

J. TAYLOR & E. W. BUCKLEY.
 MECHANICAL WEFT FEELING MECHANISM FOR LOOMS.
 APPLICATION FILED FEB. 25, 1908.

915,248.

Patented Mar. 16, 1909.
 4 SHEETS—SHEET 1.

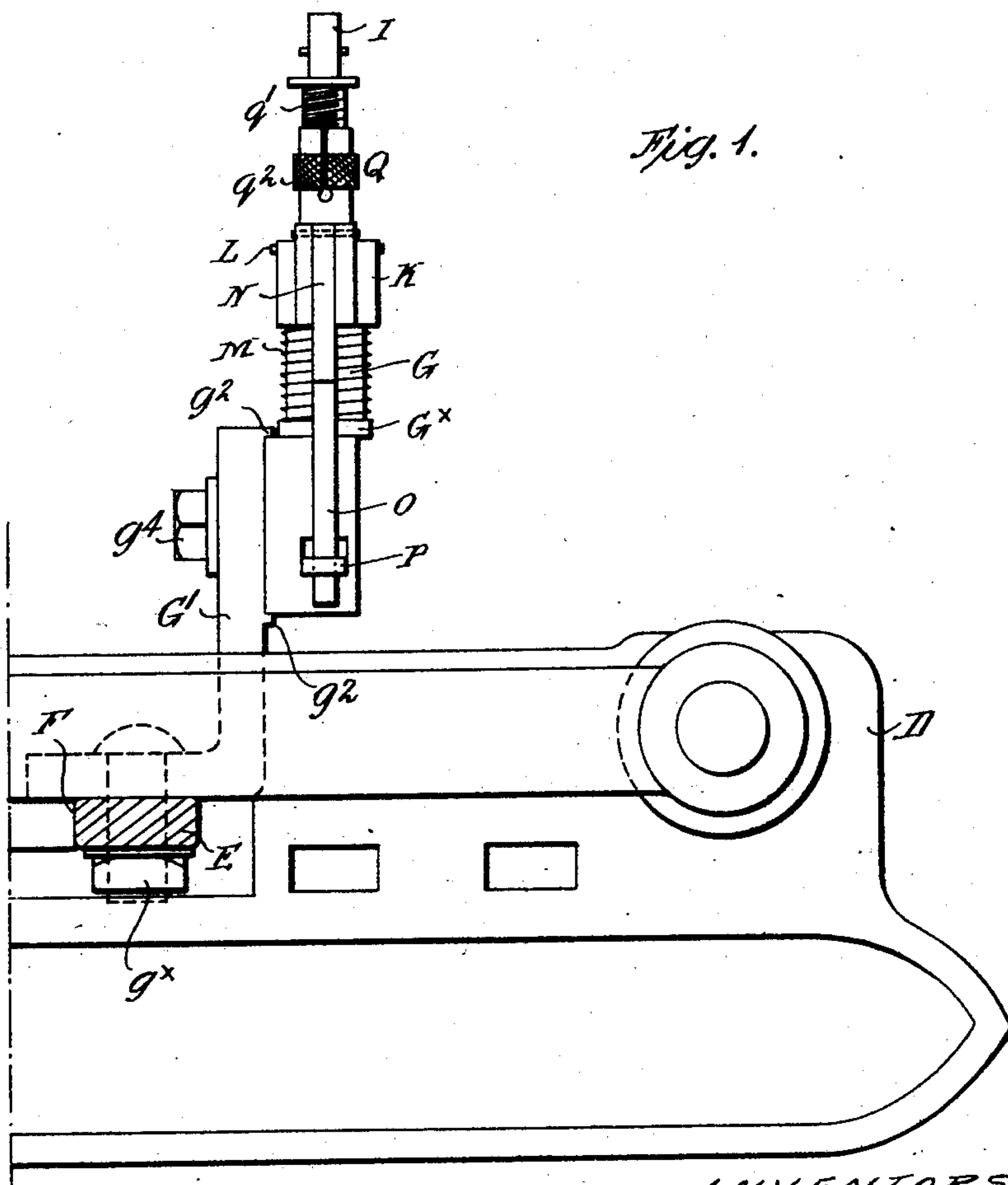
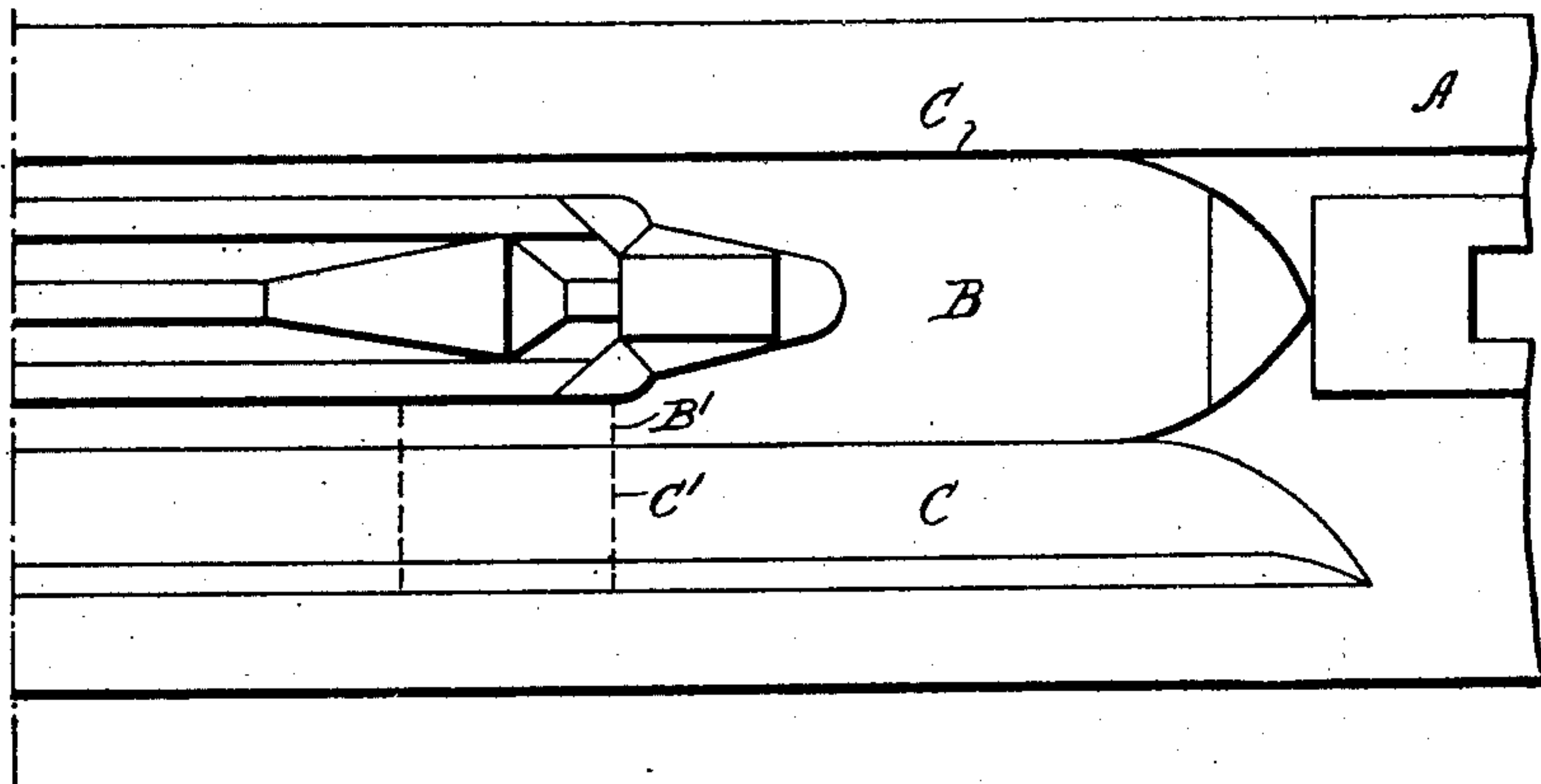


