

No. 734,402.

PATENTED JULY 21, 1903.

G. E. CORK.
ROTARY EXTENSION BELL SWITCH.

APPLICATION FILED SEPT. 6, 1902.

NO MODEL.

3 SHEETS—SHEET 1.

FIG. 1.

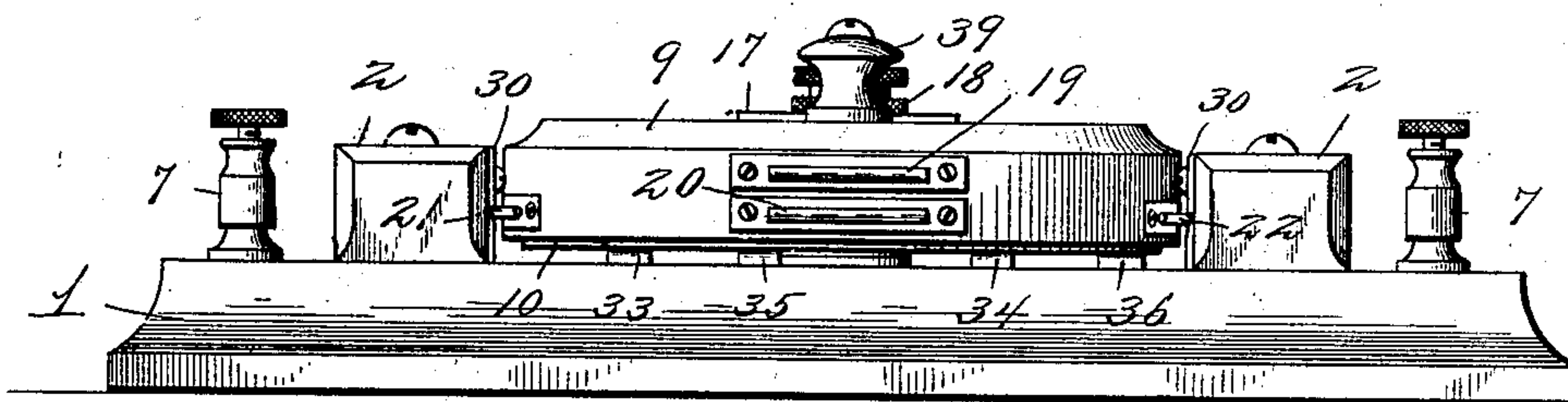


FIG. 2.

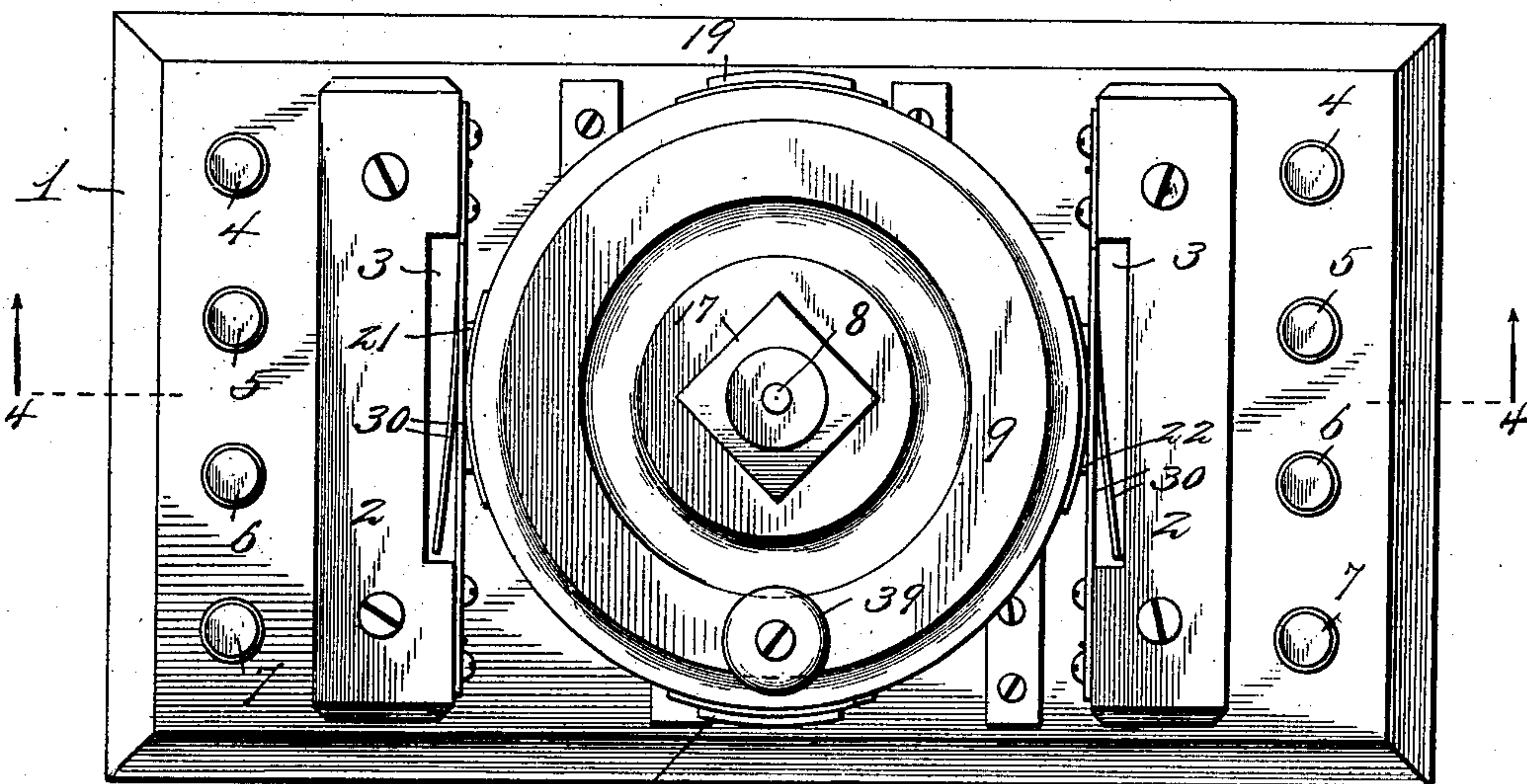
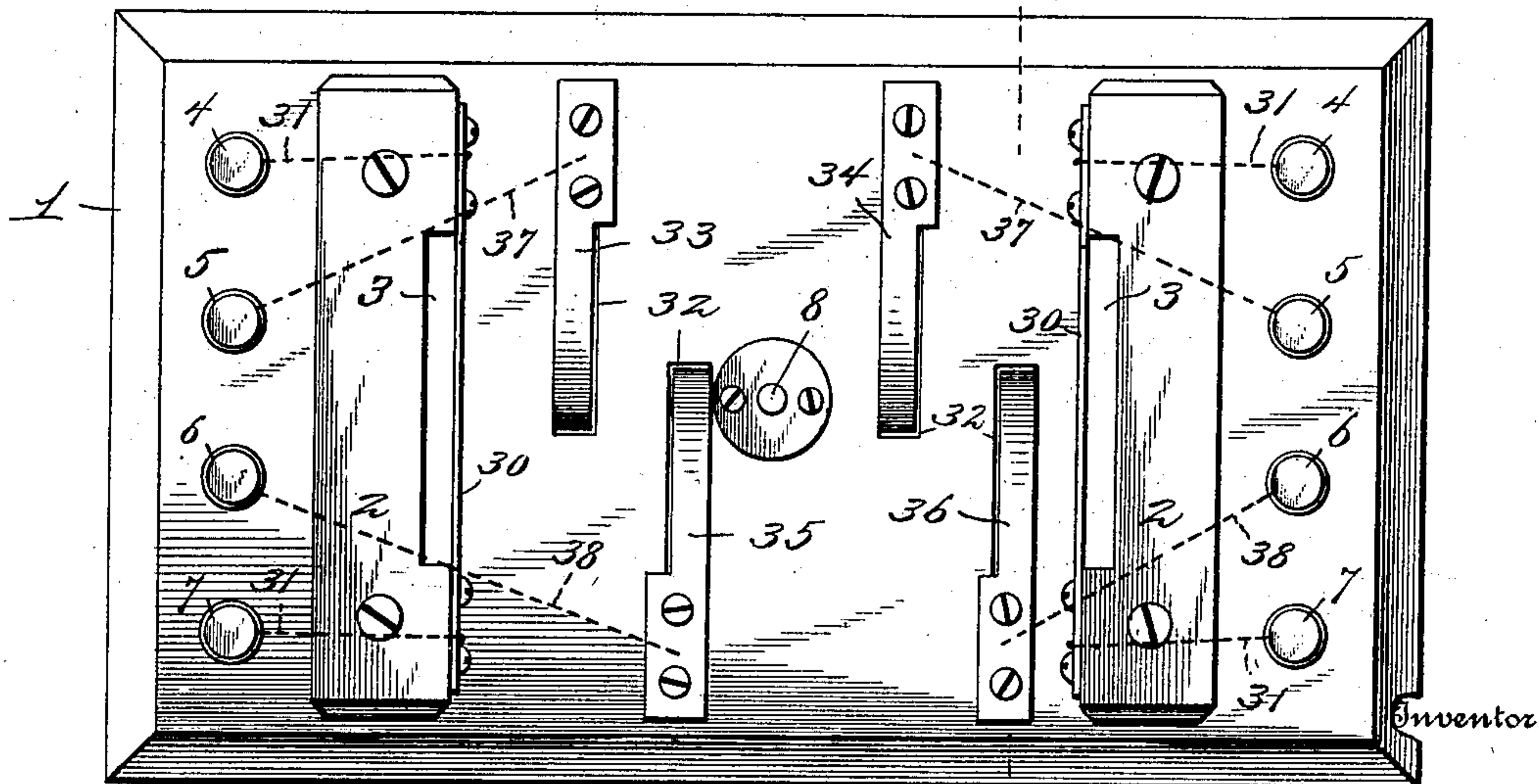


