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2,073,880

INTERFERENCE ELIMINATING DEVICE

Filed June 19, 1935

Fig. 1-

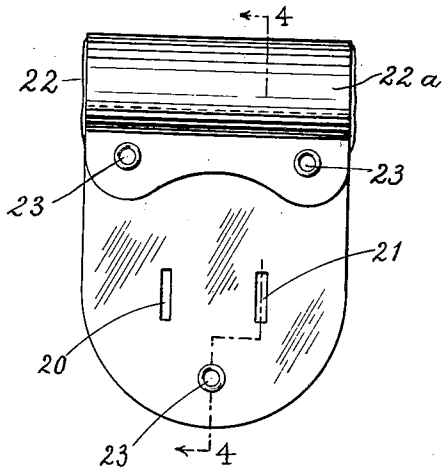


Fig. 2-

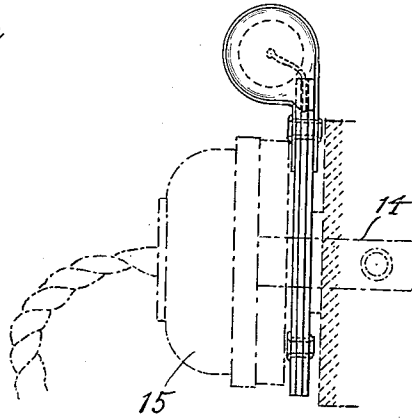


Fig. 3-

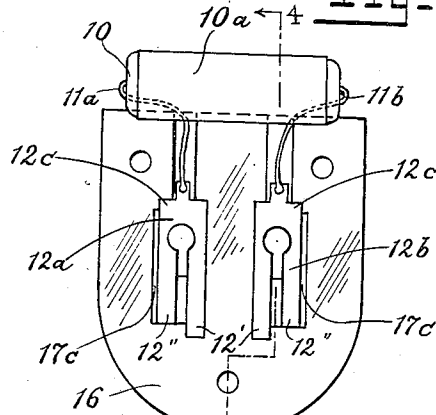


Fig. 4-

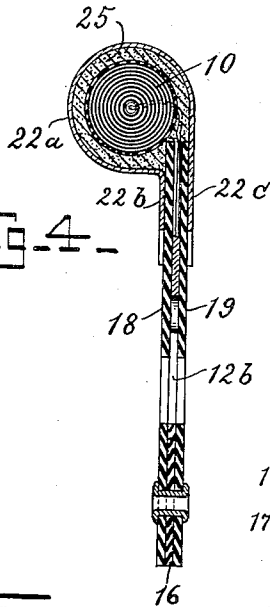


Fig. 5-

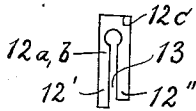
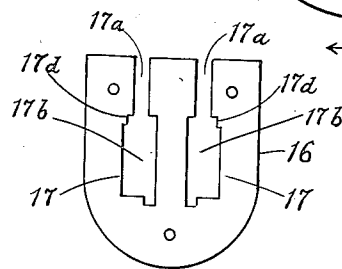


Fig. 6-



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INTERFERENCE ELIMINATING DEVICE

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6 Claims. (Cl. 250—16)

This invention concerns an appliance adapted to be used in radio receiving circuits and its general purpose is to eliminate interference and other extraneous disturbances.

5 Among such appliances may be counted induction coils used for different technical or medical purposes, X-ray apparatus, Tesla transformers, ultra-violet ray lamps, electric vacuum cleaners, flat irons and cookers, etc. But while interference, due to natural, i. e. atmospheric sources, is mostly, if not exclusively, picked up by the receiving antenna, the second class of disturbances is often directly transmitted to the receiving radio circuit over the service power line into
15 which the so-called "electrified" receiving set is plugged whether the electric appliances causing interference are on the same line or near by.

