

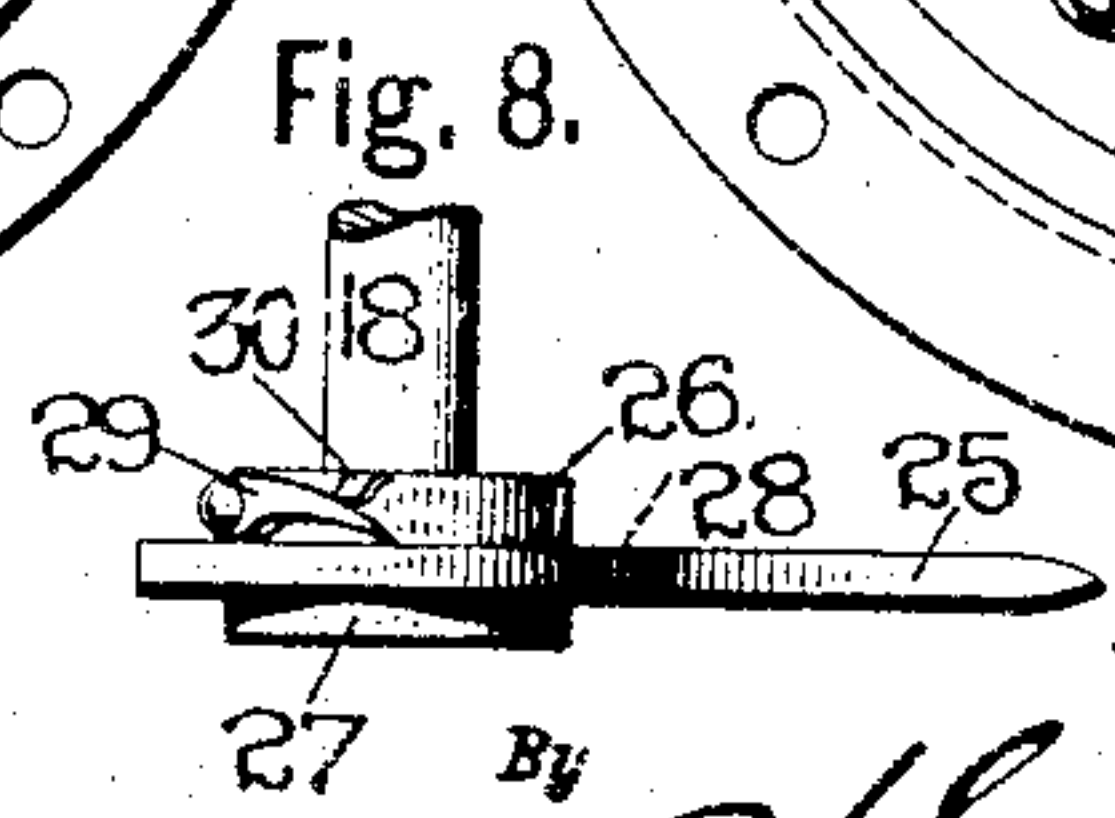
