May 24, 1938. N. C. SCHELLENGER 2,118,268

SWITCH SHIELD

Filed July 30, 1934 5 Sheets-Sheet 1

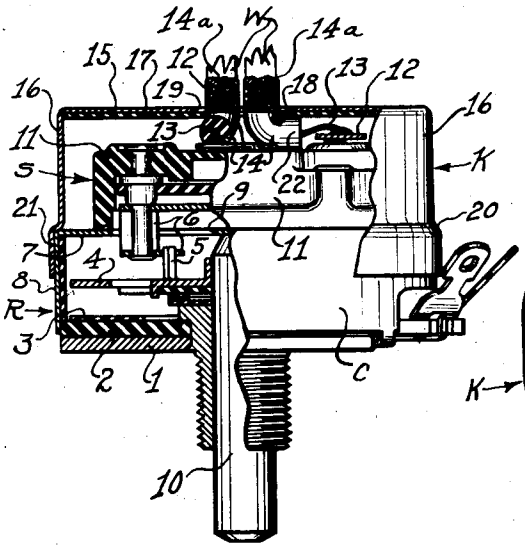


FIG. 1.

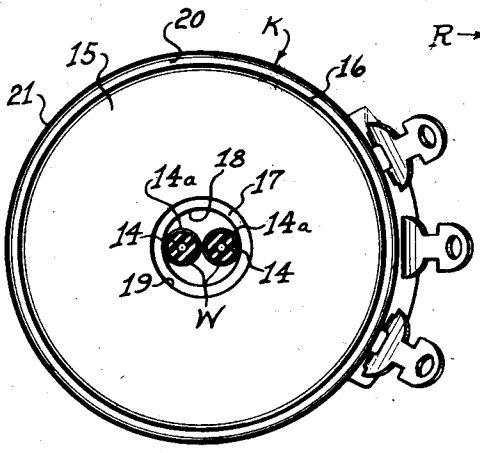


FIG. 2.

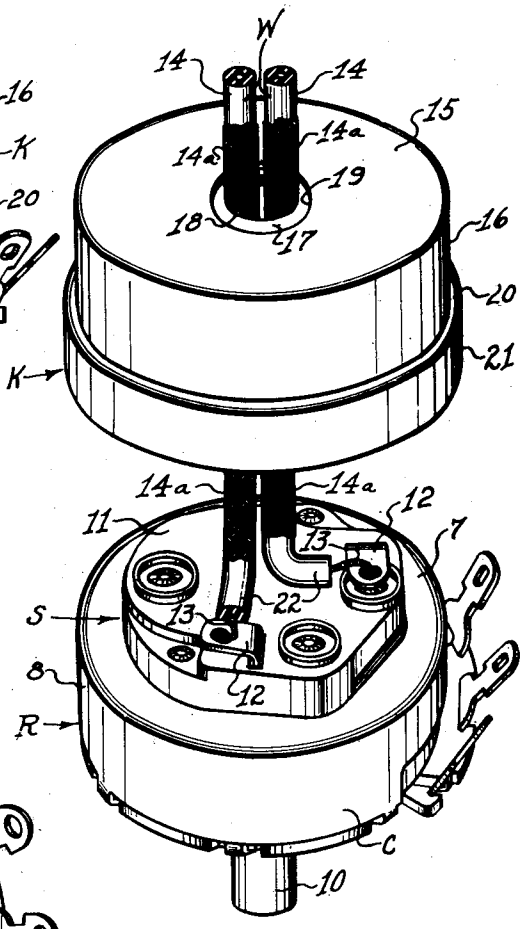


FIG. 3.

INVENTOR.

NEWTON C. SCHELLENGER.

BY. Humphrey ATTY.

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SWITCH SHIELD

Filed July 30, 1934 5 Sheets-Sheet 2

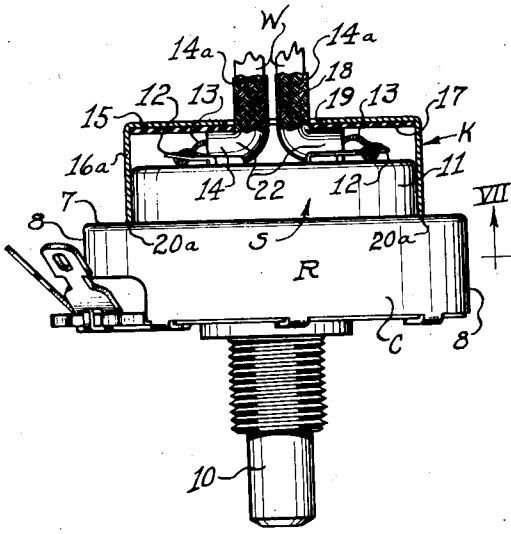


FIG. 4.

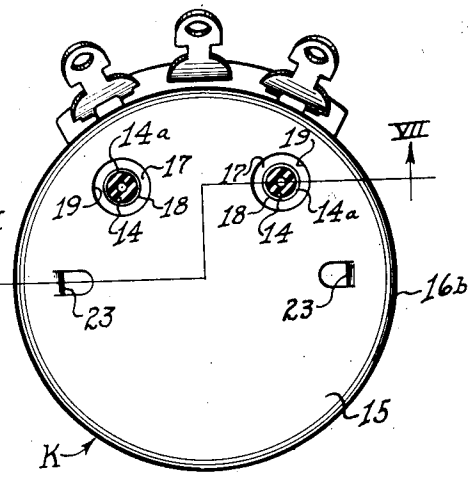


FIG. 6.

