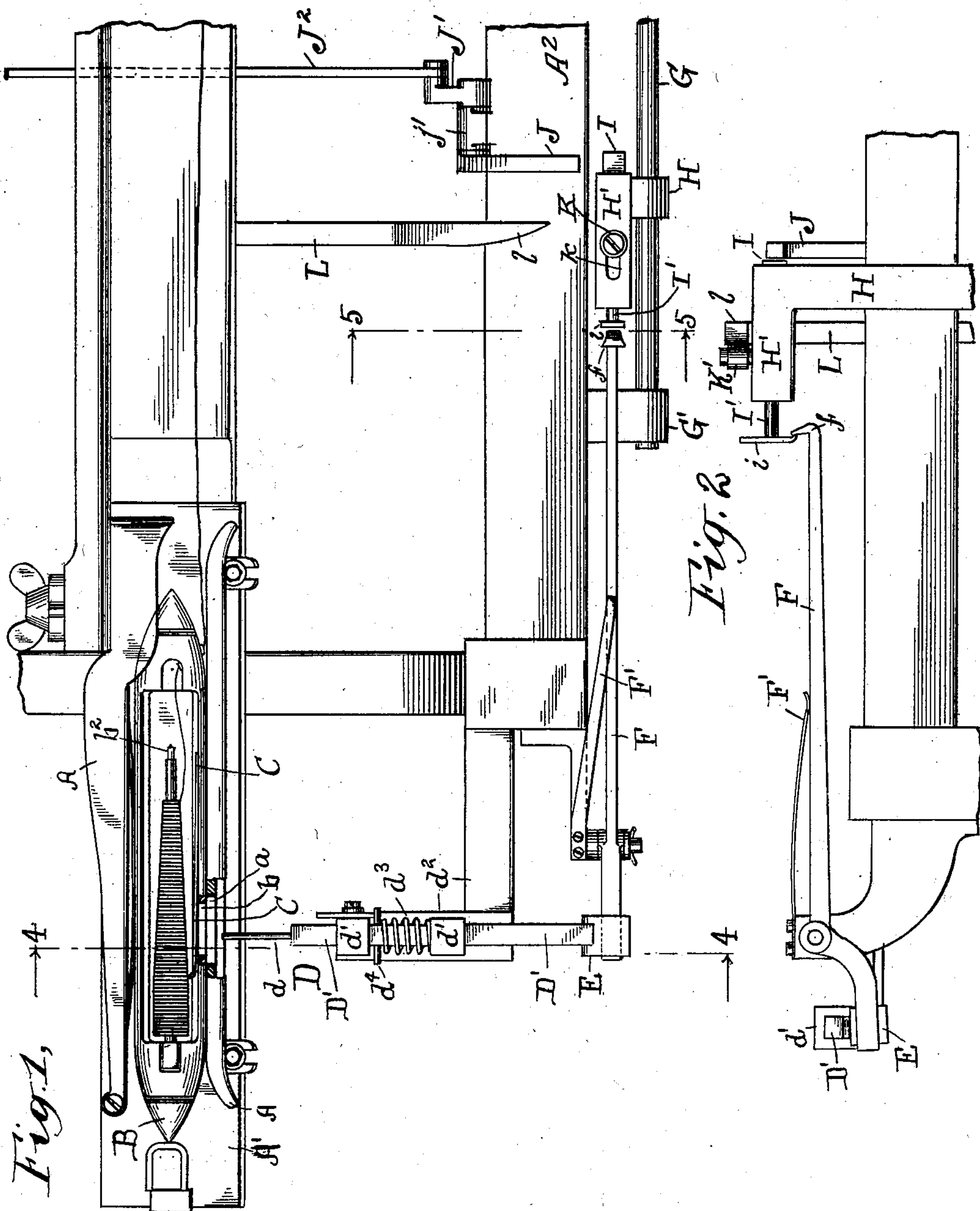
J. H. KLERX.

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

(Application filed Dec. 10, 1901.)

(No Model.)

