E. R. GILL.

VARIABLE RESISTANCE MEANS.

APPLICATION FILED AUG. 2, 1911.

1,026,798.

Patented May 21, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

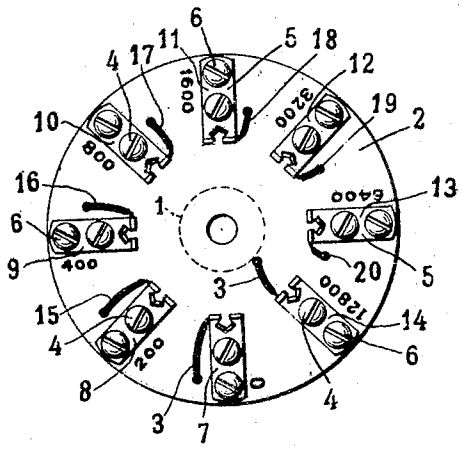
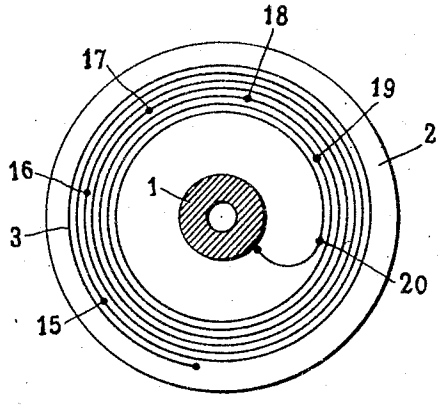


Fig. 2.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 3.

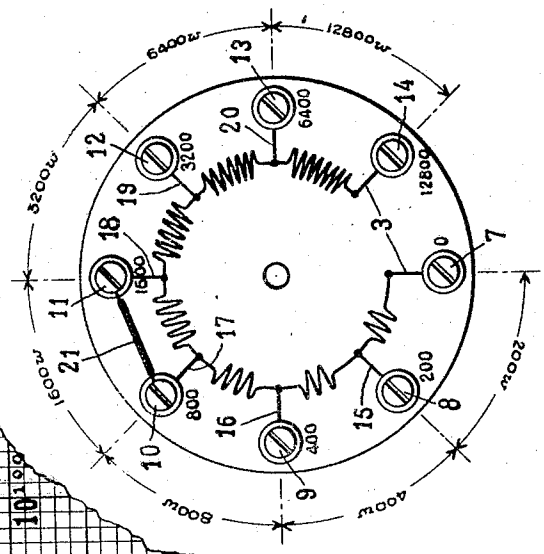


Fig. 4.

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VARIABLE-RESISTANCE MEANS.

1,026,798. Specification of Letters Patent. Patented May 21, 1912.

Application filed August 2, 1911. Serial No. 641,890.

To all whom it may concern:

Be it known that I, EDWIN R. GILL, residing at Yonkers, in the county of Westchester and State of New York, have invented certain new and useful Improvements in Variable-Resistance Means, of which the following is a specification.

This invention relates to resistance devices, and one of the objects thereof is to provide a new and improved variable resistance coil.

The invention contemplates an improved unitary structure, preferably taking the form of a spool, with resistance wire connected at various points intermediate its ends, with a plurality of taps or terminals, and having means whereby any one or a plurality of lengths or sections of the resistance wire may be cut out or shunted at will.

Another object of the invention is to provide a variable resistance coil such that a maximum range of resistance may be interposed in a line.

Another object is to so arrange and connect the resistance wire with a plurality of terminal members forming a part of said unitary structure that the ohmic resistance can be stepped up from zero to the maximum or vice versa in a series of geometrically progressive steps. Thus a very wide range of resistances may be had, and the quantity thereof easily and quickly adjusted.

While my invention is susceptible of a variety of uses, it is particularly adapted to signaling systems, and I shall describe the same in that relation.

The invention accordingly consists in the features of construction, combinations of elements and arrangements of parts, which will be exemplified in the construction hereinafter described, and the scope of the application of which will be indicated in the following claims.

In the accompanying drawings wherein is illustrated a preferred form of embodiment of my invention: Figure 1 is a view in plan showing the same; Fig. 2 is a transverse sectional view thereof; Fig. 3 is a view illustrating the same diagrammatically; and Fig. 4 is a chart illustrating schematically the manner in which the various combinations of resistance may be made in a single device.

Similar reference characters refer to similar parts throughout the several views of the drawings.

