

Feb. 24, 1953

A. COLES, JR., ET AL

2,629,787

ELECTRICAL SWITCH

Filed Nov. 8, 1948

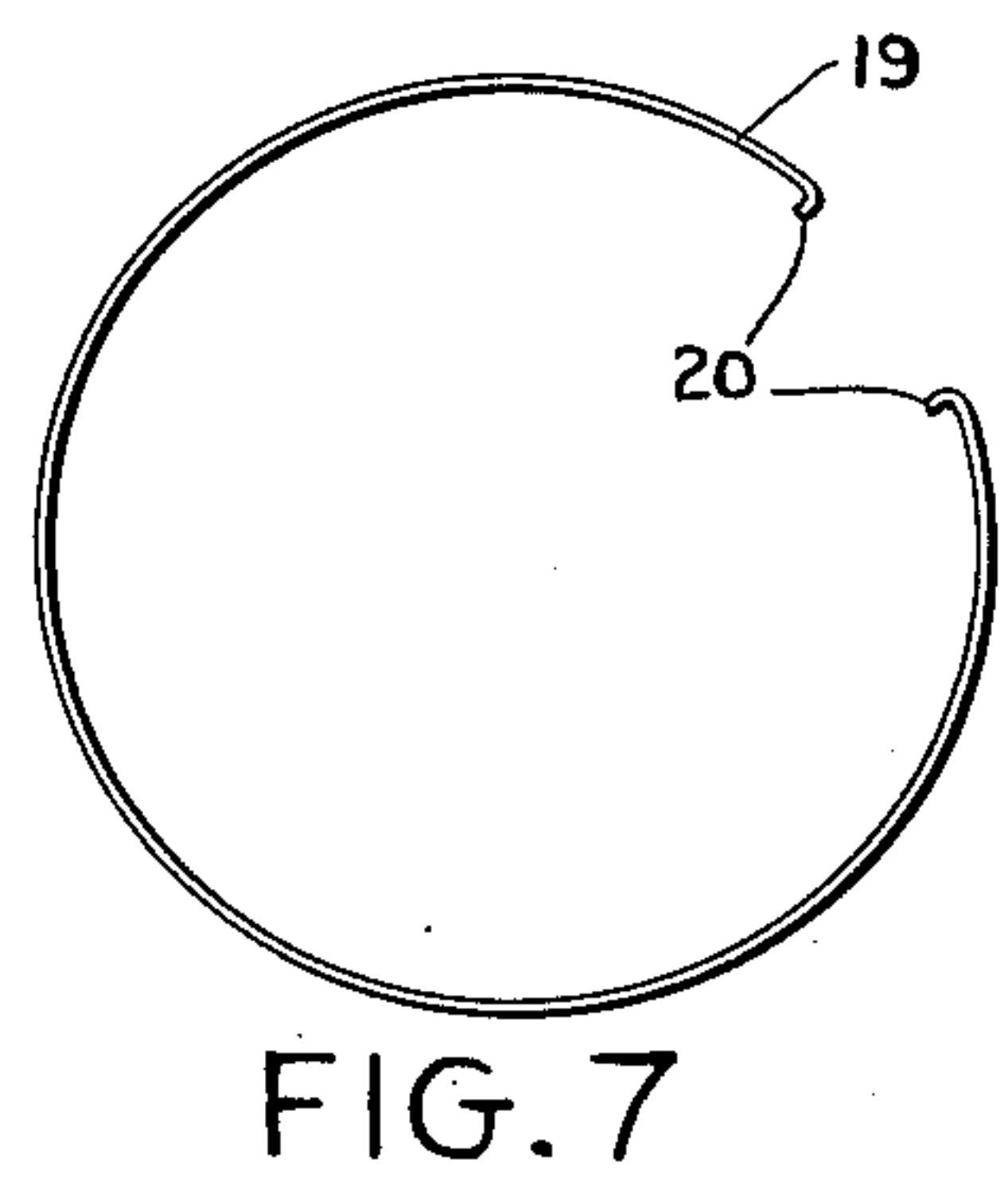