FIG. 3. — 5



Witnesses

Harry L. Amer.
Chas. S. Hoyer.

George E. Cork.
By Victor J. Evans
Attorney

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3 SHEETS—SHEET 2.

FIG. 4.

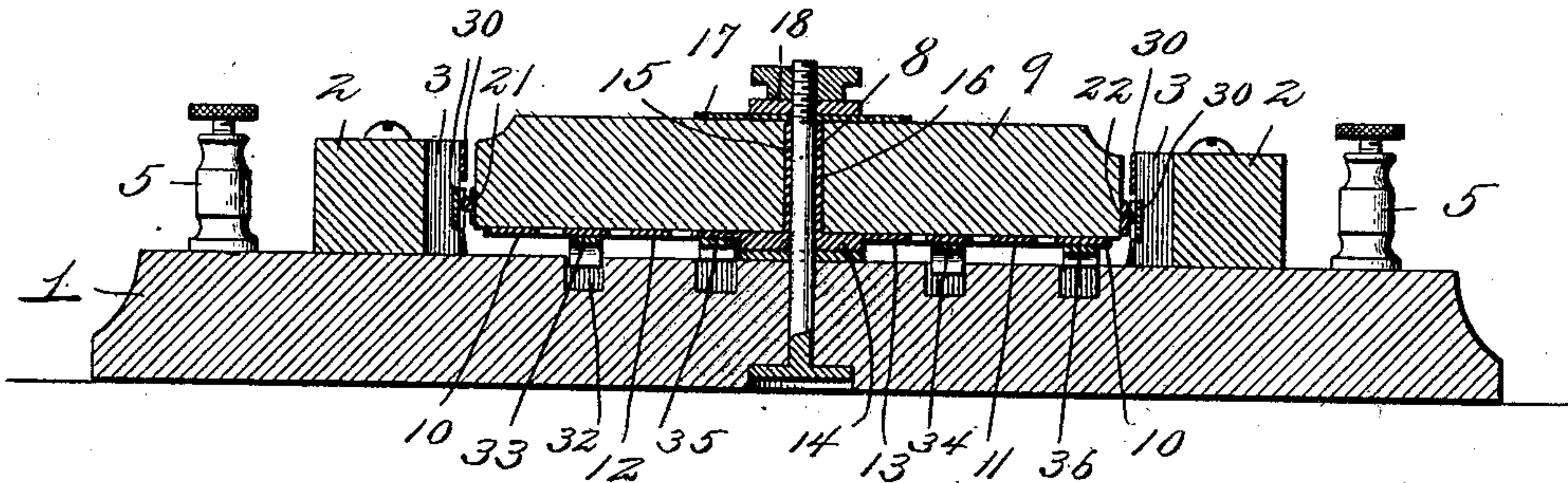


FIG. 5.

