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Gusaras

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[54] **MULTISECTION ROTARY WAFER TYPE SWITCH ASSEMBLY WITH INTERLOCKING STATOR AND ROTOR SECTIONS**

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[52] **U.S. Cl.** ..... **200/14,** 200/168 K

[51] **Int. Cl.** **H01h 19/58**

[58] **Field of Search** ..... 200/11 R, 11 D, 11 DA, 200/14, 17, 18, 168 K, 166 SD

[56] **References Cited**

UNITED STATES PATENTS

3,290,456	12/1966	Meyer	200/168 K X
2,956,131	10/1960	Tabet	200/14
2,798,907	7/1957	Schneider	200/14
3,251,956	5/1966	Rasor et al.	200/168 K UX

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[57] **ABSTRACT**

A rotary switch construction includes a plurality of generally identical switch sections and a switch shaft of fixed length. There are interlocking means between the stators and rotors of each of the switch sections, with one of the rotors interlocking with the switch shaft. Thus, any number of switch sections may be connected to the fixed length shaft through the interlocking arrangement between the rotors with the advantage that a single length shaft can provide rotary movement of different numbers of switch rotors.

8 Claims, 4 Drawing Figures

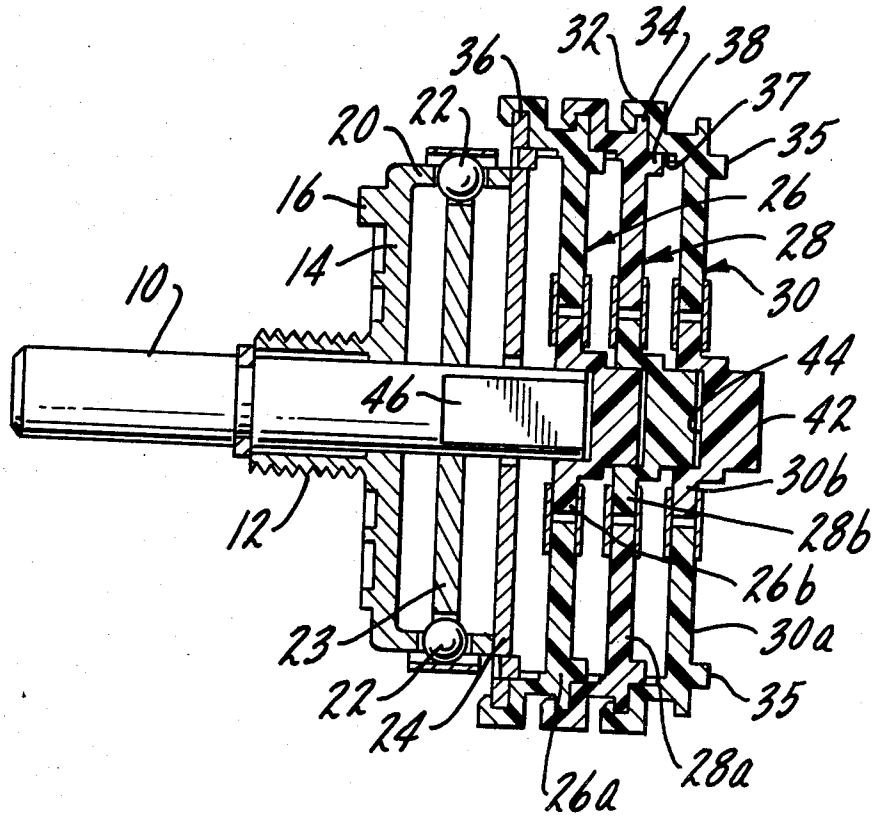


fig.1.

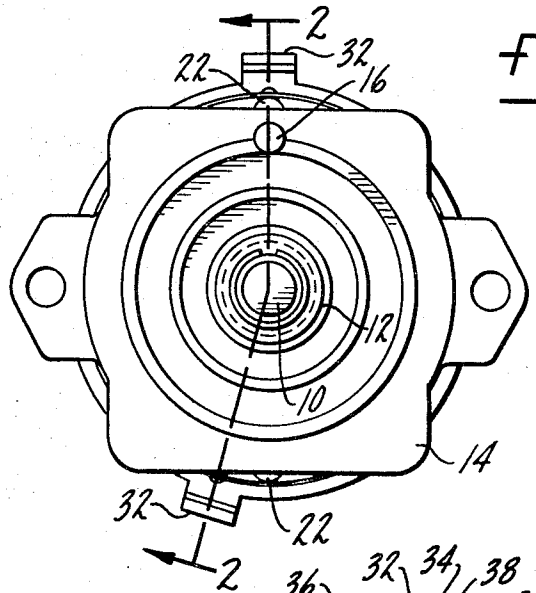


fig.2.

