Sept. 1, 1959 R. P. DE PUY 2,902,664

POWER RESISTOR ASSEMBLY

Filed July 3, 1958

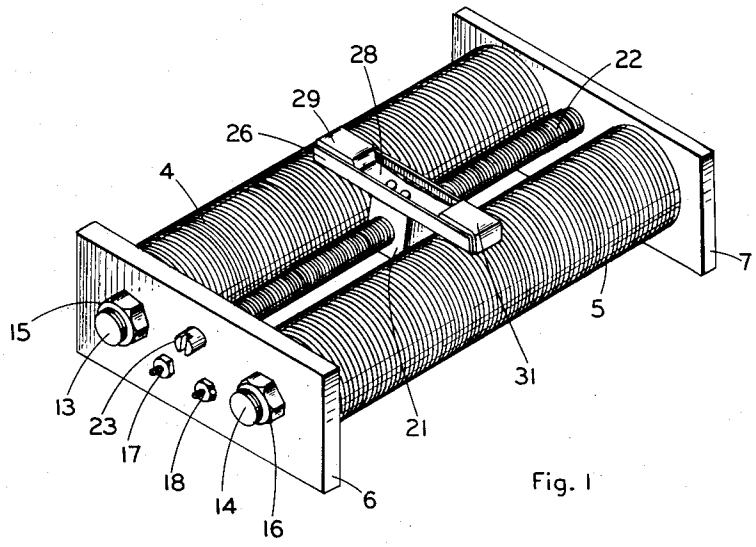


Fig. 1

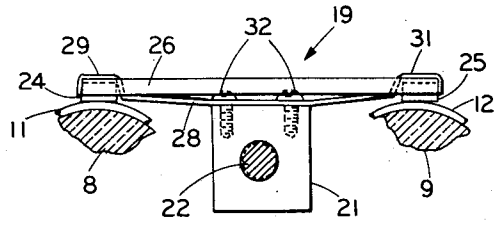


Fig. 2

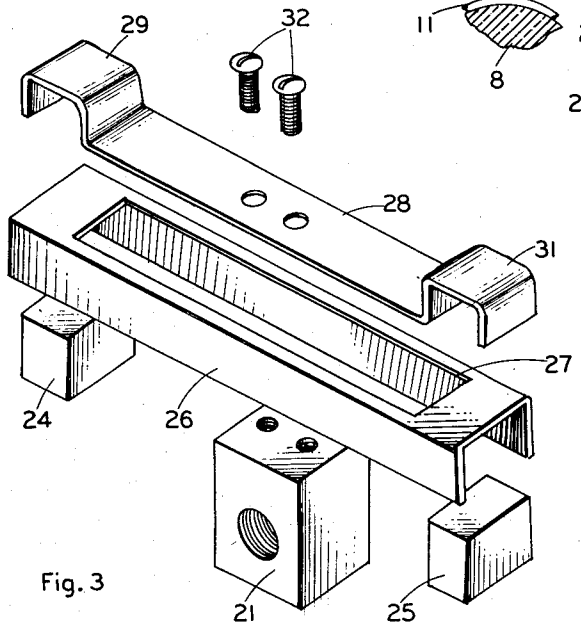


Fig. 3

INVENTOR.
Robert P. DePuy
BY Robert F. Beck

His Attorney

United States Patent Office 2,902,664
Patented Sept. 1, 1959

2,902,664

POWER RESISTOR ASSEMBLY

Robert P. DePuy, Lynchburg, Va., assignor to General Electric Company, a corporation of New York

Application July 3, 1958, Serial No. 746,394

4 Claims. (Cl. 338—176)

This invention relates to improvements in adjustable power resistor assemblies and has for its object the provision of a better, more reliable shorting member therefor.

Heretofore, in power resistor assemblies of the type which include at least a pair of spaced parallel wound resistor units and a shorting member which contacts both of the resistor units and is mounted to move along the parallel axis of the units to vary the combined resistance of the assembly, the shorting bars have usually comprised spring members which bear against the resistors, a typical arrangement being shown in U.S. Patent No. 803,453. Since the usual applicataion of such power resistor assemblies requires them to carry very large currents, it has been found that there is a tendency when spring elements are used for the large currents to destroy the spring elements thereby making the assemblies unreliable and necessitating frequent maintenance to insure continuous operation.

This invention overcomes the difficulties of such prior arrangements by the use of solid contacting elements which are adapted to slide along portions of the spaced resistors, with a rigid conducting element arranged across the resistors to engage the contacting elements and make electrical contact therewith, and a spring member with novel gripping portions which engages both the conducting member and the contacting elements to clamp them together and hold them in place in the assembly. In this manner the contacting elements and the conducting member carry the current which flows through the resistors and the spring member serves primarily as a clamping device which at the same time maintains proper contact pressure, with current flow through the spring member held to a minimum.

The invention together with its objects and advantages will be more fully understood upon reference to the detailed description set forth below particularly when taken in conjunction with the single sheet of drawing in which:

Figure 1 is a perspective view of a typical power resistor assembly which embodies the present invention; and

Figure 2 is a partial sectional view further illustrating the invention; and

Figure 3 is an exploded perspective view showing the various details of the novel shorting bar.