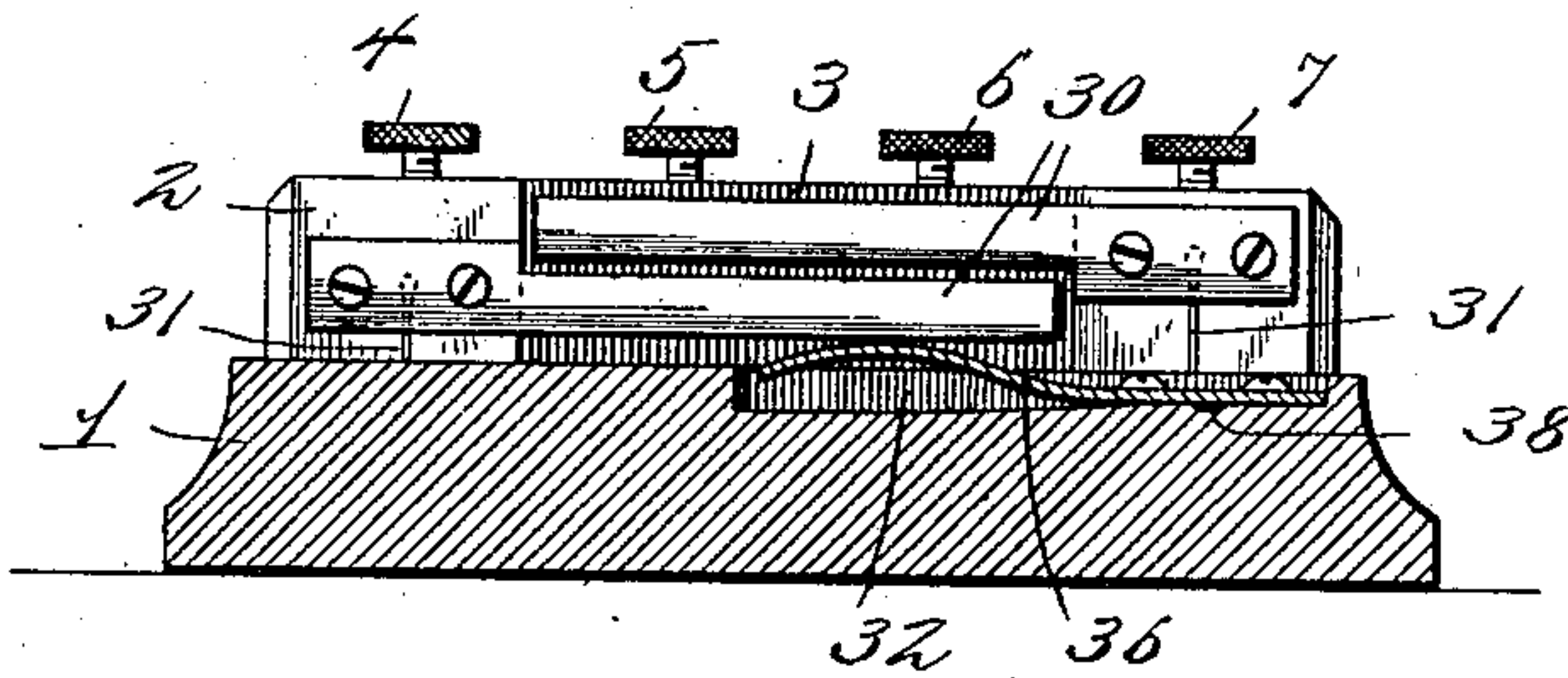


FIG. 6.