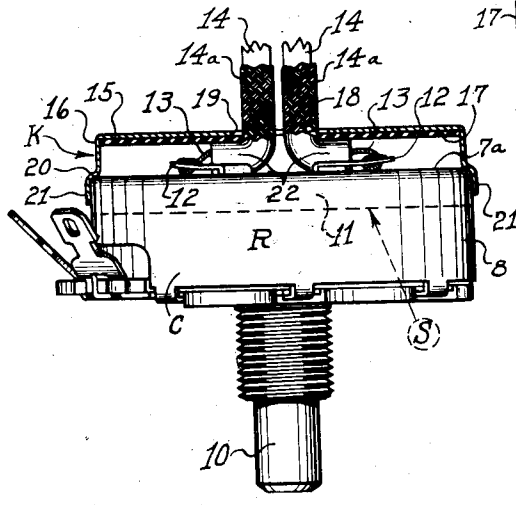


FIG. 5.

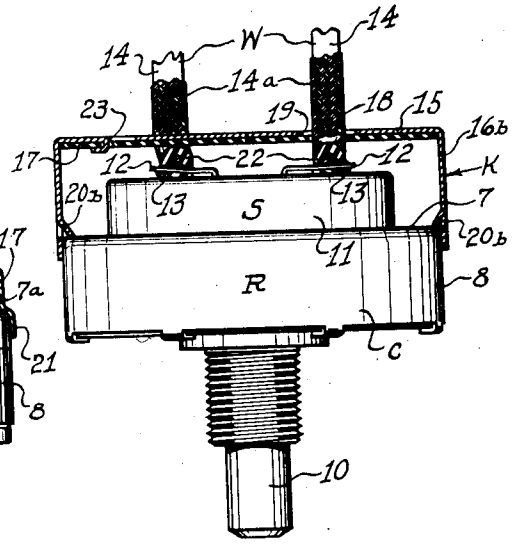


FIG. 7.

INVENTOR

NEWTON C. SCHELLENGER.

BY. ATT'Y.

May 24, 1938. N. C. SCHELLENGER 2,118,268

SWITCH SHIELD

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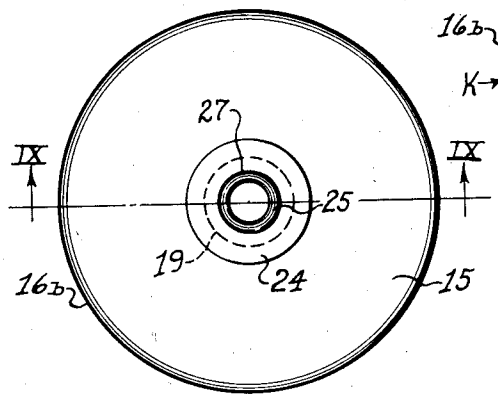


FIG. 8.

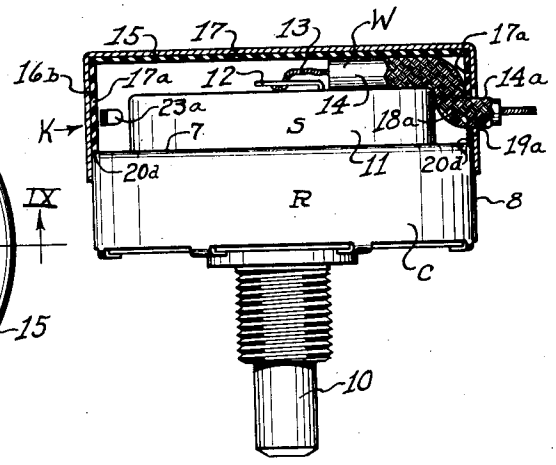


FIG. 10.

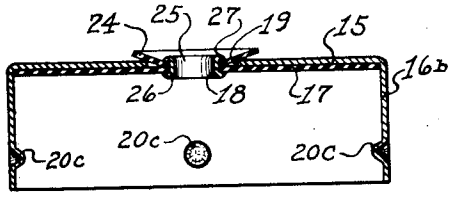


FIG. 9.

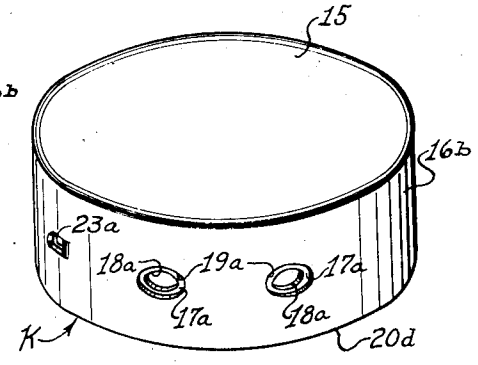


FIG. 11.

INVENTOR

NEWTON C. SCHELLENGER.

BY. Henry Hume

ATTY.

May 24, 1938. N. C. SCHELLENGER 2,118,268

SWITCH SHIELD

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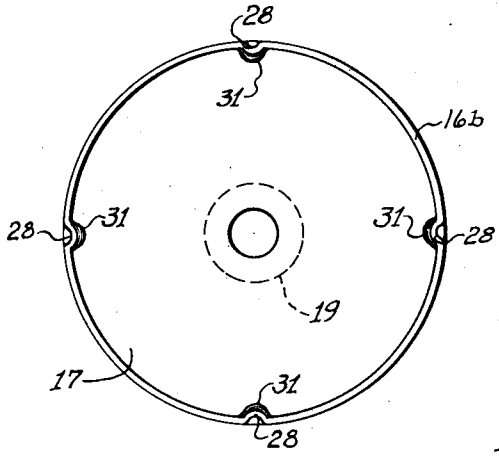


FIG. 12.