Referring first to Figure 1 the power resistor assembly is seen to comprise a pair of spaced parallel wound resistor units **4** and **5** suitably mounted at their ends between a front support **6** and a back support **7**. The resistor units are shown as elongated cylindrical sticks which may have cylindrical porcelain cores **8**, **9** around which is helically wound the resistor wires **11** and **12**. The cores may have their extremities threaded at each end as shown at **13**, **14** in Figure 1 with the threaded portions extending through suitable apertures in the supports so that the nuts **15**, **16** may be installed to secure the units properly in place. The manner of affixing the resistor unit to the back support **7** may be identical with the arrangements used at the front support.

The front ends of the resistor wires **11** and **12** are brought out through the front support in the form of terminals **17**, **18** to which suitable leads may be affixed for connection of the resistor assembly into an electrical circuit. The back ends of the resistor wires may be joined together, if desired, so that the two resistor units are effectively shorted at their rear extremities.

In order to provide a traveling shorting bar which can move along the axes of the resistors to vary the combined resistance of the unit, as desired, for any regulating purpose, there is provided the shorting bar assembly **19** which is mounted on an insulated nut **21** which in turn is carried by a rotatably mounted screw member **22**. The screw member **22** has its head **23** extending through the front support **6** where it is slotted so that a screw-driver or other suitable means can be applied to turn the screw and thus cause the nut **21** to travel back and forth between the front and back supports. A suitable control knob can be fixed to the screw head, if desired, for further convenience in adjustment of the position of the shorting bar assembly **19**.

The shorting bar assembly includes a pair of contacting elements in the form of carbon blocks or brushes **24**, **25** which rest respectively on the resistor units **4**, **5** and are adapted to slide along portions thereof. Cooperating with the contacting elements **24**, **25** is a copper conducting member **26** in the form of an inverted trough which has its outer ends adapted to both confine and make electrical contact with the carbon brushes. Since the trough member **26** is substantially U-shaped in configuration, its brush engaging ends are in the form of yokes which easily slip over the brushes and make electrical contact therewith.

The trough member **26** has a portion of its base removed intermediate its ends to form the elongated slot **27** in which is fitted in nesting relation a coextensive spring member **28** which has its outer extremities in the form of gripping portions which are adapted to engage the ends of the trough member and the carbon brushes to clamp them together and hold them in place within the resistor assembly. These gripping portions are in the form of substantially U-shaped yokes **29**, **31** which are at right angles to the yokes formed by the ends of the trough member **26** such that they overlie the conducting member and form therewith a receptacle which contains the contacting brushes.

The spring member **28** is securely affixed to the insulated nut by means of the screws **32** and the arrangement is such that a biasing force is developed by the spring member which urges the ends of trough member **26** against the carbon brushes and at the same time urges the carbon brushes against the resistor units **4**, **5** to maintain proper electrical contact throughout the shorting bar assembly.

With the above arrangement, the heavy current which may flow through the resistor units **4**, **5** will be shorted through the assembly **19** and its path therethrough will be via the carbon brushes **24**, **25** and the interconnecting conducting trough member **26**. Very little of the current will flow through the spring member and therefore any tendency for the current to damage the spring member is minimized. The carbon brushes and the conducting trough member will pass the currents without any damage and should there be any wear of the brushes the ends of the spring member can easily be lifted to permit ready replacement of the brushes. Alternatively the spring member can easily be removed by removal of the screws **32** to permit replacement of worn brushes.

From the above it is thus seen that manipulation of the screw **22** will cause the brushes **24**, **25** to slide along the resistor units to thereby produce the desired change in resistance for regulating purposes.

Therefore, while a particular embodiment of the subject invention has been shown and described herein, it is in the nature of description rather than limitation, and it will occur to those skilled in the art that various changes, modifications, and combinations may be made within the province of the appended claims, and without departing either in spirit or scope from this invention in its broader aspects.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. In a power resistor assembly, in combination: a pair of spaced parallel wound resistor units; a pair of contacting elements, each adapted to slide along a portion of one of the resistor units and make electrical contact therewith; an electrically conducting member in the form of an inverted trough extending across said resistor units to bridge the space therebetween, opposite ends of said conducting member forming first yokes engaging said contact elements both to confine said elements and to make electrical contact therewith; a spring member substantially co-extensive with said conducting member having gripping portions at its ends forming second yokes which overlie said first yokes at right angles thereto to further confine said contacting elements, said spring member functioning to urge said contacting elements against said conducting member ends and said resistor units to maintain electrical contact therewith; and means for moving said conducting member along the parallel axis of said resistor units whereby the resistor units may be shorted at any of a plurality of points along said axes.

2. The combination defined by claim 1 wherein said trough has a portion of its base removed intermediate its ends to form a slot therein, and said spring member has its portion intermediate said gripping portions nested within said slot.

3. The combination defined by claim 2 wherein the means to move said conducting member include a rotatably mounted screw extending between said resistor units parallel thereto and an insulated nut carried by said screw, said nesting portion of said spring member being securely affixed to said nut.

4. The combination defined by claim 3 wherein said resistor units comprise elongated helically wound cylindrical members and said contacting elements are in the form of carbon blocks.

References Cited in the file of this patent

UNITED STATES PATENTS

1,692,962	Thompson	Nov. 27, 1928
1,853,798	Brownell	Apr. 12, 1932
2,040,278	Siegel	May 12, 1936