

No. 790,262.

PATENTED MAY 16, 1905.

C. G. PERKINS & N. W. CRANDALL.
INDICATING DIAL FOR ELECTRIC SWITCHES.

APPLICATION FILED OCT. 19, 1904.

2 SHEETS—SHEET 2.

Fig. 17.

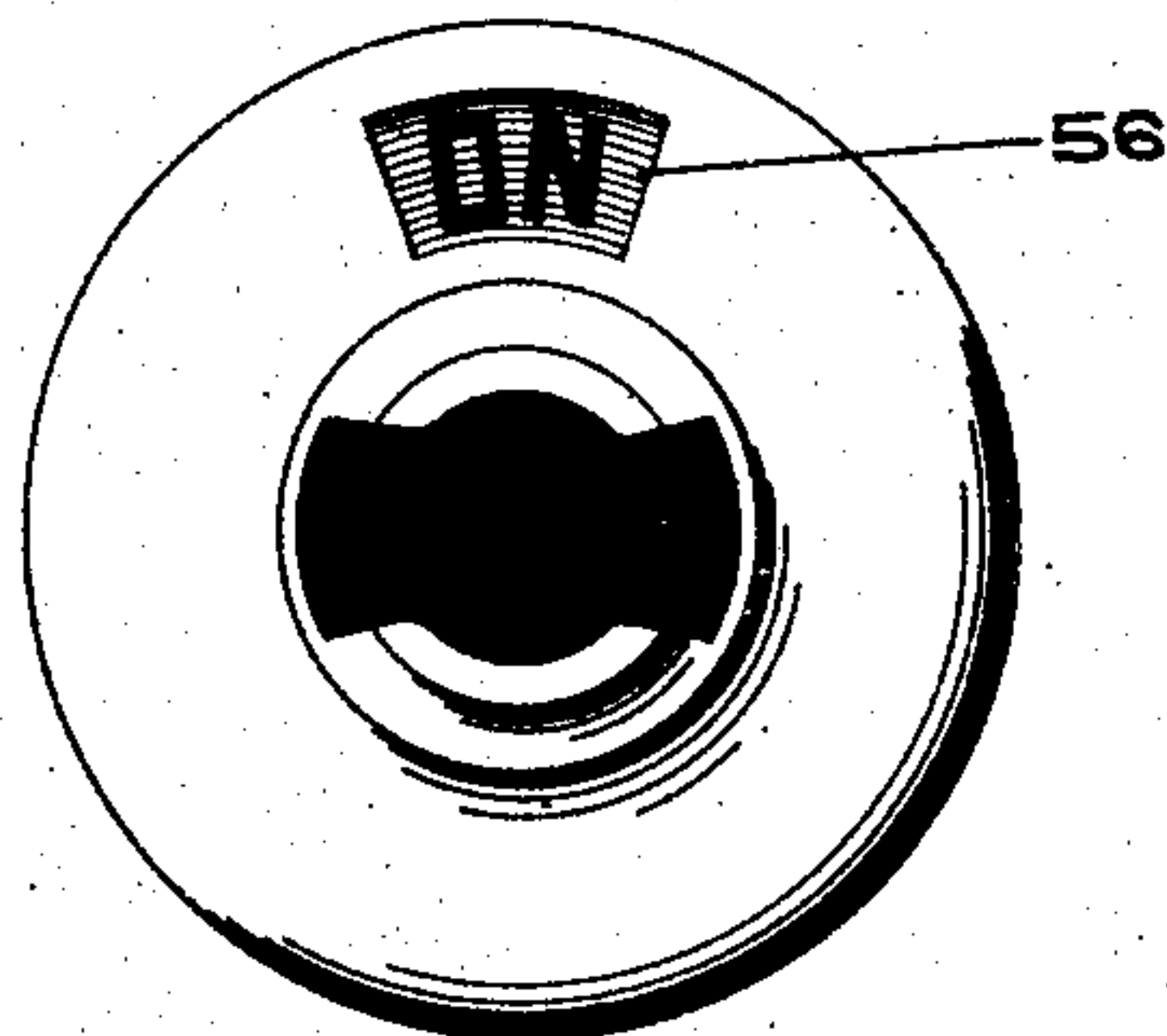


Fig. 18.

