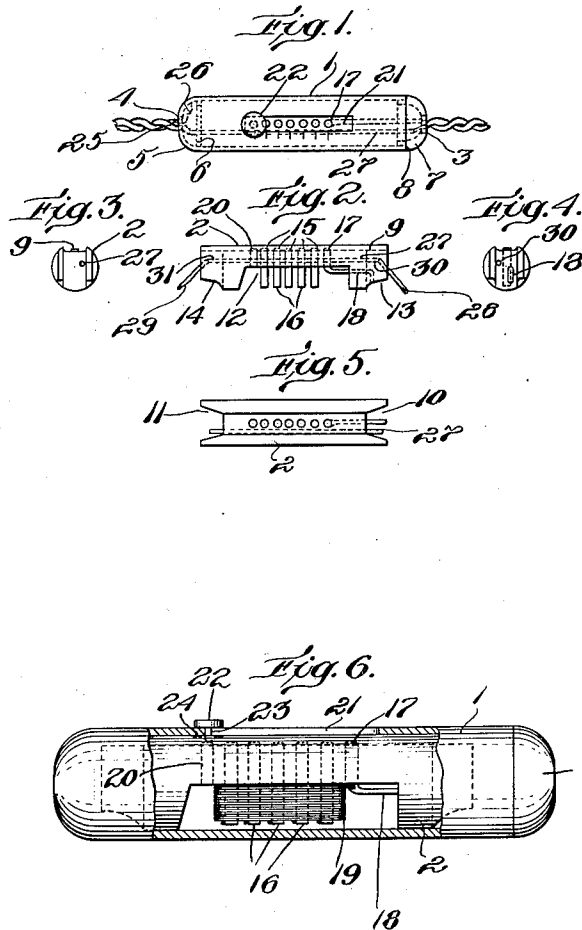


K. B. HASTINGS.
AUDIPHONE RHEOSTAT AND SWITCH.
APPLICATION FILED APR. 13, 1911.

1,018,356.

Patented Feb. 20, 1912.

2 SHEETS—SHEET 1.



Witnesses:
C. L. Rogers
Edward Maxwell

Inventor:
Kenneth B. Hastings,
by *Geo. S. Maxwell*
attg.

K. B. HASTINGS.
AUDIPHONE RHEOSTAT AND SWITCH.
APPLICATION FILED APR. 13, 1911.

1,018,356.

Patented Feb. 20, 1912.

2 SHEETS—SHEET 2.

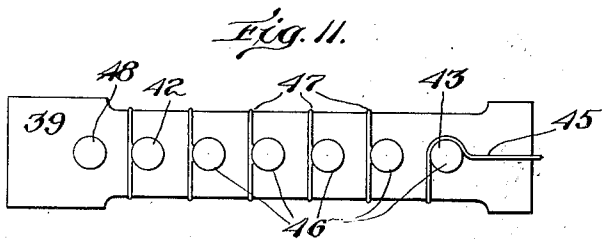
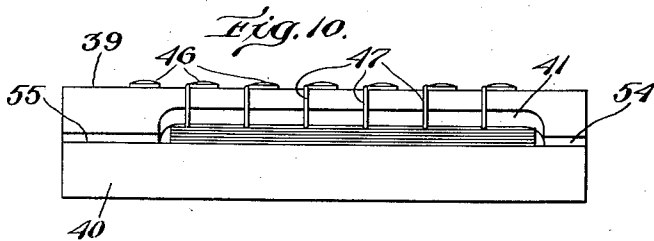
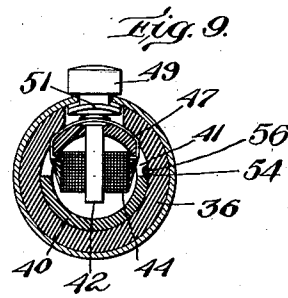
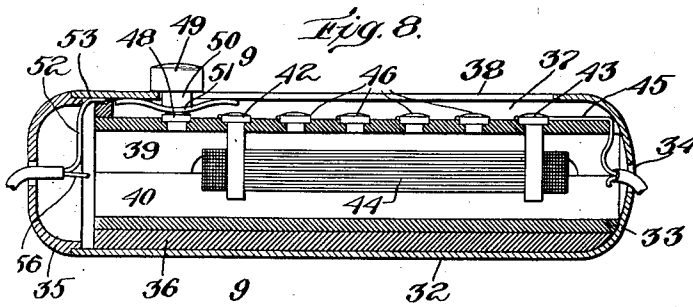
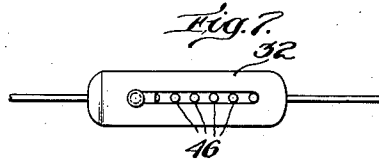
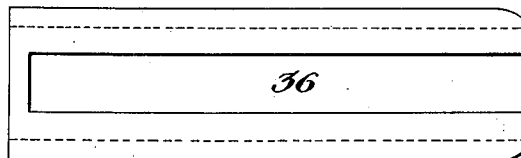


Fig. 12.