Fig. 1.

WITNESSES

W. P. Burke
 W. H. Kennedy

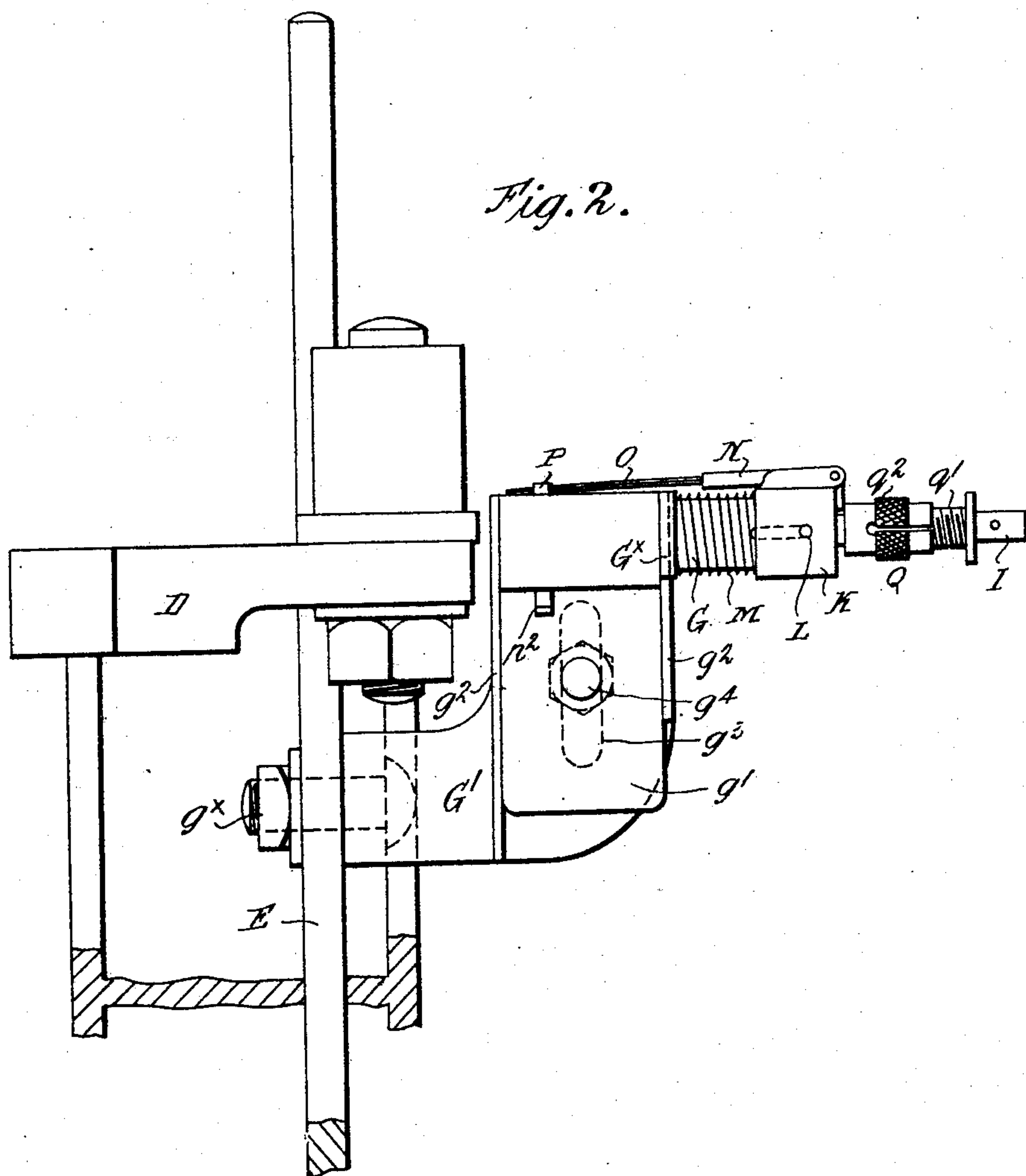