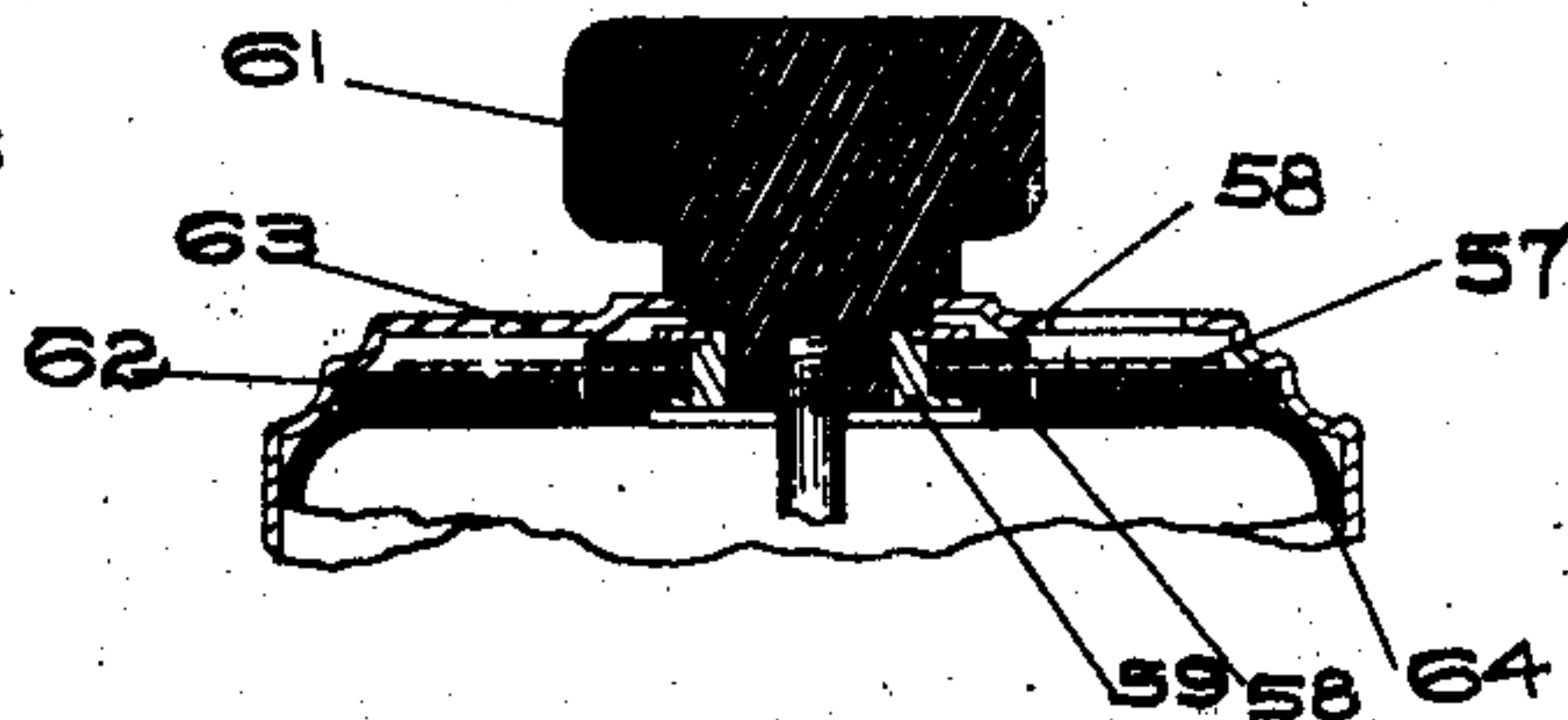


Fig. 20.