Witnesses:

C. L. Rogers

Edward Maxwell

Inventor:

Kenneth B. Hastings,
by *Edw. H. Maxwell* atty.

UNITED STATES PATENT OFFICE.

KENNETH B. HASTINGS, OF BOSTON, MASSACHUSETTS, ASSIGNOR TO GLOBE EAR-PHONE COMPANY, OF BOSTON, MASSACHUSETTS, A CORPORATION OF MASSACHUSETTS.

AUDIPHONE RHEOSTAT AND SWITCH.

1,018,356.

Specification of Letters Patent.

Patented Feb. 20, 1912.

Application filed April 13, 1911. Serial No. 620,875.

To all whom it may concern:

Be it known that I, KENNETH B. HASTINGS, a citizen of the United States, and resident of Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Audiphone Rheostats and Switches, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

This invention relates to a combination rheostat and switch, which, while applicable to other and more general uses, is especially designed for use with portable telephone apparatus of the type adapted to be carried about by persons of defective hearing to augment and clarify the sounds of conversations, etc. In this type of apparatus it is highly desirable that a current-controlling means be employed in the telephone circuit since the batteries used deliver a much greater current when new or fresh than after a period of use; further, the amount of current required varies considerably with different persons of various degrees of deafness and with the same person as he becomes more accustomed to the use of the device. It is also necessary that a disconnecting switch be provided to entirely shut off the current when the device is not in use so that the battery may not be quickly worn out. Thus, a rheostat and disconnecter switch are requisites of the apparatus and, in these devices, it is essential that all the working parts be made as small and simple in construction as possible so that the whole mechanism may not be unwieldy and cumbersome to the user.

My invention therefore provides an improved combination disconnecter switch and rheostat with a construction that can be brought within very small compass, while operating with perfect certainty to perform its functions and being at the same time of an attractive design and convenient to manipulate.

The invention will be more fully understood from the following detailed description, taken in connection with the accompanying drawings, and will thereafter be pointed out in the appended claims.

Referring to the drawings, Figure 1 is a plan view, approximately actual size, of my improved device; Fig. 2 is an elevation

of the interior mechanism removed from the shell; Figs. 3 and 4 are left and right end elevations respectively of the parts shown in Fig. 2; Fig. 5 is a plan view of the same parts; Fig. 6 is an enlarged front view of the device with the casing shell broken away to better show the interior construction; Fig. 7 is a plan view of a modified form of the invention; Fig. 8 is an enlarged central longitudinal section thereof; Fig. 9 is a transverse section on the line 9—9, Fig. 8; Fig. 10 is a front elevation showing the interior parts of this form removed; Fig. 11 is a plan view of the parts shown in Fig. 11; and Fig. 12 is a plan of an insulating shell.

Referring to Figs. 1 to 6, a tubular shell 1 is provided to receive a generally cylindrical block 2 of vulcanite, this typifying any suitable hard insulating material. The tube or shell 1 has its ends closed except for the wire openings 3, 4 in any suitable manner, the left-hand end in Fig. 1 being shown at 5 as spun over to rounded form, an annular shoulder 6 being provided as a backing for the block 2. The other tube-end may be closed by a removable cap 7 fitted thereto, this cap having, as shown, a shoulder 8 interfitting with the end of the tube to form a smooth joint. The block 2 has a groove 9 formed along its top, and cut out portions 10, 11 at its ends. Its lower portion is also cut out through most of the length thereof, as shown at 12, and the ends are also cut away at the bottom as at 13, 14. A series of metallic pins, shown as seven in number, are driven transversely through the block 2, the middle ones 15 of these pins projecting through into the cut out recess 12 almost to the circumferential line of the cylindrical block 2, as shown at 16. The right hand pin 17 is shorter than the others and has connected thereto one circuit terminal 18. A coil of fine resistance wire 19 is wound around the projecting pins 15, one end of this wire being connected to the post 17 of terminal 18 and contacts being made to the successive posts 15 to include progressively increasing portions of the coil 19, the left-hand one of the posts 15 being connected to the other end of the coil 19 so that, when contact is made through this post, the entire resistance coil is in circuit. A left-hand pin 20 of the series is likewise cut off short