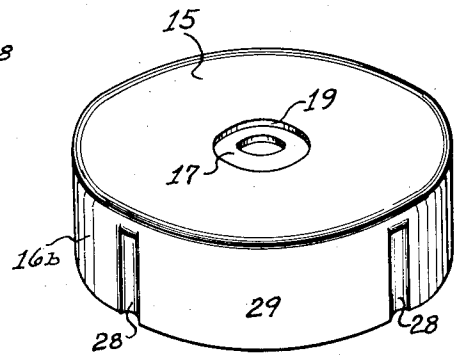


FIG. 16.

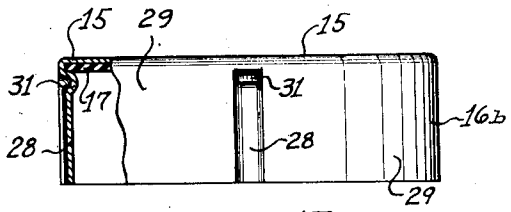


FIG. 13.

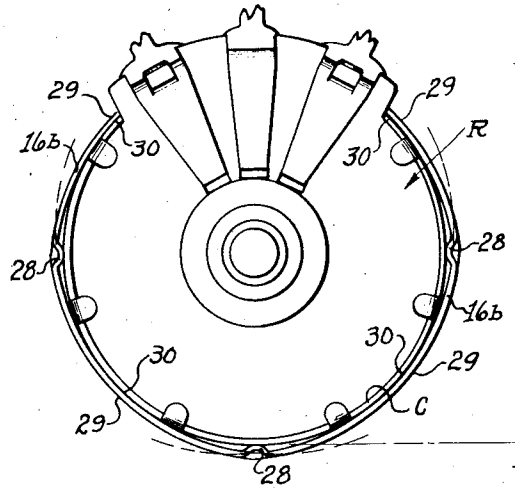


FIG. 14.

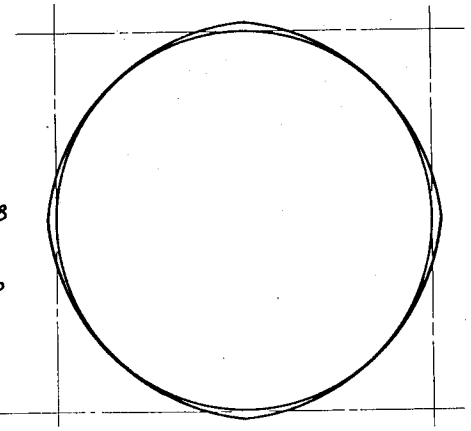


FIG. 15.

INVENTOR.

NEWTON C. SCHELLENGER.

BY. (Signature)

ATT'Y.