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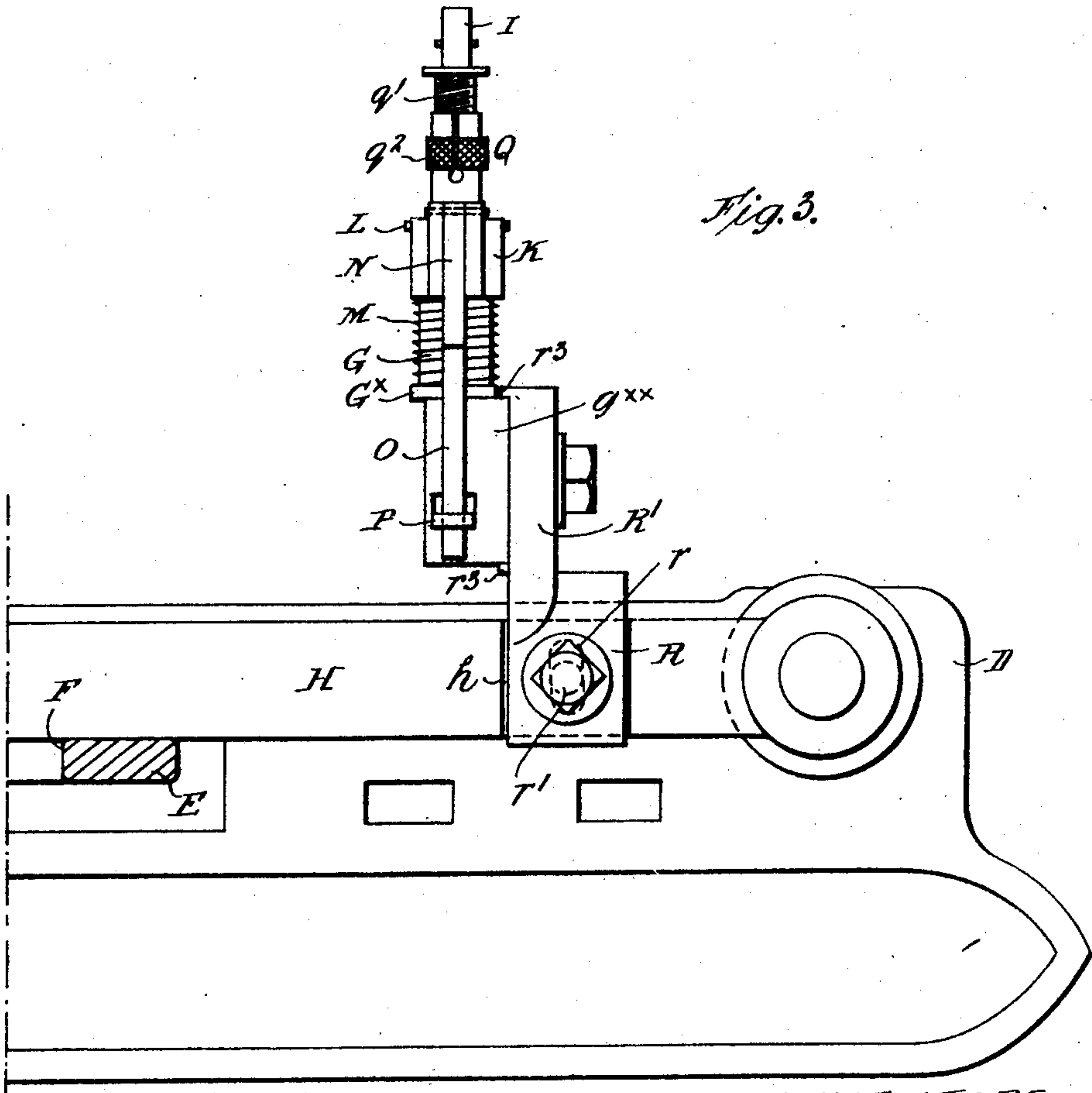
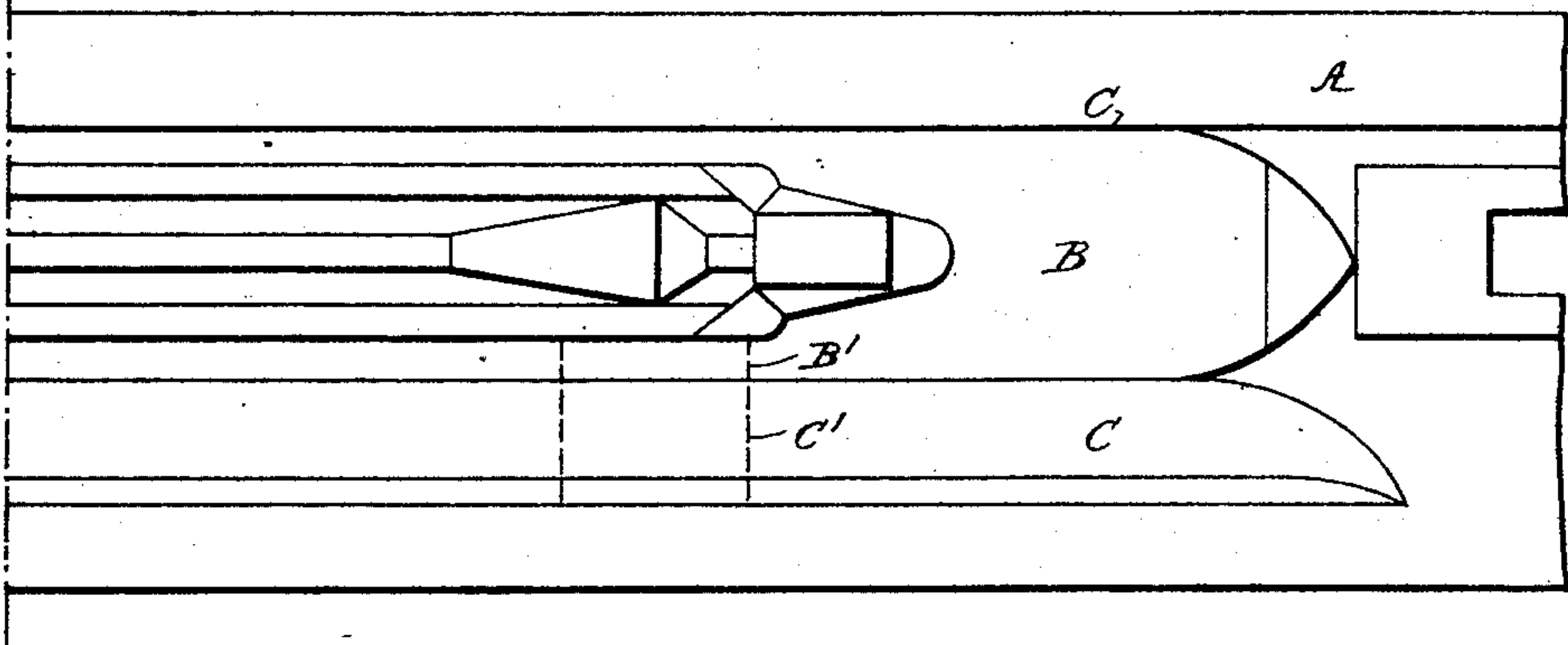