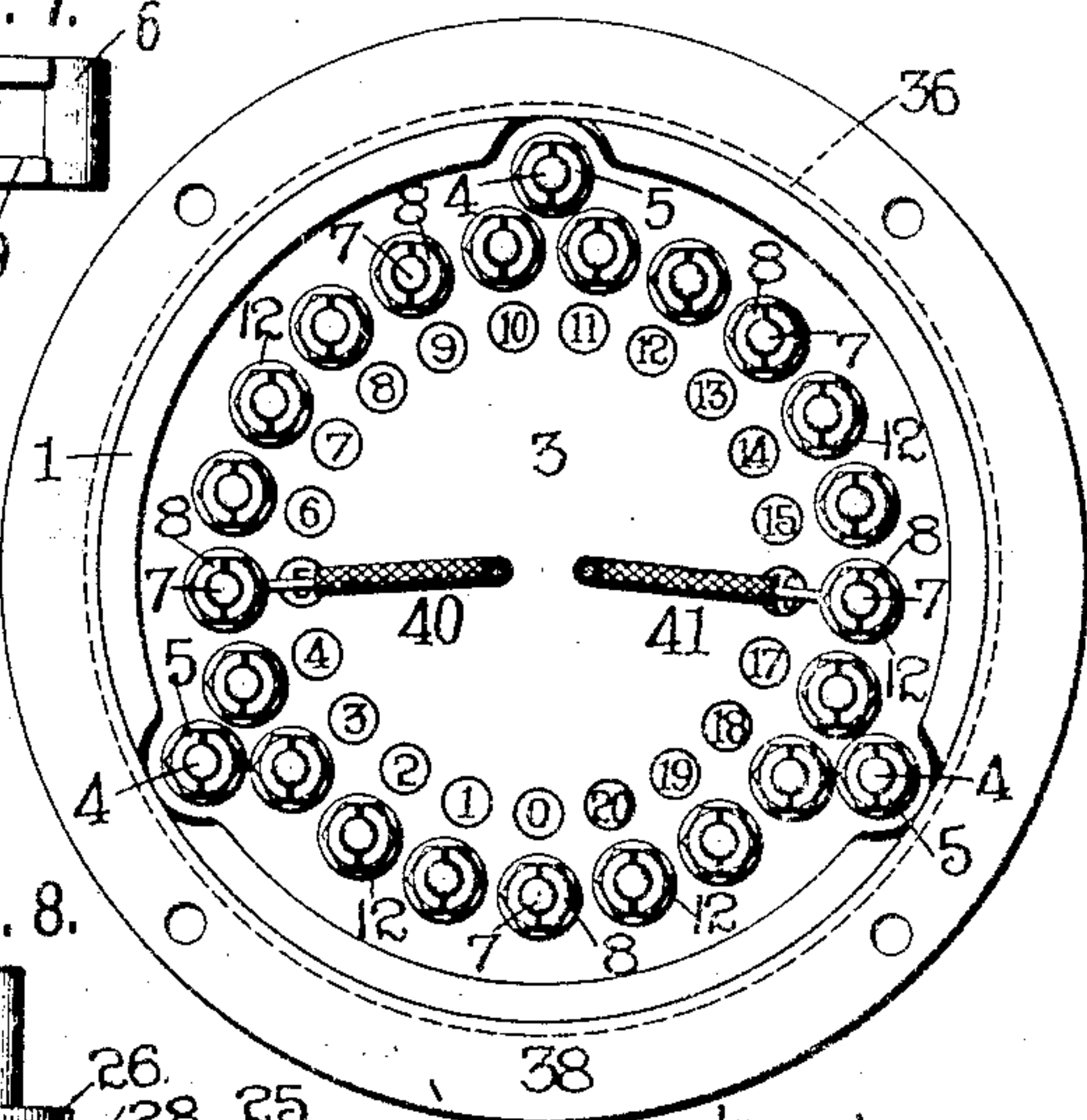
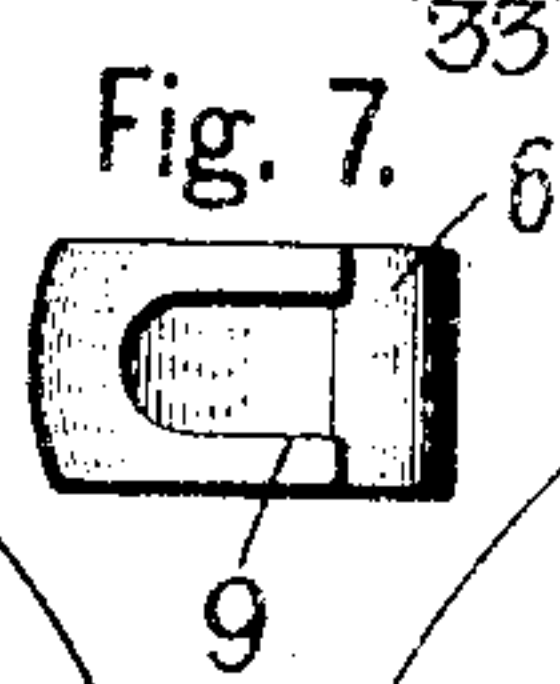