May 24, 1938. N. C. SCHELLENGER 2,118,268

SWITCH SHIELD

Filed July 30, 1934 5 Sheets-Sheet 5

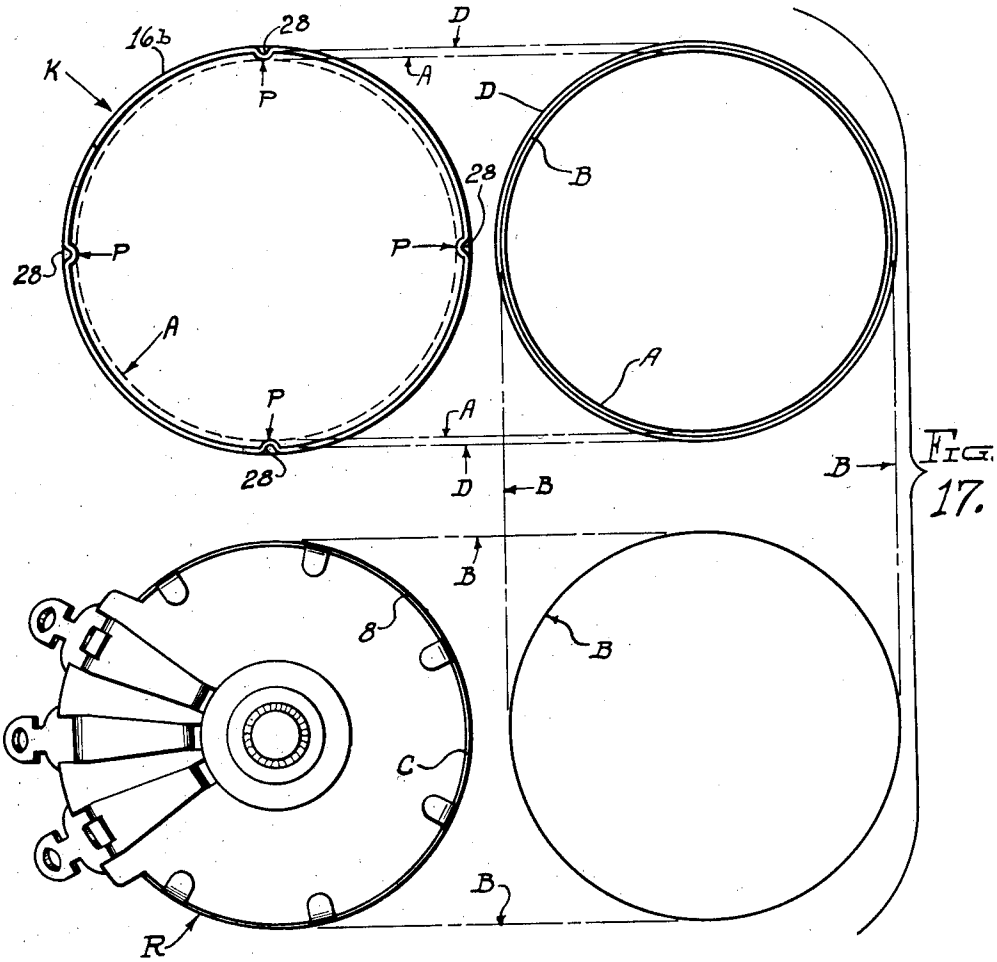


FIG. 17.

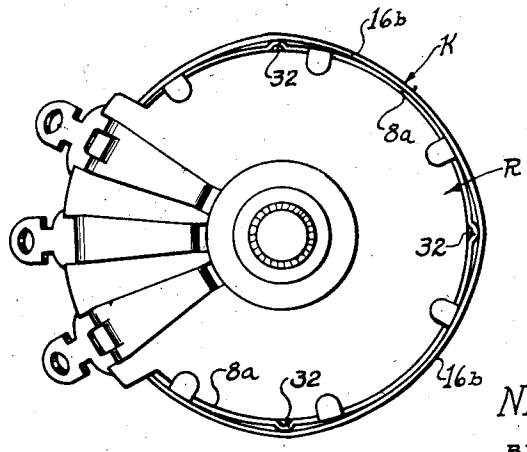


FIG. 18.

INVENTOR.

NEWTON C. SCHELLENGER.

BY. Kemp Hume ATT'Y.

Patented May 24, 1938 2,118,268

UNITED STATES PATENT OFFICE

2,118,268

SWITCH SHIELD

Newton C. Schellenger, Elkhart, Ind., assignor to Chicago Telephone Supply Co., Elkhart, Ind., a corporation of Indiana

Application July 30, 1934, Serial No. 737,486

8 Claims. (Cl. 201—48)

My invention relates to shields for electrical devices and, more particularly, to electrostatic shields for radio power supply switches, and to shields for use with combination volume or tone control and power supply switch units as are employed in present day radio receiving sets.

The present trend in radio receiving set design is toward exceedingly compact assemblies, as in the case of the modern receiving sets adapted for use in automobiles. In such sets as these, the component parts thereof must necessarily be correspondingly compact, and their respective positioning relative to each other, when assembled, necessarily is very close and crowded.

Heretofore, it has been exceedingly difficult to crowd the component parts of a radio receiving set, along with the associated wiring, into the small space provided for this purpose, without disturbing the electrical balance of the various circuits, due to undesirable inductive or capacitive coupling.

Furthermore, in radio switches as known heretofore, particularly those used in combination with volume or tone controls, the terminals were usually left in an exposed position for connection of lead wires thereto. Such constructions had many attendant disadvantages. First, the lead wires, unless connected with the exercise of extreme care, were easily loosened from the terminals. Secondly, the operation of the radio set was seriously interfered with by the electrical "hum" induced in sensitive control devices positioned adjacent the switch by the alternating or pulsating current flowing in the switch mechanism. Thirdly, the exposed terminals or lead wires of the switch often contacted the closely adjacent wires or radio instrumentalities whereby sets frequently sustained considerable damage.

There have been many attempts to overcome some of these disadvantages whereby power switches and other radio or electrical mechanisms have been provided with mechanical shields (as distinguished from electrostatic shields), made to cover any exposed terminals of the device upon which they were to be used, and to which they were permanently fixed when manufactured. These mechanical shields were not removable, and since they covered the terminals, it was necessary for the supplier of such devices to fasten wire leads to the terminals before fastening the mechanical shield in place.

The provision of these wire leads on such devices is not only costly in time and expense from the manufacturer's standpoint, but is unsatisfactory from the radio assembler's standpoint, in that the leads are rarely of the appropriate length to effect the required connections. Also, when such devices are handled in assembling, as down an assembly line, the leads become excessively weakened, and the contacts and connections broken or rendered unfit for use.

Electrostatic sheathing, as wire gauze or metallic armor, has been provided for the wires in sensitive electrical and radio hook-ups, and is usually applied over the insulation. This sheathing is grounded to exclude undesirable coupling effects. Various other parts of radios have been encased in metallic housings that are grounded for the same purpose. However there has never been any satisfactory means provided for electrostatically shielding the power switch, and particularly power switches constructed with or mounted upon a volume control unit or rheostat, to isolate the exposed terminal portions from adjacent sensitive circuits and parts. Such a need exists today more than ever before due to the exceedingly compact assemblies.

Also, heretofore, when it has been necessary to pass a wire or power lead through a metallic casing, it has been necessary to include in the wire outlet aperture, some sort of insulative bushing to insure against grounding of the circuit. This is undesirable due to added manufacturing costs, and because of the delays occasioned in assembly operations.

It is, therefore, an object of my invention to provide an electrostatic shield for electrical or radio devices that will eliminate undesirable inductive or capacitive coupling caused by the nearness of adjacent associated parts.

It is another object of my invention to provide a shield for electrical or radio devices that will protect the otherwise exposed terminal portions and wire lead connections thereof.

