

No. 680,396.

Patented Aug. 13, 1901.

W. ROSENHAIN.
COUNTING DEVICE.

(Application filed Oct. 9, 1900.)

(No Model.)

4 Sheets—Sheet 1.

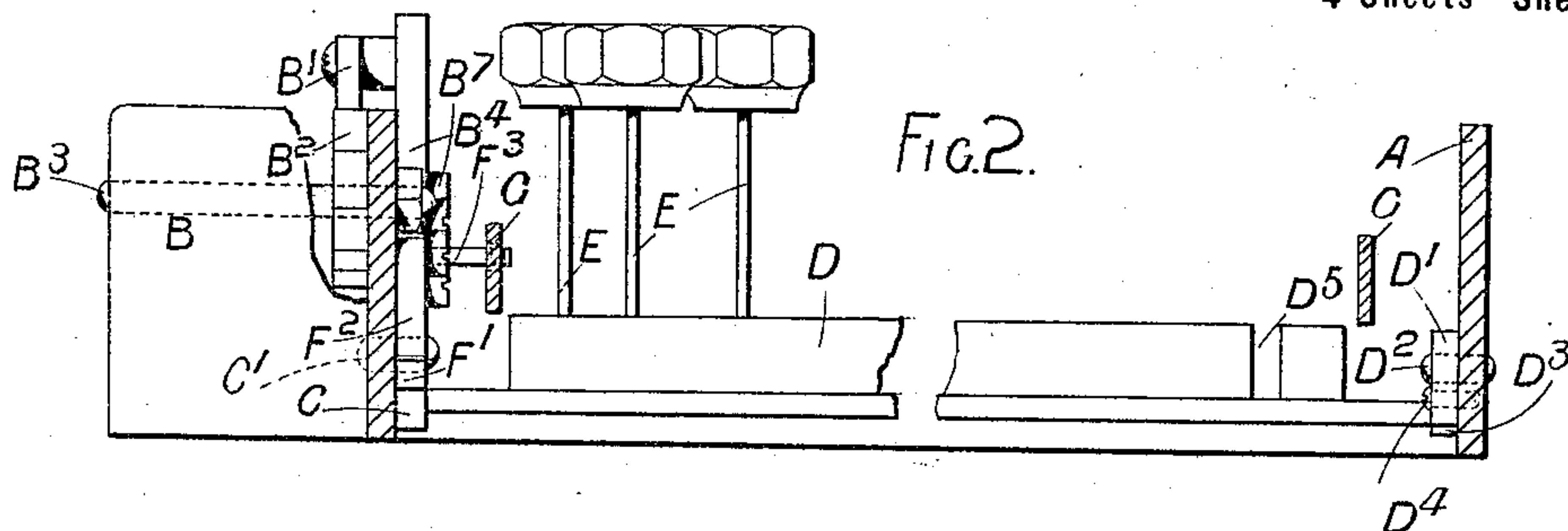
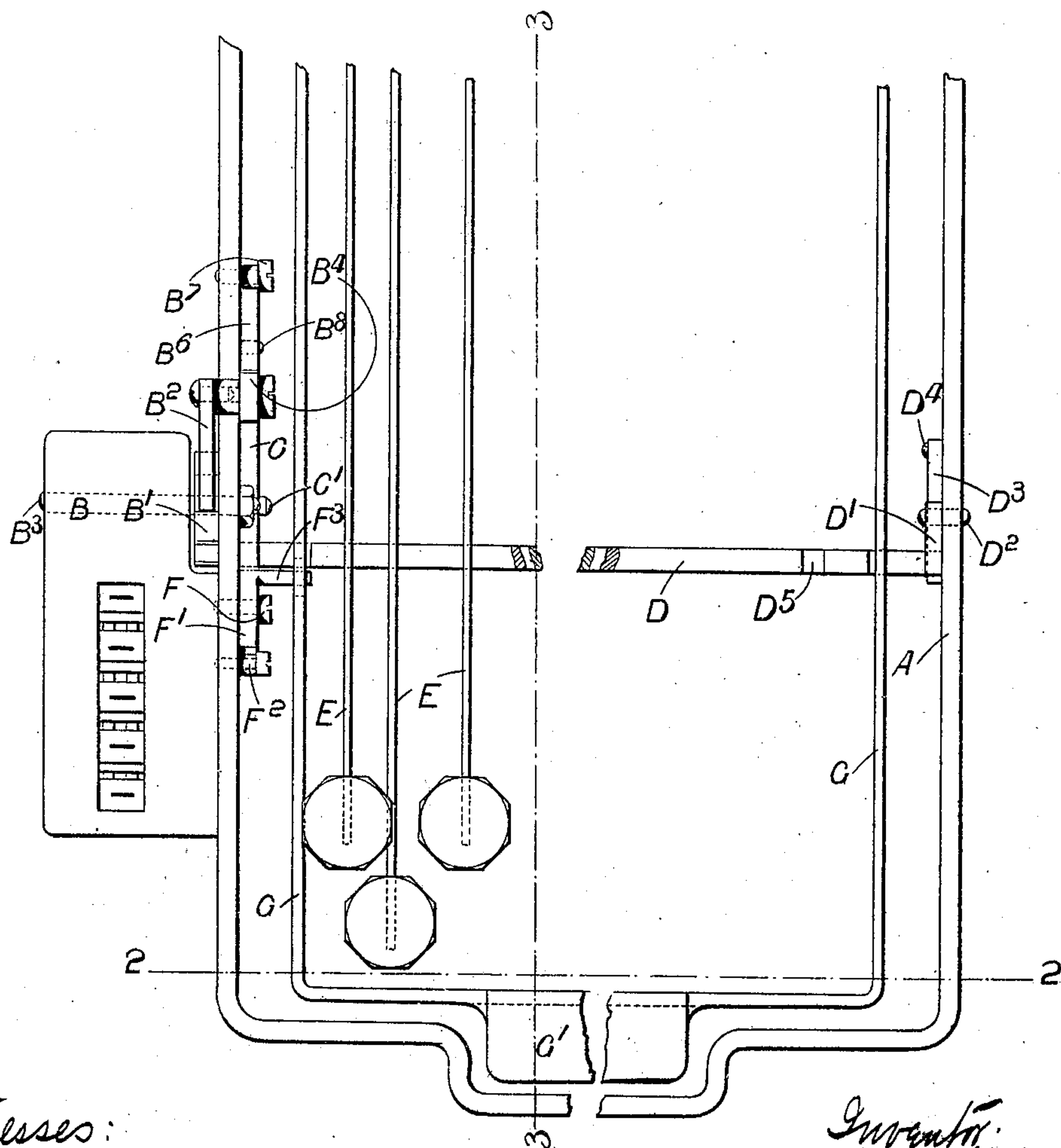


