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BOBBIN TYPE ELECTRICAL RESISTOR

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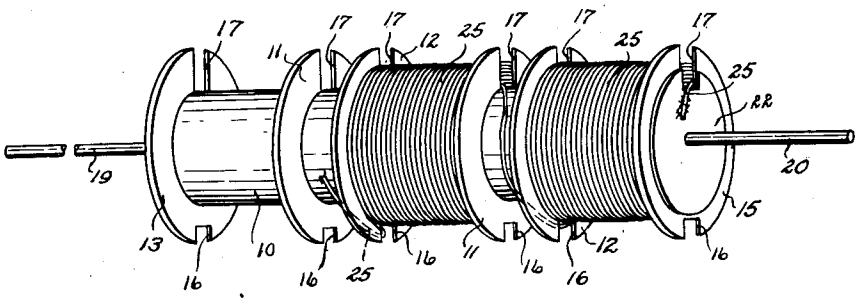


Fig. 1

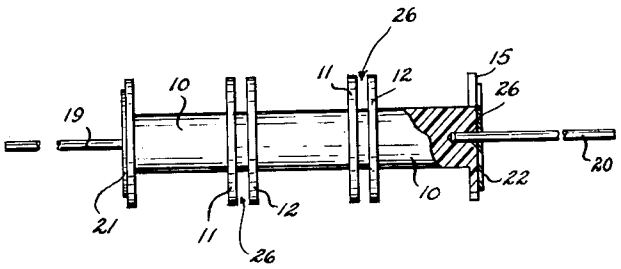


Fig. 2

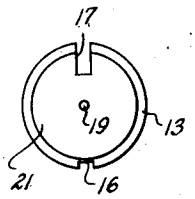


Fig. 3

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BOBBIN TYPE ELECTRICAL RESISTOR

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This invention relates to electrical resistors and more particularly to a resistor of the multiple bobbin type.

Bobbin type resistors having more than one spool section are old. In such resistors, the wire is wound from the spool core outwardly and then usually reversed to wind on the next adjacent spool, also from the core outwardly. The objection to such a structure is that the wire, after finishing one spool, must extend over the disk between the two spool portions, and then pass radially inwardly into the second spool to start its wind at the core of the second spool. This means that the wire must first pass radially inwardly and at the side of its subsequent coil in any one spool unit. Obviously, this is highly objectionable. A further objection to the present bobbin type electrical resistor is that the wire coil has its two ends secured to the two bendable terminals, and often in the bending of the terminals, these connections between the wire of the coils and terminals are broken off or strained to the point where there is a change in resistance value.

Therefore, one of the principal objects of my invention is to provide a bobbin type resistor of the multiple coil type that has no lead wire portion that extends from one coil to the other, that extends downwardly and engages the side of the subsequent coil portion.

More specifically, the object of this invention is to provide a bobbin type resistor wherein no coil or coils have their entrance leads extending inwardly at the side of the coil and in engagement with the coil proper.

A further object of this invention is to provide a resistor that is not subject to having its coil connections broken when the terminals are bent.

Still further objects of my invention are to provide an electrical coil resistor that is economical in manufacture and durable in use.

These and other objects will be apparent to those skilled in the art.

My invention consists in the construction, arrangements, and combination, of the various parts of the device, and whereby the objects contemplated are attained as hereinafter more fully set forth, specifically pointed out in my claims, and illustrated in the accompanying drawings, in which:

FIG. 1 is a perspective view of my electrical resistor,

FIG. 2 is a side view of the device and more fully illustrates its construction, and

FIG. 3 is an end view of my resistor.

The base portion of the resistor is of non-electrical conductive material, such as plastic, and consists of a shaft portion **10**, having a plurality of spaced apart pairs of radially extending disk flanges on and embracing the shaft as shown in FIG. 1. The two disk flanges that make up each pair of disk flanges are designated by the numerals **11** and **12**. Each pair of these disk flanges is separated to provide an area for a resistance wire coil. At each end of the shaft is a single radial disk flange and which has been designated by the numerals **13** and **15**, respectively. Each of the disk flanges **11** and **12** has a shallow notch **16** and a deep notch **17**. The notches **17** extend inwardly to the shaft **10** and are positioned one hundred and eighty (180°) degrees from the shallow notches **16**. The numerals **19** and **20** designate bendable metallic terminal rods extending from the two ends of the shaft **10**. Embracing and connected to the terminal **19**, and secured to the outer side of the end disk **13**, is a metallic circular plate **21**. Embracing and connected to the terminal **20**, and secured to the outer side of the end disk **15**, is a metallic circular plate **22**. The disk **13** and plate **21** also have a radial notch **17**. The disk **15** and plate **22** have a radial notch **16**. If desired both end disks and plates may have both deep notches **17** and shallow notches **16**.

The resistance wire that makes up the coils is designated by the numeral **25**. One end is welded or otherwise electrically attached to the plate **21**, and its other end is welded or otherwise electrically attached to the plate **22**. These plates **21** and **22** are of relatively large surface and therefore the wire ends can be attached any place on the surfaces of the plates, which is an aid in calibration for greater accuracy. Herebefore the ends of the resistance wire were secured to the bendable terminals **19** and **20**, and, as herebefore indicated, the bending of the terminals often broke the connection between the resistance wire and terminals. By securing the resistance wire to the plates, the bending of the terminals will not damage these electrical connections.