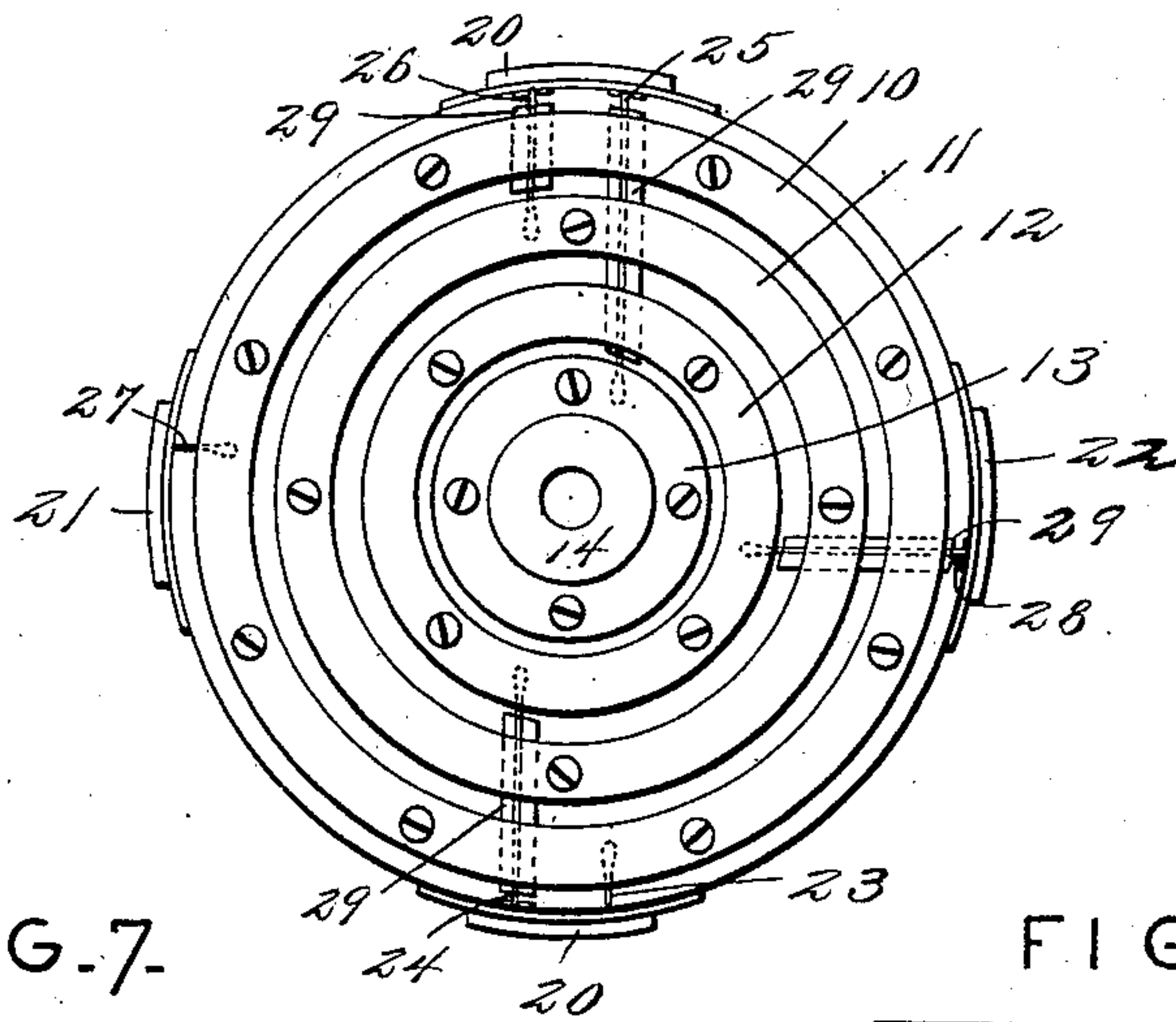


FIG. 7.

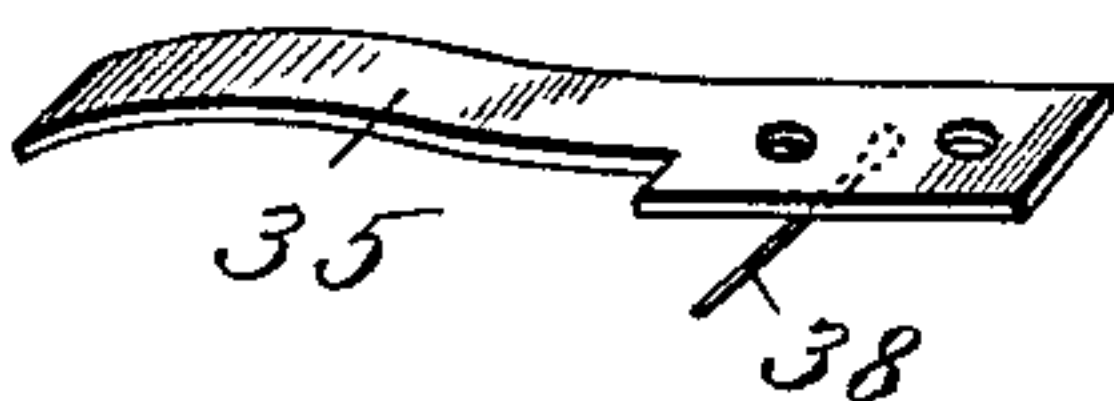
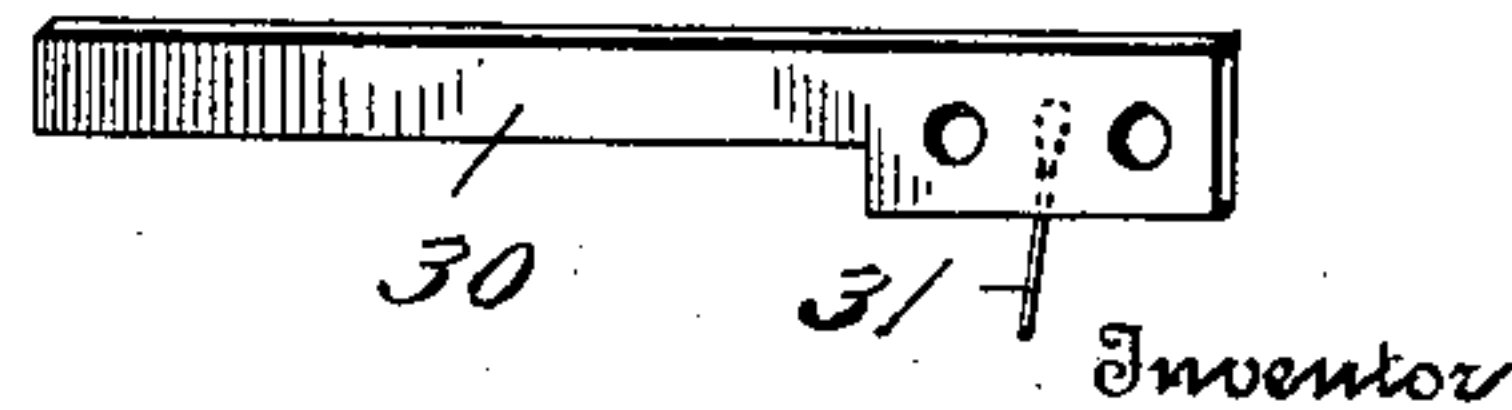


FIG. 8.



Witnesses

Harry L. Ames,
Chas. S. Hoyer.

George E. Cork.

By Victor J. Evans
Attorney

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3 SHEETS—SHEET 3.

FIG. 9.