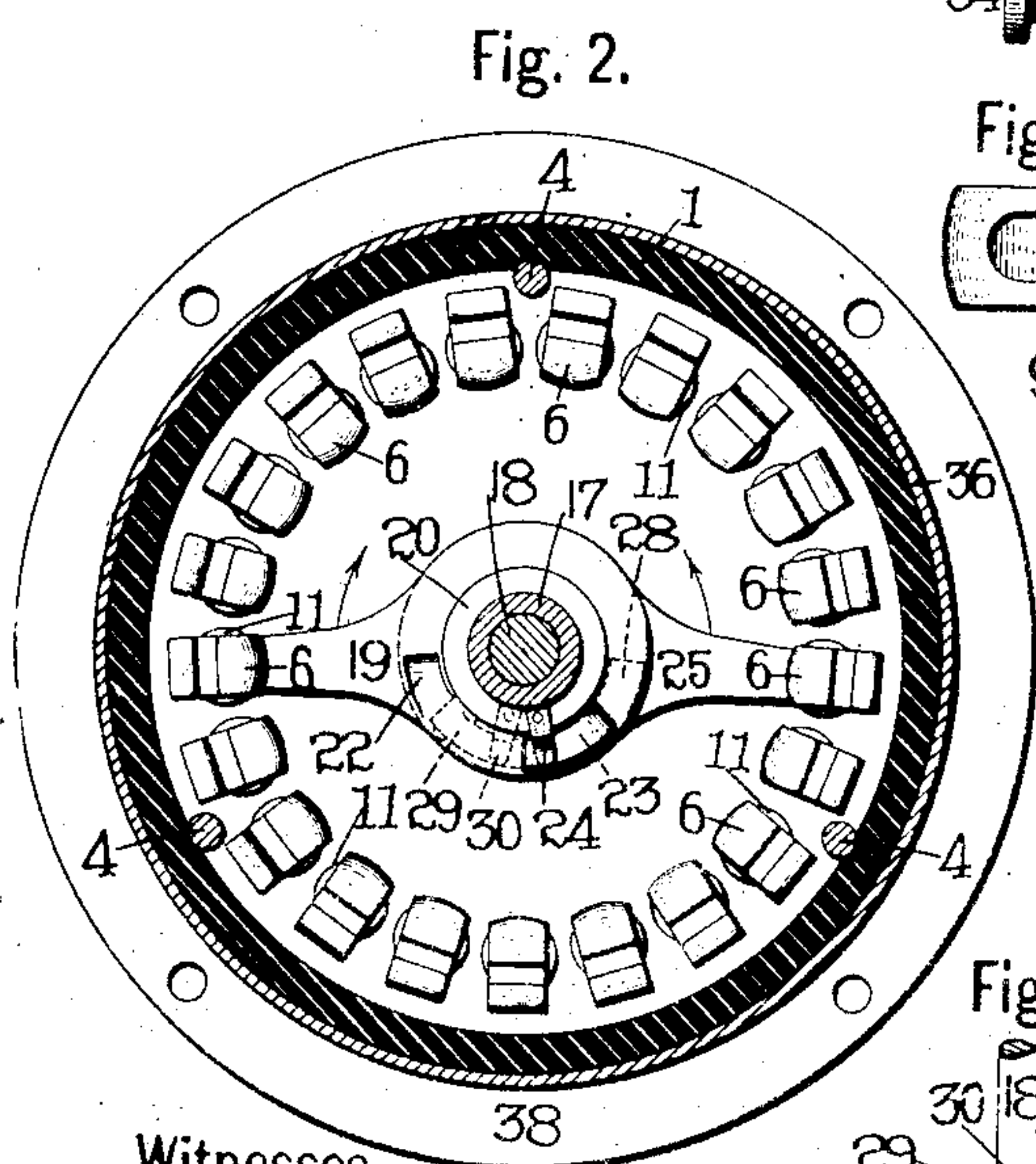
