

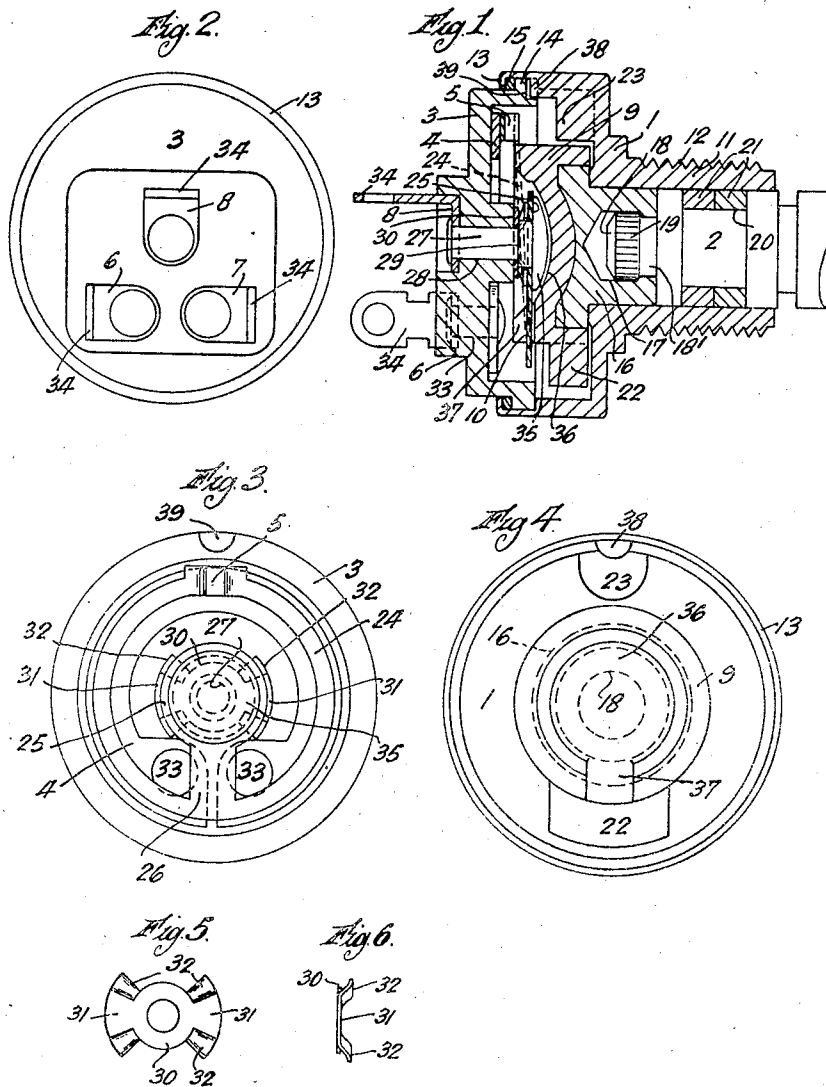
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VARIABLE ELECTRICAL RESISTANCE

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VARIABLE ELECTRICAL RESISTANCE

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This invention relates to an improved variable electrical resistance especially suitable for volume control in radio reception but not necessarily limited to that application.

The invention provides a construction which can be embodied in a very small and compact form, such as is useful as a midjet type control on aircraft, and which is capable of withstanding extreme conditions without undue variation in its electrical characteristics.

The variable resistance or volume control according to the invention is of box-like construction comprising two parts fitting or telescoping together, one part providing a bearing for an operating spindle and the other part, hereinafter called the "lid" part, carrying an assembly comprising a resistance element, a rotor contact bearing with a predetermined pressure on the resistance element and outside terminals connected to the ends of the resistance element and to the rotor contact respectively, the operating spindle carrying an actuating member adapted to enter into driving engagement with the rotor contact without affecting the bearing pressure between the rotor contact and the resistance element, when the two parts of the construction are assembled.

The invention is illustrated by way of example in the accompanying drawing, of which—

Fig. 1 is a longitudinal central section of the assembled box-like construction;

Fig. 2 is an end view upon the left hand side of Fig. 1;

Fig. 3 is a view facing the inside of the lid part of the construction shown in Fig. 1;

Fig. 4 is a view facing the inside of the other part of the construction shown in Fig. 1;

Figs. 5 and 6 show a detail in frontal and side view respectively.

Referring to the drawing, the box-like construction comprises the part 1 providing a bearing for the operating spindle 2 and the lid part 3 carrying an assembly comprising the segmental strip resistance element 4, the rotor contact 5 and outside terminals 6, 7 and 8, connected to the ends of the resistance element and to the rotor contact respectively. The operating spindle 2 carries the actuating member 9 in driving engagement at 10 with the rotor contact 5.

The body of the lid part 3 is made of synthetic plastic material, whilst the other part 1 is made of light metal such as aluminium or aluminium alloy. This latter part 1 is of a cup-like shape with an integral outwardly extending boss 11 providing the bearing for the operating spindle

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This may be formed in a single operation by a die-stamping extrusion process. A screw thread 12 on the boss for fixing it to the control panel of an instrument board may be formed during the stamping process or subsequently. The two parts are secured together by spinning the rim 13 of the cup-like part over an outward flange 14 on the lid part, after interposing a washer or sealing ring or ribbon 15.