Fig. 3.

WITNESSES
W. P. Burke
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Patented Mar. 16, 1909.

4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JOHN TAYLOR AND EDWIN WILLIAM BUCKLEY, OF MANCHESTER, ENGLAND.

MECHANICAL WEFT-FEELING MECHANISM FOR LOOMS.

No. 915,248.

Specification of Letters Patent.

Patented March 16, 1909.

Application filed February 25, 1908. Serial No. 417,653.

To all whom it may concern:

Be it known that we, JOHN TAYLOR and EDWIN WILLIAM BUCKLEY, subjects of the King of Great Britain, residing at Park Works, Newton Heath, Manchester, in the county of Lancaster, England, have invented new and useful Improvements in and Relating to Mechanical Weft-Feeling Mechanism for Looms, of which the following is a specification.

This invention relates to mechanical weft feeling mechanism for looms of that type in which a feeler is adapted, on the beat up of the lay, to pass through coincident holes in the sides of the shuttle box and the shuttle and to impinge on the weft in the shuttle, the moment for the operation of the loom stopping or weft replenishing mechanism being determined by the exhaustion of the weft to the predetermined extent. Weft feeling devices of this description have been known for some time, but have not come into general use owing to irregularities in their operation. In constructing a device of this type which shall prove successful in practice the main difficulties to be overcome are the very short space of time within which the device must operate and the great accuracy of touch or feeling required.

While many of the irregularities of existing feelers have been attributed to variations in the beat of the lay, we believe that the comparative failure of other devices has been largely due to the fact that sufficient attention has not been given to insuring full use being made of the whole of the short space of time allowed for the device to operate nor to making allowance for irregularities and sluggishness of action rising either from wear in the parts of the device or from the vibration of the loom frame itself when the loom is running. Moreover considerable variation is found in practice in the tightness with which cops are wound, and unless the feeling device can be made to operate with only a very slight normal pressure on the weft, the feeler will, in the case of loosely wound wefts, indent or squeeze the weft out of shape, thereby causing the loom stopping or weft replenishing mechanism to be operated before the weft has been exhausted to the predetermined extent, thus causing unnecessary waste.