The usual means, employed to eliminate interference consists in connecting a condenser of
20 suitable capacity or across the power line leads. A similar effect, eliminating radio interference, can be attained by shunting such condenser at the source of the interfering disturbance, i. e. across the power lines, actuating the electrical
25 appliance or tool. These same well known principles are used also in this invention and no claim is laid regarding the discovery or specific use of said principles per se; the alleged novelty is rather the specific form or construction in
30 which this principle is embodied.

More accurately expressed:

The first object of my invention is to provide an eliminator for radio noises of man-made origin.

35 Another object of the invention is to provide an eliminator for the purpose described and adapted to be used in radio-receiving sets, actuated from service power lines, e. g. the usual A. C. or D. C. house current.

40 A further object of my invention is to provide an interference eliminator that can be readily attached over the terminal prongs of the standard plug by means of which the receiving set or the electrical device producing interference is
45 plugged into any standard socket of an A. C. or D. C. service line.

Another object is to provide an interference eliminator of the kind described of much simplified construction, compared with other similar
50 previous devices.

A further corollary object is to devise such an appliance which may consist of fewer parts and can consequently be manufactured at a lower cost.

55 A concurrent object is to provide an interference

eliminator of man-made radio noises which is simple, compact and of very small dimensions, so that, when installed, it will be inconspicuous.

A further object of my invention is to devise an eliminator for the purpose described which has
5 only two positive contacts instead of four, which previous similar devices show.

Other objects will become apparent from the following specification and the drawing which illustrates an embodiment of the present inventive
10 conception, but it is to be understood that the same is only illustrative and not restrictive and that other modifications are possible without deviating from the principle of the invention. Similar reference numerals denote similar parts
15 throughout the different views.

Fig. 1 is a front elevation of an interference eliminator built according to the principles of my invention and shown at a somewhat enlarged
20 scale.

Fig. 2 is a side elevation of the eliminator and indicates in dot and dash lines how the prongs of a standard plug are inserted through the slots of the eliminator into a wall socket.

Fig. 3 shows the inner construction of the
25 eliminator. The protective ferrule of the condenser and the insulating front panel with the eyelets have been removed.

Fig. 4 shows at a greatly exaggerated scale a longitudinal cross section through the eliminator,
30 taken along the line 4—4 of Fig. 1 or Fig. 3.

Fig. 5 shows, about in actual size, the intermediate non-conductive plate, supporting the two terminal clamps of the fixed condenser, seated
35 upon the prongs.

Fig. 6 shows in actual size one of the aforesaid terminal clamps.

Referring more in detail to the different views, the essential operative element of the device is a fixed paper-wound condenser 10, shown in
40 elevation in Fig. 3 and in section in Fig. 4. The construction of such condensers is well known. They consist essentially of a pair of spirally wound metal foil strips, insulated from each other by paraffined paper or a similar non-conducting
45 layer, each foil strip connected to a separate terminal wire 11a and 11b respectively.

The spiral film roll is encased in a non-conducting tube 10a and the open ends are usually hermetically sealed around the terminal wires by
50 wax, asphalt or a similar material. Each terminal wire is with its end soldered to a clamp 12a or 12b respectively.

This clamp is an oblong metal strip of phosphor bronze, No. 20 B. & S. gauge for example, divided
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along its center line for about two-thirds of its length by a slot 13, wide enough to tightly fit over either of the plug-in prongs 14 of the electric plug 15 (Fig. 2). The two legs 12' and 12'' are of unequal length, and when the clamps are arranged side by side, as shown in Fig. 3, soldered to the wires 11a and 11b, the two longer legs 12' are on the inside.