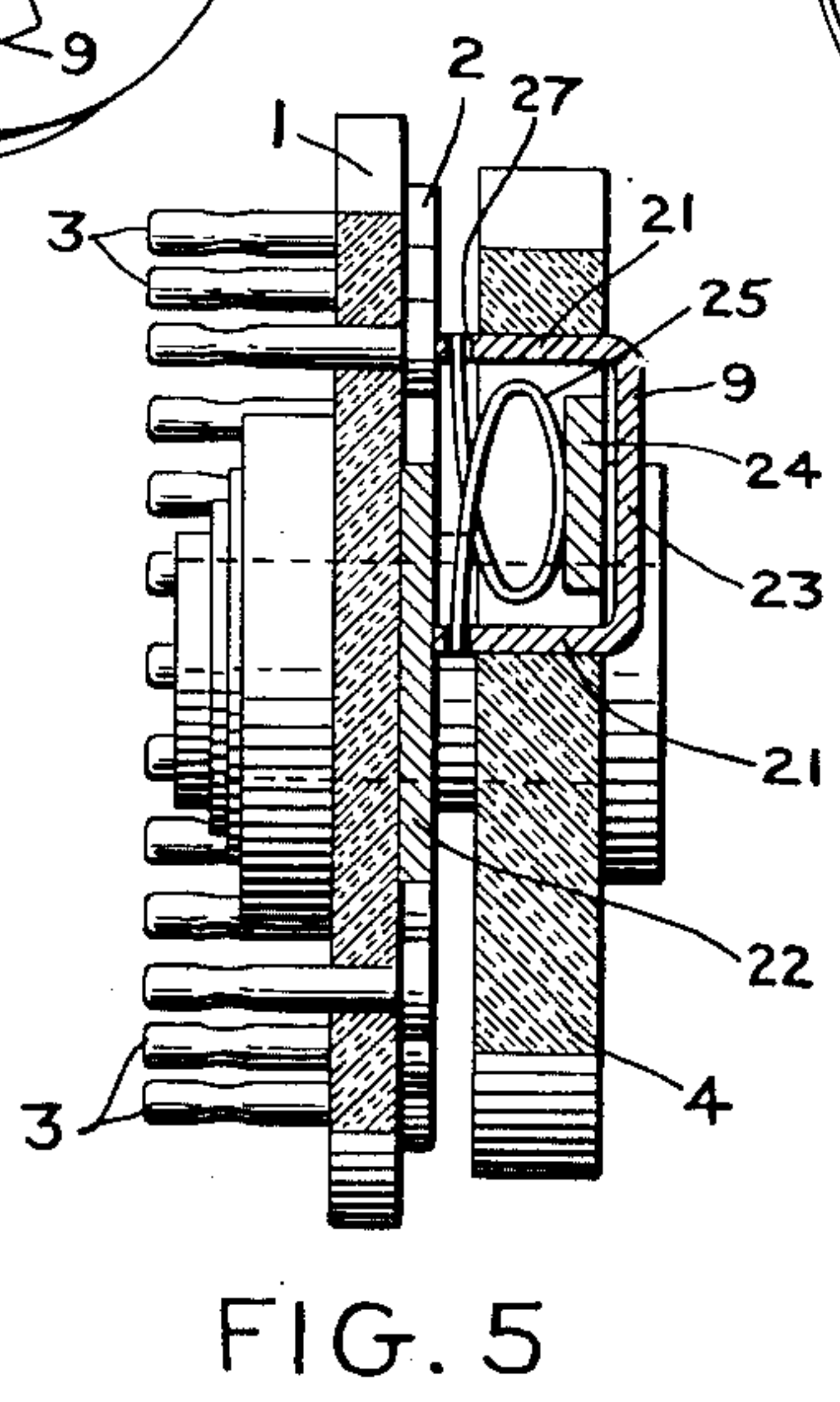
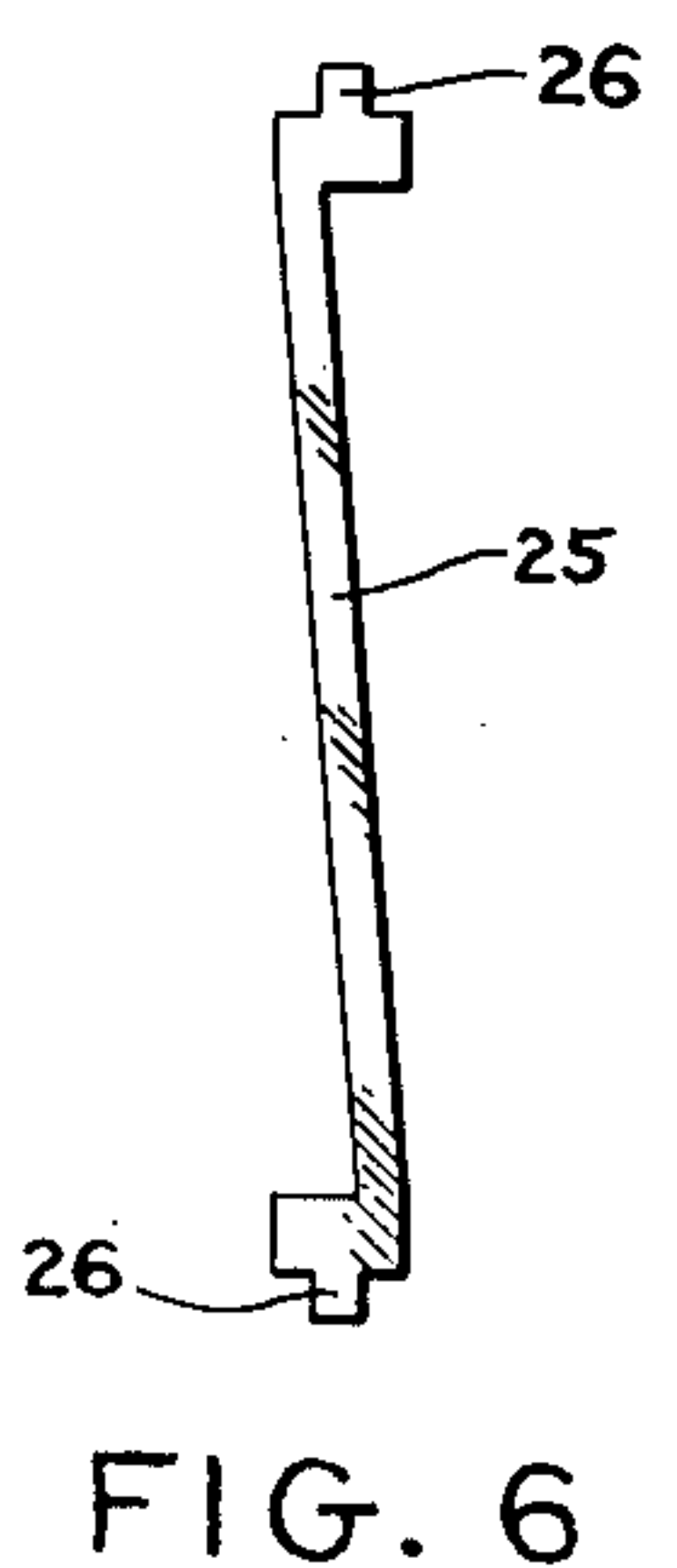