The object of the present invention is to

obviate the disadvantages of existing feeling devices and so to construct such devices that they shall, by reason of the construction and arrangement of parts, not be affected in their action either by vibration of the loom frame or by ordinary wear of their parts, and that they shall be independent of the degree of tightness of the winding of the weft and shall operate immediately and unfailingly upon the exhaustion of the weft to the predetermined extent. Moreover as a feeling device constructed according to the present invention can be mounted either on the shipper lever or on a lever directly bearing against the shipper lever no intermediate connections between the feeler mechanism and the shipper lever are required, so that knocking off of the loom is effected by the weft carrier in a direct manner. This enables the device to operate more quickly, reduces the number of parts liable to wear, and prevents damage to the wall of the shuttle.

According to our invention we so construct and arrange the parts of a feeling device that a gentle cushioned blow is given to the weft, which in no way depresses or changes the shape of the weft, however loosely wound, and a ferrule loosely mounted on the feeler rod is adapted, when the weft has become exhausted to the predetermined extent, to come into contact with the side of the shuttle and cause the feeler rod to be locked to the casing in which it is mounted and the latter to be pushed against the shipper lever or the like upon the beat up of the lay, so stopping the loom.

In carrying out our invention we preferably mount the feeling device directly on the shipper lever. We provide a casing for containing a sliding feeler rod, which latter is enlarged, at its central part and is suitably guided at its rear end. Surrounding the rear portion of the feeler rod is a very light spring which presses against such central enlarged part of the feeler rod and tends to move it outward. On the outer end of the exterior of the casing a sleeve is slidably mounted, and through this sleeve and slots in the casing and the enlarged portion of the feeler rod a transverse pin is passed. Around the exterior of the casing a second light spring is mounted, one end of said spring pressing against the sleeve and the other against a

shoulder on the casing. Alternatively, this second spring may be arranged within the casing, as hereinafter described. The slots in the casing are of sufficient length to permit of the feeler rod and parts connected therewith being pushed back by contact with the weft as far as required, while the slot in the feeler rod is of sufficient length to allow the feeler rod to be pressed a short distance inward by the weft before any sliding movement is imparted to any other part of the device. To the sleeve is pivoted a bell-crank lever, the short vertical arm of which comes close to the feeler rod and in the path of a ferrule which is loosely mounted on the forward part of the feeler rod and is preferably so constructed as to be adjustable in length, with which object we construct the ferrule in two pieces, one piece being provided with longitudinal slits and threaded to receive the other. The longer horizontal arm of the bell crank lever is provided with a flexible flat spring the outer end of which is threaded through an eye at the upper end of a small vertical metal blocking piece, which is provided with a hole for the passage of the rear end of the feeler rod and is adapted to slide within a vertical slot. The parts are so arranged that when quiescent the rear end of the feeler rod lies a short distance in front of and in line with the hole in the blocking piece.

In order that our invention may be thoroughly understood we will now refer to the accompanying drawings illustrating our construction of feeling device as used for the purpose of stopping a loom.

Figures 1 and 2 are a plan and side elevation of portions of a loom showing our feeling device secured to the shipper lever. Fig. 3 is a plan corresponding to Fig. 1, but illustrating said feeling device mounted on a lever bearing directly against the shipper lever. Fig. 4 is a side elevation of the bracket shown in Fig. 3, by which the feeling device is attached to the lever that bears against the shipper lever. Figs. 5 and 6 are vertical sections, on an enlarged scale, of the feeling device shown in Figs. 1, 2 and 3, Fig. 5 illustrating the parts in their quiescent positions and Fig. 6 showing the blocking piece raised. Fig. 7 is a vertical section of Fig. 5, on the line 1—2. Fig. 8 is a front elevation of the blocking piece. Fig. 9 is a vertical section corresponding to Fig. 5, but showing another arrangement of the springs.

In these drawings, A is the lay, B the shuttle, C the shuttle box, B¹ and C¹ the holes in the sides of the shuttle and shuttle box, D the breast beam, E the shipper lever and F the retaining notch for same, all of which parts being of ordinary or well-known construction require no further description.