of the others and this is dead, having no circuit connection so that, when the movable contact rests thereon, the circuit is disconnected. A longitudinal slot 21 is formed in the shell 1 of a length to include the projecting tops of the entire row of pins 15, 17, and 20. A movable contact button 22 slidable over the slot on the outside of the tubular shell has a shank 23 extending through said slot and a metallic leaf-spring contact 24 secured thereto and adapted to press upon the interior of the tube and upon any one of the pin-head contacts over which it may be positioned, thus making reliable contact between the metallic shell and a pin-head with which it is engaged. Graduations, which may be suitably distinguished, are formed opposite the respective contact posts on the tube adjacent the slot so that the proper position of the contact button for any desired strength of current can be instantly ascertained. A line terminal 25 is connected with the metallic shell by soldering or friction pressure, as shown at 26. The current through the apparatus is therefore under the control of the slidable button 22; when this button is moved to its extreme left, as shown, resting upon the dead contact pin 20, the circuit is entirely broken. As it is moved toward the right to engage with the first pin 15, a relatively small current is delivered, being required to pass through the entire resistance of coil 19. As the button is moved progressively to the right over the succeeding pins 15, the resistance is gradually cut out until, as it rests upon the right-hand pin 17, the circuit is entirely freed from the resistance 19 and the maximum current is delivered. It is desirable in devices of this kind that the return circuit cord also be connected with the switch, so that the parts present a neat appearance and are convenient for handling, and to this end a rod or stout wire 27 is passed lengthwise through the block 2 out of contact with the several pins and other conductive elements, and the terminals 28, 29 of the return conductor are soldered or otherwise fastened thereto at the two projecting ends 30, 31 of said wire.

In the form of the invention shown in Figs. 7 to 12, a tubular shell 32, similar to the shell 1, with a spun-over end 33 and wire-receiving opening 34, may be employed and a closure cap 35 fitted to the other end as in the other form. In this form of the invention, likewise, the rheostat and switch mechanism are preferably carried by a hard insulating composition, and in this case the vulcanite or other substance for this purpose is formed in an outer shell 36 fitted within the metallic tube and having a wide lengthwise slot 37 adapted to register with a longitudinal slot 38 of the metallic tube. The resistance coil and the rheostat and

switch contacts are in this case carried by an inner vulcanite shell longitudinally divided into an upper half 39 and a lower half 40, this being of a size to fit within the outer vulcanite shell 36. The upper half 39 of this shell is cut away for most of its length at both its sides where it engages the other shell half as shown at 41, so that when the two halves of the shell are fitted together, opposite lengthwise openings are provided thereinto. A series of metallic contact pegs are fixed in lengthwise alinement to the top half 39, the two at either end 42, 43 being extended as pins down through the hollow of the shell, and around these projecting ends is wound a fine resistance wire coil 44. One of the wire terminal connections to the device shown at 45 is connected to the pin peg 43, and one end of the resistance coil 44 is also connected thereto. The successive intermediate contact pegs 46 are connected with the successive parts of the resistance coil winding by having the wire brought up through the side grooves 41 past the successive contacts as shown at 47, and the other end of the coil is connected with the left hand pin peg 42. A dead peg 48 is fixed to the shell portion 49 at the left of the pin 42 and shown as spaced therefrom correspondingly to the spacing of the other pegs. A button 49 is slidable along over the tube slot 38 on the outside of the tube, with a shank 50 extending through the slot and carrying a metallic leaf spring contact 51 pressing between the interior of the shell and any one of the contact pegs over which it may be positioned and thus making circuit connection therebetween. The other line terminal to the device is shown at 52 and is brought into contact with the metallic tubular shell at 53. Thus, when the button 49 is moved to the extreme left, as shown in Fig. 8, the circuit is disconnected. When it is moved one step to the right to engage the contact peg 42, current will pass through the entire resistance coil 44 and be correspondingly reduced to a minimum. As the button is moved to the right to engage the successive pegs 46, successive portions of the resistance coil are cut out until, when the button is moved to the extreme right and engages the pin peg 43, the resistance is entirely cut out and a maximum current is permitted to be delivered. In this case, likewise, the return wire is arranged to pass through the switch, this being accomplished by providing grooves 54, 55 in the shell portion 39 from the ends of the cut out part 41 to the ends of the shell, so that the return wire 56 may have a passageway through the device.