Fig. 1.



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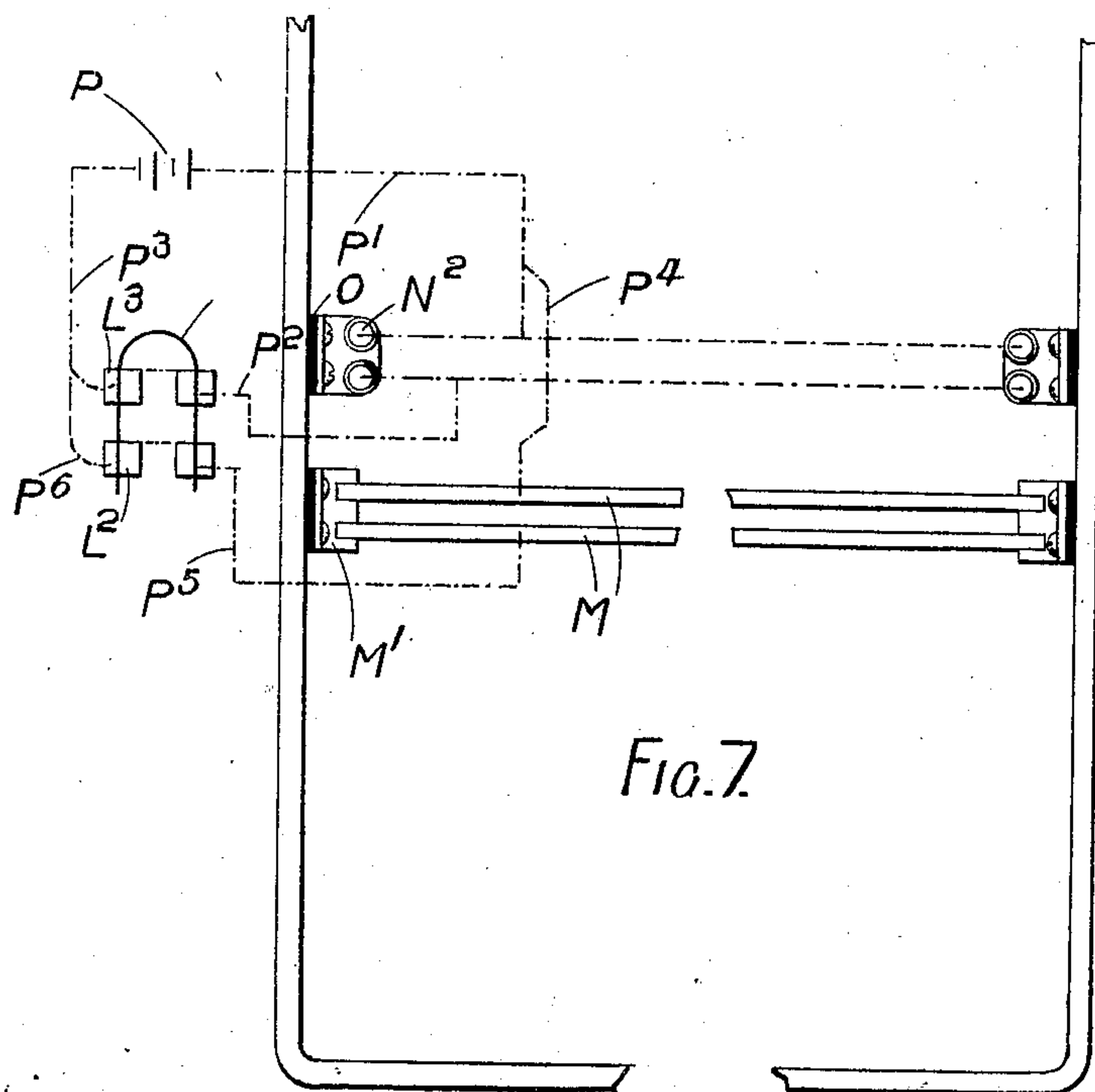
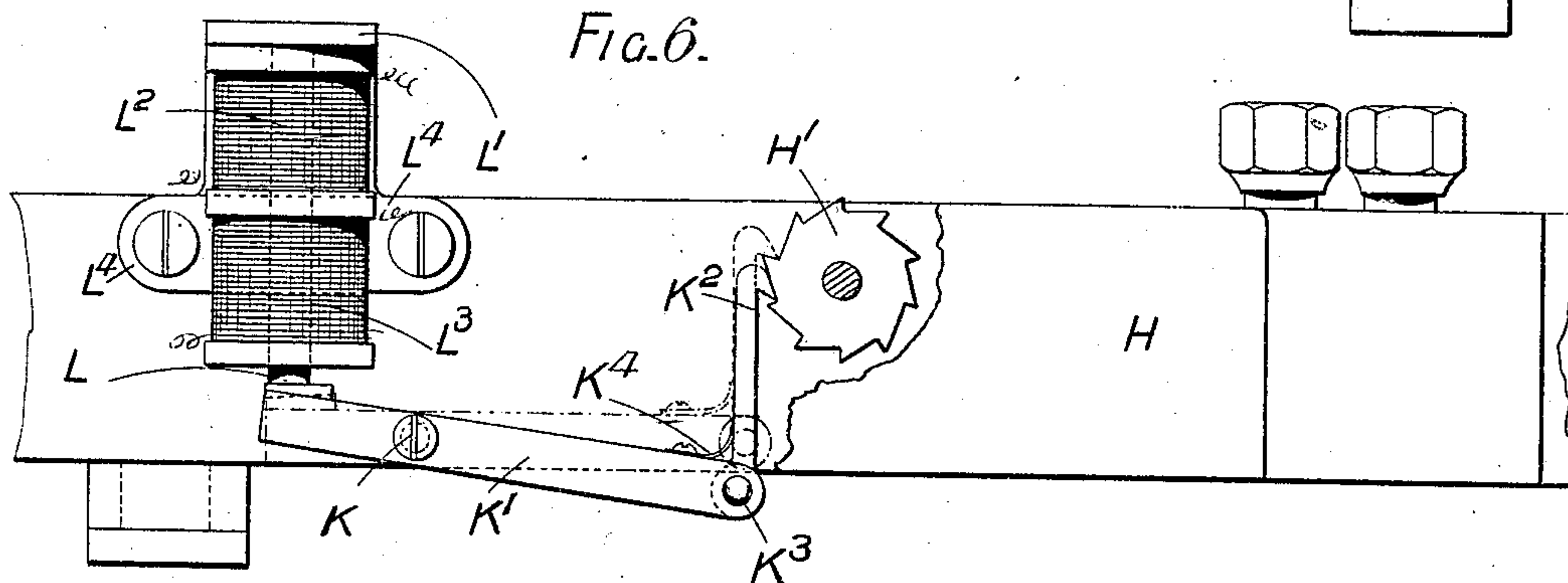