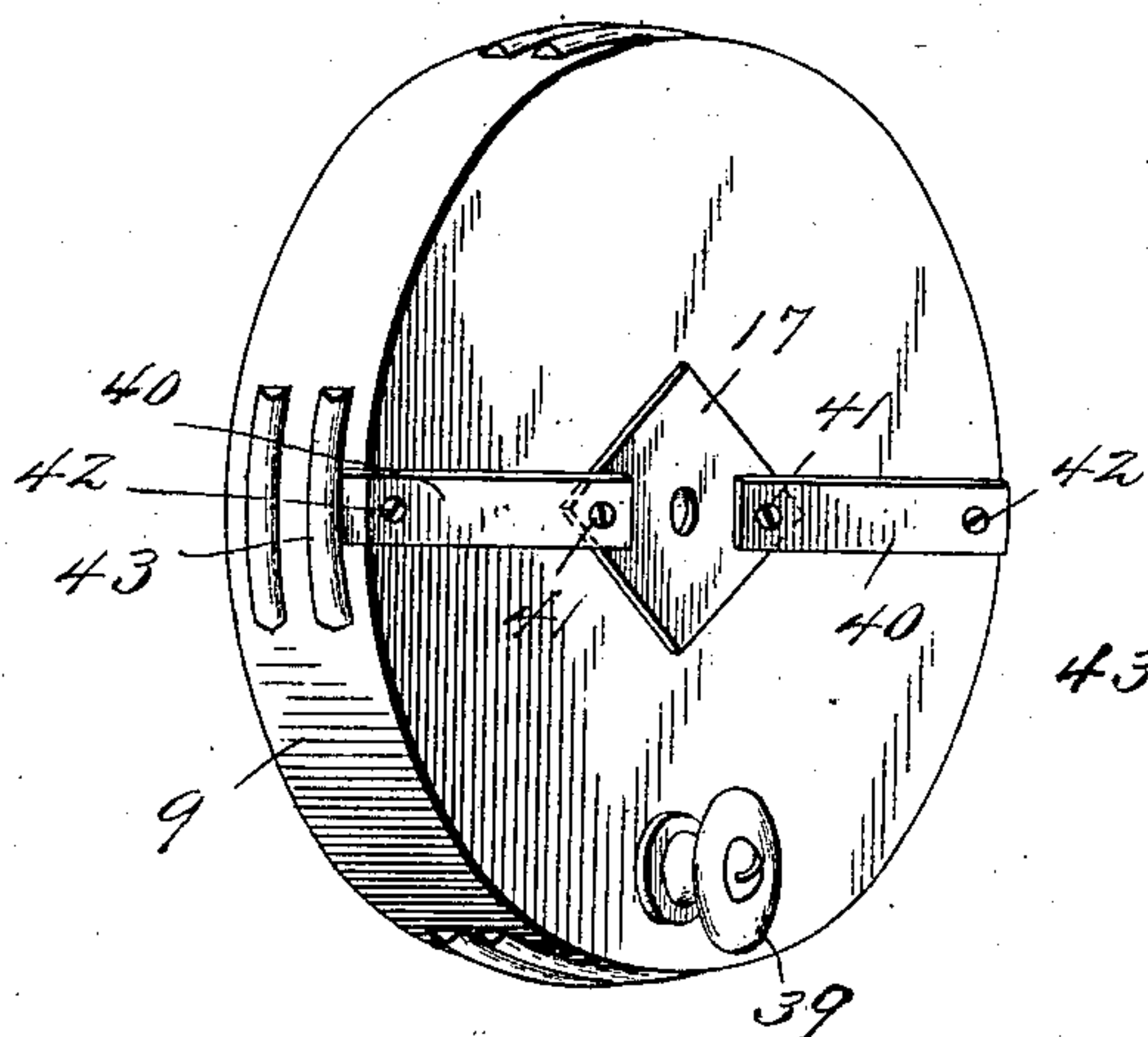


FIG. 10.