The resistance wire extends from one of the end plates, first through a notch **17** in the same, and an end disk flange directly to the first coil area and adjacent the shaft **10** as shown in the drawings, and then is wound in the usual manner into a coil, with the inner end of the coil at the shaft and the outer end of the coil near the outer periphery of the disk flanges. To get the resistance wire into the next coil area, and with its starting length adjacent the shaft **10**, it is first passed through a shallow notch **16** of the adjacent and first disk flange, and into the area **26** between the two pairs of disk flanges **11** and **12**. In this neutral shielded area **26**, the resistance wire extends inwardly to the shaft **10** and also extends a one-half circle to pass laterally through the bottom of the deep notch **17** to start the wind of the next coil. This order of the winding of the resistance wire continues until all coil areas have been completed, at which time the resistance wire extends through a notch of the other end disk flange and terminates at its connection with the adjacent plate.

By such a structure it will be noted that no resistance wire lead at the end of any coil extends in contact along the side of the coil wind. When the resistance wire passes from one coil area to another coil area through a notch **17**, it may have its direction of wind reversed from that of the previous coil, or if desired it may be continued in the same direction of rotation.

Some changes may be made in the construction and arrangement of my bobbin type electrical resistor without departing from the real spirit and purpose of my invention, and it is my intent to cover by my claims any modified forms of structure or use of mechanical equivalents which may be reasonably included within their scope.

I claim:

1. In an electrical resistor, a shaft portion having at least two wire coil areas along its length, two spaced apart disk members between the said two wire coil areas, a shallow notch in each of said two disks, a deep notch spaced from said shallow notch extending substantially to said shaft in each of said two disks, a coil of wire in each of said two coil areas disposed laterally of said disks; said wire coils each being wound around and outwardly from said shaft, and a connecting wire portion between said two coils extending from the outer periphery of one of said coils, laterally through the shallow notch of the most adjacent disk, thence inwardly between the two disks, thence laterally through the deep notch of the furthermost disk to connect with the innermost wind of the other wire coil, and a terminal connected to each of the two wire coils.

2. In an electrical resistor, a shaft portion having at least two wire coil areas along its length, two spaced apart

disk members between the said two wire coil areas, a shallow notch in each of said two disks, a deep notch spaced from said shallow notch extending substantially to said shaft in each of said two disks, a coil of wire in each of said two coil areas disposed laterally of said disks; said wire coils each being wound around and outwardly from said shaft, and a connecting wire portion between said two coils extending from the outer periphery of one of said coils, laterally through the shallow notch of the most adjacent disk, thence inwardly between the two disks, thence laterally through the deep notch of the furthermost disk to connect with the innermost wind of the other wire coil, and a terminal connected to each of the two wire coils; said two wire coils being wound in opposite directions.

3. In an electrical resistor, a shaft portion having at least two wire coil areas along its length, two spaced apart disk members between the said two wire coil areas, a shallow notch in each of said two disks, a deep notch spaced from said shallow notch extending substantially to said shaft in each of said two disks; said shallow notch of each of said disks being positioned substantially one hundred and eighty (180°) degrees from the deep notch of the same disk, a coil of wire in each of said two coil areas disposed laterally of said disks; said wire coils each being wound around and outwardly from said shaft, and a connecting wire portion between said two coils extending from the outer periphery of one of said coils, laterally through the shallow notch of the most adjacent disk, thence inwardly between the two disks, thence laterally through the deep notch of the furthermost disk to connect with the innermost wind of the other wire coil, and a terminal connected to each of the two wire coils.

4. In an electrical resistor, a non-conducting shaft portion having bores extending centrally and longitudinally within said shaft from either end thereof, at least one coil of resistance wire on said shaft portion, electrically non-conducting end disk flanges disposed at opposite ends of said shaft portion, each of said disk flanges having a radial slot therein, bendable electrically conductive rod terminals extending from opposite ends of said shaft portion, each of said rod terminals having one end thereof carried

within one of said bores in said shaft portion, and at least two electrically conductive disks having apertures therein, each of said conductive disks being juxtaposed one of said end disk flanges with the aperture therein coaxial with the adjacent one of the bores in said shaft portion, each of said conductive disks covering substantially the whole end surface of the juxtaposed disk flange and having a slot therein aligned with the radial slot in said juxtaposed disk flange, each of said electrically conductive disks surrounding one of said rod terminals and being electrically connected therewith, said coil of resistance wire having its two ends attached to said two conductive disks respectively.

5. In an electrical resistor, the structure defined in claim 1 wherein said shaft portion is part of an elongate electrically non-conductive shaft having a bore at either end thereof, wherein said disks are non-conductive, wherein additional electrically non-conductive disks are provided at opposite ends of said elongate shaft, wherein electrically conductive members having a smaller cross-section than the cross-section of said disks, and having apertures therein, are mounted on the outside face of each of said additional disks, wherein said terminals are electrically conductive bendable rods extending through the apertures in said members, and into the bores at opposite ends of said shaft, wherein each of said electrically conductive members embraces one of said rods and is electrically connected therewith, and wherein one end of each of said coils is electrically coupled with the most adjacent one of said members.

6. In an electrical resistor, the structure defined in claim 5 wherein like notches in adjacent disks are aligned.

7. In an electrical resistor, the structure defined in claim 6 wherein said shaft portion and said disks are integral.

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