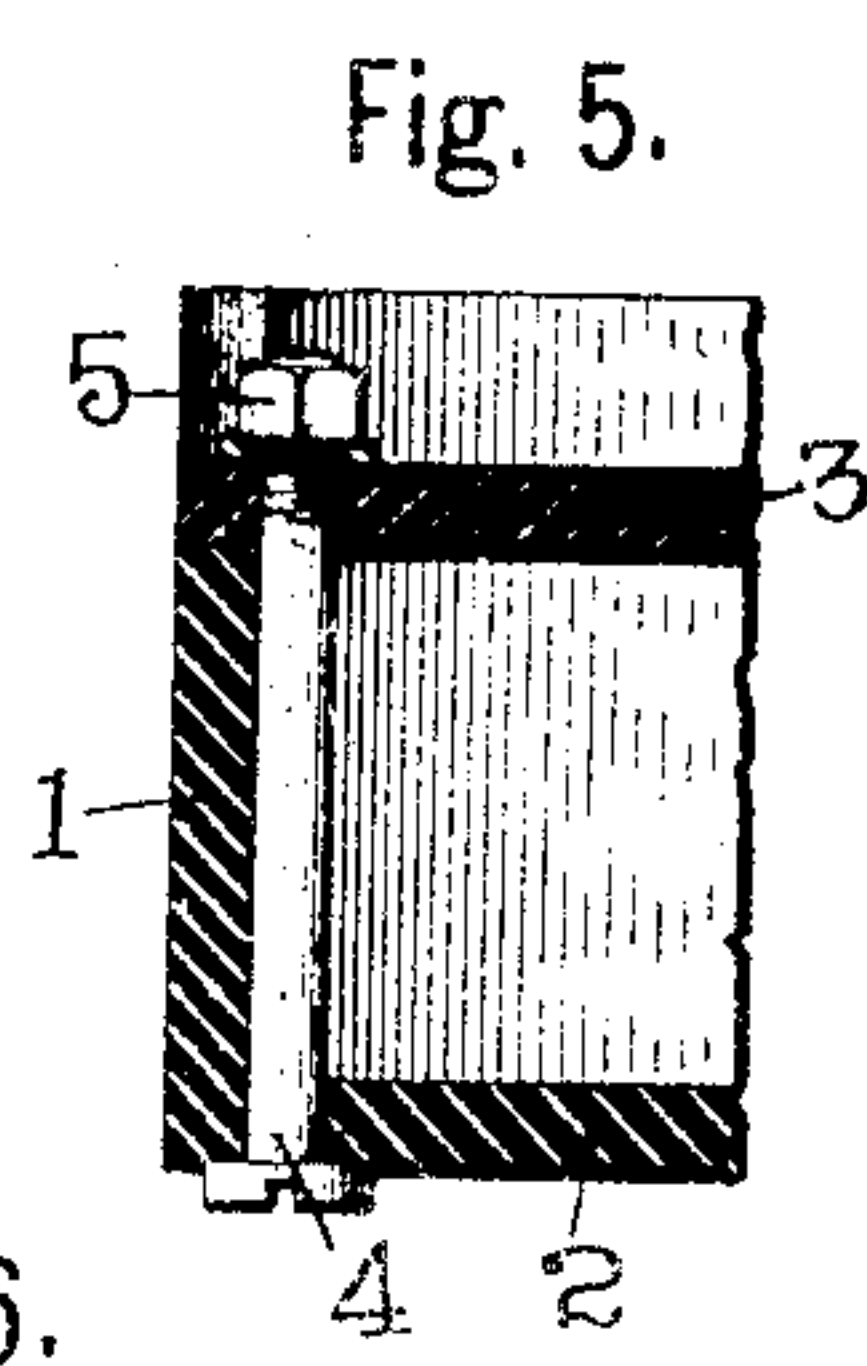
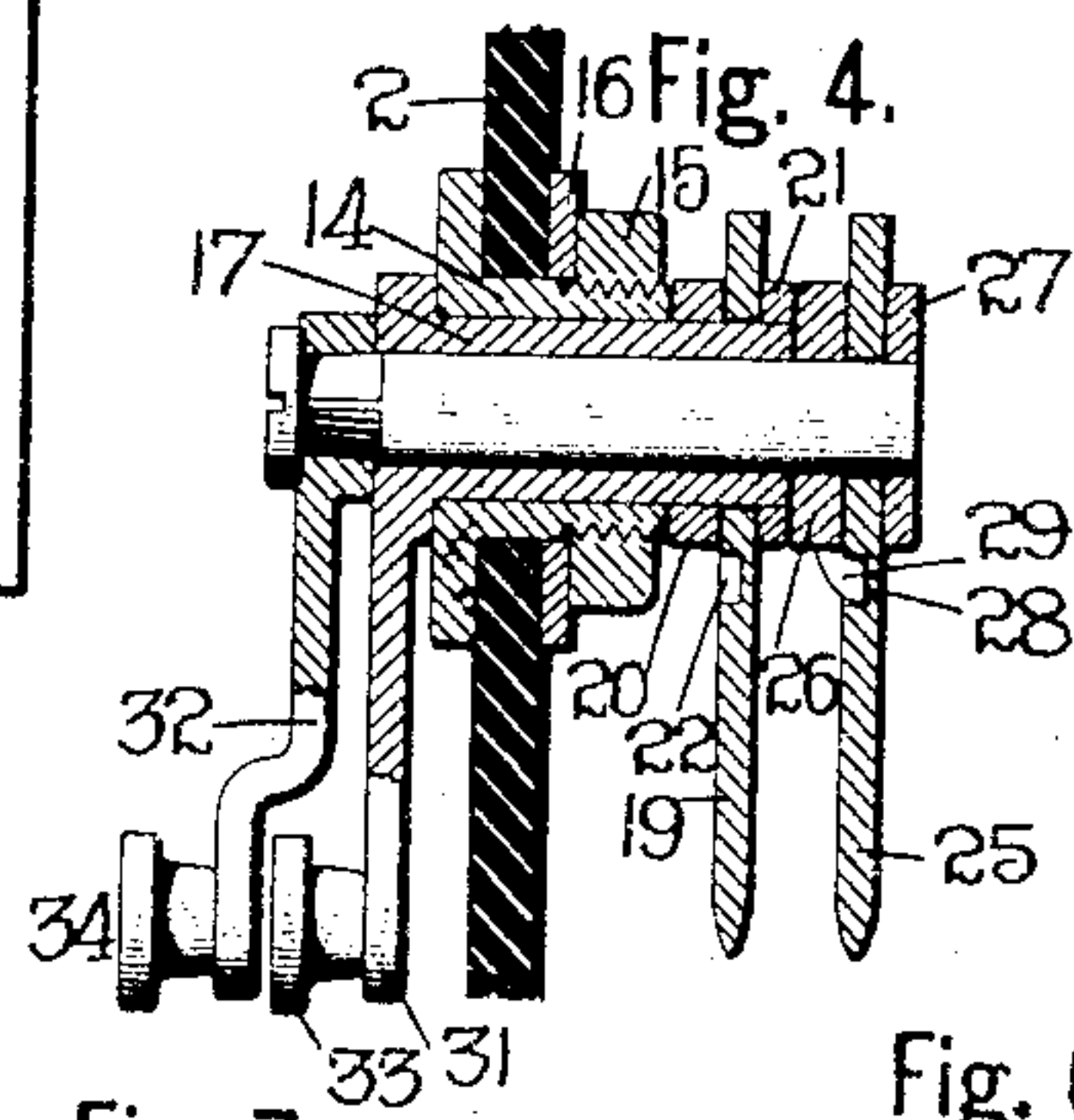