2 Sheets—Sheet 1.



WITNESSES:

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Donald Campbell

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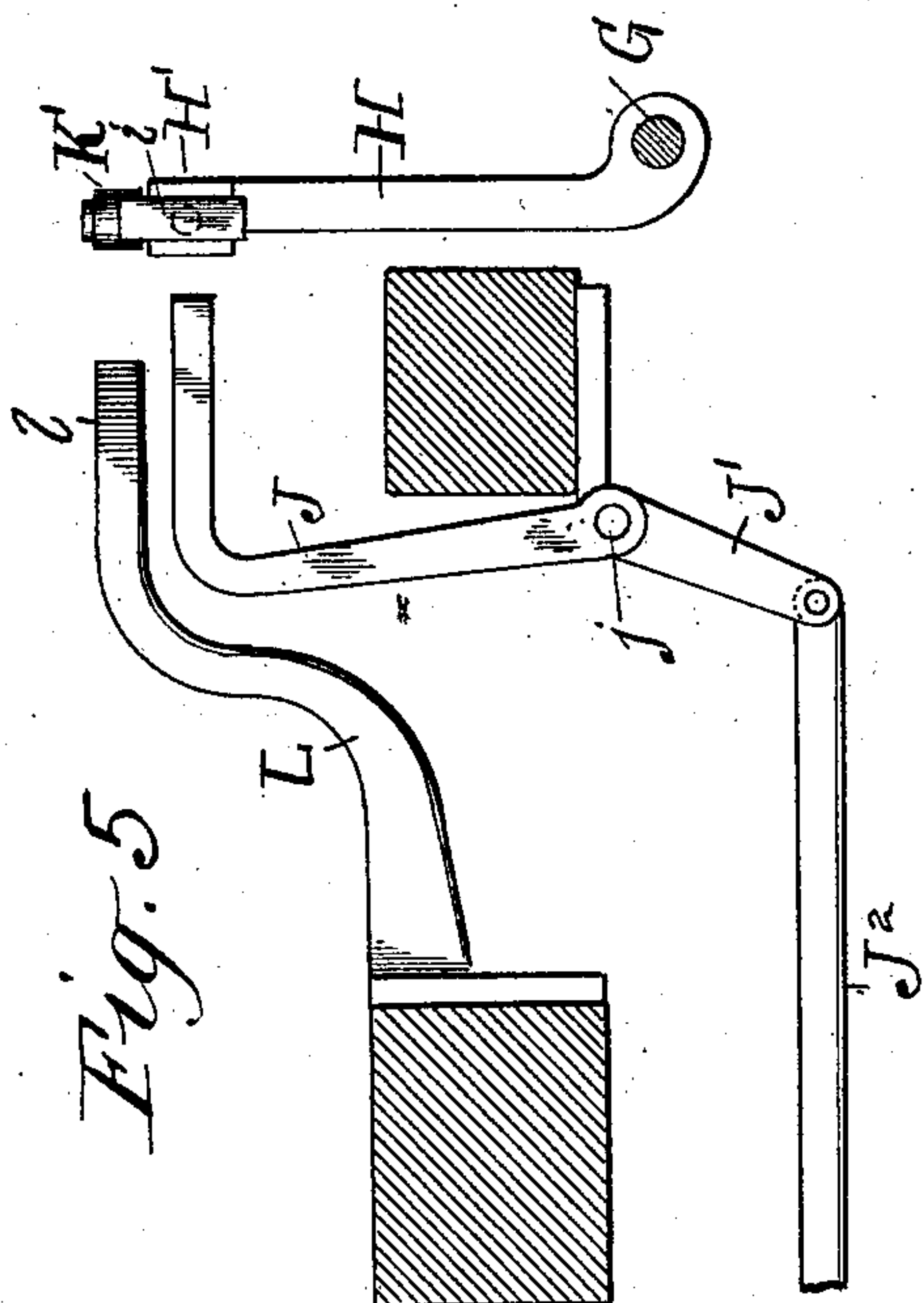