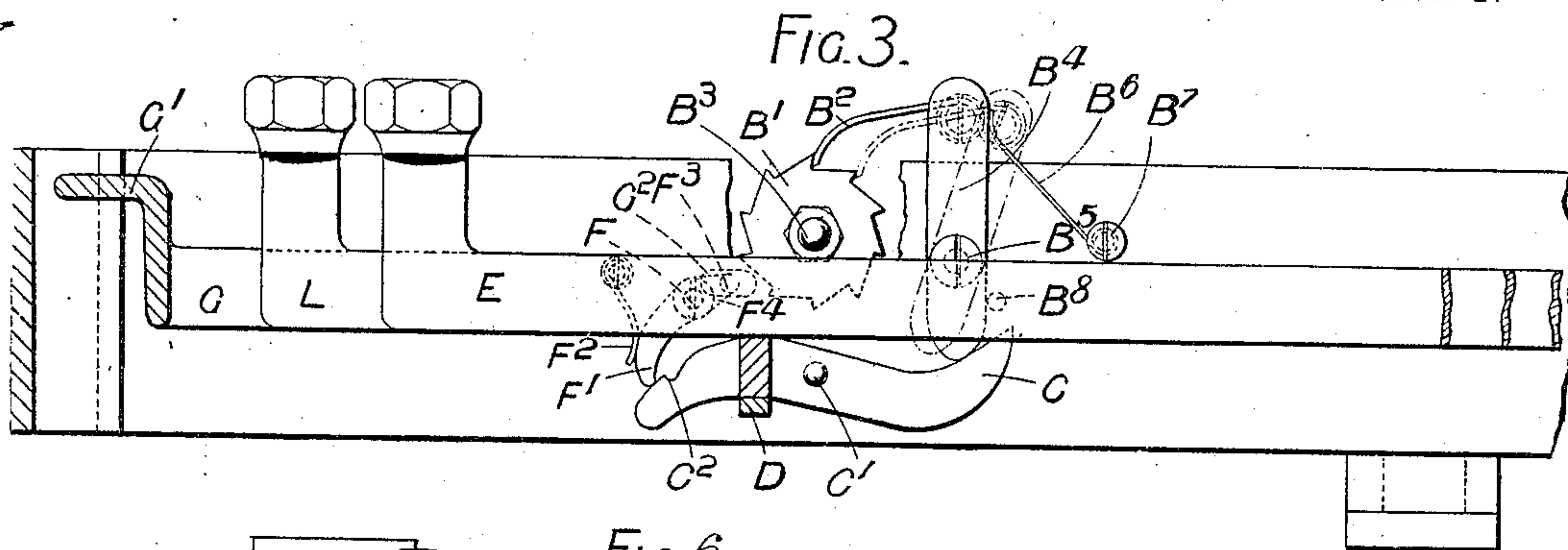
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4 Sheets—Sheet 2.