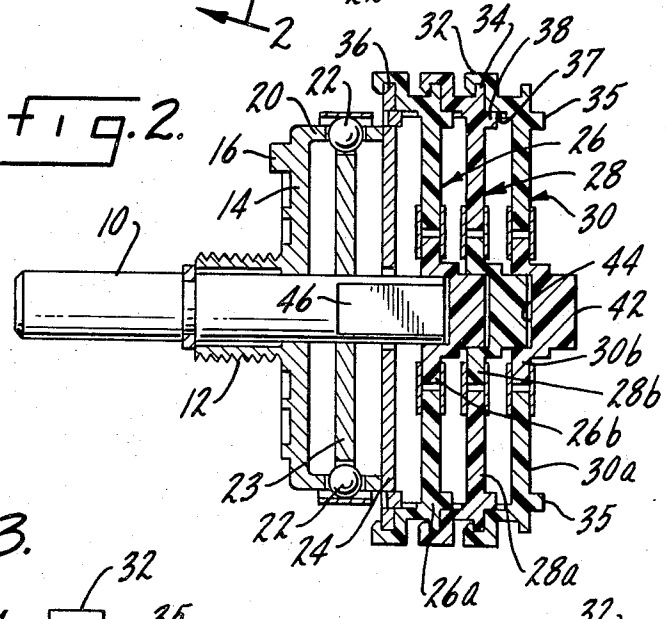
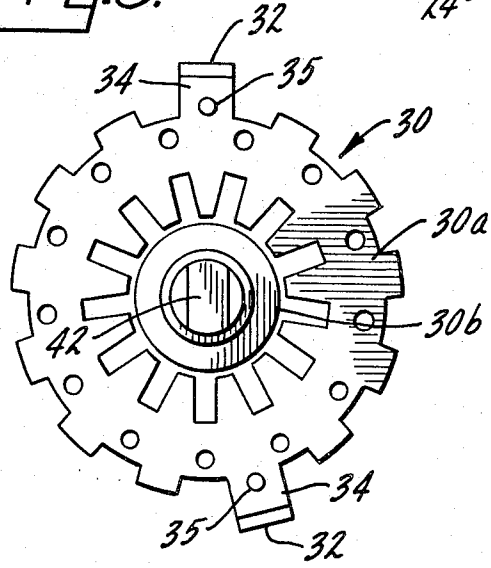


fig.3.



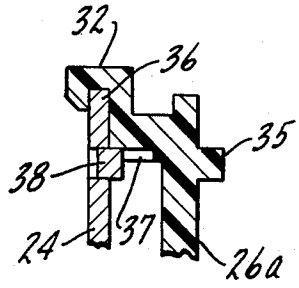


fig.4.

MULTISECTION ROTARY WAFER TYPE SWITCH ASSEMBLY WITH INTERLOCKING STATOR AND ROTOR SECTIONS

SUMMARY OF THE INVENTION

The present invention relates to rotary switches and in particular to a means for interlocking the rotors of a number of switch sections so that a single size shaft can accomodate any number of switch sections.

Another purpose is a rotary switch construction including means for interlocking the stators and means for interlocking the rotors.

Another purpose is a rotary switch construction using a single length shaft to accomodate different combinations of rotary switch sections.

Other purposes will appear in the ensuing specification, drawings and claims.

BRIEF DESCRIPTION OF THE DRAWINGS

The invention is illustrated diagrammatically in the following drawings wherein:

FIG. 1 is a front view of a rotary switch construction of the type described,

FIG. 2 is a section along plane 2—2 of FIG. 1,

FIG. 3 is a plan view of a switch member with parts removed, and

FIG. 4 is an enlarged partial sectional view illustrating the connection between the adapter plate and one of the stator sections.

DESCRIPTION OF THE PREFERRED EMBODIMENT

A switch shaft is indicated at **10** and may be received within an exteriorly threaded bushing **12.** The bushing **12** may be integral with a front plate or housing **14** having a positioning projection **16** on the front thereof. Typically, the bushing **12** will extend through an opening in an instrument panel and a nut or the like may be screwed on the threaded area of the bushing to fasten the switch section to the instrument panel. A conventional knob may be placed on the shaft **10** for operation of the switch.

The housing **14** may have rearwardly extending sides **20** which mount detent balls **22.** The balls **22** cooperate with a detent wheel **23** to control rotary position of the switch. The details of the detent mounting arrangement may be similar to that shown in U. S. Pat. Nos. 3,293,382 and 3,411,377. The rear of the housing **14** may be closed by an adapter plate **24** which may be attached in a suitable manner to the rear of the sides **20.**

There are a plurality of switch sections, in this case three, indicated at **26, 28** and **30.** Preferably, the mechanical portions of the switch sections will be generally similar and will include stators **26*a***, **28*a*** and **30*a***, and rotors **26*b***, **28*b*** and **30*b***. The rotors and stators may be conventionally constructed relative to the electrical connections therebetween.