Fig. 5

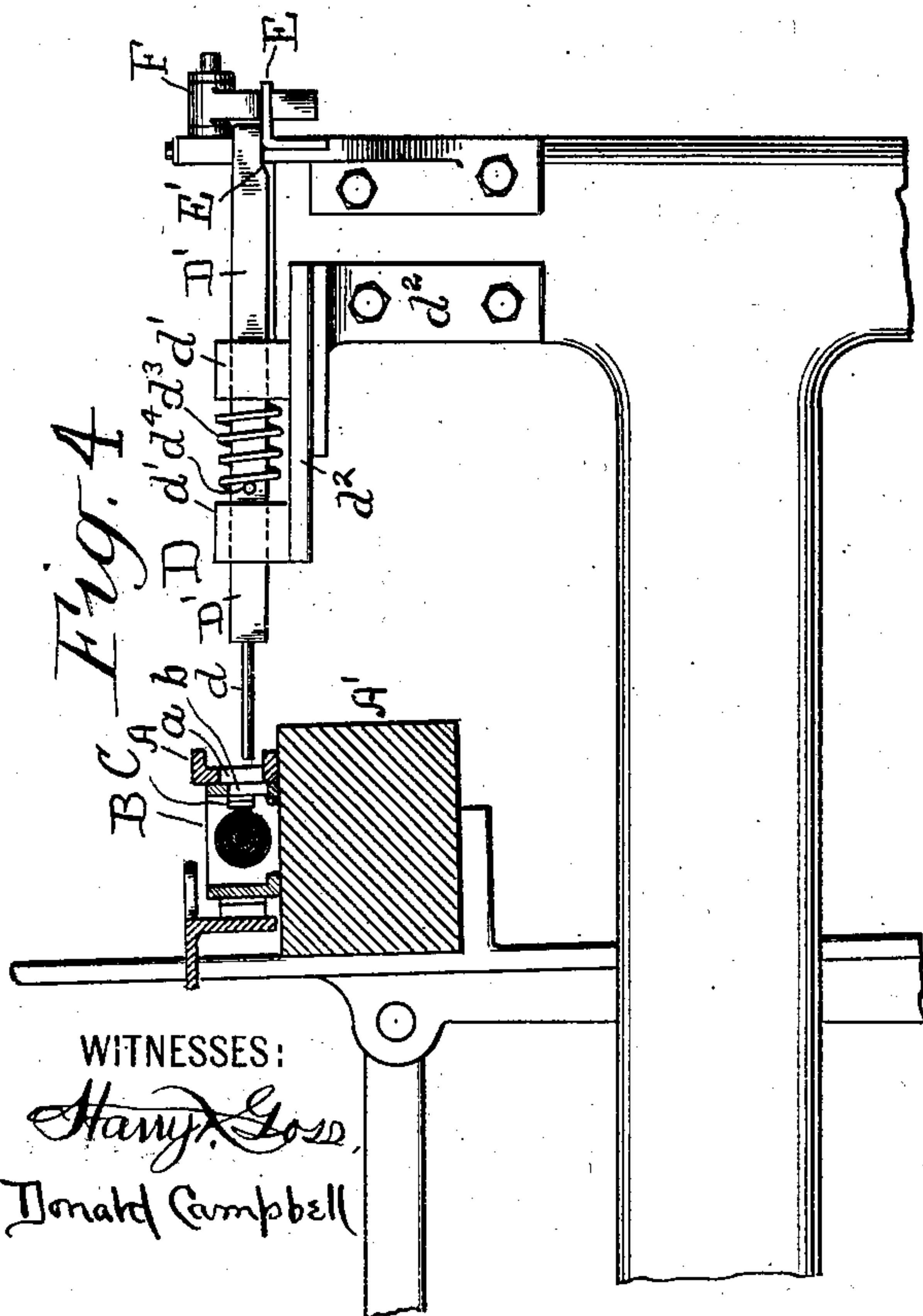


Fig. 4

WITNESSES:

