May 8, 1962 S. E. TODD 3,034,000

APPLIANCE ADAPTER

Filed July 19, 1960

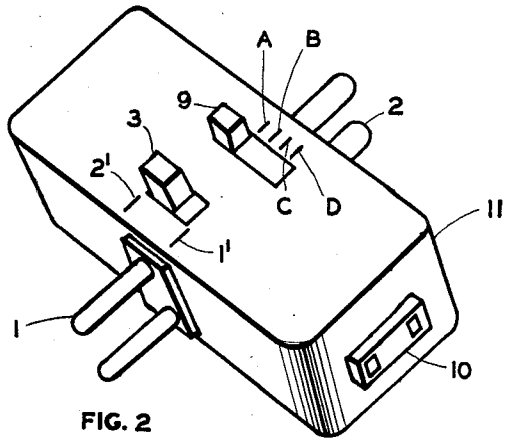


FIG. 2

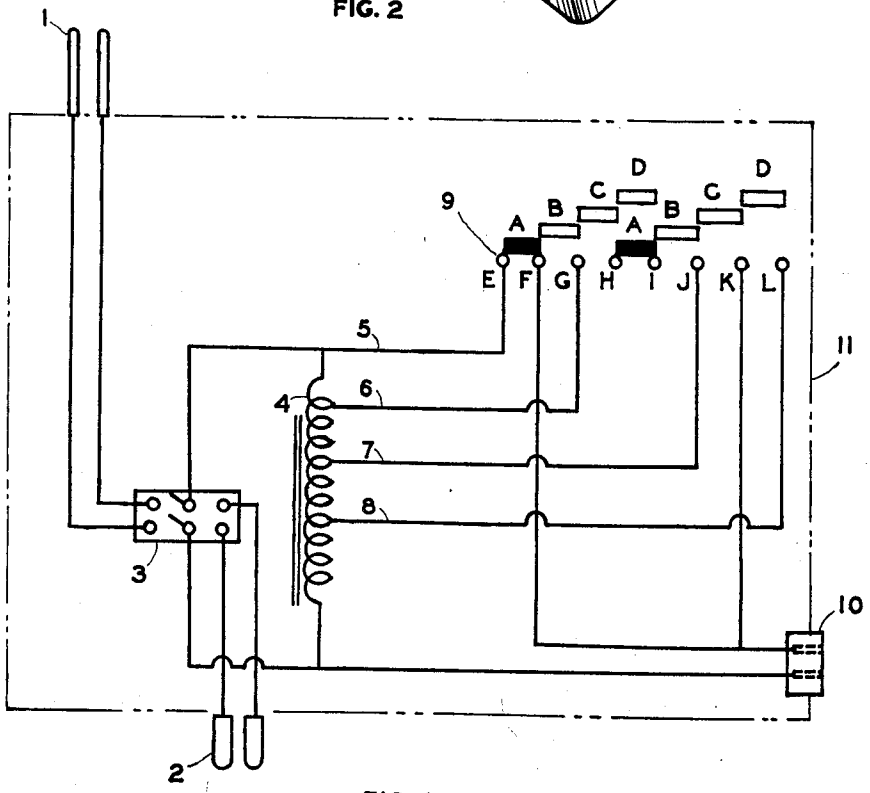


FIG. 1

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APPLIANCE ADAPTER

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This invention relates to an electrical device of the plug and socket type to provide a connection between the plug of an electrical appliance such as an electric razor or electric heating pad and an electrical outlet of different configuration and voltage characteristics from that of the plug of the electric razor, heating pad or appliance and from the design voltage of the appliance. A traveler in moving from country to country encounters three classes of electrical outlets, the British, the Continental and the American type, voltages varying from 100 to 250 volts, direct current and alternating current, varying in frequency from 40 to 80 cycles per second. The British and Continental type of plug employ round terminal prongs which differ from each other in spacing, length and diameter of their terminal prongs; the American type of plug employs flat, parallel terminal prongs.

It is an object of this invention to provide an adapter whereby a plug of one of the above classes, from an appliance such as an electric razor, may be connected with an electrical outlet of one of the other classes; in particular to connect a plug employing flat terminal prongs of the American type to an outlet, either of the British type or of the Continental type.

It is an object of this invention to provide an adapter to accomplish the above purpose in a single unit, without the need for separable parts.

It is another object of this invention to provide safety in the use of this adapter by a switch which isolates the exposed, unused terminal prongs from the current source when one pair of terminal prongs of the adapter is connected to an electrical outlet.

Another object of the invention is to provide a switch to match the voltage of the electrical outlet, which may range from 100 to 250 volts, 40 to 80 cycles, to the voltage required by the appliance, such as an electric razor which requires 117 volts.

In the drawings:

FIGURE 1 is a circuit diagram of a preferred form of this invention.

FIGURE 2 is an external perspective view of the assembled invention in the preferred form.

The adapter comprises a metal enclosure 11 for mounting the several components, terminal prongs of the Continental type 1, terminal prongs of the British type 2, a double pole, double throw slider switch 3 to connect the terminal prongs which are in use to autotransformer 4 which reduces the input voltage to the voltage which is required at the electrical outlet 4 (of the American type) and a four position, eight point, two slider switch 9 to tap the autotransformer 4 at the required ratio.