These two terminal clamp plates 12a, 12b are framed within and fixedly held in place by a non-conductive plate 16, made of hard rubber and about the same thickness as the terminal plates,—in this case about $\frac{1}{2}$ ". This plate is shown separately in Fig. 5. It is provided with two longitudinal slots 17 starting from the top in a parallel direction, and cut in such a way as to envelop the outer contour of the terminal plate clamps, each starting with a narrow slot 17a, in which the wires 11a and 11b, respectively, are located, widens out at the bottom into an irregular rectangular cut-out 17b, which follows the exact outer contour of the clamp plate, except that aside of the shorter legs of the clamps a narrow extra clearance 17c is provided in such a way that the cut-outs 17b are a little wider than the clamp plates 12a or 12b. The object of this is that when for instance a tight-fitting prong 14 of the plug 15 is pushed into the slot 13 (Fig. 6), the short leg 12'' can yield a little sideways to let the prong pass, whereafter it will close tightly upon the side of the prong, insuring a good electrical contact. It is to be noted that the long legs 12' are both held rigidly in place as well as the upper and outer corners 12c by the little projections 17d. The lower part of plate 16 is semi-circular and the top part rectangular.

This plate 16 is sandwiched between two other non-conductive plates 18 and 19 which are of the same material, size, thickness and outer contour as plate 16, but are not slotted in the same way. Alike to each other, they both are perforated by a pair of narrow slots 20 and 21 (Fig. 1). These slots, arranged symmetrically to the center line of the plates are placed at such a distance from each other that the prongs of a standard plug (about $\frac{1}{2}$ " center to center) will just fit into them. They also fit the cross-section of the prongs (about $\frac{1}{4}$ " x $\frac{1}{16}$ ") and moreover, when the third plate 16 is sandwiched in between the plates 18 and 19 and an electrical standard plug is inserted through these slots 20, 21, the prongs will pass through the slots 13 of the terminals 12a, b, making electrical contact with both of them, as can be seen from a contemplation of Fig. 3.

The three plates 16, 18 and 19 form a mounting plate 26 and in order to more firmly support and protect the condenser 10 on top of the three adjacent plates 18, 16, 19, a ferrule 22 is slipped over the entire length of the condenser as well as the top edges of the plates. This ferrule is preferably made of sheet tin and bent from a symmetrically formed blank in such a way that a cross section resembles the shape shown in Figs. 2 and 4. It will be seen that while the main portion forms a cylindrical body 22a, the rear end 22c (which otherwise is cut and swept along its extreme edge alike to the front end, shown in Fig. 1) is joining the cylindrical body at a tangent, while the front end 22b is sharply bent downward so as to form a pair of parallel wings with the rear end to embrace the top edges of the three hard rubber plates between them.

All three plates as well as the wings 22b, c are

then riveted tightly together by means of three eyelet rivets 23. The empty space between the condenser 10, the ferrule 22 and the top of the hard rubber plates is finally cast out with asphalt 25 or wax, or some other non-conductive substance.

It is, however, also feasible to form the non-conductive support for the fixed condenser out of two pieces only, instead of three single hard rubber blades, as described; likewise it is possible to use other non-conductive material, for example, a phenol-concentrate, usually called by the trade name: "Bakelite", instead of hard rubber.

If for instance the intermediate blade 16 were made integral with either one of the outer covers, e. g. plate 19, the slots 17 could be molded simply as recesses on the inner surface of such a plate, while the apertures 20, 21 would be the only openings going through. The front cover 18 would remain as shown in Fig. 1, and both plates forming a sort of pocket could be molded out of "Bakelite". The rear plate seen from the inside would have the same appearance as shown in Fig. 3. This modification therefore would likewise come within the legitimate scope of my claims.

Another possibility would be to mold the two plates 12a, b, with the lead-in wires 11a, 11b attached, directly into the interior of a non-conductive plate, so that when finished, the washer-like support of the condenser would consist of a single integral piece.

If in this case the clamps 12a, b, were simply split in the middle instead of having a wider slot 13 as shown, while the mold had slots cored therein, such as 20, 21 (Fig. 1), the necessary resiliency and electrical contact for the terminals could be secured by "swaging" or reaming out the slots in the metal plates in such a way that these slots would be a trifle narrower than the slots in the molds.