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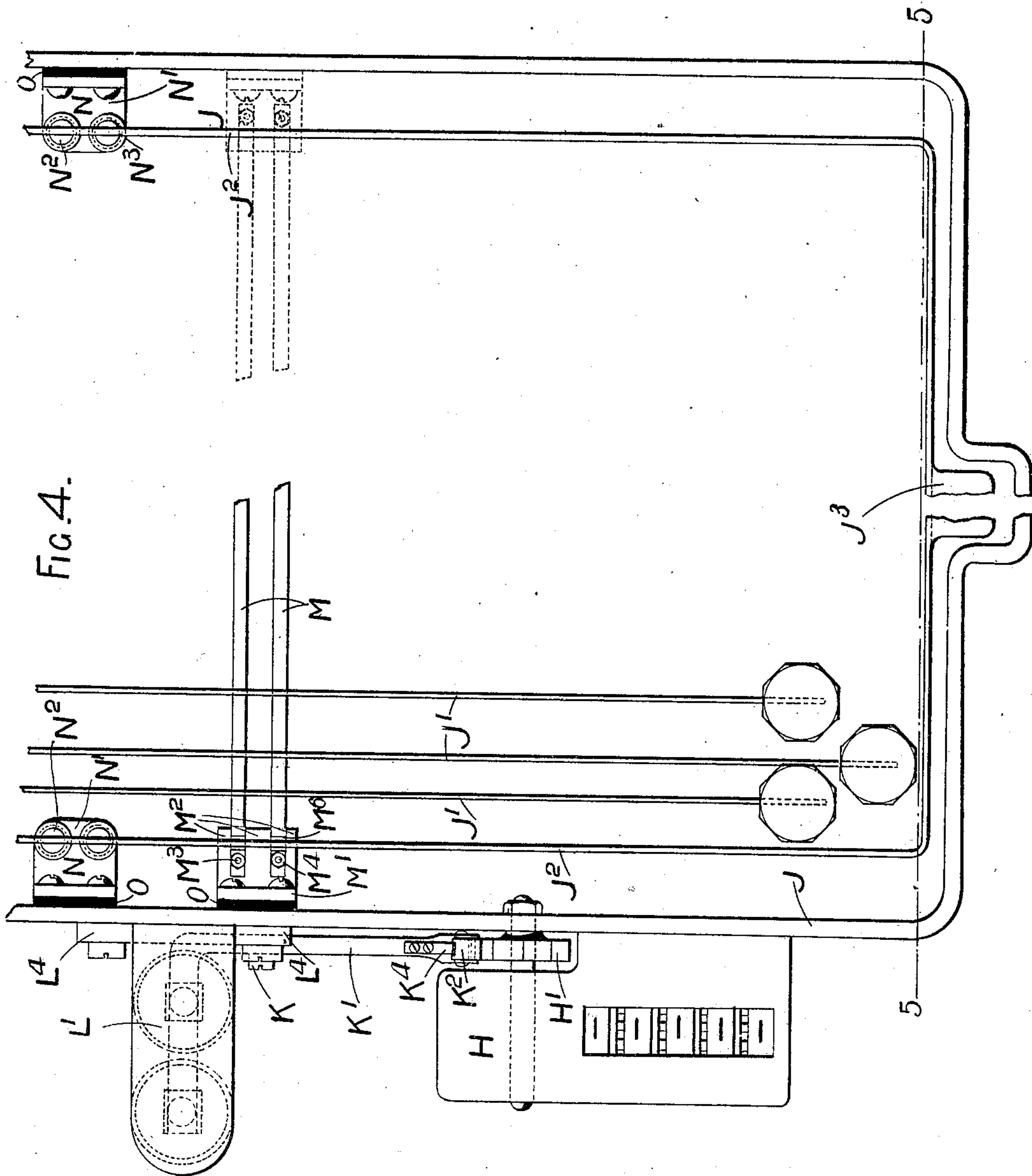
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4 Sheets—Sheet 3.