It is a further object of my invention to provide a shield for electrical or radio devices that will anchor lead wires to portions of such devices to prevent the rupture of the connections of the wires at the terminal portions and their disconnection therefrom.

It is still a further object of my invention to provide a shield for electrical or radio devices that can be readily removed from association with such devices, to facilitate assembling or repair operations.

It is still a further object of my invention to provide a shield for electrical or radio devices having a lead wire aperture (or apertures) therein, which is so constructed and arranged that in-

sulative bushings in such apertures may be dispensed with.

The foregoing objects, and others ancillary thereto, I prefer to accomplish as follows:

According to a preferred embodiment of my invention, I employ a metallic cup-shaped body of such size and configuration as will telescope snugly upon and conform to the casing of a volume control unit which has a power switch mounted upon one of its ends. The metallic cup-shaped body, or shield, has a lead wire aperture suitably arranged therein, and is adapted to overlie the power switch to cover the exposed terminals thereof, and to protect the lead wires connected therewith. The shield, in this preferred embodiment, will be grounded on the volume control casing, which in turn will be connected to the grounded chassis, or metallic frame, of the set, thus insuring against electrostatic interference.

To provide against the metallic shield from coming into contact with terminal and exposed lead wire portions, a sheet or disc of insulating material is interposed between the shield and the terminal and exposed portions. This insulating disc has an aperture in it, coinciding with the aperture in the shield, to permit passage of the lead wires therethrough, but this aperture is substantially smaller than the aperture in the shield, and is preferably but slightly larger than the overall diameter of the wire or wires passing therethrough. This serves to keep the wire leads always out of contact with the electrostatic shield, and substantially concentric with the larger aperture therein, which disposes of the necessity of having insulative bushings.

The side wall portions of the shield may have a peripheral shoulder portion, lugs, or struck-in portions to serve as stop members, to insure the proper spacing of the end portion of the shield from the end portion of the volume control unit upon which it rests, and upon which the switch is mounted. Where a smooth, straight-sided casing is desired, I dispose a band of insulation around the inner periphery of the sidewall portion of the shield, that extends in width from the end portion of the shield, down the side walls thereof to some suitable intermediate, peripheral line. Thus, when the shield is telescoped over the volume control device, the lower edge of the insulation, disposed as above, forms a bearing shoulder, which will engage the end wall of the volume control unit adjacent its edge, and thus act as a spacer member to maintain portions of the shield, switch and volume control unit in predetermined spaced relation.

The assembly of the unit, in one contemplated form, may be effected by passing the lead wires through the coincident apertures in the shield and insulation; sliding the shield and insulation back along the wires to permit fastening the ends of the wires to the exposed terminals of the switch of a combined switch and volume control unit, and bringing the shield back into engagement with the volume control unit upon which the switch is fastened, thereby covering said switch, and pressing the shield into firm engagement with the volume control unit. The apertures in the shield and insulation do not overlie the switch terminals, but are substantially off-set therefrom, whereby the wire leads, fastened to said terminals, passing outwardly through the apertures are caused to assume a degree of angularity amounting to substantially 90°. Hence, when the shield is pressed down into firm engagement with the volume control and switch unit, it presses the angularly offset portions of the wire into firm engagement with the top surface of the switch, adjacent the terminals.

It will be apparent from the above described assembly, that any tensional strain exerted upon the wire leads outside the assembled unit will be transmitted to the shield and volume control casing, rather than being transmitted to the wire and terminal connections.

The novel features that I consider characteristic of my invention are set forth with particularity in the appended claims. The invention, itself, however, both as to organization and mode of operation will be understood from the following description of specific embodiments when taken in conjunction with the accompanying illustrations thereof, in which

Fig. 1 is a side elevational view of a combined volume control (or rheostat) and power switch unit having a shield constructed in accordance with one form of my invention mounted thereon with portions broken away to show the cooperation of the various parts;

Fig. 2 is a top plan view of Fig. 1;

Fig. 3 is an exploded perspective view of the device shown in Fig. 1;

Fig. 4 is a side elevational view of a combined variable resistance and power switch unit having a modified form of shield constructed in accordance with my invention mounted thereon and shown in section;

Fig. 5 is a side elevational view of a combined rheostat and switch unit having another modified form of shield shown in section;

Fig. 6 is a top plan view of still another modified form of shield mounted on a combined rheostat and switch unit;

Fig. 7 is a vertical sectional view taken on line VII—VII of Fig. 6 showing only the shield in section;

Fig. 8 is a top plan view of a still further modified form of shield;

Fig. 9 is a vertical sectional view taken on line IX—IX of Fig. 8;

Fig. 10 is a side elevational view of a combined variable resistance and power switch unit having a modified form of shield thereon shown in section;

Fig. 11 is a perspective view of the form of shield shown in Fig. 10;

Fig. 12 is a bottom plan view of a shield constructed in accordance with my invention showing novel means for securing the shield to a circuit controller, and novel means for securing a disc of insulation adjacent its inner end wall;

Fig. 13 is a side elevational view of the device shown in Fig. 12 with portions broken away;

Fig. 14 is a bottom plan view of a variable resistance device having the form of shield illustrated in Figs. 12 and 13 positioned thereon;

Fig. 15 is a diagrammatic plan view illustrating the distortion of the walls of the shield illustrated in Fig. 12 when positioned as in Fig. 14;

Fig. 16 is a perspective view of the shield illustrated in Figs. 12 and 13;

Fig. 17 is a composite diagrammatic plan view that will be fully explained in the accompanying specification; and

Fig. 18 is an alternative form of the device shown in Fig. 14.

