Dec. 15, 1953

D. W. SNOW

2,662,954

ROTARY ELECTRICAL SWITCH

Filed May 2, 1952

2 Sheets-Sheet 1

Fig. 1.

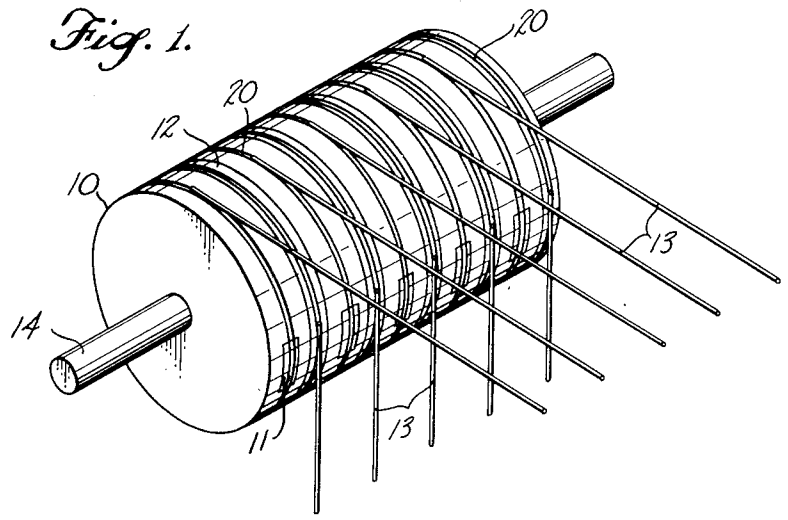
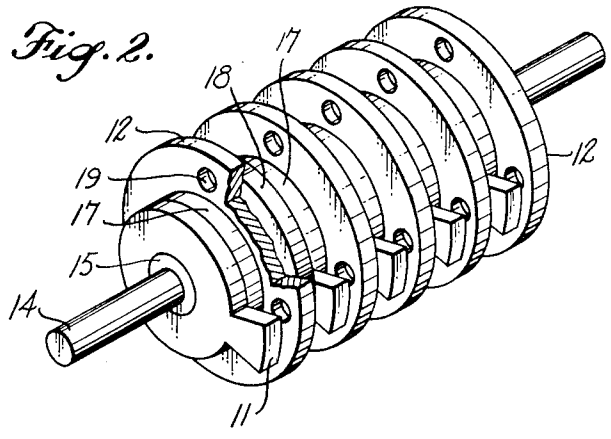


Fig. 2.



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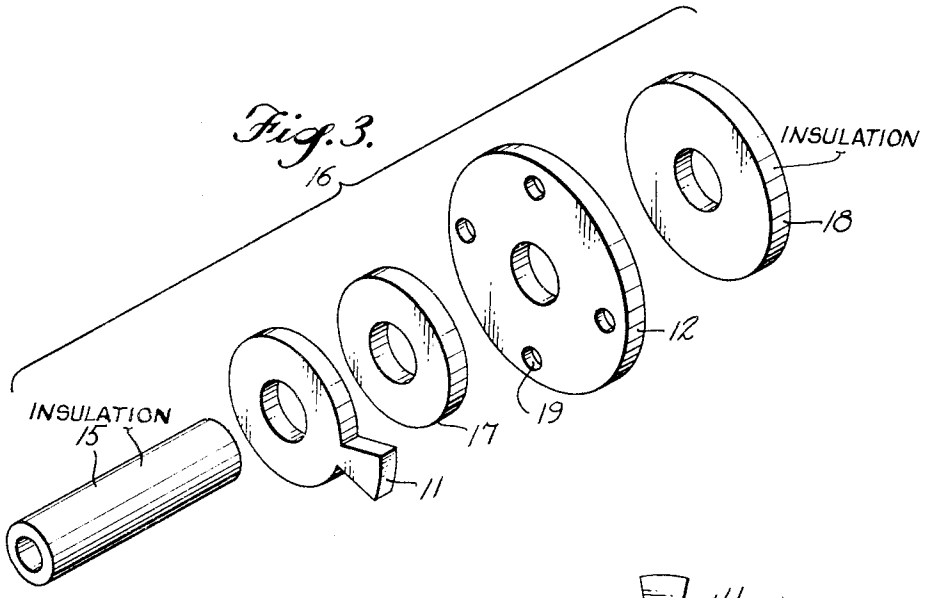
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Fig. 3.



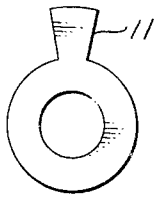


Fig. 4.

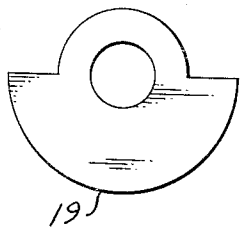


Fig. 5.