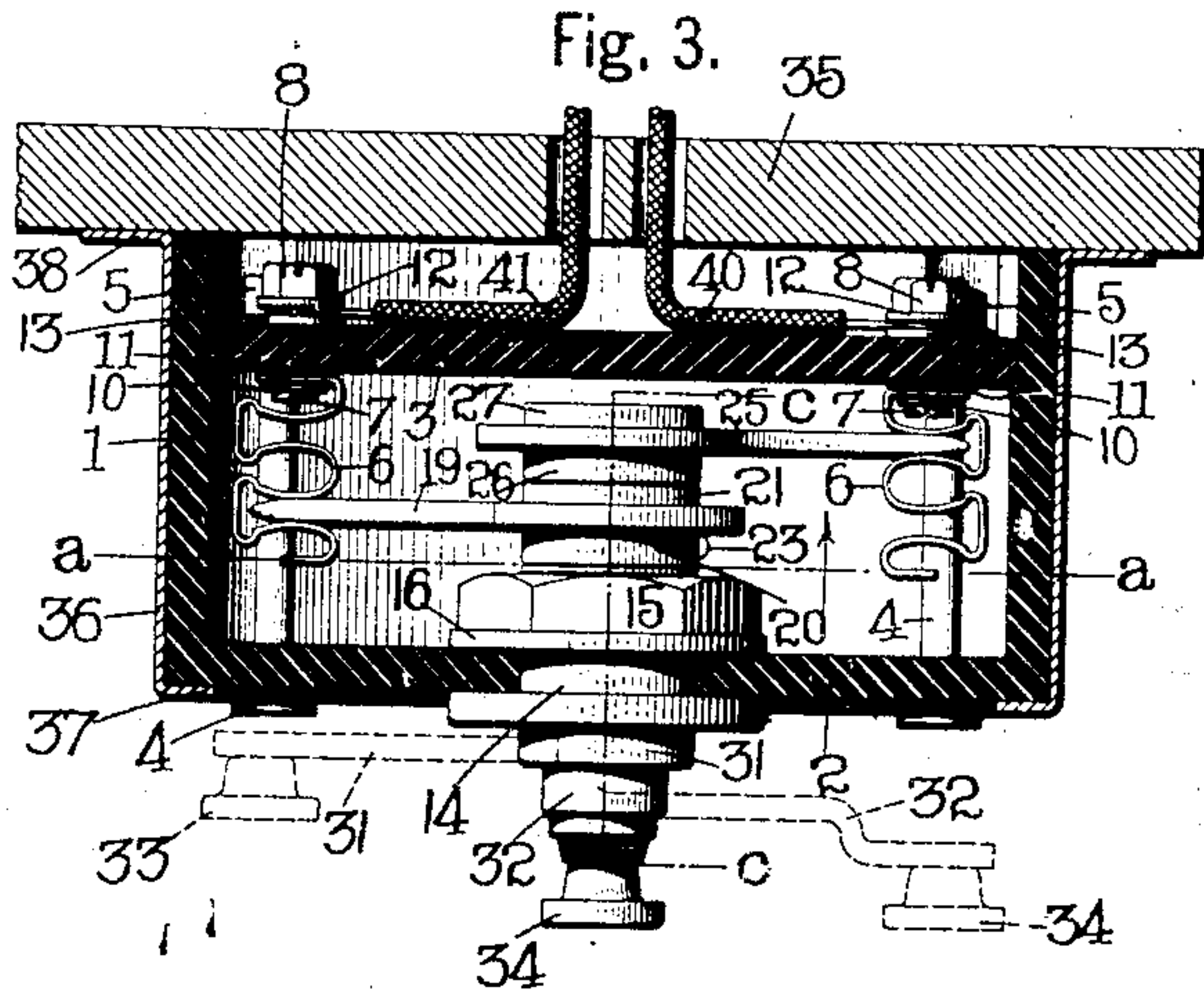