Referring in detail to the drawings in which like reference characters refer to like parts throughout:

In Fig. 1, R designates generally a variable

resistance unit, having a composite base member composed of grounding plate, 1, and main base portion, 2, made of insulative material. Mounted upon main base portion, 2, is a flat, arcuate resistance element, 3, which is engaged by an adjustable contactor arm, 4, at a point not shown.

Projecting from the contactor arm, 4, is a switch actuating lug, 5, which is adapted to engage cam member, 6, of a power switch unit generally designated by S. The variable resistance unit, R, is housed in a metallic casing member, C, having an end wall portion, 7, and depending side wall portions, 8. The end wall portion, 7, carries switch unit, S, and has an opening, 9, therethrough which permits cam member, 6, of the switch to project through it, to be engaged by lug, 5, of the contactor arm.

The contactor arm, 4, is adjusted relative to the resistance element, 3, by shaft, 10, which, at certain positions during its rotative movement, causes the switch, S, to be actuated into open or closed position through lug, 5, and cam, 6, depending upon the direction of rotation.

The switch mechanism is carried by switch mounting, 11, of insulating material, which is fastened in any desired manner, as by rivets, etc., to the end wall portion, 7, of the variable resistance unit casing, C.

For a more detailed disclosure of the combined variable resistance and switch unit, reference is made to my co-pending application Serial No. 711,644, filed February 17, 1934.

Projecting through the switch mounting, 11, of switch S, are terminal portions, 12, to which bared end portions, 13, of lead wires, W, are fastened by solder, in the usual manner. The lead wires, W, are covered in the conventional way by insulation, 14, over which is a grounded metallic sheath, 14*a*, preferably of woven or braided fine wire or thin metallic ribbon.

The lead wires, W, and insulation, 14, are preferably bent laterally adjacent their terminal ends so that a portion of the insulation, 14, rests upon portions of a surface of the switch mounting, 11, for purposes to hereinafter appear.

A metallic shielding switch cover generally designated by K, having a substantially planar end wall portion, 15, with stepped or offset side walls, 16, is telescoped upon the resistance unit, R, so as to overlie the switch unit, S. Closely adjacent the inner face of end portion, 15, a disc, 17, of insulating material having a central aperture, 18, therein is positioned in any suitable manner. The end wall portion, 15, of the shield, K, has a centrally located aperture, 19, which is larger than and substantially concentric with aperture, 18, of the insulating disc, through which the lead wires, W, pass outwardly.

The side walls, 16, of the shield, K, have radially extended shoulder or bearing portions, 20, which off-set wall portions, 21, to form a "bell-mouthed" portion on the shield. This off-set or "bell-mouthed" portion, 21, telescopically engages the side walls, 8, of the resistance unit casing, C, and the peripheral shoulder or bearing member, 20, rests on the end portion, 7, of casing, C, adjacent its edge, thus serving to keep the end wall, 15, of the shield suitably spaced a fixed distance from the end wall portion, 7, of the resistance unit, R, and the top surface of the switch mounting, 11. This spacing is such that the end wall, 15, of the shielding cover, presses the insulator disc, 17, firmly upon the insulated laterally disposed portions, 22, of the lead wires, W, whereby they are forced into contact with the end surface of the switch mounting, 11. Thus it will be seen that the lead wires are literally clamped in place between the inner, insulated face of the end wall of the shield, and the top surface of the switch mounting in such a manner as to resist any pulling strains that might be exerted on the wires, W, thus preventing breakage of the terminal connections.

The shield, K, is grounded to the casing, C, of the resistance unit, R, where the shoulder portions, 20, and off-set wall portions, 21, contact with it. The casing, C, is grounded through grounding plate, 1, to a grounded metallic base or chassis of a radio set (not shown). In this manner an effective electrostatic shield is provided whereby all electrostatic and other coupling influences are prevented from adversely affecting the sensitive circuits of the radio set.

Fig. 4 illustrates a modified form of my invention in which the shielding cover, K, is made to the same configuration as the switch unit, S, and is of such size as to telescope snugly thereon. The side walls, 16*a*, of the shield are regular and smooth and rest at edge, 20*a*, adjacent their open end, firmly, to insure good ground connection upon the end wall, 7, of variable resistance device, R. The walls, 16*a*, are of such height or breadth as to cause the end wall, 15, of the shield, K, to press the insulative disc, 17, down upon off-set portions, 22, of the lead wires, W, to force the insulation, 14, of the wires into firm engagement with the end portion of switch mounting, 11. The shield, K, is grounded to the casing, C, at 20*a*, and the casing, C, is grounded to the chassis of a radio set (not shown) in the same manner as described in the discussion of Fig. 1.

Fig. 5 shows a further modified form of shield generally designated as K, to be employed on a modified form of resistance unit. The switch, assembly, S, is diagrammatically illustrated as mounted inside the variable resistance casing, C, with its terminals, 12, projecting through the end wall, 7*a*, thereof. Side walls, 16, of the shield are made of less height above the radially extending bearing shoulder, 20, so that insulative disc, 17, and end wall, 15, of the shield, K, may press the insulation, 14 of the off-set wire portions, 22, into firm engagement with the end wall, 7*a*, of the casing, C. The terminal connections are thus protected against any tensional force exerted on the wires, W, as has been hereinbefore explained.