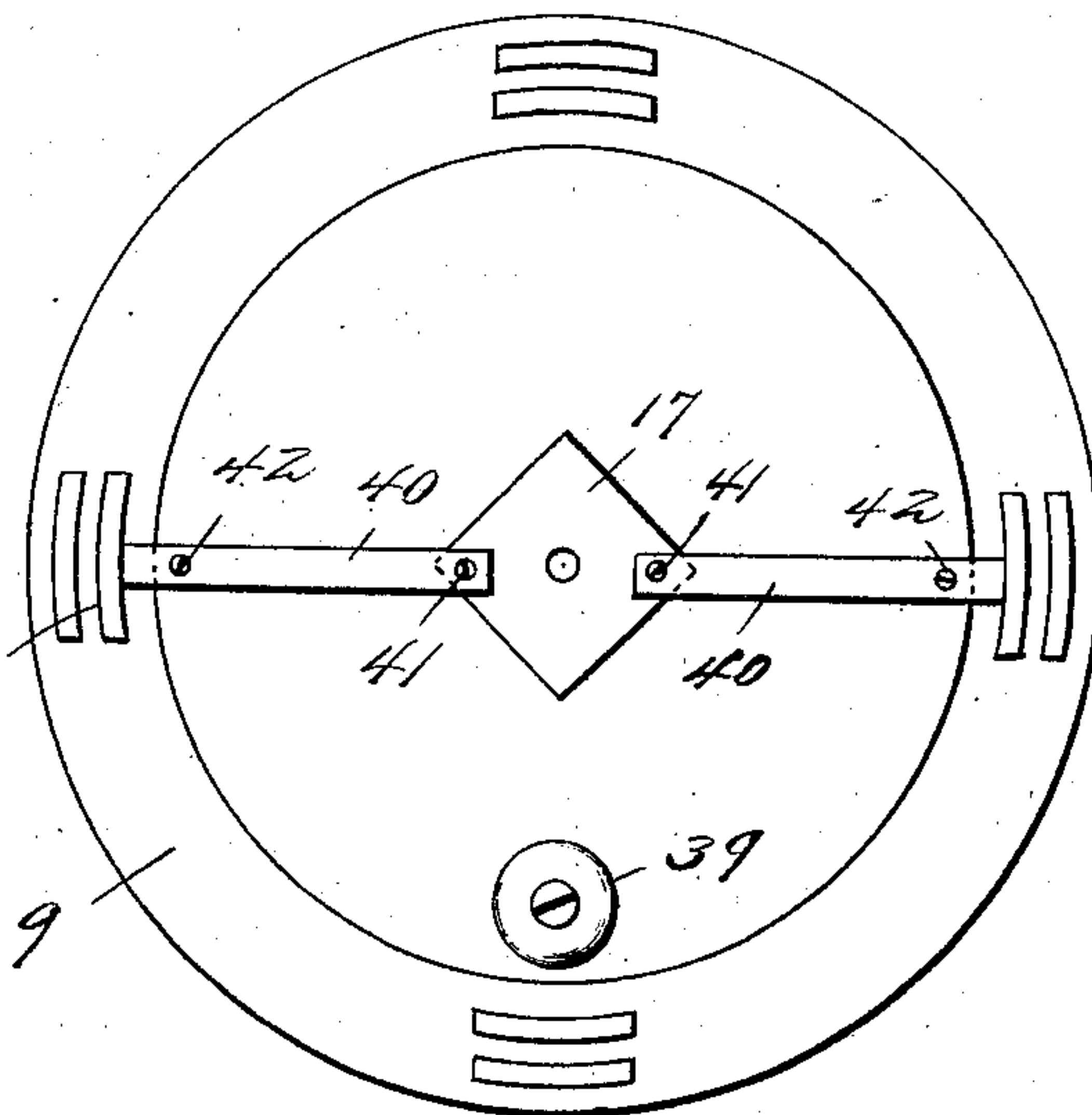
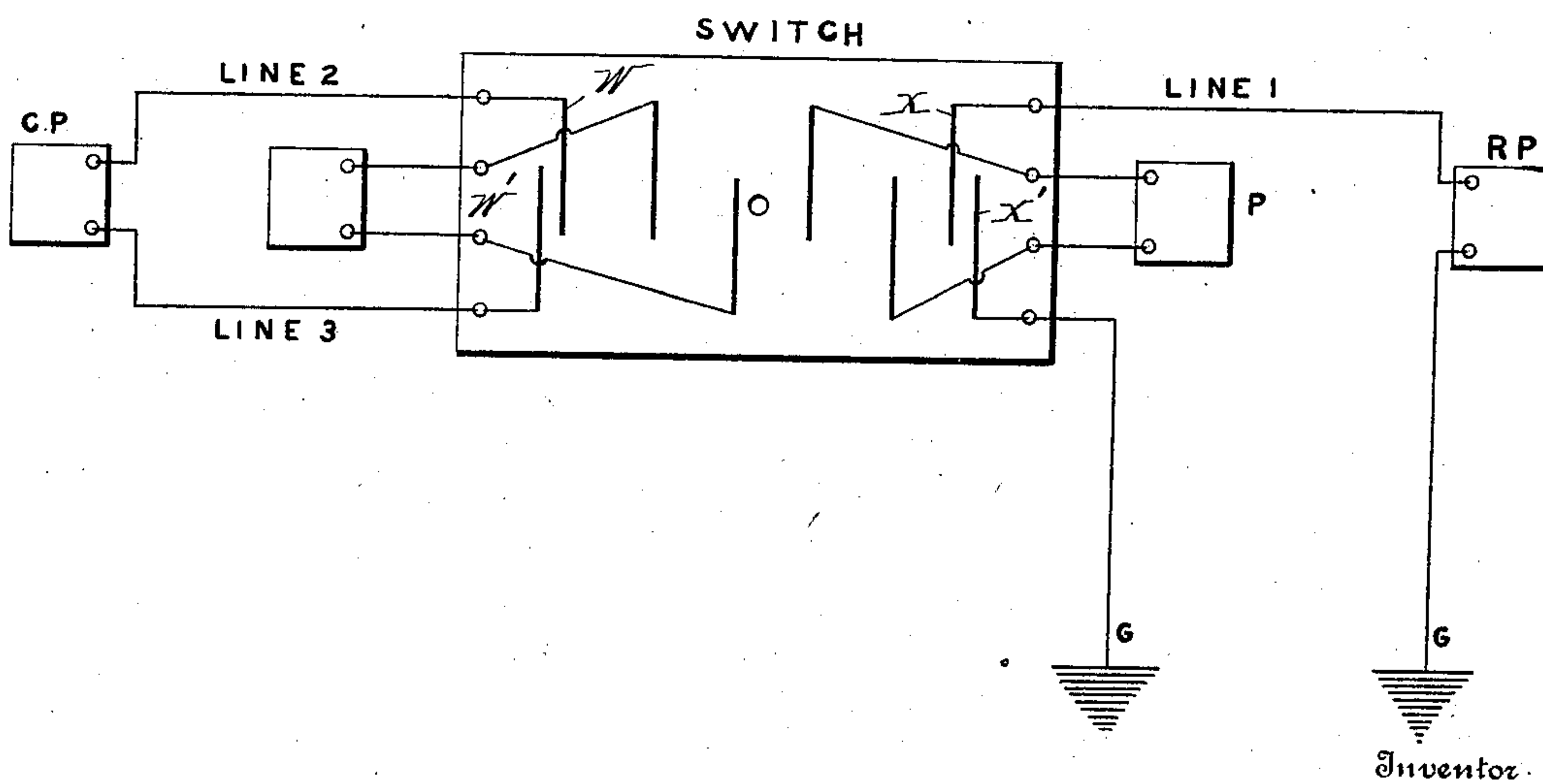


FIG. II.



Witnesses

Harry L. Ames.
Chas. S. Hoyer.

George E. Cork.

By

Victor J. Crane
Attorney

UNITED STATES PATENT OFFICE.

GEORGE E. CORK, OF PACKERTON, INDIANA.

ROTARY EXTENSION-BELL SWITCH.

SPECIFICATION forming part of Letters Patent No. 734,402, dated July 21, 1903.

Application filed September 6, 1902. Serial No. 122,379. (No model.)

To all whom it may concern:

Be it known that I, GEORGE E. CORK, a citizen of the United States, residing at Packerton, in the county of Kusciusko and State of Indiana, have invented new and useful Improvements in Rotary Extension-Bell Switches, of which the following is a specification.

This invention relates to a rotary extension-bell switch for telephone-lines adapted to be applied where two telephone-lines terminate and where only one telephone and an extension-bell are in use.

The purpose of the improved device is to switch the telephone to either line and also keep the extension-bell on the line to which the telephone is not connected, or it may be adjusted to connect both lines as one, if desired.

The advantages of the present invention reside in the simple construction and operation of the switch, whereby any one can readily understand the use of the same when a knowledge is obtained of what changes the different positions of a knob or analogous device indicate. The improved switch has long contact-points to provide extended surfaces to compensate for variations, does not have to be placed precisely at a certain point, and, further, obviates any tendency toward the formation or institution of short-circuits by not having the switch properly placed. It is also capable of rapid operation without liability of damage thereto and will work in connection with either ground or metallic circuits, and all the working parts are easily accessible for cleaning, repairing, and other manipulation. Moreover, when the telephone is connected through the medium of the improved switch with either one of the lines and the extension-bell is on the opposite line there is no metallic connection then between the two lines and they work entirely independent of each other, thereby providing a very desirable arrangement, especially for subscribers who wish to have lines of a private nature connecting their residences and places of business, and also adapting the telephone to be connected up with the main line.