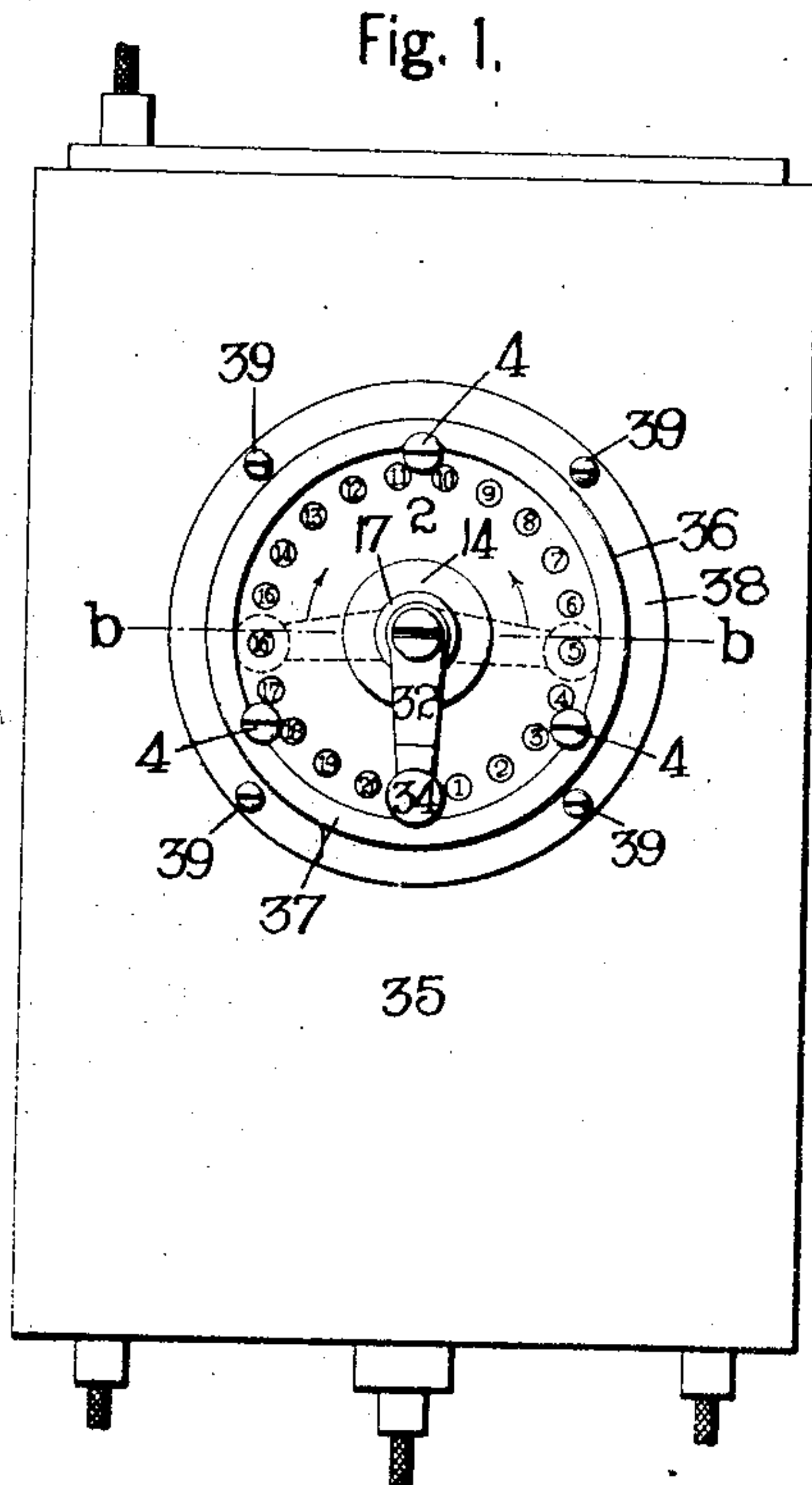
H. J. CARRIGAN & A. J. SANGSTER.