The rotor contact actuating member 9 carried by the operating spindle 2 is of synthetic plastic material moulded upon a metal piece 16 having an axial hole 17 to receive the spindle proper. The latter has a reduced head 18 comprising a knurled portion 19 which is forced into the axial hole 17, a groove 18' being provided adjacent the knurled portion into which the metal piece 16 is swaged, thus firmly securing the head 18 to the metal piece 16. The spindle is fitted in an annular recess 20 with sealing rings 21 to make the bearing in the bush fluid-tight.

The rotor contact actuating member 9 is formed with a lateral extension 22 adapted to abut against a projection 23 in the cup-like part 1 to limit the rotation of the spindle in correspondence with the range of movement of the rotor contact 5 on the resistance element 4.

The rotor contact is constituted of a flat metal ring 24 indented to form a projection 5 for bearing on the resistance element 4, and having a leaf 25 extending radially inwards from the point 26 on the ring diametrically opposite to the projection 5, and provided with a central pivot hole. The rotor contact is rotatably mounted on the inside of the lid part 3 by means of a rivet 27 passing through the lid, the rivet having a neck in the pivot hole 28 and clamping, by means of its shoulder 29 under the neck, the central portion 30 of a spring element serving to hold the radial leaf 25 of the rotor contact against the underside of the rivet head.

This spring element (see Figs. 5 and 6) is a piece of metal comprising a central portion 30 surrounding the rivet stem and wing portions 31 having upstanding edges 32 bearing with pressure, due to the inherent springiness of the element so formed, upon the underside of the radial leaf 25 of the rotor contact.

The plane of the ring portion 24 of the rotor contact is inclined to the plane of the radial leaf 25 so that the projection 5 on the ring bears, due to the cantilever springing of the ring, with the desired pressure on the resistance element 4. The latter is secured upon the inside face of the lid part and its ends are respectively clamped by

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rivets 33 which pass through the lid part. The outside heads of these rivets 33, and of the central rivet 27 on which the rotor contact is pivoted, are clamped upon the terminals 6, 7 and 8, which have upstanding tags 34.

The head 35 of the central rivet inside the lid part is rounded, and the head of the rotor contact actuating member is correspondingly hollowed out at 35 so as to shroud, but not bear upon, the head of the rivet.

The driving engagement between the actuating member and the rotor contact, when the parts are assembled, is by means of formations which abut in the direction of drive only. It will be seen to be constituted by the radial leaf 25 of the rotor contact engaging at 10 in a corresponding radial recess or slot 37 formed in the edge of the head of the actuating member 9. The head of the latter is otherwise snugly accommodated within the ring portion 24 of the rotor contact, without touching it, so that it does not interfere with the springing of this ring portion.

A projection 38 on the part 1 engages in a recess 39 on the part 3 to ensure that the parts are assembled at the desired angular relationship.

What I claim is:

1. A variable electrical resistance comprising two parts fitting together, one of said parts carrying an assembly comprising a resistance element presenting a plane surface, a rotor contact bearing with predetermined pressure on said surface, and the other of said parts carrying an operating spindle which is rotatable about an axis perpendicular to said surface and which has a driving connection with said rotor contact which permits freedom of relative movement in the axial direction with absence of axial thrust.

2. A variable electrical resistance comprising two parts fitting together, one of said parts carrying an assembly comprising a resistance element presenting a plane surface, a rotor con-

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tact in the form of a flat metal ring indented to form a projection bearing on said surface and having a leaf extending radially inwards from a point on the ring diametrically opposite to the projection and being inclined to the plane of the ring, said leaf being mounted for rotation in a plane spaced from said resistance element so as to give to the ring a cantilever springing exerting through the said projection a predetermined force upon the said surface, and the other of said parts carrying rotatably, about an axis perpendicular to the said plane surface, a rotor contact actuating member having a recessed part engaging said leaf to provide rotary driving engagement whilst permitting freedom of relative movement in the axial direction with absence of axial thrust.

3. A variable electrical resistance as claimed in claim 2 in which the said leaf is mounted on a rivet having a head spaced from said resistance element and is urged towards said head by a spring element.

4. A variable electrical resistance as claimed in claim 2 in which the said leaf is mounted on a rivet having a head spaced from said resistance element and is urged towards said head by a spring element consisting of a central portion surrounding the rivet and wing portions having upstanding edges bearing with spring pressure upon said leaf.

5. A variable electrical resistance comprising two parts fitting together, one of said parts carrying an assembly comprising a resistance element presenting a plane surface, a rotor contact bearing with predetermined pressure on said surface, and the other of said parts carrying an operating spindle having a part fast therewith rotatable about an axis perpendicular to said surface, said spindle part engaging said rotor contact for rotating said rotor contact but permitting freedom of relative axial movement between said rotor contact and said spindle.

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