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Donald Campbell

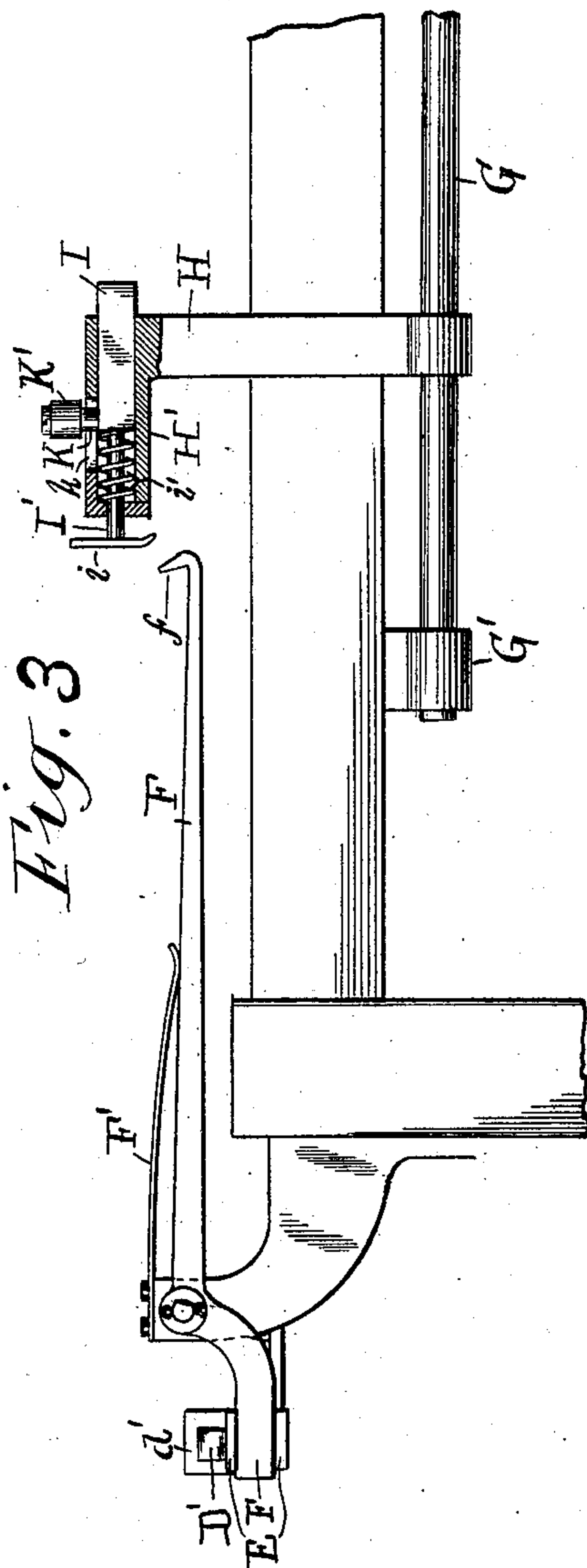


Fig. 3

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UNITED STATES PATENT OFFICE.

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

SPECIFICATION forming part of Letters Patent No. 709,910, dated September 30, 1902.

Application filed December 10, 1901. Serial No. 85,329. (No model.)

To all whom it may concern:

Be it known that I, JOHANN HEINRICH KLERX, of Sunbury, Pennsylvania, have in-
vented a new and useful Improvement in
5 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 con-
trolling a loom by the quantity of weft in a
10 shuttle thereof and more particularly to mech-
anism intended for effecting or bringing about
the operation of a loom-stop mechanism or a
weft-supplying mechanism upon the failure
or substantial exhaustion of the weft.

15 I will describe a mechanism embodying my
invention and then point out the novel fea-
tures in the claims.

In the accompanying drawings, Figure 1 is
a top view of a mechanism embodying my in-
20 vention, together with a sufficient portion of
a loom to illustrate its application thereto.
Fig. 2 is a front view of the mechanism illus-
trated in Fig. 1. Fig. 3 is a view similar to
Fig. 2, but partly in section and the parts in
25 a different position. Fig. 4 is a section taken
on the plane 4 4 of Fig. 1, and Fig. 5 is a sec-
tion taken on the plane 5 5 of Fig. 1.

Similar letters of reference designate corre-
sponding parts in all the figures of the draw-
30 ings.

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 con-
comitant parts as well as the shuttle-box be-
35 ing of well-known construction need not be
further described here. Any usual forms may
be employed, as these parts are not of the es-
sence of my invention.

B designates a shuttle which may be of or-
40 dinary form, except that it is provided with a
side opening at *b* on that side which is to-
ward the breast-beam of the loom to permit
the entry into the shuttle of a feeler device
hereinafter to be described. The shuttle-box
45 is provided with a corresponding opening at *a*.