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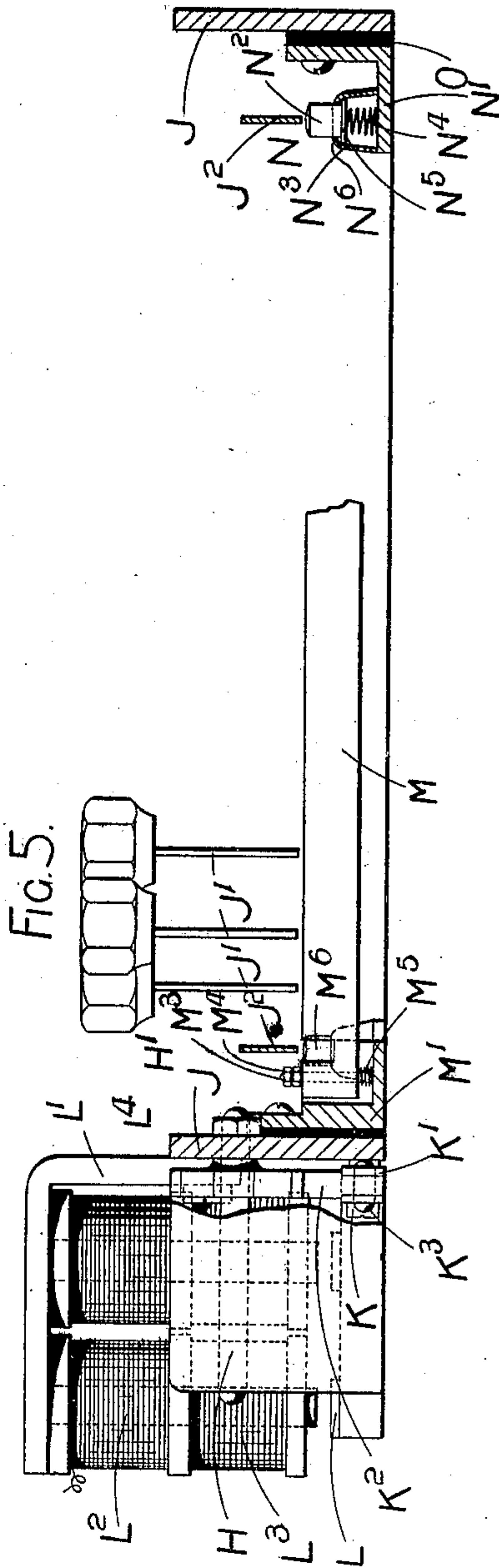
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4 Sheets—Sheet 4.