ELECTRIC SWITCH.

APPLICATION FILED SEPT. 22, 1908.

943,215.

Patented Dec. 14, 1909.



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ELECTRIC SWITCH.

943,215.

Specification of Letters Patent.

Patented Dec. 14, 1909.

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To all whom it may concern:

Be it known that we, HENRY J. CARRIGAN and ARTHUR J. SANGSTER, citizens of the United States, residing at Buffalo, in the county of Erie and State of New York, have invented certain new and useful Improvements in Electric Switches, of which the following is a specification.

This invention relates to a combination lock switch for induction coils and the object of the invention is to produce a switch for closing an electrical circuit which can be operated only by a person conversant with the proper combination of contacts to which the terminals of the electric wires are connected.

The improved combination lock switch is intended principally for use in connection with the ignition apparatus of automobiles or motor driven vehicles and is designed to prevent the unlawful use of unscrupulous persons of motor vehicles which may be temporarily left in public thoroughfares, as only a person who knows the proper combination of the contacts is able to throw the switch so as to close the circuit and permit the starting of the motor.

The invention also relates to certain details of construction all of which will be fully and clearly hereinafter described and claimed, reference being had to the accompanying drawings, in which,—

Figure 1 is a front view of the improved combination lock switch attached to the box of an induction coil which forms part of the ignition system of motor driven vehicles. Fig. 2 is a transverse section through the improved combination lock switch on line *a a*, Fig. 3, showing the circuit closed, all the contacts except the two to which the terminals of the wires are connected being omitted so as to more clearly disclose the construction. Fig. 3 is an enlarged central horizontal section through the combination lock switch and a portion of the coil box on line *b b*, Fig. 1. Fig. 4 is a vertical section on line *c c*, Fig. 3, the circuit closing arms being shown in the position they assume when the electrical circuit is broken. Fig. 5 is a fragmentary section through the body of the combination lock switch showing the manner of securing the disk carrying the contacts in place. Fig. 6 is a detached rear view of the improved combination lock switch. Fig. 7 is an enlarged detached rear

view of one of the contacts. Fig. 8 is a fragmentary elevation of the spindle showing the circuit closing arm attached thereto.

In referring to the drawings for the details of construction, like numerals designate like parts.

The body of the improved combination lock switch consists of a cylindrical housing 1 having its outer end closed by an integrally formed end 2, and a removable disk 3 located within the cylindrical housing near the inner end thereof. The housing and the removable disk are formed of a non-conducting material of the kind usually employed for such purposes, such as fiber. The internal diameter of the housing 1 is slightly enlarged near its inner end so as to form a shoulder against which the disk 3 seats, the disk being drawn up in place and rigidly held by bolts 4 which pass through the end 2 of the housing and through the disk and have nuts 5 screwed upon their ends, see Figs. 3, 5 and 6.

The removable disk 3 carries the electrical contacts which are arranged thereon in an annular row and are equi-distant from the center of the disk and from each other. Each contact consists of a thin metal plate 6 bent upon itself in a serpentine manner to form a series of contacting surfaces, a screw or short bolt 7 for securing the contact plate to the disk 3, and a nut 8 screwed upon the outer end of the bolt 7 to fasten it in place and also fasten the wire terminal thereto. These contacts are clearly illustrated in Figs. 2, 3, 6 and 7. The metal plates 6 are bent in such manner that each plate presents two contacts each composed of two opposed curved contact surfaces between which the circuit closing arm is gripped. The outer end of each metal plate 6 is slotted as shown at 9 in Fig. 7 where the bolt 7 passes therethrough to provide for the adjustment of the plate and also for the easy removal and replacement thereof. Washers 10 and 11 may be interposed between the head of the bolt 7 and the plate, and between the plate and the disk 3, so as to insure a perfect electrical union between the plate and the bolt. Washers 12 and 13 are placed upon the outer end of the bolt 7 between which the wire terminal is held as shown in Fig. 3.

A central opening is formed in the outer end 2 of the housing in which a flanged bushing 14 is placed, the bushing being held

in position by a nut 15 screwed upon the inner screw threaded end of the bushing. A washer 16 is interposed between the nut 15 and the end 2 of the housing, as shown in Fig. 4, so that the housing is gripped between the flange of the bushing and the washer.

A hollow spindle 17 is rotatively supported in the bushing 14 and another spindle 18 is rotatively supported in the hollow spindle 17. A circuit closing arm 19 is mounted on the inner end of the hollow spindle 17 so as to be capable of independent rotation thereon, but is held against displacement therefrom by two collars 20 and 21 which are rigidly fastened to the spindle, one on each side of the circuit closing arm. This arm 19 has a notch or depression 22 formed therein which terminates in an abrupt shoulder and a dog or pawl 23 pivoted to the collar 20 by a pin is adapted to engage this shoulder so as to lock the circuit closing arm to the spindle when it is rotated in one direction. The dog or pawl 23 is held against the arm by a small spring 24, see Fig. 2. The other spindle 18 is also provided with a circuit closing arm 25 which is retained in place on the inner end thereof between two collars 26 and 27 so as to be capable of rotation independent of the spindle. This circuit closing arm 25 also has a notch or depression 28 similar to the notch or depression in the circuit closing arm 19 but located so that the shoulder formed thereby faces in the opposite direction to that formed by the notch 22. A dog or pawl 29 is pivoted to the collar 26 and held against the arm by a spring 30, in a manner similar to the other pawl. The spindles 17 and 18 are rotated by short cranks 31 and 32 located at the outer extremities thereof and provided with buttons or knobs 33 and 34 for convenience in manipulating.

The device is fastened to the coil box 35 or wherever desired by means of a cylindrical casing 36 within which the device is placed. This casing 36 has an inwardly extending flange 37 formed on its outer end which retains the device within the casing and an outwardly extending flange 38 at its other end through which screws 39 pass to secure the whole to the coil box, see Fig. 1.