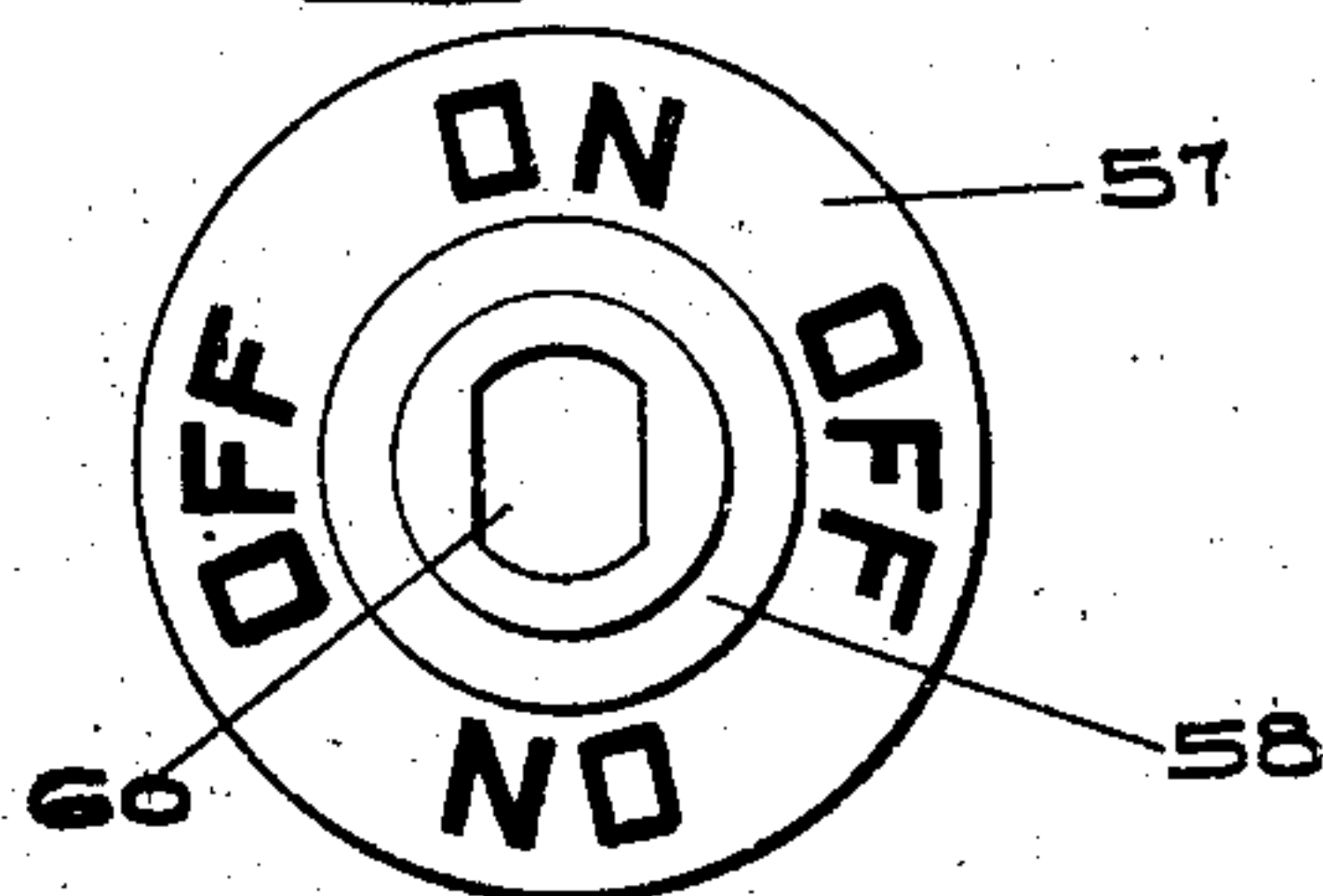


Fig. 15.

