United States Patent

[11] 3,611,245

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[21] Appl. No. 11,694
[22] Filed Feb. 16, 1970
[45] Patented Oct. 5, 1971
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[54] CONTROL UNIT WITH IMPACT CONTROL MOUNTING CUSHION
5 Claims, 2 Drawing Figs.

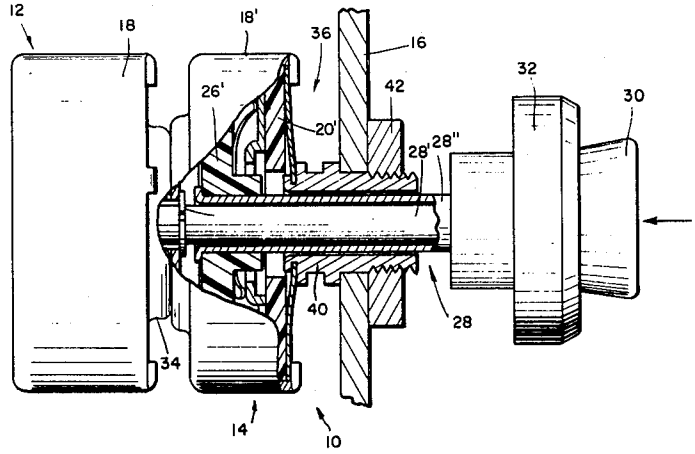
[52] U.S. Cl. 338/134, 338/320
[51] Int. Cl. H01c 9/02
[50] Field of Search 338/98, 128, 134, 197, 315, 320

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ABSTRACT: A control unit having two variable resistors connected in tandem with one each connected to concentric shafts utilizes an impact cushioning means to absorb shock loads imposed on the central shaft.