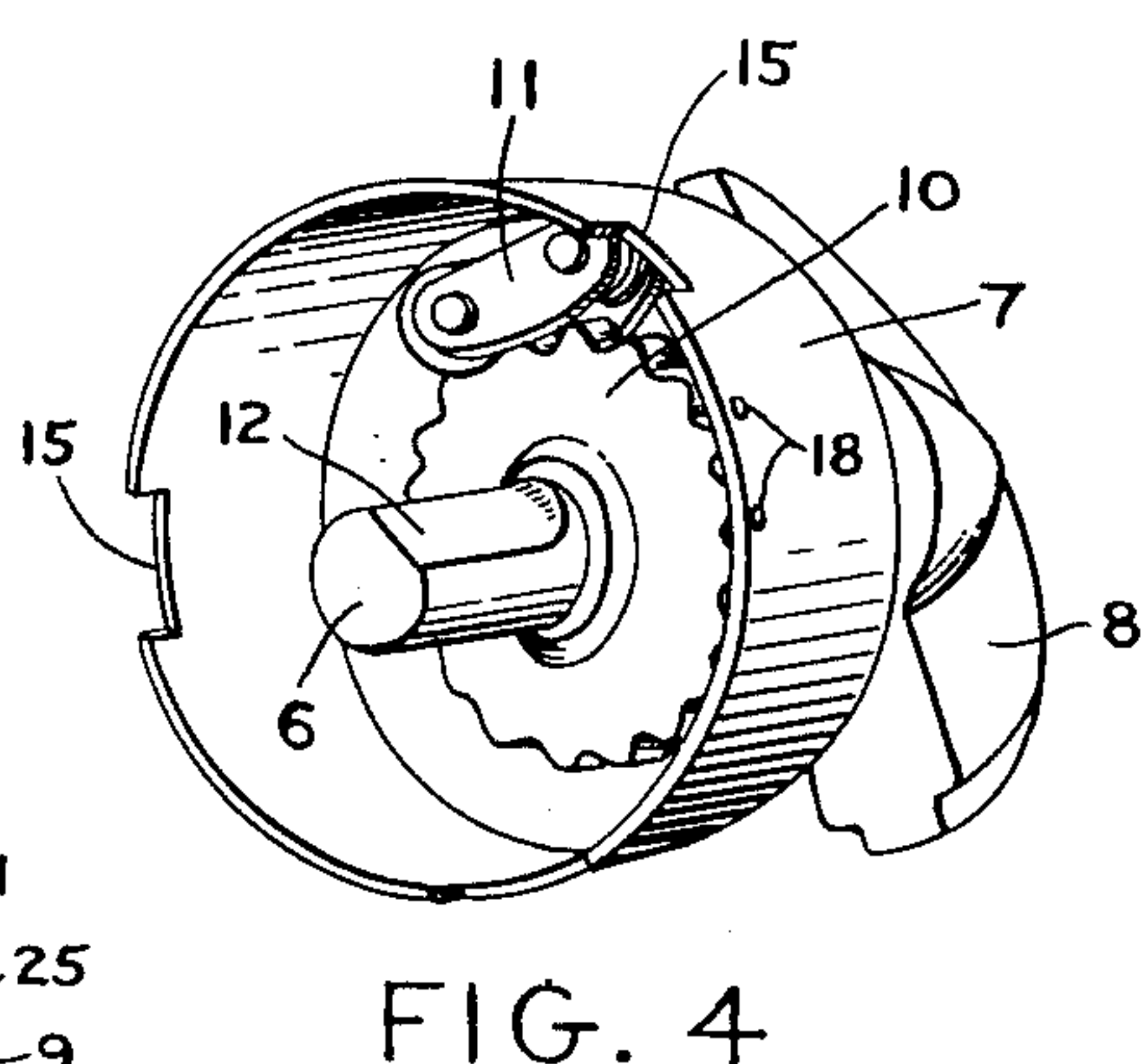