The form of shuttle I have illustrated is pro-
vided 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
50 a mortise in the shuttle-body and the bottom

of the mortise preventing the spindle from
being swung down into the shuttle-cavity be-
low 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
55 be swung upwardly when necessary.

C designates a member which may some-
times be employed in connection with the
feeler device hereinafter described. It is se-
cured, preferably, within the body of the
60 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
65 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.
70

The feeler device already referred to is
adapted to enter periodically into the shut-
tle, so as to contact and press the member C
when employed toward the weft upon the
spindle. As the filling or weft is exhausted
75 in weaving the innermost position or limit
of movement of the member C progressively
advances toward the spindle.

D represents a feeler device. Its purpose
is through its movement toward the weft in
80 the shuttle and the regulation thereby afford-
ed in accordance with the amount of weft in
the shuttle to bring about or control the
operation of mechanism for replenishing fill-
ing or weft when the supply thereof is ex-
85 hausted 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 slid-
90 ing, and for this purpose bearings are pro-
vided 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
95 the lay, for convenience a spring *d*³ is em-
ployed, 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 bear-
ing *d'* limits the movement toward the lay.
100

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 I 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 exhausted 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.

A short incline E' , serving as a vertically-operating cam, is provided upon the outer end or end farthest from the lay of the feeler device D as a convenient means to actuate a co-operating part E , secured to a first-class lever F . The relation of the incline E' and part E is such that the beat-up of the lay will normally cause the incline E' to engage and lower the part E , thereby elevating the opposite end of the lever F . Said lever is pivoted to a fixed part of the loom and is provided with a spring F' , tending to elevate that end which carries the part E . The opposite end or arm of the lever F is preferably the longer and provided with a hook f , that may be upwardly extending, the purpose of which will appear hereinafter.

G represents a rock-shaft that is mounted in bearings, one of which is shown at G' . The rock-shaft is adapted to be operatively connected with a filling-renewing or loom-stop mechanism, for which purpose I preferably extend the shaft G to that side of the loom which is opposite the feeler device already described, as it is usually found most convenient to so locate the filling-renewing or loom-stop mechanism.

Fast upon the shaft G is an upwardly-extending arm H through which the rock-shaft may be oscillated. The arm H is preferably of an inverted-L shape, the horizontal branch H' being fitted to support a sliding block I , which is for convenience inclosed in the branch H' and has connected to it a rod I' , extending through an opening in the end of branch H' , which rod is also spring-inclosed, the spring i' tending to force the block I and rod I' in a direction to throw the block I out-

wardly and draw the rod I' inwardly, as shown in Fig. 3.

J represents a continuously-oscillating bunter that is located opposite and adapted to strike the projecting end of block I if the block should be in the outward position of Fig. 3 when the bunter is moving forwardly. In such case it is obvious the arm H will be carried forward with the bunter and by oscillating the rock-shaft G operate the filling-renewing or loom-stop mechanism. The bunter J is fast upon a short rock-shaft j , turning in a bearing j' upon the breast-beam A^2 (for convenience) of the loom, and upon the same short shaft is a second arm J' , to which is pivoted a link J^2 , that extends to a suitable moving part of the loom and through which the oscillation of the bunter J is effected, there being preferably one forward movement of the bunter for every two throws of the shuttle. It is not intended, however, that the bunter J shall strike the block I at every operation of the bunter. To normally withdraw the block I from the path of the bunter the following mechanism may be employed: A short stud K , fast to block I , passes through an extended slot provided in the branch H' at k , so as not to interfere with the sliding of block I , and said stud is provided with a roller K' , that is adapted to engage the incline or cam-face l of a cam L , fast upon or vibrating with the lay-beam.

The action of the vibrating cam L , it will be readily seen from Fig. 1, is upon each beat-up of the lay to force the roller K' out of the normal or to the left in said figure. Upon the extremity of the rod I' is a device i for engaging the hook f of the lever F .