The form of shield illustrated in Figs. 6 and 7 is modified in several respects. The lead wire apertures, 18 and 19, in the shield, K, and insulative disc, 17, are located off-center, and there is a set of apertures provided for each lead wire. The apertures, 18, in the insulative disc, 17, are sufficiently smaller than the apertures, 19, in the end wall, 15, of the shield, K, so as to insure against the lead wires, W, from coming into contact with the metal of the shield adjacent the aperture, 19. In this manner grounding of the power circuit is prevented without having to employ bushings of insulative material as has heretofore been the practice.

Lugs or struck in portions, 20*b*, on the side walls, 16*b*, (Fig. 7) supplant the bearing shoulder, 20, illustrated in Fig. 1 and Fig. 5, and serve as stop members or spacers to maintain the shield in proper spaced relation to the switch and rheostat for purposes hereinbefore set forth.

Ears, 23, are struck in from the end wall, 15, of the shield and are crimped over to hold the insulative disc, 17, in place to prevent any relative movement between the disc and shield.

Figs. 8 and 9 illustrate a shield device having a central aperture, 19, in the end wall, 15, in which a novel means for securing the insulative disc, 17, thereto is shown. The disc, 17, has a central aperture, 18, smaller than the aperture, 19, of the shield end wall, and substantially concentric therewith. Mounted in this aperture is a metallic tubular member or bushing, 25, having radial flanges, 26 and 27, projecting from its opposite ends. The outside diameter of the body portion of this tubular member is of substantially the same diameter as that of aperture, 18, in the insulative disc, 17, thus making a tight fit. The flange, 26, on one end of the tubular member or bushing, engages the disc, 17, at points adjacent the aperture, 18, therein, and the flange, 27, at the other end thereof engages a washer, 24, made of insulative material. Since the flange, 27, is of less diameter than the diameter of aperture, 19, in the shield, the washer, 24, being of greater diameter than the aperture, maintains the metallic bushing in place and secures the disc, 17, to the inner face of the end wall, 15. Aperture, 18, in disc, 17, is positioned to always retain the metallic bushing, 25, out of contact with the metal of the shield.

An alternative form of bearing or spacer projections, 20c, are provided by embossing the side wall, 16b, inwardly at as many points as is desirable.

In Figs. 10 and 11, the shield, K, has an imperforate end wall, 15, having straight side walls, 16b, perpendicularly depending from the periphery thereof and integral therewith. The end wall, 15, is provided with an imperforate disc, 17, of insulating material, which is held in place adjacent the inner face of the end wall by an insulative band, 17a, which is disposed around the inner periphery of the side walls, 16b. The band, 17a, extends in width from the insulative disc, 17, at the end wall, down the side walls of the shield to an intermediate peripheral line. The edge, 20d, of the band forms a bearing portion that engages the end wall, 7, of the casing, C, of the rheostat, R, adjacent its edge. The band is of such width as to permit the end wall, 15, and insulation, 17, to press the insulation, 14, of the wire, W, upon the switch mounting, 11.

The band, 17a, has wire apertures, 18a, smaller than and substantially concentric with apertures, 19a, in the side walls, 16b, of the shield, K, and are retained in this position by ears, 23a, struck in from side walls, 16b, of the shield.

These apertures are positioned to distort the wires, W, along their longitudinal axis into a reverse curve (Fig. 10) by causing the wire to bend over a corner of the switch mounting, 11, down a side wall thereof, and then outwardly through the wire apertures. The end wall, 15, through its insulative disc, 17; and the side walls, 16b, through the insulative band, 17a, cooperate with the switch mounting, 11, to grip the insulation, 14, of the wires, W, whereby no pulling strain exerted on the wires may be transmitted to the connections.

Figs. 12 through 17, inclusive, show views of a preferred form of my invention. The diameter of this type of shield is slightly larger than the diameter of the variable resistance unit casing upon which it is adapted to be telescoped. To insure a tight fit, the side walls, 16b, are provided with indented ribs or corrugations, 28. I have illustrated four of these corrugations as a preferred number, although, from one to any desired number, may be employed.

The corrugations, 28, at their ends adjacent the end wall, 15, terminate in bosses, 31, that are of sufficient depth to hold insulative disc, 17, securely in place. This disc may be sufficiently resilient to be forced in between the corrugations, and snapped in place beneath the bosses, 31.

The function of the corrugations will be better understood by referring to Fig. 17, in which it will be seen that a circle, as A, inscribed through points, P, lying in the innermost portions of the corrugations, 28, would be of less magnitude than any circle, as B, lying in the outer circumference of the casing, C, of the variable resistance unit, R, and as suggested above, any circle, D, lying in the inner periphery of the side walls, 16b, of the shield, K, would be of greater magnitude than any circle, B, lying in the outer circumference of the casing, C.

Thus it will be seen that the corrugations, 28, collectively form expansible bearing portions that are adapted to be forced upon the casing, C, of rheostat, R. When forced upon the casing, the corrugations, 28, are displaced radially (the metal forming side walls, 16b, being sufficiently yieldable to permit this) and the segments, 29, of the side walls, disposed intermediate the corrugations, are stretched between their adjacent corrugations whereby they lose their true arcuate shape, and tend to become chords to a greater circle in which the radially distended corrugations now lie. The distortion of the walls is diagrammatically illustrated in Fig. 15. In this position the wall segments, 29, are drawn tangent with the casing, C, at 30 and due to the resiliency of the metal, firmly grip the casing to provide a compact and rigid assembly. (Figs. 14 and 15.)