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UNITED STATES PATENT OFFICE.

WALTER ROSENHAIN, OF LONDON, ENGLAND.

COUNTING DEVICE.

SPECIFICATION forming part of Letters Patent No. 680,396, dated August 13, 1901.

Application filed October 9, 1900. Serial No. 32,527. (No model.)

To all whom it may concern:

Be it known that I, WALTER ROSENHAIN, a subject of the Queen of Great Britain, residing at London, England, have invented a certain new and useful Counting Device for Type-Writers or other Keyboard-Operated Machines, (for which application for Letters Patent has been made in Great Britain under No. 16,522, dated September 17, 1900,) of which the following is a specification.

This invention relates to the application of a counting device to type-writers or other keyboard-operated machines, such as linotypes, monotypes, or telegraphic instruments in which a keyboard is used.

The invention consists in applying a counting device of any convenient construction to keyboard-operated machines in such a manner that when any one of the character-keys is depressed the mechanism for operating the counting device is put in position to register the movement of the keys and when the spacing-key is depressed a registration of the movement of the character-keys is completed. By this means any number of the character-keys may be depressed consecutively while the mechanism for operating the counting device is maintained in position to record, the actual registration only taking place when the spacing-key is depressed, and thus indicating that a certain combination or grouping of the keys has been accomplished—as, for instance, at the close of the formation of a word. Thus in a type-writer the depression of the spacing-key after each word is formed will record the formation of the complete word upon the counting device.

In the accompanying drawings, which illustrate a counting device attached to a typewriter, Figure 1 is a plan showing the disposition of the counting device and its mechanism on the machine. Fig. 2 is a transverse vertical section of the machine on the line 2 2 of Fig. 1. Fig. 3 is a longitudinal section of the machine on the line 3 3 of Fig. 1. Fig. 4 is a plan view showing a counting device attached to a machine and provided with electrical connections for operating it. Fig. 5 shows a transverse section of the machine on the line 5 5 of Fig. 4. Fig. 6 shows a side elevation of the machine, and Fig. 7 is a diagrammatic view illustrating the electrical

connections between the different parts of the machine.

Secured to the frame A of the machine and conveniently upon one side of it is a counting device B of any suitable construction. The counting device is operated by a ratchet B' and pawl B². The ratchet B' is carried by a spindle B³, which engages with the rest of the mechanism of the counting device in any well-known manner. The pawl B², which may be in the form of a flat spring, as shown in the drawings, is secured to the upper end of an arm B⁴, pivoted at B⁵ to the frame A of the machine. The arm B⁴ is normally urged forward in the direction indicated by the arrow, Fig. 3, by a spring B⁶, secured to the frame A of the machine at B⁷. The spring B⁶ thus keeps the arm B⁴ normally in the position shown in Fig. 3, its lower end abutting against a stop B⁸, so that after having been displaced it is always brought back to its original position.

The lower end of the arm B⁴ engages a cam-shaped part of a lever C, pivoted at C' to the frame A of the machine. The lever C projects beyond the pivot C' on that side remote from the lever B⁴ and has secured to it one end of a universal lever D. The universal lever D extends beneath the character-keys E of the machine, and its free end is secured to an arm D', pivoted to the frame A at D² on the opposite side of the machine to that at which the lever C is pivoted. A spring D³, secured to the frame A of the machine at D⁴ and made to bear against the arm D', normally maintains the universal lever D in contact with the levers of the character-keys E.

In close proximity to the lever C and pivoted at F to the frame A of the machine is a pawl F', controlled by a spring F², (which is also secured to the frame A,) so that the end of the pawl is made to bear against that end of the lever C remote from the arm B⁴, which carries the pawl B². This end of the lever C is curved, so that the pawl F' slides upon it when the lever turns about its pivot C'. In the face of the lever is a recess C², adapted to engage the pawl when brought into its path. The pawl carries a pin F³, secured to it at F⁴ upon the opposite side of the pivot F to that upon which the operative end of the pawl is arranged. The pin projects at right

angles to the pawl into the path of one of the arms G commonly used to carry the spacing-key G'. The arm G adjacent to the pawl is provided with a slot G² to receive the end of the pin F³, so that when the arm of the spacing-key is depressed the pin is carried down with it.