The improved switch when properly installed will render telephone service more satisfactory, owing to the fact that there will be less work at the central station, less in-

duction, which is a source of much confusion, and less annoyance where a number of subscribers are on a single line leading to the central station.

In the drawings, Figure 1 is a side elevation of a switch embodying the features of the invention. Fig. 2 is a top plan view of the same. Fig. 3 is a top plan view with the rotary disk forming one of the elements of the switch removed. Fig. 4 is a longitudinal vertical section on the line 4 4, Fig. 2. Fig. 5 is a transverse vertical section on the line 5 5, Fig. 3. Fig. 6 is a bottom plan view of the rotary disk, showing the conductors arranged thereon and the manner of connecting the peripheral contacts with said conductors. Figs. 7 and 8 show detail perspective views, respectively, of one of the base-springs and one of the side springs with which the conductors and contacts on the disk engage in the operation of the disk. Fig. 9 is a detail perspective view of the rotary disk having a metallic-circuit attachment. Fig. 10 is a diagrammatic plan view of the disk, showing the metallic circuit in relation to the other parts of the same. Fig. 11 is a diagrammatic view of a mixed-circuit telephone-line, illustrating the features of the invention.

Similar characters of reference are employed to indicate corresponding parts in the several views.

The numeral 1 designates a main base of suitable shape and dimensions and preferably constructed of non-conducting material, such as wood, and on the said base are two transversely-extending subbases or supports 2, which are spaced apart from each other and formed with inner slots 3. At the opposite ends of the base are binding-posts 4, 5, 6, and 7, and at a central point between the inner opposing sides of the subbases or supports 2 a post 8 rises from the base 1 and has a switch disk 9 rotatably mounted thereon and preferably constructed of wood, though other non-conducting material may be employed, if desired.

The disk 9 has a series of contact-rings 10, 11, 12, and 13 secured to the bottom thereof and arranged in concentric relation with intervening spaces between their edges. The central ring 13 is continuous with the boss 14 of a metal socket 15, extending through the

opening 16 in the center of the disk 9 to bear on the post 8, the upper side of the disk at the center also having a metallic disk 17, secured thereon. The upper end of the post 8 is screw-threaded and engaged by jam-nuts or securing-nuts 18, whereby the disk may be easily removed or applied. The socket 15 and the plate 17 prevent wear on the body of the disk 9, and the boss 14 depends to such an extent as to sufficiently elevate the under side of the disk 9 above the adjacent surface of the base 1. The disk 9 is of such diameter that the periphery thereof will move in close relation to the inner opposing slotted sides of the subbases or supports 2, and on the periphery of said disk double contacts comprising elongated outwardly-projecting ribs 19 and 20 are removably secured and double contacts 19 and 20 being diametrically disposed. In planes at right angles to the double contacts 19 and 20 the disk also has diametrically-disposed single contacts 21 and 22, also including upstanding ribs, and all the ribs are longitudinally curved or of arcuate form. The outer edges of the ribs 19, 20, 21, and 22 are parallel with the periphery of the disk 9, and one pair of the ribs 19 and 20 are connected by wires 23 and 24, respectively, to the rings 10 and 12, as clearly shown by Fig. 6, and the opposite pair of contacts of a similar nature are respectively attached by wires 25 and 26 with the rings 11 and 13. The contact 21 is connected by a wire 27 with the ring 10 and the opposite central contact by a wire 28 with the ring 12, strips 29 of mica being interposed between the rings and the wires connecting the contacts with the rings at such points where it is not desired that said wires shall have outward bearing or electrical engagement with other rings over which they extend.

On the inner opposing slotted sides of the subbases or supports 2 pairs of side springs 30 are secured and have their free extremities in reverse arrangement and projected across the slots 3, the said springs being normally parallel in a vertical direction or so that the top edge of one will be in parallel relation to the bottom edge of the other. These springs 30 are at such an elevation above the upper surface of the main base 1 that they may be engaged by either the double contacts 19 and 20 or the lowermost ones of said springs by the single contacts 21 and 22. As clearly shown by Fig. 3, the springs 30 are connected by wires 31 with the end binding-posts 4 and 7 of the series of said posts. In the upper portion of the main base, between the inner opposing sides of the subbases or supports 2, a series of transversely-extending slots 32^a are formed, and disposed in operative engagement with said slots are opposite pairs of inwardly-extending base-springs 33 34 and 35 36, the free extremities of the said base-springs being located over the slots and disposed into the latter, and to insure a reliable contact engagement of the

said springs with the conductors on the bottom of the disk 9 the free extremities of such springs are bowed upwardly, as clearly indicated by Figs. 4 and 5 and shown in detail by Fig. 7. The springs 33 34 are connected by wires 37 with the binding-posts 5, and the springs 35 36 are connected by wires 38 with the binding-post 6. The springs 35 36 engage the outermost and innermost ring conductors 10 and 13 on the bottom of the disk 9, and the springs 33 34 are held in continual contact with the conductors 11 and 12. The engagement of the springs 33 34 and 35 36 with the conductors on the bottom of the disk 9 is positive and at all times maintained when the disk 9 is in operative position between the subbases or supports 2. The telephone and extension-bell are connected up to the binding-posts 5 and 6, and hence are in direct connection with the base-springs 33 34 and 35 36, and through the said springs will be connected with the circular conductors 10, 11, 12, and 13 on the bottom of the disk 9. From the circular conductors on the bottom of the disk 9 the connection for the telephone and extension-bell are continued through the wires 23, 24, 25, 26, 27, and 28 to the peripheral contacts on said disk, and said disk is made to rotate, the contacts on the periphery thereof are brought into engagement with the side springs 30, and the circuit is made complete to line and ground in view of the fact that said springs are connected by the wires 31 through the posts 4 and 7 to line and ground.

To facilitate the operation or rotation of the disk 9, it is provided with a knob or analogous projection 39, which is adapted to be grasped by the operator to move the disk, and said knob or projection will serve as a guide when the operation of the switch is fully understood to indicate when the particular connection desired has been obtained or the several peripheral contacts on the disk brought into engagement with the side springs.