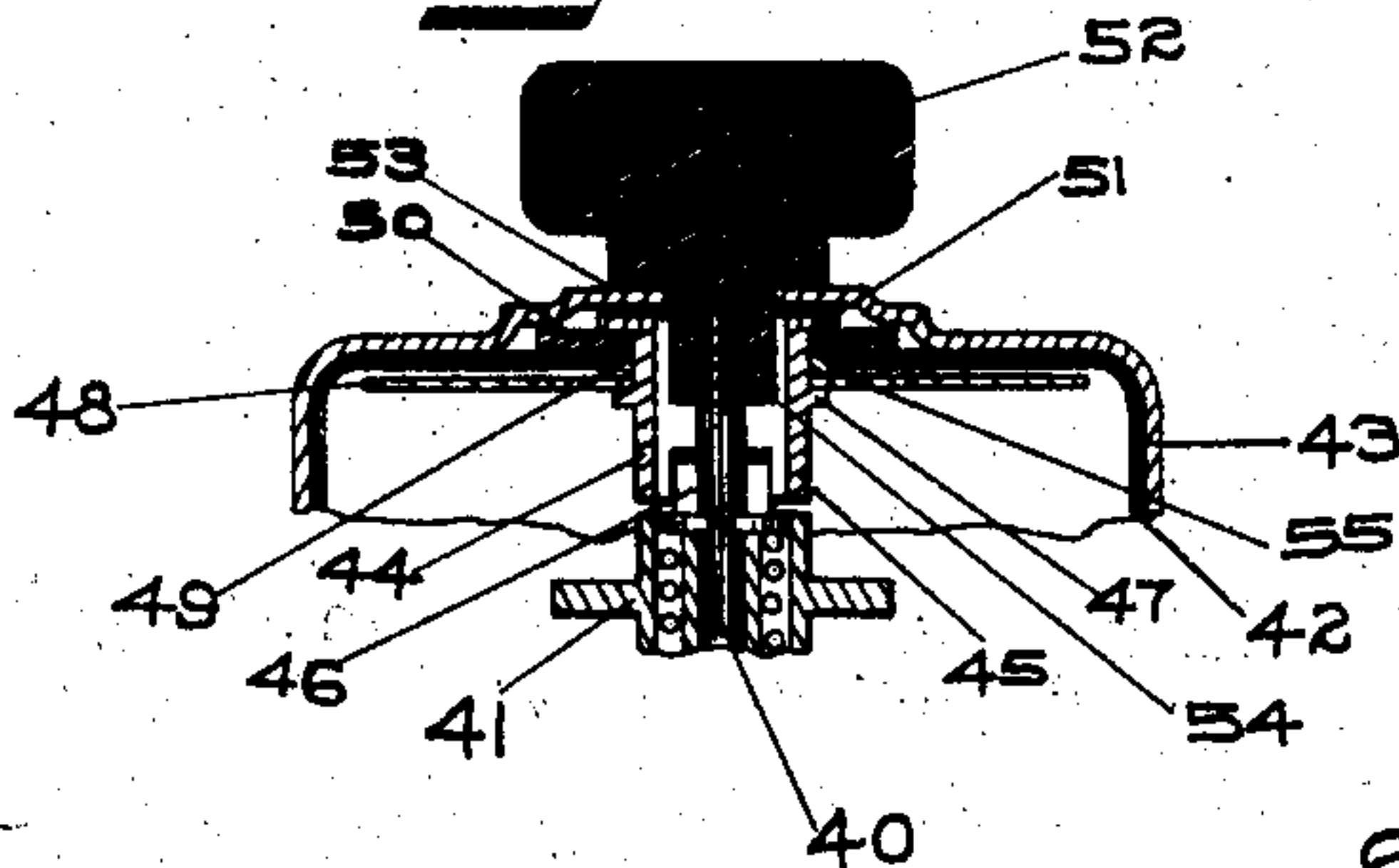
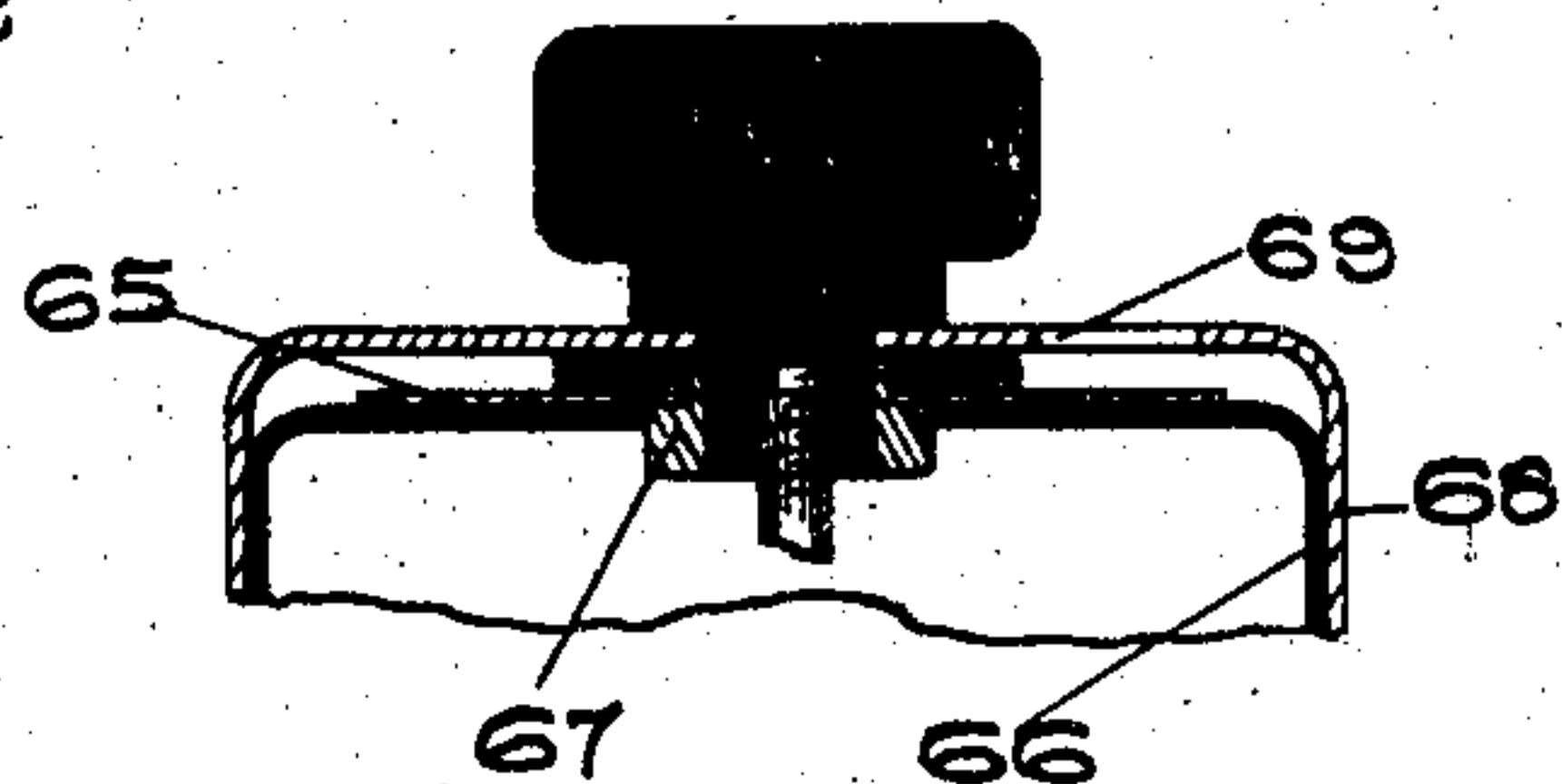