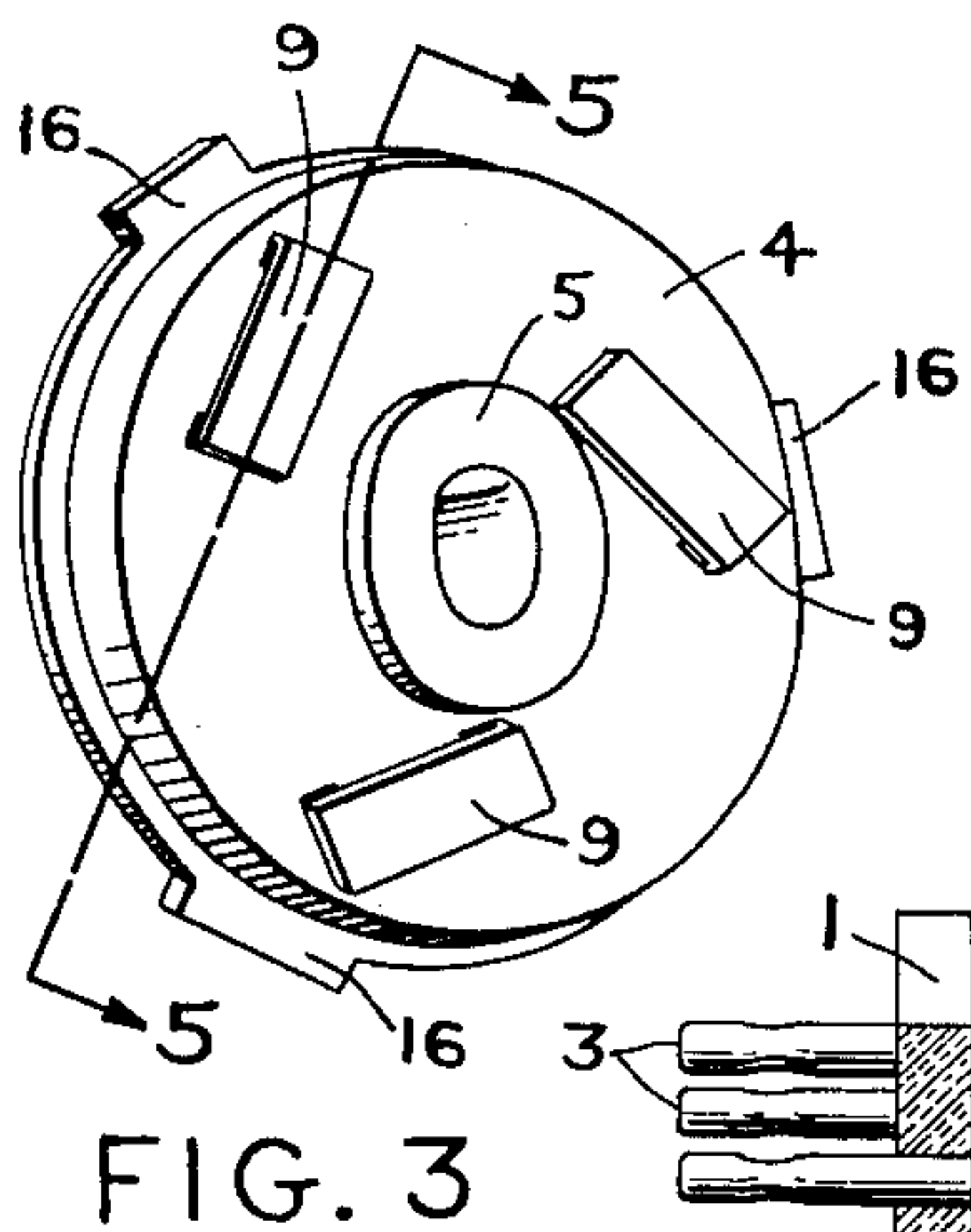
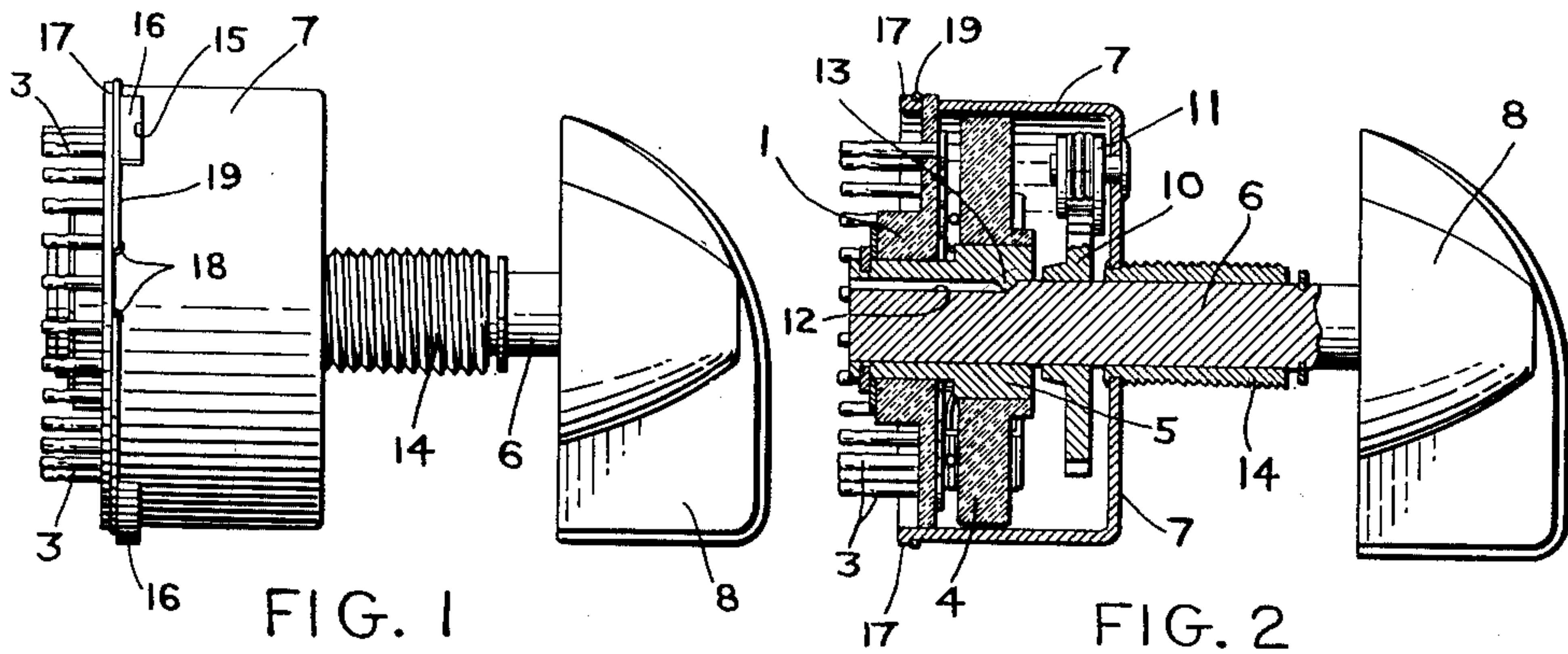