The operation of this device is as follows: When any one of the character-keys is depressed, it carries down with it the universal lever D. This movement of the lever D raises that end of the lever C which is in engagement with the lower end of the arm B⁴, and the cam-shaped portion of the lever operating against the arm turns it upon its pivot B⁵ against the action of its spring B⁶. At the same time the opposite end of the lever C is depressed until the recess C² is brought into the path of the pawl F'. The pawl F' will then drop into the recess C² under the action of its spring F² and prevent the lever C, and consequently the universal lever D, from returning to their normal positions when the character-key is released. Any number of character-keys may thus be depressed in turn without altering the position of the universal lever D, so that the arm D⁴, carrying the pawl, will also remain in its displaced position, the pawl B² being withdrawn upon the ratchet B', as shown in dotted lines in Fig. 3. If now the spacing-key G' is depressed, its supporting-levers will also be depressed, so that the lever engaging the pin F³ of the pawl F' will be carried in a downward direction, thus raising that end of the pawl in contact with the lever C out of the recess C² against the action of its spring F². This will release the lever C, and consequently the universal lever D, so that both levers will assume their normal positions beneath the character-keys under the action of the spring D³. As the end of the lever C carrying the end of the universal lever D rises the opposite end will be depressed, so that its cam-shaped portion will be removed from the lower end of the arm B⁴, carrying the pawl B². By this means the arm is allowed to again assume its normal position under the action of its spring B⁶. As the arm B⁴ turns about its pivot B⁵ the pawl B² will be carried forward in the direction indicated by the arrow, Fig. 3, carrying with it the ratchet-wheel B'. Each complete oscillation of the arm B⁴ is arranged to revolve the ratchet B' one tooth, so that a unit is registered in the counting device. The number of complete oscillations, and thus the total number of units registered, will give the total number of times in which the spacing bar or key G has been depressed next in order after a character-key and so indicate the total number of words written. As the use of the spacing-key next in order after a character-key is the only means by which a complete oscillation can be given to the arm B⁴, and thus a unit registered, it is obviously necessary that the operator should always use the

spacing-key at the end of a word, even though that word may be the end of a line. If it is desired that any of the keys should not operate the universal lever D, the lever may be cut away, as at D⁵, Figs. 1 and 2, to allow of any such particular key or keys being depressed without depressing the universal lever D.

Figs. 4 to 7 illustrate the arrangement of a counting device upon the keyboard of a typewriter or other machine when the counting device is operated by electrical means. The counting device H may be conveniently secured, as before, to one side of the frame J of the machine and is provided with a ratchet H', which gears with the rest of the counting-train in any convenient manner. Pivoted to the side of the frame J at K is a lever K'. The pivot K is situated near one end of the lever, so that the lever is divided into a long arm, which extends toward the ratchet H' of the counting device H, and a short arm, which extends on the opposite side of the pivot K and carries a polarized armature L. The long arm of the lever K' is provided at its extremity with a pawl K², pivoted to it at K³ and maintained in engagement with the teeth of the ratchet H' by a spring K⁴. Above the polarized armature L is arranged an electromagnet L', provided with a double winding L² L³, respectively. The base of the electromagnet is provided with lugs L⁴, by which it is secured to the frame J of the machine. Arranged across the frame J of the machine, at the forward end of the same and beneath the character-keys J', are two spring-controlled contact-bars M. The ends of the bars M are each carried by brackets M', secured to the frame J of the machine. Each bracket is preferably provided with guides M², between which the ends of the bars are free to rise and fall. To the brackets M' are secured pins M³, which pass freely through the ends of the bars M and are provided at their upper ends with nuts M⁴. Beneath the bars M and surrounding each pin M³ is arranged a spiral spring M⁵, which normally keep the bars pressed against the nuts M⁴. To the rear of the bars M are arranged two pairs of contact-studs N, a pair being disposed beneath each one of the arms J² of the spacing-key J³. The contact-studs may each be made in a similar form to an electric bell-push, each being carried by a bracket N', secured to the base J of the machine and comprising a plug or push N², sliding in a casing N³ and maintained in a raised position by a spring N⁴. The plug is provided with a projection N⁵, cooperating with an opposed projection N⁶ on the casing, by means of which the plug is prevented from being driven out of the casing by the spring N⁴. Each of the brackets M', carrying the bars M, and the brackets N', carrying the plugs N², is insulated from the frame J of the machine by any convenient means, such as a piece of insulating material O placed between it