Fig. 19.



Witnesses
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UNITED STATES PATENT OFFICE.

CHARLES G. PERKINS AND NATHAN W. CRANDALL, OF HARTFORD, CONNECTICUT, ASSIGNORS, BY MESNE ASSIGNMENTS, TO THE PERKINS CORPORATION, OF HARTFORD, CONNECTICUT.

INDICATING-DIAL FOR ELECTRIC SWITCHES.

SPECIFICATION forming part of Letters Patent No. 790,262, dated May 16, 1905.

Application filed October 19, 1904. Serial No. 229,194.

To all whom it may concern:

Be it known that we, CHARLES G. PERKINS and NATHAN W. CRANDALL, citizens of the United States, residing at Hartford, in the county of Hartford and State of Connecticut, have invented certain new and useful Improvements in Indicating - Dials for Electric Switches; and we do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same, reference being had to the accompanying drawings, and to the figures of reference marked thereon, which form a part of this specification.

This invention relates to indicating-dials for electric switches, and particularly to that class commonly known as "detachable dials."

The object of this invention is to produce a dial which will not only indicate to the manipulator of the switch whether the circuit is open or closed, but which may also be easily and quickly coupled with or uncoupled from the commutator thereof to facilitate attaching or detaching the switch to and from a support. In many switches as at present constructed the attaching-screw holes are located in the base thereof and underneath the dial, making it necessary to cut away the portions of the dial which are normally located above such screw-holes in order to admit of easy access thereto. It will be seen that various other advantages accrue from this construction—such as freedom from friction of rotating parts, absolute indication of the position of the movable pole-plate, perfect insulation of the dial, and a dust-proof cover-lining, &c.—all of which will be more fully hereinafter specified, and pointed out in the claims.