FIG. 7
ANDREW HOOD
ARTHUR COLES, JR.
INVENTORS
BY *Robert M. Meyer*
attorney

Patented Feb. 24, 1953

2,629,787

UNITED STATES PATENT OFFICE

2,629,787

ELECTRICAL SWITCH

Arthur Coles, Jr., Westfield, and Andrew Hood,
Arlington, N. J., assignors to The Daven Com-
pany, Newark, N. J., a corporation of New
Jersey

Application November 8, 1948, Serial No. 59,006

4 Claims. (Cl. 200—11)

1

This invention relates to electrical switches and more particularly to a switch for use in decade resistors, attenuators and other instruments such as power switches where the points of contact sweep over a plurality of stationary contacts.

An object of the present invention is to provide a switch as specified which is dustproof, relatively simple in construction and which may be removed from a panel board without disconnecting the wiring thereto.

Another object of the present invention is to provide an electrical switch wherein the movable members are yieldably carried by the movable carrying element or body of the switch for yielding movement relative thereto to provide a firm positive contact at all times with the stationary contacts with which they cooperate.

A further object of the invention is to provide in an electrical switch of the type specified means whereby proper positioning of the movable contact carrying element or body and the detent gear relative to the stationary contacts is assured when the switch is assembled or reassembled after cleaning or repair.

With these and other objects in view, as may appear from the accompanying specification, the invention consists of various features of construction and combination of parts, which will be first described in connection with the accompanying drawings, showing an electrical switch of a preferred form embodying the invention, and the features forming the invention will be specifically pointed out in the claims.

In the drawings:

Figure 1 is a side elevation of the improved switch.

Figure 2 is a longitudinal section through the improved switch.

Figure 3 is a perspective view showing the rotary movable contact carrying element and the stationary contact carrying element in assembled relation for insertion into the housing.

Figure 4 is a perspective view of the housing looking inward thereinto and showing the rotary shaft for rotating the movable contact carrying element.