A series of numbers corresponding in position and number to the contacts on the disk 3 are arranged in an annular row upon the outer surface of the end 2 of the housing so that this end of the housing actually constitutes a dial which indicates the location of each contact within the housing.

In the form of the invention illustrated, a series of twenty contacts are arranged in an annular row on the disk 3, to any two of which the wire terminals 40 and 41 may be connected in the manner heretofore described. Each contact is designated by a

number on the outer surface of the disk 3 as shown in Fig. 6, the contacts being numbered consecutively from one to twenty in the form illustrated. Between the contacts numbered one and twenty is located one designated by the symbol 0, to which the wire terminals are never connected. This symbol or zero mark indicates the resting place at all times of the operating cranks 31 and 32 except when they are being manipulated to make or break the circuit, and also of the circuit closing arms 19 and 25 when the electrical circuit is broken.

The operation of the improved combination lock switch is as follows,—In the drawings the wire terminals are shown connected to the contacts numbered "five" and "sixteen" so that in order to complete the electrical circuit the contact plates 6 of these two contacts must be connected. The circuit closing arms 19 and 25 and the manipulating cranks 31 and 32 are in the position indicated by the zero on the dial, as shown in Fig. 4. The operator turns the crank 32 toward the right as shown by the arrow in Fig. 1, until it is directly over the number "five" on the dial. This movement of the crank rotates the spindle 18 and by means of the dog or pawl 29 carries the circuit closing arm 25 up to the contact indicated by the number "five". The operator then moves the other crank 31 in the opposite direction or to the left as indicated by the arrow in Fig. 1, until it is directly over the number "sixteen" on the dial. This movement of the crank 31 rotates the hollow spindle 17 and moves the circuit closing arm 19 by means of the dog 23 up to the contact indicated by the number "sixteen". The instant the circuit closing arm 19 touches the contact numbered "sixteen", the electrical circuit is completed between the wire terminals 40 and 41, the current passing through the contacts "five" and "sixteen" and through the circuit closing arms 19 and 25 and the spindles 17 and 18. The operator now reverses the direction of the movement of the cranks 31 and 32 and returns them to their former position at zero. The device now presents exactly the same appearance as before the circuit was closed, it being impossible to discern to which contacts the circuit closing arms were moved. When it is desired to break the circuit the cranks 31 and 32 are each given a full revolution in the proper direction, as indicated by the arrows in Fig. 1, from the position at zero. This movement of the cranks carries the circuit closing arms from their position in engagement with contacts numbered "five" and "sixteen" around to the position at zero.

It will readily be seen that only a person conversant with the proper combination of the contacts to which the wire terminals are

connected can operate the cranks so as to bring the circuit closing arms into engagement with these contacts. As any combination of any two contacts can be employed at the will of the user, it will be seen that it is practically impossible for any person not knowing the exact combination to throw the switch so as to complete the circuit.

It is obvious that the circuit closing together with the pawls which lock them to the spindle may be arranged so that both rotate in the same direction, if desired, and that any number of contacts may be used without departing from the spirit or scope of this invention.

We claim.

1. An electric switch comprising an annular row of fixed contacts any two of which are adapted to be connected with opposite sides of an electric circuit, two rotatable contact arms which are adapted to engage with said fixed contacts independently of each other, an outer hollow shaft carrying one of said contact arms, and an inner shaft arranged within the outer shaft and carrying the other contact arm.

2. An electric switch comprising an annular row of fixed contacts any two of which are adapted to be connected with opposite sides of an electric circuit, two rotatable contact arms which are adapted to engage with said fixed contacts independently of each other, an outer hollow shaft carrying one of said contact arms, an inner shaft arranged within the outer shaft and carrying the other contact arm, and shifting arms connected with said shafts, respectively.

3. An electric switch comprising an an-

nular row of fixed contacts any two of which are adapted to be connected with opposite sides of an electric circuit, two rotatable contact arms which are adapted to engage with said fixed contacts independently of each other, an outer hollow shaft carrying one of said contact arms, an inner shaft arranged within the outer shaft and carrying the other contact arm, shifting arms connected with said shafts, respectively, and a dial which corresponds to said fixed contacts and which is traversed by said shifting arms.

4. An electric switch comprising an annular row of fixed contacts, two rotatable contact arms adapted to engage said fixed contacts, shifting means for rotating said arms comprising a hollow outer shaft adapted to be connected with one of said arms and an inner shaft arranged within the outer shaft and adapted to be connected with the other arm, and coupling means for connecting each shaft with its respective arm comprising a pawl mounted on one of the members to be coupled and adapted to engage with a shoulder on the companion member to be coupled, the pawls and shoulders of both coupling means being constructed to cause one arm and its shaft to be coupled upon turning the respective parts in one direction while the other shaft and its arm are coupled upon turning the last mentioned parts in the opposite direction.

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