Similar figures of reference refer to the same parts throughout the different views.

Figure 1 is a plan view of one form of an electric switch which is well calculated to illustrate the spirit of our invention. Fig. 2 is a similar view with the handle, cover, and dial removed. Fig. 3 is a cross-section of the parts shown on Figs. 1 and 2. Fig. 4 is a plan view of the dial and its coupling-sleeve.

Fig. 5 is a side elevation of Fig. 4. Fig. 6 is a cross-section of the same. Fig. 7 is a detail in elevation of the coupling-sleeve. Fig. 8 is a plan view of Fig. 7. Fig. 9 is a plan view of the commutator-body. Fig. 10 is a side elevation of the same. Fig. 11 is a plan of the bottom plate, the pivoted segmental gear, spindle, pinion, and detent being shown in position by dotted lines. Fig. 12 is an elevation of Fig. 11. Fig. 13 is a view of the fixed ratchet-wheel, segmental gear, detent, and spindle, showing their relative positions when in normal or locked position. Fig. 14 is a view of the same parts, showing their relative positions an instant before the detent is released. Fig. 15 is a view of the same parts as the two preceding figures in their second locked position or after they have been advanced one step forward from the positions which they occupy in Fig. 13. Fig. 16 is an elevation in section of a modification of the device shown in Fig. 3, and Fig. 17 is a plan of same. Figs. 18 and 19 are sectional views of other modified forms. Fig. 20 is a plan of the dial shown in Fig. 18. Figs. 21 and 22 are respectively an elevation and plan of the dial insulation-washers.

The switch illustrated in the accompanying drawings is a modified form of the invention set forth in the United States Letters Patent issued to Charles A. Clark, No. 737,349, dated August 25, 1903, and is but briefly described herein, since a fully-detailed description may be found in the Letters Patent to him hereinbefore referred to.

1 is a base formed of any suitable non-conductive material.

2 and 4 are binding-posts adapted to receive and clamp the ends of incoming and outgoing circuit-wires. Upon the binding-posts 2 are flexible or yielding metallic pole-pieces 3, which may be termed the "lower" stationary contact members, and similar pieces 5 are mounted upon the binding-posts 4, which may be termed the "upper" stationary contact members. When the space between these upper and lower contact members are respectively bridged by any suitable conductive ma-

terial, the circuit is closed, and when such bridges are withdrawn or displaced the circuit is open. Rigidly mounted in the center of the base is a ratchet-wheel 6, the teeth of which serve as a part of a device for retaining the commutator 7 from rotating, except when actuated by the helical spring 8, which is connected at one end to the commutator and at its opposite end to the spindle 9. The spindle 9 is provided with a segmental pinion 10, which engages with the segmental gear 11, which is pivotally borne by the plate 12, which in turn is secured to the lower hub of the commutator. The segmental gear is provided with a pivot 13 and also bears a detent 14, which is caused to engage with the teeth of the fixed ratchet-wheel. Movable pole-plates 15 are supported upon the studs 16, which are carried by the commutator. The pole-plates are insulated from the commutator by mica washer-piles 17. A handle 18 is secured to the top of the spindle in any well-known and approved manner. The top end of the upper commutator-hub is provided with upwardly-extending lugs or fingers 19. The operation of this part of the device is as follows: The parts all being assembled as hereinbefore recited, it is obvious that by rotating the handle in the proper direction the detent will be swung out of contact with the fixed ratchet-wheel by reason of the action of the pinion 10 and the gear 11 until it clears the teeth of the ratchet-wheel 6, when the spring 8, which has become tense by reason of the rotation of the spindle 9, will cause the commutator carrying the movable pole-plate 15 to rapidly rotate or snap forward to the next tooth of the fixed ratchet-wheel 6, it being drawn into engagement therewith by the action of the segmental gear 11 advancing rapidly around the spindle-pinon 10. The teeth of the ratchet-wheel 6 are so disposed that the commutator is normally held in locked position, so that the movable pole-plates 15 are located and held alternately in open and closed positions. It will further be seen that by a continued rotation of spindle 9 the detent 14 will, through the action of intervening mechanism, cause the commutator to rotate around the ratchet-wheel step by step, alternately opening and closing the circuit in a manner which will be readily understood by one skilled in the art to which the foregoing appertains.