Each of the stators may have a pair of interlocking hook members extending outwardly from the periphery. The hooks are indicated at **32** and, as shown in FIG. **3,** are unevenly circumferentially spaced apart such that the adjacent switch sections can only be snapped together in a particular manner. Details of the interlock between the stators are shown in U. S. Pat. No. 3,290,456. In particular, each of the hooks **32** will snap over a projection **34** on an adjacent stator to prevent relative axial movement between adjacent stator sections. Projecting pins **35** on each stator interlock with mating openings or holes **37** in the adjacent stator to provide an interlock against rotary movement between the adjacent stators. Again, this construction is detailed in U. S. Pat. No. 3,290,456. Thus, each of the stators is interlocked with an adjacent stator to prevent relative axial and rotary movement between stators.

FIG. 4 details the interlock between the adapter plate **24** and the closest stator, in this case stator **26*a***. The hook **32** of stator **26*a*** fits over a projection **36** on the adapter plate **24** which is of a size and shape generally the same as that of the hook portion **34** of each of the stators, thus necessitating no change in a stator to interlock it with the adapter plate. Dimples **38,** similar to the pins **35** on the stators, interlock with openings **37** in the stator **26*a*** to prevent rotary movement between the adapter plate and stator **26*a***. Thus, the interlock, both axial and rotary, between the adapter plate and the stator **26*a*** is effectively the same as the interlock between each of the adjacent stators.

Rotors **26*b***, **28*b*** and **30*b*** have identical rearwardly projecting hubs **42.** There are sockets **44** on the opposite side of the rotors with the result that the rearwardly projecting hub of one rotor interlocks with the mating socket of the adjacent rotor. The hubs and sockets may have identical cross sectional areas, for example flatted, square, rectangular, triangular or the like. In the alternative, the hubs may be formed in what is known as the double D cross section, with the sockets having the same configuration. The particular cross section is not important. What is important is to provide a non-rotational interlock between adjacent hubs and sockets so that the rotors will turn in unison.

The rear end **46** of the switch shaft **10** may have the same cross sectional shape as that of the hubs **42.** Thus, the rear end **46** of the shaft may fit into the socket **44** of rotor **26*b***. Accordingly, rotoary movement of the shaft **10** will be effective to turn all of the interlocked rotors.

The shaft **10** has a fixed length, but can accomodate a switch construction made up of any number of separate switch sections, each having similar rotors and stators. By means of the interlock between the adjacent rotors, the fixed length shaft **10** can operate as many rotors as there are positioned in the switch construction. New switch sections, each having stators and rotors similar to the already mounted switch sections, can simply be added by snapping the stators on the hooks of the previously mounted stator and interlocking the rotors to the rotor of the previous switch section. Thus, a single shaft may operate any number of switch sections with the advantage that the switch shaft may be manufactured in a single size.

Whereas the preferred form of the invention has been shown and described herein, it should be realized that there may be many modifications, substitutions and alterations thereto.

I claim:

1. A rotary switch construction including a plurality of concentric, axially spaced switch sections, each section having a rotary portion and a stationary portion, means on each stationary portion for interlocking with the stationary portion of an adjacent switch section, means on each rotary portion for interlocking with the rotary portion of an adjacent switch section, thus interlocking all rotary portions for simultaneous rotation, including a hub extending outwardly from one side of

each rotary portion and a socket recessed into the opposite side of each rotary portion,

a fixed length switch shaft, one end of said shaft interlocking with the socket of one of said rotary portions such that rotation of said shaft provides unitary rotation of all of said rotary portions.

2. The structure of claim 1 further characterized in that said switch sections are all similar.

3. The structure of claim 1 further characterized in that the hubs and sockets have compatible non-rotational cross sectional shapes, with said one end of the shaft having generally the same cross sectional shape as that of said hubs.

4. The structure of claim 1 further characterized in that the stationary portions of the switch sections are interlocked against both axial and rotational movement.

5. The structure of claim 1 further characterized by and including a detent mechanism for controlling the rotary position of said shaft and said rotary portions.

6. The structure of claim 1 further characterized by and including an adapter plate for attaching said detent mechanism to one of said stationary portions.

7. The structure of claim 6 further characterized by and including an interlock between said adapter plate and said one of said stationary portions.

8. The structure of claim 7 further characterized in that the interlock between said adapter plate and said one stationary portion is generally the same as between said adjacent stationary portions.

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