and the frame. The holes in the brackets through which the screws are passed may also be lined with insulating material in the well-known manner. Electrical connections are provided between a source of electric energy, the contact-bars M, contact-plugs N, and the coils L^2 L^3 of the electromagnet L' . These connections will be readily understood by referring to the diagram Fig. 7. One pole of a battery P is connected to one of each of the pairs of contact-studs N by a lead P^1 , while the remaining studs N are connected by a lead P^2 to one end of the coil L^3 of the electromagnet L' . The other end of the coil L^3 is connected by a lead P^3 to the opposite pole of the battery to that which communicates with the lead P^1 . In a similar manner one of the bars M is connected by an extension P^4 of the lead P^1 to one pole of the battery P, while the other bar M is connected by a lead P^5 to one end of the coil L^2 of the electromagnet L' , the other end of the coil L^2 being connected to the lead P^3 by a lead P^6 . The coil L^2 is wound upon the electromagnet in the opposite direction to the coil L^3 , so that the electromagnet will be magnetized in one sense when the current from the battery P is passed through the coil L^2 and in the opposite sense when the same current is passed through the coil L^3 . The operation of this device is as follows: When any one of the character-keys is depressed, the lower end of the key bears against the bars M and, being metal, makes electrical contact between the two bars. This causes a current to pass from the battery P through the leads P^1 P^4 P^5 , through the coil L^2 , magnetizing the electromagnet L' , and returning by the leads P^6 P^3 to the opposite pole of the battery. This magnetizing of the electromagnet is arranged to repel the polarized armature L, so that the short end of the lever K' is depressed and the long end raised, carrying with it the pawl K^2 . The pawl K^2 is thus moved over the ratchet H' and engages one of the teeth of the ratchet, as shown in dotted lines, Fig. 6, preparatory to its being withdrawn, and carrying with it the ratchet H' . Whatever number of the character-keys J' are depressed, after one has been depressed, the position of the lever K' remains unaltered. If now, however, the spacing-key J³ is depressed—as, for instance, at the end of a word—the arms J² of the spacing-key will be brought down upon the contact-studs N, making electrical contact between the studs of each pair, so that a current will be made to pass through the leads P^1 P^2 to the coil L^3 of the electromagnet and from thence by the lead P^3 to the battery P. The coil L^3 being wound in an opposite direction to the coil L^2 will cause the electromagnet to be magnetized in the opposite sense to that in which it was formerly magnetized, so that the polarized armature L will now be drawn toward it instead of being repelled from it. This movement of the armature will cause the short end of the lever K' to be raised and the long end depressed,

so that the pawl K^2 will be drawn back to its normal position, at the same time revolving the ratchet H' one tooth. This revolution of the ratchet will record a unit in the recording device, indicating that one word has been completed. If desired, the contact-bars may be provided with platinum contacts, and the keys may similarly be provided with corresponding contact-pieces. It is of course obvious that the spacing-key J³ or its supports J² must not bear upon the contact-bars M, and for this purpose the ends of the bars M may be cut away, as indicated at M⁶. In place of two pairs of contact-studs N one pair only may be used, although two have been shown in the drawings, the spacing-key J³ being provided with two supports, and it being desirable that the pressure upon each side of the key should be even. In machines where the spacing-key is carried by a single lever one pair of contact-studs will of course be sufficient. Also in place of the studs contact-bars similar to the bars M may be used, if desired, these being, however, cut away or carried down beneath the character-keys J', so that the latter shall not come into contact with them. The battery P supplying the necessary current to the electromagnet L' may be either mounted upon the machine or detached from the same, the leads connecting the battery and parts of the machine being varied in length according to requirements. It is of course understood that the contact-studs N and the contact-bars M and preferably the brackets N' M' are made of some conducting material, so that the leads may be secured to them at any convenient point.

In both the mechanical and electrical devices for operating the counter no registration takes place unless the spacing-key is depressed next in order after a character-key, so that it is necessary to depress the spacing-key at the completion of each word, although the depression of the spacing-key a consecutive number of times does not affect the record.

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

In a machine operated by a keyboard device the combination of character-keys, a spacing-key, a counting device, a pawl-and-ratchet mechanism for operating the counting device, an arm to carry the pawl pivoted to the frame of the machine, a universal lever pivoted to the frame of the machine and arranged beneath the character-keys and adapted to be displaced when any one of the character-keys is depressed, an extension of the pawl-arm, a cam-shaped extension on the universal lever in operative engagement with the extension on the pawl-arm, means for keeping the extension of the pawl-arm against the face of the cam-shaped extension of the universal lever, a catch to retain the universal lever in its displaced position when any one of the character-keys has been depressed so that any further movement of the charac-

ter-keys in succession after the operation of
the first will not move any of the parts of the
counting device and means for operatively
connecting the catch with the spacing-key so
5 that the former may be disengaged from the
universal lever when the spacing-key is
struck substantially as set forth.

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

WALTER ROSENHAIN.

Witnesses:

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W. M. HARRIS.