This type of shield preferably has its lead wire aperture, 19, in the end wall portion, which together with the apertured insulative disc, 17, engages the laterally off-set portions of the lead wires in the manner hereinbefore described.

In Fig. 18, the same result is accomplished by placing corrugations, 32, on the side walls, 8a, of the rheostat casing whereby a shield having smooth side walls may be employed. It is felt that this further modified form may be readily understood from the foregoing description of Figs. 12 to 17, inclusive, and that no further explanation is necessary here.

The advantage of this latter type of shield lies in the fact that a positive, mechanical, gripping action is obtained between the shield and rheostat casing whereby accidental separation of the shield from the rheostat is prevented; and yet, when it is desired to remove the shield from the rheostat for assembly or repair operations, the corrugations, serving to keep portions of the side walls of the shield spaced away from the side walls of the casing, provide projections that may be engaged by the fingers or suitable implements to effect easy removal. Also, shields constructed in this manner are adapted to fit casings which vary over a limited range of size. This is highly desirable, since the casings made with old, worn dies might be three to four thousandths of an inch oversize, and thereby larger than a casing made by a new die. Irregularities of the casings are likewise compensated for.

The switch and variable resistance device as well as the cooperating shield member are illustrated as cylindrical members. It is obvious that either one or both the variable resistance device or the switch may be of any desired configuration with the shield member of similar configuration to cooperate therewith.

All of the various types of shields hereinbefore described may be grounded in any suitable manner, such as that disclosed in Fig. 1 herein, in order that electrostatic interference may be excluded.

The advantages of the shields made in accordance with my invention are many and varied, since they not only serve to eliminate electrostatic disturbances, but also serve to protect the delicate parts to which they are applied from mechanical disturbances, such as physical impact, dust and other foreign matter, etc.

The shields constructed in accordance with my invention, hereinbefore disclosed, materially improve the appearance of the units to which they are applied, presenting a neater and more compact assembly, whereby the marketability of such units is highly improved. Assembly operations are facilitated and expedited by my invention, and after assembly, where my shield has been fastened upon a unit, covering terminals, lead wires and their connections, any tensional force, pulling away from said unit upon the lead wires, will be transmitted from the insulation around the wire to the insulative disc carried on the inner face of the shield. This in turn will transmit the strain, through the shield, to the rheostat casing where it will be harmlessly dissipated. The wire and terminal connections are thus kept intact, and breakage thereof is rendered almost impossible.

The words "volume or tone control", "variable resistance device" and "rheostat" have been interchangeably used in this specification, and are to be construed as referring to the same part or equivalent parts throughout, the same being designated by "R" in the drawings.

Although I have shown and described certain specific embodiments of my invention, I am fully aware that many modifications thereof are possible. My invention, therefore, is not to be restricted except insofar as is necessitated by the prior art and by the spirit of the appended claims.

I claim:

1. In combination, a variable resistance device having a grounded metallic cover, a switch secured to said cover, means for jointly actuating the variable resistance and switch, said switch having a plurality of terminals and lead wires extending from a surface thereof, a metallic cup-shaped shield telescopically mounted on the grounded metallic cover of said variable resistance device and enclosing the switch, said shield being grounded to the cover of said variable resistance device, and an insulation means within said shield covering said terminals and lead wires.

2. An electrostatic shield comprising an end wall portion, corrugated side walls integral therewith, said corrugations extending from the free edge of said side walls across toward said end wall and terminating in enlarged indentations adjacent the end wall.

3. An electrostatic shield device comprising an end wall portion and corrugated side wall portions, said corrugations extending from the free edges of the wall portions toward the end wall portion, and a sheath of insulation held adjacent the inner face of said end wall portion by said corrugations.

4. In combination with a volume control unit having a switch mounted thereon, means for jointly actuating the switch and volume control unit, a shield device comprising an end wall portion and depending side wall portions telescoped upon said unit so as to overlie said switch, said side wall portions having inner axially extending peripheral lugs permanently engaging said unit whereby the shield is distorted to grip the unit at a plurality of peripheral points intermediate said lugs.

5. In combination with a circuit control device having a casing therefor, an electrostatic shield comprising an end wall and side walls, said side walls having a plurality of axially extending bearing projections upon their inner face arranged to engage the outer periphery of said casing whereby the side wall portions intermediate the projections are distorted into tangency with said casing.

6. In combination with a circuit control device, a cylindrical casing therefor, a cup-shaped shield telescoped upon said casing, the side walls on said shield having a plurality of diametrically disposed axially extending projections around the inner periphery thereof, points in the apices of which normally lie in a circle of less magnitude than a circle inscribed about the circumference of said casing, said projections engaging the outer cylindrical wall of the casing.

7. In combination with a circuit control device, an electrostatic shield adapted to telescope thereon comprising an end wall portion and side wall portions, said side wall portions having axially extending corrugations impressed therein engaging the unbroken wall of said circuit control device at spaced peripheral points, a planar area defined by points lying in said corrugations normally being of less magnitude than a coplanar area defined by points of contact lying on the periphery of said circuit control device.

8. An electrostatic shield comprising an end wall portion having an opening therein, corrugated side walls integral therewith, said corrugations extending parallel to the axis of the shield and terminating in enlarged indentations adjacent the end wall, and a sheath of insulation held adjacent the inner face of said end wall by said enlarged indentations.

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