By the arrangement of parts described in both forms of my invention, it is to be observed that a combination rheostat and disconnect switch is provided which is ca-

pable of performing its functions perfectly and with certainty and which can be formed in very small dimensions, while the tubular form with lengthwise slidable button makes a device neat and attractive in appearance and convenient to manipulate. The entire device is composed of a small number of parts which can be quickly assembled, requiring no screws or special fastenings, and the wire cord connections can be readily attached to the projecting contacts at either end without any particular skill being required for the assemblage.

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

1. A device of the kind described, comprising a metallic tubular shell having connection to constitute a circuit terminal, an insulating block fitted within the same and carrying spaced apart contacts constituting the other circuit connection, and a contact button slidable along said shell to make contact and complete the circuit from the same to any of said contacts, said button extending without the shell for direct hand operation.

2. A device of the kind described, comprising a metallic shell constituting a circuit connection, an insulating block fitted within the same and having a plurality of spaced-apart contacts extending lengthwise thereof to form the other circuit connection, and a button slidable in a lengthwise slot of said shell and adapted to complete the circuit from said shell to any one of said contacts at option, said button extending without the shell for direct hand operation.

3. A device of the kind described, comprising a metallic shell connected to a line terminal, an insulating block fitted within said shell, a series of spaced-apart contacts extending lengthwise of said block, a resistance coil carried by said block and having different parts connected to said series of contacts and connected at one end to the other line terminal, and a contact button slidable along a slot in said shell and adapted to make contact from the shell to any one of said resistance-connected contacts or to a final contact to cut out all of said resistance.

4. A device of the kind described, comprising a metallic shell having an extended longitudinal slot, an insulating block fitted within said shell and having a series of spaced-apart contacts fixed to said block and connected to different parts of a resistance coil, and a button carrying a spring contact slidable along said slot and engageable with any one of said contacts.

5. A device of the kind described, comprising a metallic shell constituting a circuit connection, an insulating block within said shell and having transversely fixed thereto a series of spaced-apart contacts, said

block being hollowed out, a resistance coil within the hollowed out portion of said block and having different parts thereof connected to the several contacts, and means for completing the circuit from said shell to any one of said contacts at will.

6. An apparatus of the kind described, comprising a metallic tubular holder constituting a circuit connection, an insulating block fitted within said holder and having a plurality of spaced-apart contacts, a resistance coil connected at separated points in its length to the several contacts, and means operable from the outside of said holder for making connection therefrom to any one of said contacts at will.

7. A device of the kind described, comprising a metallic holder constituting a circuit connection, an insulating member carried thereby and holding a circuit connected contact in spaced-apart relation to said metallic holder, and a slidable spring member adapted to simultaneously press upon said metallic holder and upon said contact to complete the connection therebetween, said member being slidable therefrom to disconnecting position.

8. A device of the kind described, comprising a metallic shell constituting a circuit connection, an insulating member held therein and carrying a series of spaced-apart contacts, circuit connection to said contacts including a resistance coil connected at different points to the several contacts, and a movable contact member operable from the outside of the shell for completing the circuit therefrom to any one of said contacts, said member being also movable to disconnecting position.

9. A device of the kind described, comprising a metallic tubular shell having a spun-over end with a cord-receiving opening and having a cap closure for its other end, an insulating block insertible in said shell and carrying a series of spaced-apart contacts, a resistance coil connected at separated points to the several contacts, and a slidable member for completing the circuit from said shell to any one of said contacts at will and movable also to disconnecting position.

10. A device of the kind described, comprising a metallic tubular shell having a spun-over end with a cord-receiving opening and having a cap closure for its other end, an insulating block insertible in said shell and carrying a series of spaced-apart contacts, a resistance coil connected at separated points to the several contacts, a slidable member for completing the circuit from said shell to any one of said contacts at will and movable also to disconnecting position, and a return conductor extending through said block and projecting from its ends to receive line connections.

11. A device of the kind described, com-

prising an inclosing shell of electrically conductive material having connection to constitute a circuit terminal, an insulating member fitted within the same and carrying
5 spaced apart contacts, said contacts having connections to constitute the other circuit terminal, and a contact member movable along the shell in constant engagement therewith and adapted to make contact and

complete the circuit from the same to any of 10 said spaced apart contacts at will.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

KENNETH B. HASTINGS.

Witnesses:

CLYDE L. ROGERS,
EDWARD MAXWELL.