Figure 5 is a detailed section through the switch taken on the line 5—5 of Figure 3.

Figure 6 is a plan view of a spring element employed for yieldably supporting the individual U-shaped moving contacts.

Figure 7 is a view showing a locking spring ring employed for locking the switch structure in assembled condition.

Referring more particularly to the drawings, 1 indicates the stationary contact carrying member which has a plurality of contacts 2 carried thereby at spaced points preferably in a circle about the axis of the carrying member 1. Suitable terminal connections 3 are carried by the member 1 and serve for connecting electrical wires to the stationary contacts 2. Movable contacts of the switch which engage certain of the

2

stationary contacts for closing an electrical circuit are carried by the movable contact carrying member 4. The member 4 is mounted upon a sleeve 5 for rotation therewith. The sleeve 5 is in turn mounted upon the shaft 6 which projects outwardly through the end of the housing 7 and has a knob 8 mounted thereon for manually rotating the shaft 6 to adjust the position of the various movable contacts 9 which are carried by the carrying member 4. A detent gear 10 is carried by the shaft 6 and cooperates with a spring pressed pawl 11 for indicating the positions of an adjustment of the movable contact carrying member. The shaft 6 has a flat portion 12 formed thereon extending inwardly from its inner end, which flat portion is engaged by a projection 13 formed within the bore of the sleeve 5 so that the movable contact carrying member 4 can be mounted on the shaft 6 in only one position thereby insuring the proper and accurate mounting of the member 4 and its movable contacts 9 relative to the stationary contacts 2 and the dial markings on the panelboard (not shown) on which the switch is mounted. A panelboard mounting sleeve 14 is carried by the housing 5 and is mounted about the shaft 6, as clearly shown in Figures 1 and 2 of the drawings. The housing 7 has an open end as clearly shown in Figure 4 of the drawings which receives therethrough the shaft 6 with the detent gear 10, movable contact carrying member 4 and stationary contact carrying member 1 mounted thereon in the assembled position of the switch so that these various elements may be assembled upon the shaft 6 and the shaft inserted into and through the housing with the assemblage thereon. The housing 7 has a plurality of cutouts or notches 15 cut in its outer edge and, while all of these notches are rectangular, each one is of a different size than any other one and they correspond in size to tongues or projections 16 which are formed on the periphery of the stationary contact carrying member 1 so that in mounting the switch assemblage in the housing it can be mounted therein in only one position, thus insuring the proper locating of the stationary contacts with relation to the dial markings on the panelboard (not shown) on which the switch is mounted, both on the initial mounting of the switch and after the switch has been taken apart for cleaning. The housing 7 has a slight annular flange 17 about its periphery and it is provided with two spaced openings 18. When the assemblage is inserted into the housing 7 the stationary contact carrying member 1 is inserted therein a sufficient distance, determined by the depths of the notches or cutouts 15 so that the outer surfaces of the tongues 16 are spaced inwardly slightly from the annular flange 17 thus leaving sufficient space to receive the locking ring 19. The locking ring 19, shown specifically in Figure 7 of the drawings, is a spring ring split and having its ends intumed as shown at 20. The in-

3

turned ends are inserted through the openings 13 and the locking ring forms a wedge between the annular flange 17 and the outer sides of the tongues or projections 16.

The individual movable contacts 9 which are carried by the movable contact carrying member 4 are U-shaped, as clearly shown in Figure 5 of the drawings. The legs 21 of these individual U-shaped contacts extend through suitable openings in the member 4 and engage respectively the inner stationary contact ring 22 and one of the outer rings of stationary contacts 2. The connecting length 23 of the U-shaped contacts 9 extends across the abutment projection 24 which serves to limit the inward movement of the contact. A coiled spring member 25 is inserted between the legs 21 and engages the abutment 24 to yieldably urge the inner ends of the legs 21 into engagement with the stationary contacts 2 and 22. The coil spring member 25 is formed of a flat piece of spring metal having a tongue 26 formed on each end thereof, and after the flat spring element 25 is coiled as shown in Figure 5 the tongues 26 are inserted into suitable openings 27 formed in the legs 21 and thus through its connection with the legs 21 and engagement against the abutment 24 the spring member 25 serves always to urge the ends of the legs of the U-shaped contact members 9 into firm contact engagement with the stationary contacts 2 and 22 and also to prevent the U-shaped contacts 9 from accidental displacement relative to the carrying member 4.

