

[54] **ROTARY SWITCH ASSEMBLY WITH CONDUCTIVE ELASTOMERIC MEDIUM BRIDGING FIXED CONTACTS**

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[75] Inventor: **Derek Thornley**, Nelson, England

[73] Assignee: **Joseph Lucas (Electrical) Limited**, Birmingham, England

Primary Examiner—James R. Scott
Attorney, Agent, or Firm—Holman & Stern

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[51] Int. Cl. **H01h 21/80**

[58] Field of Search..... 200/11, 44, 166 C

[56] **References Cited**

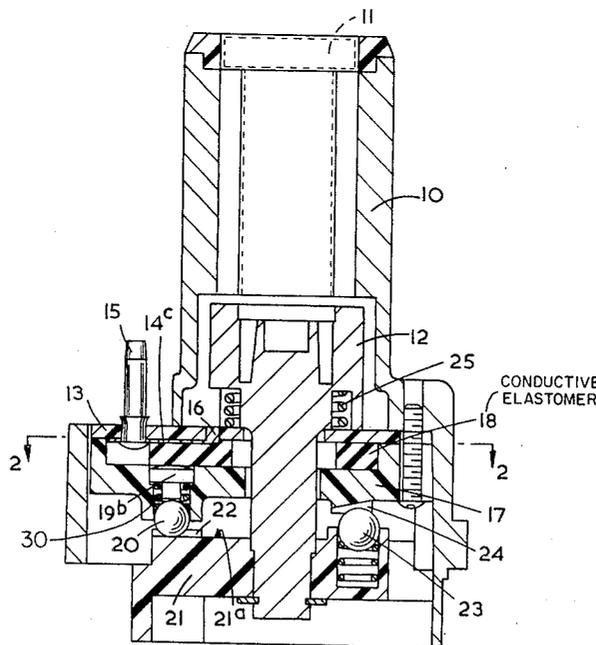
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[57] **ABSTRACT**

An electrical switch having a plurality of fixed contacts which are abutted by a layer of resilient electrically insulating material loaded with electrically conductive particles so that parts of the layer which are compressed become electrically conducting. A cam element rotatable by a cylinder lock mechanism urges selected studs into engagement with the layer to effect the desired electrical connections between pair of adjacent contacts.