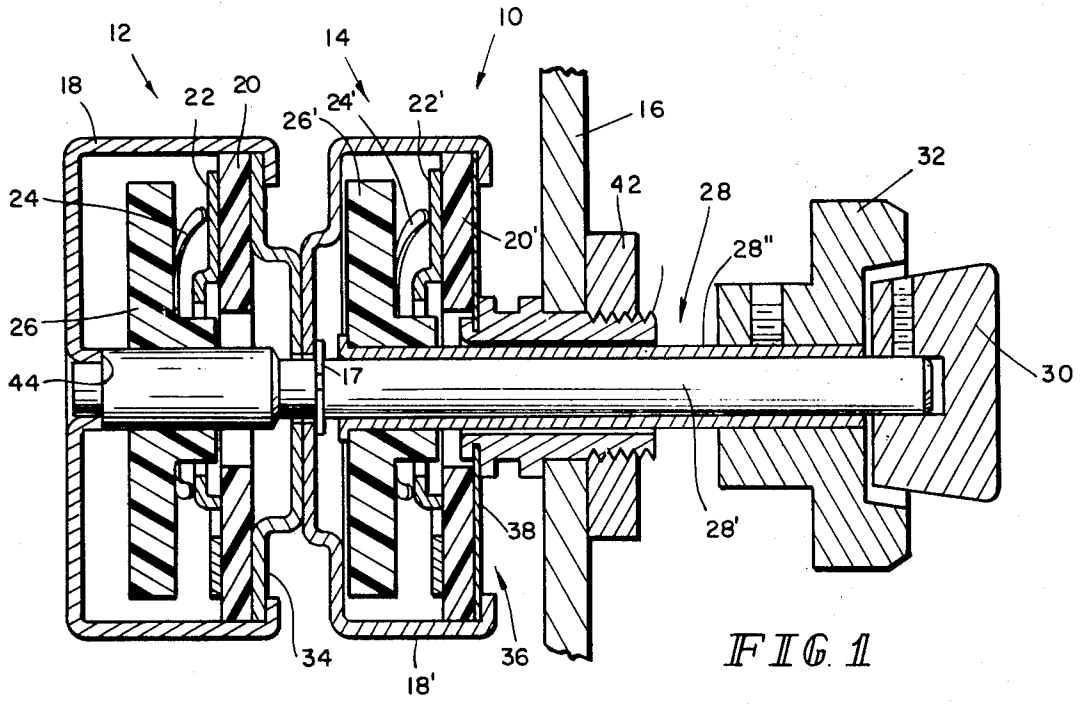


FIG. 1

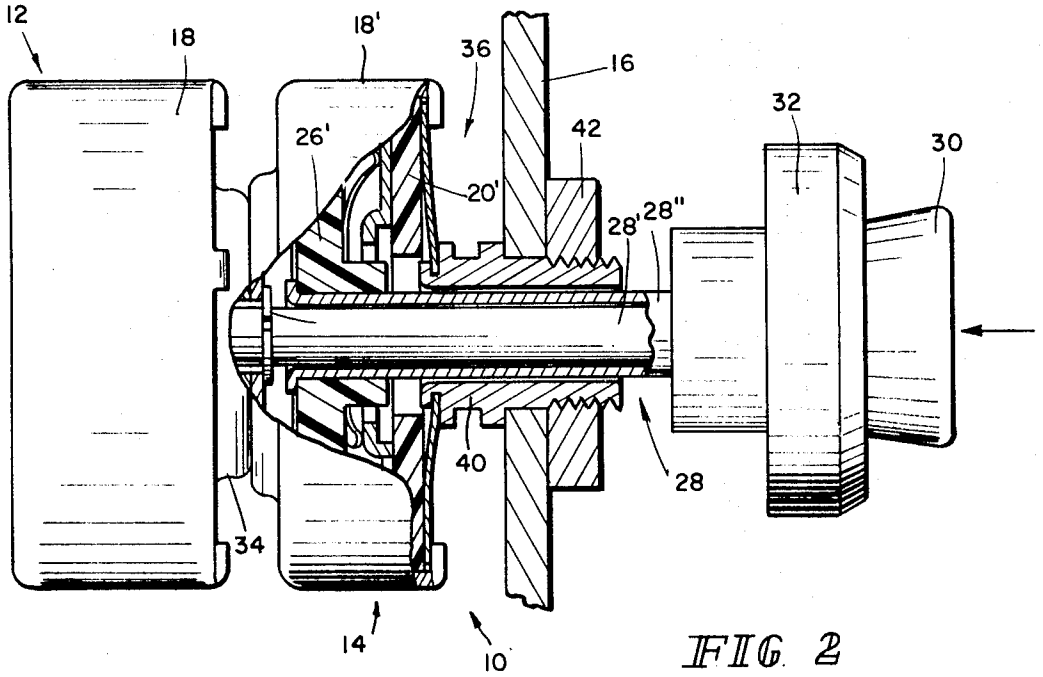


FIG. 2

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CONTROL UNIT WITH IMPACT CONTROL MOUNTING CUSHION

This invention relates to a novel control unit. More particularly, it relates to a control unit which utilizes two variable resistors mounted in tandem and an impact cushioning means therefor.

There are many instances in the appliance industry wherein variable resistance control units are used to perform independent functions with the units being independently operable off individual shafts. For example, in car radios two variable resistance units may be used to independently control the volume and the tone of the radio. In such applications, the two variable resistors usually operate off of independently operable shafts with a common axis. A common axis arrangement in such applications usually comprises a centrally disposed shaft and a sleeve concentric with and surrounding the central shaft to form the second shaft.

Further in such arrangements, the variable resistance units are usually held in tandem relationship with one being connected to the other in order to form a solid, compact unit. Also the centrally disposed shaft should, of necessity for ease of operation, extend beyond the concentric shaft. In such arrangements, it has been found that considerable damage occurs when the centrally located shaft is accidentally struck. More specifically, prior to the present invention, the central control units did not provide for means for cushioning such accidental blows such that the impact is transferred to the resistor unit connected to the concentric shaft.

The present invention is concerned with a control means wherein there are two variable resistors and has as one of its objects the provision of such a control unit wherein the variable resistors are independently operable off of shafts having a common axis.

Another object of the invention is to provide such a control unit wherein a central shaft is disposed in a concentric sleeve acting as the second shaft.

A further object of the invention is to provide such a control unit wherein cushion means are provided to cushion impact blows delivered in the unit.

Still a further object of the invention is to provide a control means including two variable resistors, one carried on a central shaft, the other carried on a concentric shaft, the two resistors being connected together with means coupling the resistor responsive to the concentric shaft to a mounting means so as to provide a cushion for impact blows.

These and other objects of the invention will become apparent from the following description taken in conjunction with the accompanying drawings wherein:

FIG. 1 is a cross section of the control means of the present invention;

FIG. 2 is a view similar to FIG. 1 showing another mode of operation of the control means.