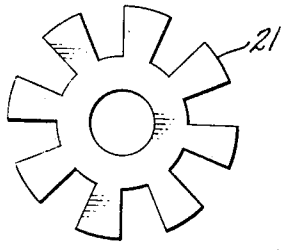


Fig. 6.

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UNITED STATES PATENT OFFICE

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ROTARY ELECTRICAL SWITCH

Dale W. Snow, Seattle, Wash., assignor to Boeing Airplane Company, Seattle, Wash., a corporation of Delaware

Application May 2, 1952, Serial No. 285,735

1 Claim. (Cl. 200—155)

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This invention relates to an electrical current conducting device and more particularly to a plural circuit connecting member that may be used as a rotary switch or a commutator.

The invention comprises the molded plastic assembly of multiple conducting, spacing and insulating segments around a common shaft. The assembly is rotatably mounted with brushes contacting the conducting segments distributing current from and to the respective circuits.

The purpose of the invention is to provide a plural circuit connecting member which is lightweight, compact and dependable.

It is an object of the invention to provide a plural circuit connecting member readily manufactured at a reasonable cost.

It is an object of the invention to provide a plural circuit connecting member adaptable to varying switching requirements over a wide range of regular and irregular timing sequences.

The purpose and objects of the invention will become more apparent as the following description is read with reference to the drawings wherein the same part is identified by a like numeral throughout the views. In the drawings:

Figure 1 is a perspective view of the plural circuit connecting member and brushes.

Figure 2 is a perspective view of the components of the circuit member in Figure 1 prior to being molded in plastic.

Figure 3 is a perspective view of a portion of the components in Figure 2 comprising a switching unit before assembly.

Figure 4 is a side view of the switching segment incorporated in the embodiment shown in Figures 1, 2 and 3.

Figure 5 is a side view of a modified switching segment.

Figure 6 is a side view of another modified switching segment.

As shown in Figure 1, the invention is a cylindrical switch or commutator 10, with conducting segments 11 and slip rings 12 arranged in a spaced relationship to contact respective brushes 13. The segments 11 and the rings 12 form part of the surface of the cylinder 10 which primarily appears as a molded plastic form on a central shaft 14. The molded plastic serves the dual function of insulating and holding together the conducting components of the circuit connecting member 10.

Figure 2 shows the assembly of the component parts prior to their incorporation within the molded plastic and Figure 3 illustrates a portion of these parts before assembly. The part 15 is

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an insulating sleeve for placement over the shaft 14 to insulate it from the multiple switching units 16 mounted side by side on the shaft 14. Each of the units is composed of the following parts: a switching segment 11, a conducting spacer 17 adjacent to the segment 11, a slip ring 12 on the opposite side of the spacer 17, and an insulating spacer 18 to insulate the switching unit 16 from an adjacent unit.

During the molding step in the manufacture of the switch 10, all the parts shown in Figure 2 are covered completely with plastic. The holes 19 in the slip ring insure the proper plastic bonding of the insulating spacer 18 to the slip ring 12. After the molding, a turning operation is employed to acquire the desired diameter of the switch 10. Subsequently grooves 20 are cut through the outer plastic surface to expose the conductors and to establish guides for the contact brushes 13.

The overall design of the plural circuit connecting member 10 is adaptable to irregular switching requirements. A selected number of multiple units 16 are arranged side by side and each unit 16 is especially adapted to transmit current following a specific timing sequence. The switching segments have contact surfaces of different lengths arranged at variable intervals along the circumferential path.

Three illustrative types are presented in Figures, 4, 5 and 6. The switching segment 11 of Figure 4 has a contact surface which completes a circuit through one brush during one short period of a single shaft revolution. The switching segment 19 of Figure 5 has a contact surface which completes a circuit during one half the period of each shaft revolution. The switching segment 21 of Figure 6 intermittingly completes a circuit eight times through one brush during one shaft revolution.

Other sequences and durations of electrical impulses can be acquired by further modifications (not shown) such as providing multiple contacting surfaces of different arcuate dimensions on the respective switching segments and providing multiple take off brushes around the individual switching segments.

The direct mounting of some of the conducting members to the shaft which is at ground potential makes the rotary switch or commutator suitable for opening and closing ground circuits at different intervals and for variable periods.

Having now particularly described and ascertained the nature of the said invention and in

what manner the same is to be performed I declare that what I claim is:

An electrical current switching device for mounting on a shaft singly or with other similar devices for controlling the distribution of electrical power comprising a shaft; a shaft insulator; a brush contacting slip ring on the insulated shaft; a brush contacting switching segment on the insulated shaft, spaced from and in a plane parallel to the plane of the slip ring; a conducting disc spacer on the insulated shaft between the slip ring and switching segment; and a plastic body molded around the slip ring, switching segment, and conducting spacer, with grooves formed in the plastic to guide brushes that contact the slip ring and switching segment as the switching device rotates.

DALE W. SNOW.

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