G is the feeler casing, which is mounted on or secured to the shipper lever E or a lever

H directly bearing against same and contains the feeler rod I. The feeler rod I is suitably guided and is provided with a central enlargement I¹.

J is a light spring surrounding the feeler rod I and pressing against the enlargement I¹.

K is a sleeve slidably mounted on the casing G and L is a transverse pin passing through slots *g* in the casing G and a slot *i* in the enlargement I¹ and extending from one side thereof to the other.

M is a light spring, of slightly greater strength than the spring J which may be mounted on the exterior of the casing G intermediate between the sleeve K and a shoulder G^x on the casing, as shown in the majority of the drawings, or may be arranged within the casing G and bear against a collar I² mounted on the enlarged portion I¹ of the feeler rod I, as shown in Fig. 9.

N is a bell-crank lever pivoted to the sleeve K and flexibly connected by means of a blade spring O to a blocking piece P. The blocking piece P is provided, as shown more clearly in Fig. 8, with an eye *p* through which the rear end of the spring O is threaded, with a hole *p'* through which the rear end of the feeler rod I passes during the normal operation of the device, and with a lug *p*² for limiting its upward movement.

Q is a ferrule loosely mounted on the feeler rod I in front of the sleeve K and kept in place by means of a pin *q*. The ferrule Q is preferably formed, as shown in Figs. 1, 2, 3, 5 and 6, in two parts *q*¹, *q*², one of which *q*¹ is flanged and screwed on its outer surface while the other part *q*² is slit at its front portion so as to prevent said parts, after the length of the ferrule has been adjusted by screwing the part *q*¹ into the other part *q*², from moving in relation to one another. The ferrule Q may however be formed in one piece as shown in Fig. 9.

When the feeling device is mounted on the shipper lever, as shown in Figs. 1 and 2, its attachment thereto may be effected by means of a bracket G¹ of the general shape shown on the drawings. In this case the rear end of the bracket G¹ would be secured to the shipper lever E by means of a bolt and nut *q*^x, while the rear end of the feeler casing G would be vertically adjusted on and secured to the front end of the bracket G¹ by means of the lug *q*¹, projections *q*², slot *q*³ and screwed pin *q*⁴, as will be clearly understood by an inspection of Fig. 2.

When the feeling device is secured to a lever, such as H, bearing directly against the shipper lever, we prefer to effect this through the medium of an L-shaped bracket R, R¹. The horizontal arm R of said bracket engages with a recess *h* cut in the lever H and is slotted as shown at *r* so that it may, after being adjusted in position, be secured to the

lever by a clamping screw r^1 . The vertical arm R^1 of the bracket is provided with a slot r^2 and projections r^3 adapted to receive a squared part g^{xx} formed on the end of the casing G. By adjustably mounting, in the above described manner, the feeler casing G on the intermediate bracket R, R^1 and the latter on the lever H the position of the feeling device can be adjusted to suit the requirements of each loom.

The slot in the feeler rod is of great importance, and serves three distinct purposes. By reason of this slot the blow with which the weft strikes the end of the feeler rod is cushioned, the only resistance offered to the weft being the very slight pressure of the light spring J surrounding the feeler rod which requires to be only of sufficient strength to return the feeler rod to its normal position when the lay beats back. This slot also allows the feeler rod to be moved by contact with the weft a short distance inward without carrying the sleeve with it, and thus permits the ferrule, which is adjusted, upon exhaustion of the weft to the predetermined extent to come into contact with the side of the shuttle while the weft is still in contact with the feeler rod, to rock the bell-crank lever and so raise a solid portion of the blocking piece into the path of the rear end of the feeler rod, before the latter can impart a sliding movement to the sleeve. Further, the time allowed for the taking up of this slot makes provision for the play which may arise from wear in the parts and the resulting slowness of their action and so insures the accurate operation of the device despite such wear and obviates the necessity for the constant adjustment required in other devices. As the parts of the device are so adjusted that when the weft is exhausted to the predetermined extent the ferrule comes into contact with the shuttle at the same time as the weft strikes the feeler rod, it will be seen that no transference of pressure from the one point to the other is required to operate our device, as is the case with other devices of this description. Such transference of pressure shortens the time within which the device can operate, and it has been found in practice that when exhaustion of the weft to the predetermined extent is exactly reached the transference of pressure often is either insufficient or too late to operate the device on that beat of the lay, and so the shuttle has to pass across the loom and back again before the device can operate, by which time, unless the device is set to allow for considerable waste, the weft is entirely exhausted and the whole object of the device is defeated.