The foregoing description has been deemed necessary in order to fully explain the method of coupling and the action of the dial in operation, which will be fully hereinafter set forth.

Again, referring to Fig. 3, 20 represents a non-conductive lining formed of any suitable material. In Figs. 7 and 8 a sleeve is formed with a flange 21 and a square portion 22 and is provided with crown-lugs 23. The squared portion is reduced to a round section 24 at its extreme end for the purpose hereinafter set forth. 25 and 26 are washers made of any

suitable non-conductive material and are provided with square center holes to fit the squared portion of the sleeve, as shown in Fig. 6. A dial 27 is likewise provided with a square center hole to fit the said sleeve and is mounted on the same between the insulating-washers. A metallic washer 28 is fitted to the outer end of the dial-sleeve, and all of the parts which are mounted on the squared portion of the spindle are bound and held in place by riveting or swaging the end of the sleeve down upon the said washer, which may be countersunk slightly to facilitate the same. The dial bears the words "On" and "Off" or words or characters of similar import, and they are so disposed with relation to the movable pole-plate (when the dial is coupled to the commutator) as to indicate the position thereof, and likewise the condition of the circuit as to whether it is "open" or "closed."

In Fig. 3, 29 is a suitable cover for the protection of the internal working parts from the weather, &c. The cover is provided with a segmental perforation or visual opening 30, so located when assembled with relation of the dial that some one of the words or characters on the latter will be displayed there-through when the mechanism is at rest. The cover is also provided with a central perforation to admit of connecting the handle 18 with the operating-spindle, the said handle being provided with a shoulder 31, which takes seat on the raised center portion 32 of the cover. 33 in Fig. 3 is a washer of non-conductive material equal to or exceeding in thickness the washer 25 and 26.

Now to assemble the dial supporting and retaining portion of the device the procedure is as follows: The washer 33 is placed centrally on the top of the cover-lining 20, and the lugs 23 of the dial coupling-sleeve are passed down through the central perforation in the lining 20, and the non-conductive washer 26 also passes into the hole into the center of the washer 33, the opening therein being sufficiently large to admit of the washer 26 rotating freely therein. The cover is now pressed down over the lining, the outside diameter of which is slightly larger than the inside diameter of the cover; but on account of the flexibility of the fibrous material of which the lining is constructed the cover may be readily forced snugly down over the said lining and held from accidental displacement by reason of the friction due to the closeness of the fit. When thus assembled, it will be seen that the lining abuts against a shoulder in the cover, as shown at 34, and the washer 33 also takes seat or abuts against the shoulder 35. The washer 25 is of a diameter larger than the upper chambered recess 36 in the ceiling of the cover, and said chamber is of sufficient height to clear the metallic washer 28 whenever the washer 25 contacts with the cover, as shown at 39. By this construction

it will be seen that the dial and its clutch-sleeve are at all times insulated from the cover. The hole through the dial coupling-sleeve is of a diameter considerably larger than the central hole in the cover, and consequently larger than that portion of the handle which passes through the cover, and therefore the dial does not seat or bear upon the handle in any manner, but is seated upon the lining 20 and washer 33 and is also held central by reason of its side bearings in the same two numbers. It will likewise be observed that as there is no opening or perforation through the lining (except the center one, and that being practically closed by the dial-sleeve which take bearing therein) no dust, dirt, or moisture can enter the chamber formed by the cover-lining. To apply the dial, it is only necessary to apply the cover in the usual manner and at the same time rotate it, when the lugs upon the dial coupling-sleeve will engage and interlock with the lugs on the commutator. The handle is now applied in the usual manner, and the whole structure is thus bound and held together. It is obvious that when the handle is turned the spring will become tense, so that when by continued movement of the handle the commutator is released (by the action of the intervening mechanism) it will be rotated quickly to the next step or location, rotating the dial, and thus indicating absolutely the location of the movable pole-plate, which is also carried by the commutator.