If the operator wishes to communicate with an office on the left-hand line, he grasps the knob 39 and turns the disk 9 until the knob is at the left side or when the disk has moved a quarter-revolution, which puts the telephone in connection with that side and also automatically connects the extension-bell with the right-hand line. If it is desired to communicate with an office on the right-hand line, the operator pulls the knob to the right the same distance as in the former left operation. If the operator wishes to connect both lines in one, he pulls the disk in either direction until the knob 39 is up or down, and when the switch is so arranged the telephone will remain in the circuit and the operator can communicate in either direction, or the terminal subscribers can communicate with each other through the switch and intermediate office.

Figs. 9 and 10 show a metallic-circuit attachment for the disk, the form of the disk heretofore explained being adapted for a

ground-circuit. This metallic-circuit attachment comprises two strips 40, diametrically arranged on the upper side of the disk and having their inner terminals removably attached by screws 41 to the plate 17, the outer extremities of the said strips being further fastened by screws 42 directly to the upper side of the disk adjacent to the peripheral edge of the latter. The outer terminals of the strips 40 are bent at an angle and are soldered or otherwise secured to contacts 43, similar in form to the contacts 19, 20, 21, and 22 and located above the contacts 21 and 22. The contacts 43 are in the form of metal ribs and are disposed in parallel relation to the contacts 21 and 22. This metallic-circuit attachment is shown as applied to the disk heretofore described, which is in all particulars similar to that shown by Figs. 9 and 10, and by this mode of illustration it is intended to be understood that the disk may be used with or without the said attachment and the latter is of such form that the parts thereof may be readily applied to and detached from the disk. The disks shown by Figs. 9 and 10 are also numbered similarly to that shown by Figs. 1, 2, 4, and 6 and will be supplied with the rings 10, 11, 12, and 13 for connecting up the ribs or contacts 19, 20, 21, and 22. It will be seen that the metallic-circuit attachment makes a complete connection across the disk between the two additional contacts 43, and the object in applying the attachment to the outer face or side of the disk is to obviate the danger of forming any cross connections in the wiring on the back of the disk, and also renders it easy to remove the attachment at any time desired when the switch is in use on a ground-circuit.

Fig. 11 shows a diagrammatic view of what might be called a "mixed-circuit" telephone-line. A metallic circuit is formed from "central phone," shown on the left and to a ground-circuit phone on the right, the improved switch being located at an intermediate point between the two phones. Now if the disk is turned to connect the phone with "central" side of the switch the phone will be working on a metallic circuit, while the extension-bell will be connected with the residence-phone side of switch, which is a ground-circuit, or the case may be reversed. Should the subscriber wish connection from residence to central, the disk will be turned until the knob is down, for example, although it may be turned either way until the knob is up or down, and the electrical current will then travel from residence over line 1, to switch and side spring X, touching the corresponding contact on the disk which would be contact 22 connected with the circular conductor or ring 12, which is engaged by the face-contact spring 34, and from the latter to the phone, returning to the base-spring 36 engaging the circular conductor or ring 10 in connection with the contact 21 on the opposite side of the disk

and touching the side spring W, and out over line 2 to central. The circuit returns to switch on line 3, connecting with the side spring W' in contact with the adjacent rib or contact 43 secured to one of the strips 40 and across the disk to contact-point in connection with the other strip 40 which is in engagement with the side spring X', and from latter to ground, returning to ground and phone at the subscriber's station or residence. The reverse case in this instance may also be true, or, in other words, the current may flow in a reverse direction.

From the foregoing it will be seen that the improved extension-bell switch will be generally useful for the purpose for which it has been devised, particularly in view of the metallic-circuit attachment.

Changes in the proportions, dimensions, and minor details may be resorted to without departing from the principle of the invention.

Having thus fully described the invention, what is claimed as new is—

1. In a switch of the class set forth, the combination of a base having yielding metallic conductors in the lower portion thereof and similar conductors at the sides in planes at right angles to those in the lower portion, a rotary element held on the base between the sides thereof having side contacts arranged in separated groups differing in number, and metallic conducting devices on the face thereof adjacent to the yielding conductors in the lower portion of the base, said metallic conducting devices being independently connected to the contacts, and electrical connections for the yielding metallic conductors.

2. A switch of the class set forth comprising a base having side members, lower yielding elements in the base and similar elements secured to the inner opposing faces of the side members, electrical connections for said elements, a rotary disk disposed on the base and provided with separated conducting devices on the lower side thereof, and groups of contacts held on the periphery of the disk and individually opposed to said yielding elements, the groups of contacts being disposed at diametrically opposite points on the disk.

3. A switch of the class set forth, comprising a base having lower and side yielding elements, electrical connections for said elements, a rotary element disposed on the said base and provided with lower conducting devices, contacts arranged in separated groups on the edge of the rotary element and connected to the said lower conducting devices, and a removable attachment for the rotary element whereby the switch may be converted for use with either a ground or a metallic circuit.

4. A rotary extension-bell switch comprising a base having lower and side contacting elements, a rotary disk provided with lower contact devices, and groups of edge-contact devices disposed at diametrically opposite

points and differing in number in the respective groups, and electrical connections for the elements and contact devices.

5 A rotary extension-bell switch, comprising a base having a series of yielding springs disposed horizontally thereon, and another series of side springs, electrical connections for the said springs, a rotary disk mounted on the base and having lower circular contact devices with which the horizontal springs engage, and contacts arranged at intervals on the edge of the disk for engagement with the side springs, said contacts being individually connected with the contact devices on the lower side of the disk.

15 6. A rotary extension-bell switch, comprising a base having a plurality of independent conducting elements arranged in different positions thereon, electrical connections for said elements, and a rotary disk having conducting and contacting devices on the oppo-

site faces and edge, the latter devices being individually connected to each other.

7. A rotary extension-bell switch, comprising a base having a series of horizontally-disposed springs rising therefrom, and end groups of springs, a rotary disk disposed on the base in close relation to the springs and having a series of circular conducting devices, and contact projections connected to the said conducting devices, and a metallic-circuit attachment consisting of strips removably applied to the disk and also having contact projections in addition to those connected to the conducting devices.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE E. CORK.

Witnesses:

EMMA K. HOLLOWELL,
GEORGE W. POLK.