The various parts described are so timed that when the cam L has operated to cause the block I , rod I' , and device i to move to the left, as in the position illustrated in Fig. 2, the lever F through the action of the cam upon the slide D' of the feeler device D will be tilted and the hook f elevated to engage the device i , thereby retaining the parts $I I' i$ in the manner and position shown in said figure until the lay has receded sufficiently to permit the lever F to return to normal position and release the parts $I I' i$. As the lay commences to recede the cam L disengages the roller, but it is ordinarily not until a slightly later period that lever F is permitted to return to normal. It is during this space of time that the bunter J moves forward and ordinarily passes by without striking the block I . (See Fig. 2.)

The operation will now be clearly understood. As long as there is sufficient weft in the shuttle in use the block I will uniformly be held out of the path of the bunter J , at the same time the bunter is passing forwardly, and thereby avoiding the swinging of the arm H upon the oscillating shaft G . When, however, the weft is gradually exhausted to a predetermined point, which may be upon complete failure or substantial exhaustion of the

weft or filling, the cam or incline operated by the feeler device D will fail to engage the device E or actuate the lever F carrying it. Consequently at such stage the device *i*, connected with block I, will fail to engage hook *f* upon lever F. The block I will return to the position of Figs. 1 and 3 as soon as the cam L disengages the roller K', and consequently will lie in the path of the bunter J as the bunter moves forwardly. The bunter will strike the block I, thereby oscillating the rock-shaft G and the filling-renewing or loom-stop mechanism will be operated.

When a filling-renewing mechanism is employed at the opposite side of the loom from the parts described, it may of course be of any usual form, and it will preferably operate when the nearly-exhausted shuttle is thrown over to the shuttle-box at such side of the loom after having effected the described operations of the exhaustion-detecting devices. The rock-shaft G will be returned to normal by any suitable means provided in connection with the filling-renewing or loom-stopping mechanisms when those mechanisms have been operated.

What I claim as my invention is—

1. In a loom the combination with the shuttle-box, of 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 pivoted to oscillate in a plane substantially at right angles to the oscillation of said feeler device, means intermediate of said feeler device and said pivoted lever device, whereby the feeler device may effect such oscillation of the lever device so long as the weft is not exhausted to the predetermined point, a part for bringing about or controlling the operation of a weft or filling-renewing mechanism or a loom-stop mechanism, and operative means intermediate of said part and a moving part of the loom, said means 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.

2. In a loom the combination of a to-and-fro moving member adapted to vibrate in harmony with the lay and under control of the weft or filling in the shuttle in play, a part for bringing about or controlling the operation of a loom-stop or filling-renewing mechanism, mechanism adapted to intermittently actuate said part and a lever device pivoted to oscillate in a vertical plane through, and under control of the said to-and-fro moving member for preventing the actuation of such part, when the shuttle is well supplied with filling and for permitting its actuation upon the failure or substantial exhaustion of the weft or filling.

3. In a loom the combination of a movable feeler device constructed and fitted to enter the shuttle in play to press upon the weft

therein, whereby the feeler device may vibrate in harmony with the lay, and its amplitude of vibration be under control of the filling or weft in the shuttle; mechanism for bringing about or controlling the operation of a loom-stop or filling-renewing mechanism; a moving part of the loom adapted to engage and actuate the said controlling mechanism; a cam for placing said mechanism in inoperative position, and means under control of the said feeler device for engaging to retain in inoperative position said mechanism, whereby it may prevent the engagement of said moving part of the loom with said controlling mechanism to actuate it, until the failure or substantial exhaustion of the weft or filling in the shuttle, and then permit such engagement.

4. In a loom the combination with a feeler device vibrating in harmony with the lay, and under control of the weft or filling in the shuttle, a movable arm or member for bringing about or controlling the operation of a loom-stop or filling-renewing apparatus, a power-actuated bunter; a reciprocating part carried on said movable arm or member adapted to be engaged by said bunter, whereby the movable arm or member is actuated, means to periodically reciprocate said reciprocating part to remove it from the action of said bunter, or into inoperative position, a catch device adapted to engage said reciprocating part to hold it in such inoperative position, while the said bunter passes its critical position, and means intermediate of the said feeler device and said catch device whereby the latter is moved periodically into operative position to prevent actuation of the aforesaid movable arm or member until the failure or substantial exhaustion of the weft.