Another advantage of this construction is freedom of the dial from friction of the rotating parts. The dial being confined within the chamber in the cover, it is less liable to be misplaced and lost when removed for any purpose than if it were independently connected.

It is obvious that many modifications of our invention may be made without departing essentially from our invention. For instance, the dial may be suspended from and inside the cover-lining and a hole formed in the said lining to register with the visual opening in the cover.

In Fig. 16, 40 is the switch-operating spindle; 41, a section of the commutator. 42 is the cover-lining of insulating material. 43 is the metallic protecting-cover. 44 is the dial-sleeve. 45 represents downwardly-projecting lugs adapted to engage with corresponding lugs 46 on the commutator. 47 is a collar or flange formed integral with the dial-sleeve. 48 is a metal dial. 49 is a metal washer or collar surrounding the dial-sleeve. 50 is a washer of non-conductive material which is also mounted on the dial-sleeve, and 51 is a metal washer fitted and riveted onto the upper end of the sleeve and acts to hold and bind the several parts together which constitute the dial proper. 52 is a handle which is threaded onto the spindle, said handle hav-

ing a shoulder which takes seat upon the cover, as shown at 53. The stem 54 of the handle is smaller in diameter than the bore of the dial-sleeve and does not contact with the said sleeve in any manner, the dial being held central by the collar 49, fitting loosely within the central hole 55 in the lining. A segmental hole or opening 56 is cut through the lining and registers with the segmental hole in the cover in the ordinary manner. The dial bears the usual designating words or numbers, which register with and are exposed through the opening or window in the cover when the switch mechanism is operated.

In Figs. 18 and 20 the dial 57, as shown, is held between washers 58 of insulating material, all being mounted upon a central metal bushing 59, said bushing being provided with an irregular-shaped hole 60. The handle 61 is provided with a stem of corresponding cross-section and fits freely but closely within the opening in said sleeve when the parts are assembled. A large washer of non-conductive material 62 is mounted in the cover 63 and over the lining 64, the hole in said washer being slightly larger in diameter than the lower dial-washer 58. A window or segmental opening is cut through the cover 63, similar to the one shown in Fig. 17, for the purpose of exposing the characters on the dial when the switch is in operation.

In Fig. 19 the dial 65 rests directly on the cover-lining 66 and is held central therein by the depending sleeve 67, the cover 68 being provided with the usual segmental window 69. The operation of all the foregoing modified forms are identical with the first one described, and further description is deemed unnecessary.

We do not wish to be held strictly to the exact means shown, but desire the liberty to adopt any of the various modified forms which readily suggest themselves to the mechanical mind and come reasonably within the spirit and limits of our invention.

Having thus described our invention, what we claim, and desire to secure by Letters Patent, is—

1. In an electric switch, a cover therefor, a non-conductive lining for the cover and an indicating-dial supported by said lining.

2. In an electric switch in combination, a circuit making and breaking contact mechanism, a protecting metallic cover inclosing said mechanism, a non-conductive cup-shaped lining fitting within said cover, a recess in the ceiling of said cover, forming a chamber between said cover and the top of said lining, a dial in said chamber and rotatably supported by said lining, and provided with means for engaging, and coacting, with a rotatable member of the circuit making and breaking contact mechanism.

3. In an electric switch in combination, a circuit making and breaking contact mechanism, a protecting metallic cover inclosing said

mechanism, a non-conductive cup-shaped lining fitting within said cover, a chamber between the top of said lining, and the ceiling of said cover, a dial in said chamber rotatably supported by said lining and provided with means for engaging, and coacting, with a rotatable member of said making and breaking contact mechanism.

4. In an electric switch, a cover therefor, a lining for the cover, and an indicating-dial supported by the lining.

5. In an electric switch, a cover therefor, a lining for the cover, said lining forming with the cover a compartment, and an indicating-

dial within the compartment, supported by the lining.

6. In an electric switch, a cover therefor, a lining for the cover, and an indicating-dial supported by said lining, said dial being insulated at all points from the cover.

In testimony whereof we affix our signatures in presence of two witnesses.

CHARLES G. PERKINS.
NATHAN W. CRANDALL.

Witnesses:

H. J. MAERCKLEIN,
J. D. KINNY.