It is thus seen that all the objects of the invention can be attained in a simple, economical and efficient way. The plug 15 may be inserted into its socket without requiring more additional space than just the combined thickness of the three hard rubber plates, i. e. not more than the thickness of a $\frac{3}{8}$ " washer. The condenser is kept out of the way, placed either above or below the plug, or to one side, as conditions may demand. It is entirely inconspicuous when installed and constitutes a simple, inexpensive and extremely efficient contrivance which, among other advantages, eliminates all man-made interference during reception.

Many modifications of the construction, as described are feasible without departing from the spirit of the invention, and the scope of the patent protection sought for should be judged not from the details illustrated but from the claims as hereinafter worded.

Having described my invention, what I claim and desire to protect by Letters Patent, is:—

1. An interference eliminator of the class described comprising a thin, flat mounting plate, a condenser mounted on and supported by said plate, apertures in said plate through which the prongs of a standard attachment plug may be passed to enter a standard outlet socket, said apertures being spaced a sufficient distance from said condenser to permit the insertion of the prongs without the condenser being overlapped by the body of the plug, terminal means for the condenser carried by said plate and adjacent said

apertures so as to be contacted by the prongs of the plug, and electrical conducting means connecting said terminals to said condenser.

2. An interference eliminator of the class described, comprising a thin, flat mounting plate, said plate being of laminated construction and having an intermediate member and a pair of cover members, a condenser adjacent one edge of and supported by the mounting plate, apertures in said mounting plate through which the prongs of a standard attachment plug may be passed to enter a standard outlet socket, said apertures being spaced a sufficient distance from said condenser to permit the insertion of the prongs without the condenser being overlapped by the body of the plug, terminal means for the condenser carried by said intermediate member and enclosed by said cover members, said terminal means being adjacent said apertures so as to be contacted by the prongs of the plug, and electrical conducting means also enclosed by said cover plates for connecting said terminals of said condenser.

3. An interference eliminator of the class described, comprising a thin, flat mounting plate of approximately semi-circular shape, a cylindrical condenser attached tangentially to the straight edge of said mounting plate so as to overhang the front surface of said plate, apertures in said plate through which the prongs of a standard attachment plug may be passed to enter a standard outlet socket, said apertures being spaced a sufficient distance from said condenser to permit the insertion of the prongs without the condenser being overlapped by the body of the plug, terminal means for the condenser carried by said plate and adjacent said apertures so as to be contacted by the prongs of the plug, and electrical conducting means connecting said terminals to said condenser.

4. An interference eliminator of the class described, comprising a thin, flat mounting plate, said plate being of laminated construction and having an intermediate member and a pair of

cover members, a condenser adjacent one edge of and supported by the mounting plate, apertures in said mounting plate through which the prongs of a standard attachment plug may be passed to enter a standard outlet socket, said apertures being spaced a sufficient distance from said condenser to permit the insertion of the prongs without the condenser being overlapped by the body of the plug, said intermediate member of the plate having slots in which are received and held terminals for the condenser in such position as to be adjacent said apertures so that the terminals will be contacted by the prongs of the plug, and electrical conducting means also received in the slots of said intermediate member and connecting said terminals to said condenser.

5. An interference eliminator of the class described comprising a thin, flat mounting plate of approximately semi-circular shape, a cylindrical condenser attached tangentially to the straight edge of said mounting plate so as to overhang the front surface of said plate, apertures in said plate through which the prongs of a standard attachment plug may be passed to enter a standard outlet socket, said apertures being spaced a sufficient distance from said condenser to permit the insertion of the prongs without the condenser being overlapped by the body of the plug, terminal means for the condenser carried by said plate and adjacent said apertures so as to be contacted by the prongs of the plug, electrical conducting means connecting said terminals to said condenser and a substantially cylindrical ferrule, split lengthwise and provided with extended flanges and slipped over the condenser and mounting plate, and secured to the latter.

6. The combination of claim 4 in which the terminals of the condenser are resilient clamps fitting over the prongs of the plug, but capable of yielding so as to spread laterally as the prongs are forced through them.

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