With the construction of the electrical switch shown in the drawings and just above described, it will be apparent that a dustproof electrical switch structure has been provided which is simple and neat in construction and appearance, which can be easily attached to a panelboard and which will permit disassembly of the parts of the switch for cleaning the contacts, both movable and stationary, or for replacing worn contacts or repairing parts of the switch and permit the remounting of the repaired switch accurately and positively with respect to the dial markings and will remove the liability of error, as well as delicate setting operations of remounting the switch.

It will be understood that the invention is not to be limited to the specific construction or arrangement of parts shown, but that they may be widely modified within the invention defined by the claims.

What is claimed is:

1. In an electrical switch, a stationary contact carrying member, a plurality of stationary contacts carried thereby, a contact carrying member movable about a fixed axis and provided with an opening extending therethrough, an abutment extending across said opening, a U-shaped contact member having its legs extending through said opening and spanning said abutment, each of the legs of said U-shaped contact member provided with an opening therein, and a coiled spring having its ends engaging in said openings and its coil engaging said abutment for urging the ends of the U-shaped contact into stationary contact engaging position.

2. In an electrical switch, a stationary contact carrying member, a plurality of stationary contacts carried thereby, a contact carrying member movable about a fixed axis and provided with an opening extending therethrough, an abutment member extending across said opening, a U-shaped contact member having its legs extending

4

through said opening and spacing said abutment member, each of the legs of said U-shaped contact member provided with a rectangular opening therein, a flat coiled spring, tongues on the ends of said spring engaging in said rectangular openings, the coil of said spring engaging said abutment for urging the ends of the U-shaped contact into stationary contact engaging position.

3. In an electrical switch, a stationary contact carrying member, a plurality of stationary contacts carried thereby, an operating shaft, a sleeve removably mounted in said stationary contact carrying member and fixedly connected to said operating shaft for rotatory movement relative to said stationary contact carrying member when said operating shaft is rotated, a movable contact carrying member fixedly mounted on said sleeve for rotation therewith, contact means resiliently mounted on said movable contact carrying member for contact with said stationary contacts, said operating shaft provided with a flat extending longitudinally therealong for a part of its length, and a projection formed in said sleeve for engagement with said flat to position said movable contact carrying member and stationary contact carrying member in predetermined relative positions when sleeve is mounted in said stationary contact carrying member.

4. In an electrical switch, a stationary contact carrying member having circumferentially spaced tongues formed on its perimeter, at least one of said tongues having a size different from the others, a plurality of stationary contacts carried by said stationary contact carrying member, an operating shaft, a sleeve removably mounted in said stationary contact carrying member and fixedly connected to said operating shaft for rotatory movement relative to said stationary contact carrying member when said operating shaft is rotated, a movable contact carrying member fixedly connected to said sleeve for rotatory movement therewith, contact means resiliently mounted on said movable contact carrying member for contact with said stationary contacts, said operating shaft provided with a flat extending longitudinally therealong for a part of its length, a projection formed in said sleeve for engagement with said flat to position said movable contact carrying member to a predetermined position relative to said shaft, said operating shaft rotatably mounted in a housing extending about said movable contact carrying member, said housing having one open end provided with a plurality of circumferentially spaced recesses corresponding in size to said tongues, said operating shaft and said housing so constructed and arranged that when said recesses are brought into engagement with said tongues the movable contact carrying member will be properly positioned relative to said stationary carrying member.

ARTHUR COLES, JR.
ANDREW HOOD.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
1,710,999	Schmid	Apr. 30, 1929
1,960,223	Rose et al.	May 22, 1934
2,090,505	Uhle	Aug. 17, 1937
2,430,215	Douchette	Nov. 4, 1947
2,459,998	Ellithorpe	Jan. 25, 1949