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LINE CORD ANTENNA

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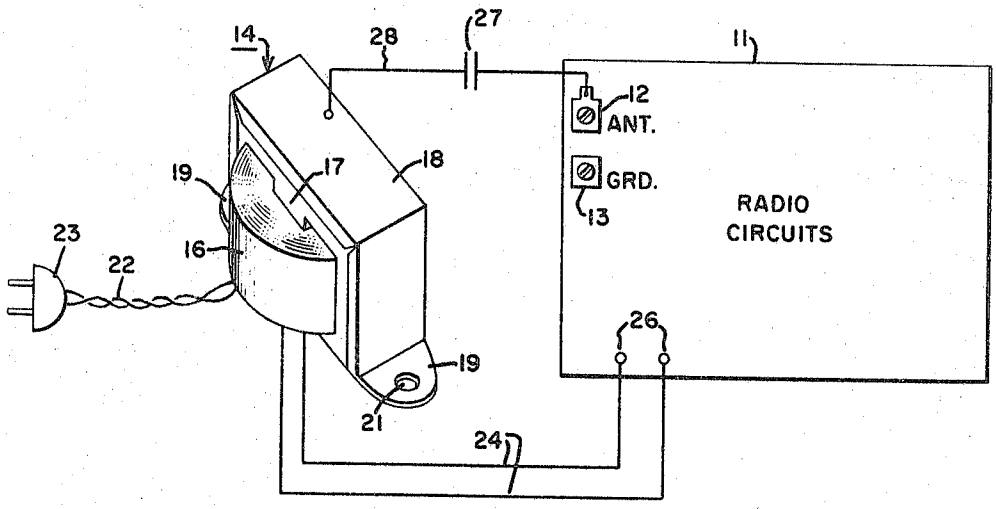

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LINE CORD ANTENNA

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This invention relates to line-cord antennas for radios and the like.

Various ways have been devised for using the power line cord of a radio as an antenna, especially for FM reception. The antenna input terminal is coupled, capacitively or inductively, to one or both wires of the radio's power cord. For example, a third wire has been added alongside the two wires of the power cord to provide a capacitive coupling to the power wires, this third wire being connected to the antenna input terminal of the radio. Also, other capacitive couplings have been employed, such as a capacitor connected between a power-cord wire and the antenna terminal, or a metal clip or clamp positioned against or around the power cord and connected to the antenna terminal. Any such capacitor must, of course, have a high enough voltage rating for safe use with respect to the power line voltage. All of these prior systems add to the cost of manufacturing radios.

An object of the invention is to provide an improved power-line antenna.

Another object is to provide a low-cost power-line antenna.

A further object is to provide a capacitive-coupled power-line antenna which does not require the use of a high-voltage capacitor.

Additional objects will be apparent from the following description and claims, and from the accompanying drawing.

The line-cord antenna of the invention comprises, briefly and in a preferred embodiment, circuitry having an antenna terminal, a power transformer for providing power to the circuitry from a power source via a line cord and having a core assembly associated with a winding arrangement, and means connecting the core assembly to the antenna terminal, whereby the core assembly provides a capacitive antenna coupling to the line-cord wires. Preferably a capacitor of small capacitance value, and which may have a low voltage rating, is connected between the antenna terminal and the core assembly of the transformer.

The single figure of the drawing shows a preferred embodiment of the invention.

Radio circuits **11**, indicated generally in block form and which may comprise conventional radio-frequency circuits, include an antenna terminal **12** and a ground terminal **13**. These terminals may, if desired, comprise screws or other means for connecting external antenna and ground wires. The radio circuits **11** may be mounted on a printed-circuit board or on a metal chassis.

A power transformer **14**, which may be conventional, comprises a winding arrangement **16** positioned on a metal core **17** which is held in place by a metal frame or housing **18** provided with mounting tabs **19** having openings **21** for accommodating rivets or other means

for attachment to a circuit board or cabinet. If the transformer is mounted on an electrically grounded metal chassis, it should be electrically insulated therefrom for the purposes of this invention.

A power cord **22** extends from a primary winding of the transformer **14**, and extends externally of the radio and is provided with a plug **23** for attachment to an electrical power outlet. Wires **24** are connected between a secondary winding of the transformer **14** and power terminals **26** of the radio circuits **11**.

The antenna terminal **12** is connected to the transformer frame **18**, either directly, or via a capacitor **27** as shown. Since the frame **18** and core **17** are inherently capacitively coupled to the wires of the line cord **22** via the winding arrangement **16**, the antenna terminal **12** is capacitively coupled to the line cord wires, thus providing line-cord antenna performance as good as or better than other types of line-cord antennas. Of course, the frame **18** should not be connected to other points in the circuits **11** which would impair the antenna performance.

The capacitance between the core assembly and the line cord of the transformer **14** is usually considerably greater than required for the antenna coupling, and hence the use of a small capacitor **27** is sometimes preferred to a direct connection from the antenna terminal **12** to the transformer frame **18**, because it reduces electrical loading by the line cord on the antenna input circuit and thus permits the use of an external long-wire antenna connected to the antenna terminal **12** if desired. Also, the use of the capacitor **27** tends to improve the intermediate-frequency rejection of the radio circuits. The capacitor **27** can be an inexpensive capacitor of low capacitance value (10 micromicrofarads, for example) and very low voltage rating since no appreciable voltage is applied across it. The capacitor **27** may be omitted, and the antenna terminal **12** may be connected directly to the frame **18**, if the radio circuits **11** have good intermediate-frequency rejection and it is not desired to provide for the use of an external antenna.

The frame **18** either inherently makes electrical contact with the core **17**, or else provides sufficient capacitive coupling thereto, for the purposes of the invention. The same applies to a fully-enclosing type of transformer frame or housing, which also would provide capacitive coupling directly to the winding **16**. If desired, the antenna connection can be made from the antenna terminal **12** to the core **17**, or to rivets or screws holding the core together. Thus, the term "core assembly" as used herein means, broadly, not only the core **16** but also includes any frame **18** or other metal support means associated with the core.

From the foregoing it will be clear that the invention provides an effective line-cord antenna for FM radios or the like, without incurring the cost of adding any extra components, or, at most, by adding only an inexpensive low-capacitance, low-voltage capacitor.

While a preferred embodiment of the invention has been shown and described, other embodiments and modifications thereof will be apparent to persons skilled in the art and will fall within the scope of invention as defined in the following claims.

What I claim is:

1. A line-cord antenna arrangement comprising electrical circuitry having an antenna terminal, a power transformer for providing power to the circuitry via a line cord and having a core assembly associated with a winding arrangement thereby providing capacitive coupling between said core assembly and said line cord, conductive means directly connected to said core assembly, and means connecting said conductive means to said antenna terminal.

2. A line-cord antenna arrangement as claimed in claim 1, including a capacitor interposed between said conductive means and said antenna terminal.

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