7 Claims, 2 Drawing Figures



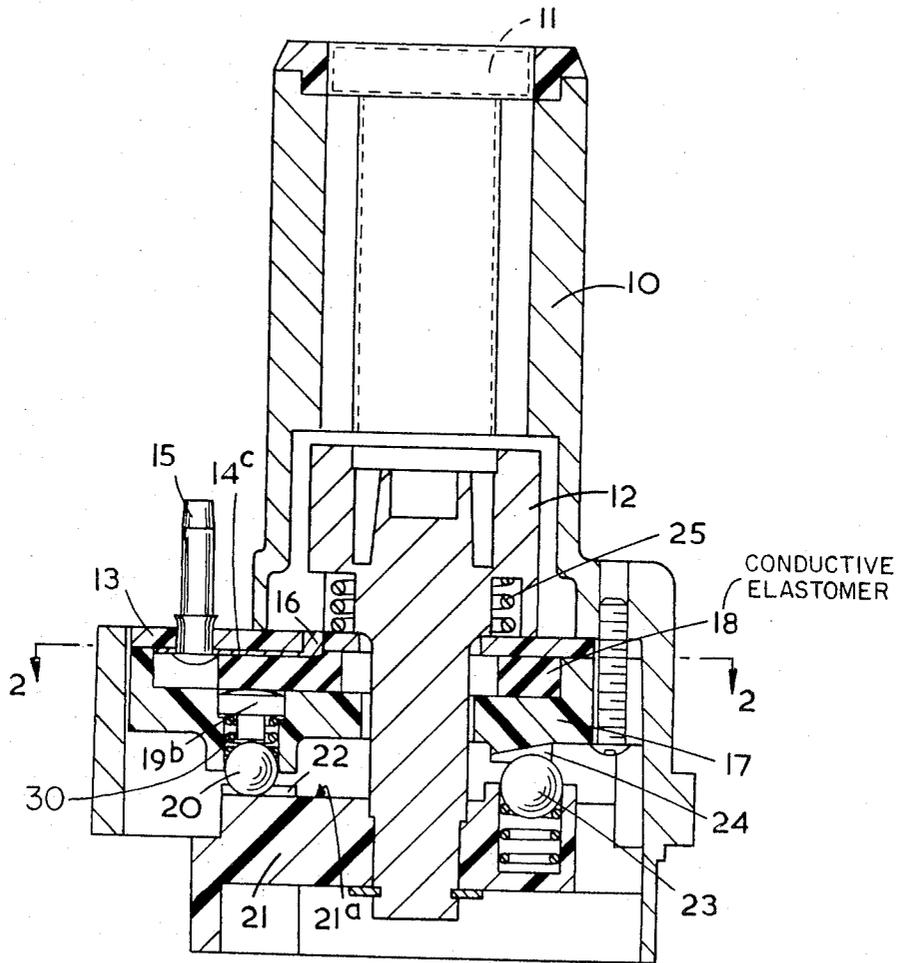


FIG. 1

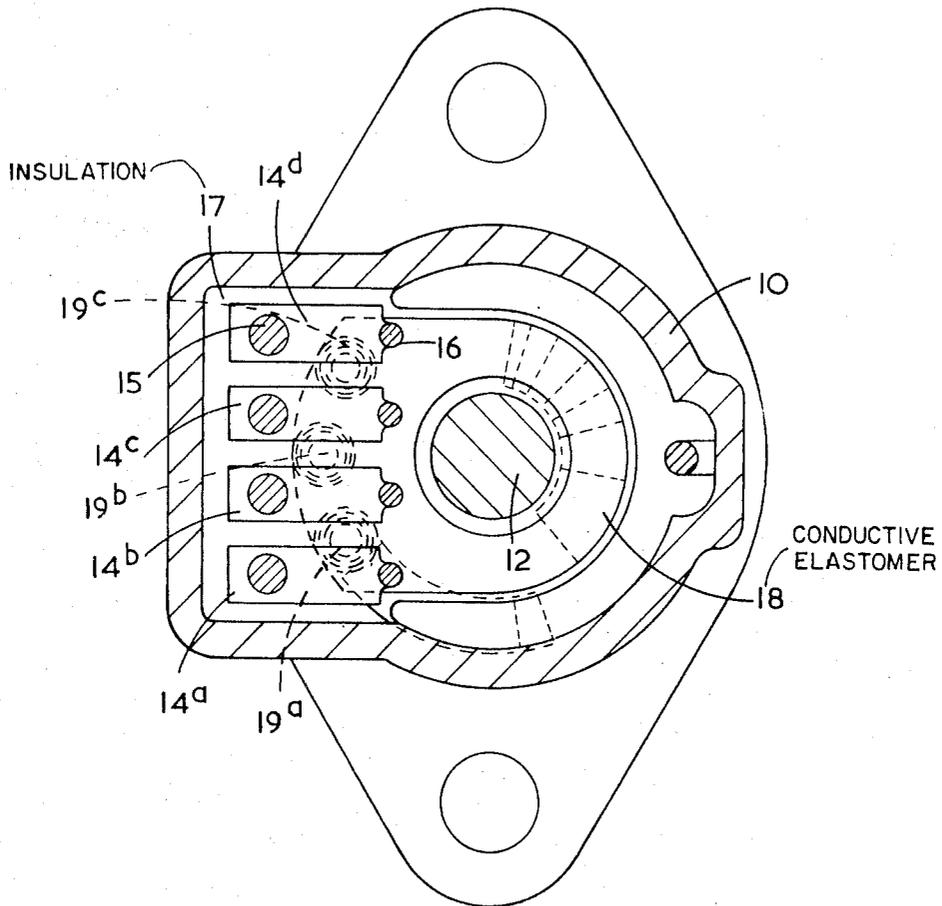


FIG.2

ROTARY SWITCH ASSEMBLY WITH CONDUCTIVE ELASTOMERIC MEDIUM BRIDGING FIXED CONTACTS

This invention relates to electrical switches and has as an object to provide a switch in a convenient form.

According to the invention, there is provided an electrical switch comprising a housing, a drive member rotatably mounted in said housing, a plurality of mutually electrically insulated, fixed electrical contacts supported in the housing, a member mounted for movement towards and away from said contacts, said member being positioned so as to overlap an adjacent pair of said fixed electrical contacts, a resiliently deformable, electrically insulating element between said member and said contacts, said insulating element biasing said member away from said contacts and being loaded with spaced, electrically conducting particles whereby compression of a part of said insulating element renders that part electrically conductive, and a cam element rotatable by said drive member to urge said member towards said contacts so as to cause pressure to be applied to said insulating element so that the latter becomes electrically conducting in a region overlapping said adjacent pair of fixed electrical contacts.

An example of the invention will now be described with reference to the accompanying drawings, in which:

FIG. 1 is a longitudinal section of an electrical switch according to the present invention, and

FIG. 2 is a section on line 2-2 in FIG. 1.

The electrical switch includes a housing 10 having a cylindrical portion adapted to receive the barrel of a cylinder lock indicated at 11. Rotatably mounted in the housing 10 and engagable by an inner cylinder of the lock 11 is a spindle 12.