Referring now to the drawings, the numeral 1 indicates a support for the resistance wire which, in the present instance, takes the form of a spool, having the usual end flanges one of which is shown at 2. Positioned upon this spool, which is preferably constructed of wood, or other non-inductive material, is a coil of wire 3, such wire being preferably formed of resistance material such as German silver. Positioned concentrically upon the exterior surface of one of the flanges 2, as by means of the screws 4 are terminal strips 5, each of said strips being furnished with a clamp screw 6. These strips in the present instance are eight in number, and are designated 7, 8, 9, 10, 11, 12, 13, and 14. One end of the coil of the resistance wire is connected to the strip designated 7, the opposite end being connected to the strip designated 14.

Leading from the resistance wire at various points intermediate the ends thereof are tap wires 15, 16, 17, 18, 19 and 20, connected respectively to the terminal strips 8, 9, 10, 11, 12 and 13. These tap wires are connected with the resistance coil at predetermined points thereof, whereby the resistance wire is divided into sections of different lengths. In the present instance the length of wire between strips 7 and 8 is sufficient to interpose a resistance of 200 ohms; that between strips 8 and 9, 400 ohms; that between strips 9 and 10, 800 ohms; that between strips 10 and 11, 1,600 ohms; that between strips 11 and 12, 3,200 ohms; that between strips 12 and 13, 6,400 ohms, and that between strips 13 and 14, 12,800 ohms. It will be noted that the ohmic resistance is stepped up from the first section of the resistance wire to the last section thereof in a series of geometrically progressive steps. Thus it will be seen that the total resistance of the present coil is the sum of the various resistances interposed between the terminal strips, in the present instance, 25,400 ohms. Therefore, if terminal strips 7 and 14 were connected in the line a resistance equal to 25,400 ohms would be interposed therein. It will also be apparent that whenever two of the terminal strips are connected in the line, the interposed resistance will be equal to the sum of

the resistance between the adjacent pairs of said terminal strips, reading their identifying indicia clockwise about the spool.

In order to provide for a wider range of variation of resistance in the device, means is provided whereby any predetermined length or lengths of the resistance wire may be cut out or shunted. This means, in the present instance, comprises wires or strips as at 21, which may be connected to adjacent terminal strips. This, as will be obvious, has the effect of cutting out the resistance wire between the connected strips. The resistance of the devices may be varied as illustrated in the chart shown in Fig. 4, where it will be seen that in the present arrangement the resistance may be varied in the steps of 200 ohms each, from zero to 25,400 ohms, although as above stated, the present arrangement is purely arbitrary. In this chart the point of connection with the terminal strips is indicated by the circles 22 and the shunting wires by the lines 23. I prefer to provide identifying indicia adjacent each terminal strip for indicating the resistance between the various pairs of said terminal strips. This enables the device to be quickly and accurately arranged and connected to interpose any desired resistance in a line.

Having thus described the construction of the present embodiment of my invention, the manner of using the same, which will be largely apparent, may now be understood. When the amount of resistance which is required in the line has been ascertained, it will only be necessary to so connect the contact strip in the line, and short circuit such terminals as will interpose such length of resistance wire as will furnish the desired resistance. This can be readily done by one skilled in the art.

The device as above described is particularly useful in signaling systems as when it is desirable to install a new signaling equipment intermediate the ends of a line. It will be seen that the resistance device at that station may be quickly adjusted and the resistance devices at the other stations may be quickly and accurately adjusted to the new current conditions.

As many changes could be made in the above construction and many apparently widely different embodiments of this invention could be made without departing from the scope thereof, it is intended that all matter contained in the above description or shown in the accompanying drawings shall be interpreted as illustrative and not in a limiting sense. It is also to be understood that the language used in the following claims is intended to cover all of the generic and specific features of the invention herein described and all statements of the scope of the invention, which as a matter of language, might be said to fall therebetween.

Having thus described my invention, what I claim as new and desire to secure by Letters Patent, is:

1. In a device of the class described, the combination of a suitable support, a coil of resistance wire mounted thereon, a plurality of terminal members mounted upon said support, means for connecting the ends of said resistance wire to certain of said terminal members, means for connecting the other terminal members with said resistance wire at various predetermined points intermediate the ends thereof, whereby a predetermined length of resistance wire is interposed between adjacent terminal members, and means for directly electrically connecting any pair of terminals whereby the resistance wire between such pair of connected terminal members will be short circuited.