5. In a loom the combination with a feeler device vibrating in harmony with the lay, its amplitude of vibration under control of the weft or filling in the shuttle, a rock-shaft for bringing about or controlling the operation of a loom-stop or filling-renewing mechanism, and mechanism for actuating said rock-shaft comprising an arm extending from the rock-shaft, a reciprocating part carried on said arm, a continuously-moving bunter for engaging said reciprocating part to actuate said rock-shaft, and mechanism under control of the said feeler device for removing the said reciprocating part from the path of said bunter when the shuttle is well supplied with weft or filling.

6. In a loom the combination with the lay and the shuttle-box thereof of the feeler device D vibrating in harmony with the lay, and adapted to enter the shuttle in the shuttle-box A, whereby the amplitude of vibration of the feeler device is under control of the filling or weft in the shuttle; a cam E' operated by the feeler device to oscillate a lever F as long as sufficient quantity of weft or filling remains in the shuttle; said lever F; a rock-shaft G for bringing about or controlling the operation of

a loom-stop or filling-renewing mechanism, an arm as H, connected to said shaft, a movable slide I carried on said arm, a bunter J adapted to coact with said slide I to actuate arm H, a
 5 cam L carried by the lay for sliding said slide I and engaging hook devices *i f* carried by said slide and said lever F respectively, substantially for the purpose described.

7. In a loom the combination with the lay
 10 of a movable arm or member for bringing about or controlling the operation of a weft-renewing or loom-stop apparatus, a reciprocating part carried on said arm or member, a spring acting on said part to hold it in normal
 15 or operative position, means, as a cam, for periodically moving said part against the action of said spring, and an intermittently-actuated and weft-controlled device for engaging and holding said part in inoperative po-
 20 sition, and a bunter for actuating said part when said weft-controlled device fails to engage the same, whereby a weft-renewing or loom-stop mechanism may be brought into operation upon failure or substantial exhaus-
 25 tion of the weft in the shuttle.

8. In a loom the combination with the lay of a device fitted to move to and fro in har-
 30 mony with the lay provided with a member for entering the shuttle to coact with the weft therein, whereby the amplitude of movement of said to-and-fro device is controlled by the quantity of weft in the shuttle; a bunter, and mechanism actuated thereby adapted to con-
 35 trol or bring about the operation of a loom-stopping or weft-renewing apparatus; means for intermittently moving said mechanism into inoperative position; and a lever device for intermittently maintaining said mechan-
 40 ism in such inoperative position; and means intermediate said lever device and said to-and-fro device for producing such intermit-
 tent movement of said lever device, until the amplitude of movement of said to-and-fro de-
 45 vice reaches a predetermined point.

9. In a loom the combination with the lay of a feeler device adapted to move to and fro

in harmony with the lay, its amplitude of movement under control of the weft in the shuttle; mechanism for bringing about or controlling the operation of a loom-stopping
 50 or filling-renewing apparatus, said mechanism including a shifting block; a moving part of the loom for engaging said block to actu-
 ate said mechanism; a second moving part of the loom for shifting said block out of the
 55 path of said first-named moving part; means for returning said block to normal position; a lever device adapted and fitted to be oscil-
 lated by said feeler device until the weft is exhausted to a predetermined extent, and
 60 means intermediate of said lever device and said shifting block whereby said lever device may intermittently retain said shifting block in its inoperative position, and thereby pre-
 65 vent the operation of the loom-stopping or filling-renewing mechanism until the prede-
 termined exhaustion of weft.

10. In a loom the combination with the lay of the feeler device D for coacting with the weft in the shuttle in play, and operated to
 70 move to and fro in harmony with the vibrations of the lay, the oscillating lever device F, the cam E constituting means whereby the feeler device may oscillate the lever device
 75 when there is sufficient weft in the shuttle, the rock-shaft G adapted to be connected with loom-stopping, or weft-renewing apparatus, the arm H carried thereon, the shifting block I fitted to said arm to actuate shaft G, the
 80 oscillating cam L for shifting said block I to inoperative position, and a hook *f* carried on said lever device F, adapted to retain said block I in inoperative position while the bunter J is actuated.

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

JOHANN HEINRICH KLERX.

Witnesses:

F. J. PURDY,
 GEO. E. DEPPEN.