Mounted in the housing 10 is a sheet 13 of electrically insulating material which supports four contact strips 14a, 14b, 14c and 14d in spaced parallel relationships so as to be mutually electrically insulated. Strips 14a to 14d are secured to sheet 13 by terminal posts 15. Each strip 14a to 14d also has a tongue 16 which extends through an associated hole in sheet 13.

Also mounted in the housing 10 is a member 17 of electrically insulating material. Sandwiched between member 17 and sheet 13 is an electrically conductive elastomeric element 18 formed of a resiliently deformable electrically insulating material which is loaded with spaced, electrically conductive particles, whereby compression of a part of element 18 urges adjacent particles into contact to render that part of the element 18 electrically conductive.

Slidably mounted in member 17 are three electrically non-conductive studs 19a 19b and 19c which are positioned so as to overlap adjacent pairs of contact strips 14a and 14b, 14b and 14c 14c and 14d, respectively. Also slidable in member 17 and engaging studs 19a, 19b and 19c are balls 20, there being springs 30 disposed between the studs and the balls.

Secured to spindle 12 is a cam plate 21 having a ramp-like projection 22 on its face 21a. Slidable in cam plate 21 is a spring-loaded ball 23 engageable with projections 24 on an adjacent face of member 17 to provide a detent arrangement for the switch. A torsion spring 25 has one of its ends secured to spindle 12 and its other end can abut a projection on casing 10 in a

predetermined angular position of spindle 12. Spring 25 thereby acts to return spindle 12 when the latter is rotated past the said predetermined position.

The switch is particularly adapted for use as an ignition and starter switch for a motor vehicle. The ramp 22 is shaped so that clockwise rotation of cam plate 21, as seen in FIG. 2, urges balls 20 and studs 19a, 19b, 19c successively towards strips 14, the studs being maintained in this position by subsequent rotation of cam plate 21 in the same direction until a fully clockwise position of plate 21 is reached, as seen in FIG. 2 in which position stud 19a is released.

In use, strip 14b is connected to a voltage supply and strips 14a 14c 14d to auxiliary, ignition and starter terminals respectively for the vehicle. Initial clockwise rotation of cam plate 21 causes stud 19c to compress element 18 to interconnect strips 14a and 14b. Subsequent rotation successively interconnects strips 14b and 14c and strips 14c and 14d, strip 14a being isolated when strips 14b 14c and 14d are interconnected. The afore-mentioned detent arrangement provides stable switch positions at which the supply via strip 14b is unconnected to any of strips 14a, 14c, 14d and also at which supply is connected to strip 14a or to strips 14a and 14c. Connected to strip 14d is obtained by rotating spindle 12 against the bias of spring 25, which on release returns the switch to a position in which strips 14a, 14b and 14c are interconnected.

I claim:

1. An electrical switch comprising a housing, a drive member rotatably mounted in said housing, a plurality of mutually electrically insulated, fixed electrical contacts supported in said housing, a member resiliently mounted for movement towards and away from said contacts, said member being positioned so as to overlap an adjacent pair of said fixed, electrical contacts, an electrically conductive elastomeric element between said member and said contacts, said conductive elastomeric element biasing said member away from said fixed electrical contact and including a resiliently deformable, electrically insulating material loaded with spaced, electrically conducting particles whereby compression of a part of said element renders that part electrically conductive, and a cam element rotatable by said drive member to urge said member towards said contacts so as to cause pressure to be applied to said conductive elastomeric element so that the latter becomes electrically conducting in a region overlapping said adjacent pair of fixed electrical contacts.

2. The electrical switch according to claim 1, wherein said member is connected for sliding movement by said cam element through the intermediary of a ball which is biased into engagement with said cam element.

3. The electrical switch according to claim 1, wherein a plurality of resiliently mounted members are provided for more than two contacts, each member overlapping a pair of adjacent contacts, and said conductive elastomeric element is disposed between all of said members and said contacts.

4. The electrical switch according to claim 3, wherein detent means are provided for detachably retaining said cam element in a plurality of its rotary positions.

5. The electrical switch according to claim 4, wherein bias means are provided between said drive member and said housing for urging said cam element out of a

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rotary position in which said detent means is non-operative and into a rotary position in which said detent means is operative.

6. The electrical switch according to claim 5, wherein said rotary position into which said cam element is urged by said bias means corresponds to a position in which one pair of adjacent contacts are not interconnected while the remaining pairs of adjacent contacts

are interconnected.

7. The electrical switch according to claim 6, wherein said rotary position in which said detent means is non-operative corresponds to a position in which another pair of adjacent contacts are not inter-connected while the remaining pairs of adjacent contacts are interconnected.

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