2. In a device of the class described, in combination with a support, a coil of resistance wire mounted thereon, a plurality of terminal members positioned upon said support, means for connecting certain of said terminal members with the respective ends of said resistance wire, means for connecting others of said terminal members with said resistance wire at various predetermined points along the length thereof intermediate the ends, whereby a predetermined length of resistance wire is interposed between each pair of adjacent terminal members, and means carried by each terminal member whereby any two thereof may be connected in the line.

3. In a device of the class described, in combination with a support, a coil of resistance wire mounted thereon, a plurality of terminal strips positioned upon said support, means for connecting certain of said terminal strips with the respective ends of said resistance wire, means for connecting the other of said terminal strips with said resistance wire at various predetermined points along the length thereof intermediate the ends, whereby a predetermined length of resistance wire is interposed between each pair of adjacent terminal strips, means carried by each terminal strip whereby any two thereof may be connected in the line, and means whereby any pair or pairs of adjacent terminal strips may be directly connected, thereby short circuiting the resistance wire between the connected terminals.

4. In a device of the kind described, in combination, a spool, a coil of resistance wire thereon, a plurality of terminal strips secured upon the flange of the spool, means for connecting one end of said resistance wire to one terminal strip, means for connecting the opposite end of said resistance

wire to an adjacent terminal strip, independent means for connecting each of the other terminal strips to the resistance wire of said coil at a predetermined point along the length thereof, and means whereby any pair of terminals may be directly connected, whereby the resistance wire interposed between the connected pair of terminal strips will be short circuited.

5. In a device of the class described, the combination of a suitable support, a coil of resistance wire thereon, a plurality of terminal members mounted upon said support, a plurality of tap wires, each of which connects one of said terminals with said resistance wire, the length of resistance wire intervening between the points of connection of adjacent tap wires being different than that intervening between other adjacent tap wires at other points of connection with the resistance wire.

6. In a device of the class described, in combination, a suitable support, a coil of resistance wire thereon, a plurality of terminal members carried upon said support, two of said terminals being connected respectively with the ends of said resistance wire, a plurality of tap wires, each of which connects one of the other terminals with said resistance wire, the length of resistance wire intervening between each pair of connections being greater than that intervening between the next preceding pair.

7. In a device of the class described, the combination of a suitable support, a coil of resistance wire thereon, a series of terminal members mounted upon said support, the first of said series of terminal members being connected with one end of said resistance wire, the last of said series of terminal members being connected with the other end of said resistance wire, the resistance wire between the first pair of adjacent terminal members of said series being of predetermined length, and the resistance wire interposed between each succeeding adjacent terminal member of said series being of different lengths.

8. In a device of the class described, the combination of a support, a length of resistance wire thereon, a plurality of terminal members on said support, a plurality of tap wires each connecting one of said terminals with said length of resistance wire at a different point in the length thereof, whereby the length of the resistance wire is divided into a plurality of sections each of said sections being of different length.

9. In a device of the class described, the combination of a support, a length of resistance wire thereon, a plurality of terminal members on said support, a plurality of tap wires each connecting one of said terminals with said length of resistance wire at a different point in the length thereof, whereby the length of the resistance wire is divided into a plurality of sections each of said sections being greater in length than the next preceding one.

10. In a device of the class described, the combination of a support, a length of resistance wire thereon, a plurality of terminal members on said support, a plurality of tap wires each connecting one of said terminals with said length of resistance wire at a different point in the length thereof, whereby the length of the resistance wire is divided into a plurality of sections the length of said sections from one end of the resistance wire to the other increasing in geometrical progression.

11. In a device of the kind described, the combination of a suitable support, resistance wire thereon, a plurality of terminal members on said support, the ends of said resistance wire being connected to one of the pair of said terminal members respectively, said resistance wire at predetermined points in its length being connected to the other of said terminals members respectively, whereby a predetermined length of resistance wire is interposed between adjacent terminal members, the length of resistance wire intervening between adjacent ones of said predetermined points of connection being different than that intervening between other adjacent ones of said points, and means for directly electrically connecting any two terminals whereby the resistance wire between said pair of connected terminal members will be short circuited.

In testimony whereof I affix my signature in the presence of two witnesses.

EDWIN R. GILL.

Witnesses:
A. S. HONIGSBERG,
NATHALIE THOMPSON.

Copies of this patent may be obtained for five cents each, by addressing the "Commissioner of Patents, Washington, D. C."