The flexible spring arm of the bell-crank lever is also of importance as it takes up any undue strain which might otherwise be thrown on the weft or the parts of the device owing to variation in the working of the

loom, and which might damage the device or cause irregular working.

We have described our weft feeling device more particularly with reference to loom stopping, but it is equally serviceable when connected through suitable mechanism to weft replenishing devices used on what are known as automatic looms.

The operation of the device is as follows: So long as the weft remains unexhausted to the predetermined extent the feeler rod on each alternate beat of the lay enters the shuttle box and shuttle through the holes provided and is driven inward by the contact, carrying with it the sleeve, the bell-crank lever and the ferrule mounted on the feeler rod, the rear end of the feeler rod passing through the hole in the blocking piece. When, however, the weft is exhausted to the predetermined extent, the ferrule comes into contact with the side of the shuttle while the weft is still in contact with the feeler rod. This results in the bell-crank lever being rocked and the blocking piece thereby raised, while the rear end of the feeler rod, when the slot in the latter has been taken up, then comes against a solid portion of the blocking piece and the whole device becomes locked and is driven back by the completion of the stroke of the lay, thus pushing the shipper lever from its notch and so stopping the loom or alternatively operating the weft replenishing mechanism.

What we claim and desire to secure by Letters Patent of the United States is:—

1. In a mechanical weft feeling device for looms the combination of a fixed casing, a spring-actuated feeler rod sliding within said casing, a ferrule loosely mounted on the feeler rod in front of the casing and means connected to said feeler rod and operated by the ferrule for limiting the sliding movement of the feeler rod, substantially as described herein.

2. In a mechanical weft feeling device for looms the combination of a fixed casing, a feeler rod sliding within said casing, a ferrule loosely mounted on the feeler rod in front of the casing, a sleeve slidably mounted on the casing and carrying means for limiting the travel of the feeler rod, and springs acting respectively on the feeler rod and the sleeve for the purposes stated, substantially as described.

3. In a mechanical weft feeling device for looms the combination of a fixed casing, a spring-actuated feeler rod sliding within said casing, a central enlargement on said feeler rod, a slot in said enlargement, a spring-actuated sleeve slidably mounted on the forward end of the casing, slots in said casing, a pin secured to said sleeve, and passing through the slot in the central enlargement of the feeler rod and the slots in the casing, and means carried by said sleeve for limiting

the travel of the feeler rod, substantially as described herein.

4. In a mechanical weft feeling device for looms the combination of a fixed casing, a
5 spring-actuated feeler rod sliding within said casing, a central enlargement on said feeler rod, a collar mounted on said enlargement, a spring actuated sleeve slidably mounted on the forward end of said casing, slots in
10 said casing and central enlargement, a pin secured to said sleeve and passing through said collar and the slots in said casing and central enlargement, and means carried by said sleeve for limiting the travel of the
15 feeler rod, substantially as described.

5. In a mechanical weft feeling device for looms the combination of a fixed casing, a
spring-actuated feeler rod sliding within said casing, a central enlargement on said feeler
20 rod, a slot in said enlargement, a spring-actuated sleeve slidably mounted on the forward end of the casing, slots in said casing,

a transverse pin secured to said sleeve and passing through the slot in the central enlargement of the feeler rod and the slots in
25 the casing, a blocking piece vertically guided at the rear end of the feeler rod and provided with a hole for the passage of the feeler rod, a bell-crank lever pivotally mounted on the sliding sleeve and connected to the blocking
30 piece by means of a blade spring passing through an eye in the blocking piece, and a ferrule loosely mounted on the feeler rod in front of the fixed casing and adapted to contact with the vertical arm of the bell-crank
35 lever, substantially as described herein.

In testimony whereof we have signed our names to this specification in the presence of two subscribing witnesses.

JOHN TAYLOR.

EDWIN WILLIAM BUCKLEY.

Witnesses:

NORMAN HENRY SHEARD,

JAS. STEWART BROADFOOT.