Generally speaking, the objects of the invention are accomplished by providing in combination a pair of variable resistor units substantially aligned and connected to each other, and a mounting means carrying the variable resistor units, concentric drive shaft means one each coupled to each of the variable resistor units, and impact cushioning means coupling one of said resistor units to the mounting means.

Referring now to the drawings, a control means **10** includes first and second variable resistor means **12** and **14** which are mounted on or carried by a suitable mounting means **15**. Mounting means **16** could include, for example, a panel or dashboard of an automobile. Each of the resistor units include a cup-shaped housing **18** and **18'**, terminal boards **20** and **20'**, the terminal boards including resistance paths **22** and **22'**, contact brushes **24** and **24'**, and rotor drive means **26** and **26'** to rotatably drive the contact brushes.

The control means **10** also includes a shaft means **28** which includes a centrally disposed shaft **28'** and a concentric sleeve **28''** acting as the second shaft. As shown, rotor drive means **26** is coupled to an responsive to central shaft **28'** while rotor drive means **26'** is coupled to and responsive to concentric shaft **28''**. Knobs **30** and **32** are coupled to shaft **28'** and **28''** respectively in order to easily manually rotate the separate shafts. Thus there is provided two shafts having a common axis through which the resistor units **12** and **14** may be independently operable. C-ring **17** locates and prevents excessive axial movement of resistor unit **12** when central shaft **28'** is axially displaced and thereby acts as a stop means.

The cup-shaped housing **18** of the variable resistor means **12** is closed by cover means **34**. Cup-shaped housing **18'** of variable resistor means **14** is suitable connected to cover means **34** through suitable means such as rivets (not shown). Cup-shaped member **18'** is closed through cover means **36** which according to the invention includes cushion means **38** such as a thin spring washer to absorb impact loads. The spring washer is coupled to a collar **40**, the collar in turn being coupled to the mounting means **16** through suitable means such as a nut **42**.

When knob **30** is accidentally struck by a blow in the direction of the arrow shown in FIG. **2**, shaft **28'** is forced against the base of cup-shaped member **18** through bearing surface **44**. Further axial movement of central shaft **28'** is prevented by C-ring **17** which acts as a stop means and abuts against the base of cup-shaped member **18'**, the impact load then being transferred through resistor unit **14** to mounting means **16**. Prior to the present invention, when this occurred, resistor unit **14** was permanently deformed. In the present invention, cushion means **38** is deflected (FIG. **2**) to absorb the impact, the cushion means then being returned to its original position.

Thus there is described a control unit wherein there are at least two variable resistor units carried by separate concentric shaft means, with means to cushion impact loads.

What is claimed is:

1. A control means comprising:

a. first and second variable resistor units connected to each other in tandem,

b. first drive shaft means coupled to said first variable resistor unit,

c. second drive shaft means concentric with said first shaft means coupled to the other of said second variable resistor units,

d. collar means surrounding said second drive shaft means and coupled to mounting means,

e. impact cushioning means coupled to said second variable resistor unit, and

f. stop means carried by said first drive shaft means engaging said second variable resistor unit upon axial displacement of said first drive shaft means.

2. The combination according to claim **1** wherein said impact cushioning means includes a spring means.

3. The combination according to claim **2** wherein said spring means includes a thin spring washer.

4. A control means according to claim **1** wherein said stop means includes a C-ring fixed to said first drive shaft means.

5. A control means comprising:

a. a first cup-shaped housing carried by a first drive shaft, and a cover closing same,

b. a terminal board disposed in said housing, said terminal board including resistance paths,

c. a rotor means disposed within said housing and responsive to said shaft, said rotor carrying contact brushes engaging said resistance paths,

d. a second cup-shaped housing carried by a second drive shaft that is concentric with said first drive shaft, said cup-shaped housing connected to said cover of said first named housing,

e. a terminal board disposed in said second named housing, said terminal board including resistance paths, a rotor means disposed in said housing and responsive to said second drive shaft, said rotor carrying contact brushes engaging said resistance paths,

f. cover means closing said second named housing including impact cushion means,

g. collar means surrounding said second drive shaft and coupled to mounting means carrying said control means, said impact cushion means connected to said collar means, and

h. stop means carried by said first drive shaft engaging said second cup-shaped housing upon axial displacement of said first drive shaft.