When the switch 3 is in position 1', FIGURE 2, terminal prongs 1 of the Continental type are connected from the outer poles of switch 3 to the center poles of switch 3 and to autotransformer 4. In position 2', terminal prongs 2 of the British type are connected from the opposite outer poles of switch 3 to the center poles of switch 3 and to the autotransformer 4.

One of the center poles of switch 3 is connected to one end terminal of autotransformer 4 and to a terminal of integral electrical outlet 10. The taps of autotransformer 4 are connected to terminals E, G, J and L of the eight point slider switch 9. Terminals F and K of switch 9 are connected to the other terminal of integral electrical outlet 10.

A, B, C and D are the four positions of the two sliders of switch 9. When the sliders are in position A, tap 5 is connected to one terminal of electrical outlet 10 through terminals E and F of switch 9; when the sliders of switch 9 are in positions B, C and D, taps 6, 7 and 8 respectively are connected to one terminal of outlet 10.

With switch 9 in position A, terminal prongs 1 or 2 may be connected to 117 volts and the same voltage, 117 volts, will be delivered to outlet 10 for use by the appliance or electric razor. In this position, the autotransformer 4 does not come into use and the voltage in equals the voltage out. The allowable range over which the appliance will operate is 105 to 135 volts. Position B is used for the operating range of 135 to 170 volts, norminal rating 150 volts, and tap 6 of autotransformer is connected through points G and F of switch 9 to one terminal of outlet 10. In position C, nominal voltage is 185 and the operating range 170 to 205 volts; tap 7 is connected through points J and K of switch 9 to outlet 10. In position D, nominal voltage is 220 and the operating range is 205 to 240 volts; tap 8 is connected through points L and K of switch 9 to outlet 10.

The voltage ranges in the foregoing paragraph are set by placing the taps on autotransformer 4 at appropriate points. The foregoing description applies to one useful and preferred construction of this invention.

Other useful modifications of this invention may be made without departing from the spirit and purpose of the invention. In place of autotransformer 4 I may substitute a tapped resistance or a resistance voltage divider whereby the adapter is more readily usable on direct current while still being usable on alternating current as well. The disadvantage of this arrangement is that a resistance voltage reducing device has inherently poorer voltage regulation than an autotransformer.

I may extend the range of the autotransformer to include step-up positions as well as step-down ratios, so that 220 volt appliances may be operated from 110 volt supplies.

A two winding transformer with a tapped secondary may replace autotransformer 4 but this serves only to increase the weight and bulk of the adapter; furthermore, although it is not recommended, it is possible to use the adapter with autotransformer 4 as a voltage divider on direct current for short periods, adequate for a single shave, without burning out the device.

It is further possible to mount three sets of terminal prongs on the device, namely, the British, Continental and American types with an integral electrical outlet 10 having the configuration of one of these types and at the same time replacing switch 3 with a double pole, triple throw switch which may be of the slider type, of the rotary type or the conventional toggle type. By this modification, the adapter may be used on outlets of all three types.

There are other special types of plugs and sockets which differ in configuration from those mentioned herein; by substituting such terminal prongs or outlets, a large number of combinations is possible for different purposes.

I claim:

1. An adapter for electrical outlets comprising a transformer with a tapped secondary, an integral electrical outlet, two pairs of terminal prongs which differ in configuration from each other, a first switch to connect either of said two pairs of terminal prongs to the primary of said transformer, a second switch to connect selectively taps on said tapped secondary to said integral electrical outlet and an enclosure on which said components are mounted.

2. An adapter for connecting an electrical device to electrical outlets whose terminal configurations differ

from the configuration of the terminal prongs of said electrical device comprising an enclosure, an electrical outlet mounted exteriorly on said enclosure, said outlet having a terminal configuration adapted to mate with the said terminal prongs of said electrical device, two pairs of terminal prongs mounted exteriorly on said enclosure and insulated therefrom, each pair of said terminal prongs differing in configuration from the other pair and from said terminal prongs of said electrical device, an autotransformer situated within said enclosure, a first switch mounted within said enclosure connecting selectively either pair of said two pairs of terminal prongs to said autotransformer, a second switch mounted within said enclosure connecting selectively taps on said autotransformer to said electrical outlet, and operating levers for said switches situated exteriorly on said enclosure.

3. An adapter for connecting an electrical device to electrical outlets whose terminal configurations differ from the configuration of the terminal prongs of said electrical device comprising an enclosure, an electrical outlet mounted exteriorly on said enclosure, said outlet having a terminal configuration adapted to mate with the said terminal prongs of said electrical device, two pairs of terminal prongs mounted exteriorly on said enclosure and insulated therefrom, each pair of said terminal prongs differing in configuration from the other pair and from said terminal prongs of said electrical device, a resistance situated within said enclosure, a first switch mounted within said enclosure connecting selectively either pair of said two pairs of terminal prongs to said

resistance, a second switch mounted within said enclosure connecting selectively taps on said resistance to said electrical outlet, and operating levers for said switches situated exteriorly on said enclosure.

4. An adapter for connecting an electrical device to electrical outlets whose terminal configurations differ from the configuration of the terminal prongs of said electrical device comprising an enclosure, an electrical outlet mounted exteriorly on said enclosure, said outlet having a terminal configuration adapted to mate with the said terminal prongs of said electrical device, two pairs of terminal prongs mounted exteriorly on said enclosure and insulated therefrom, each pair of said terminal prongs differing in configuration from the other pair and from said terminal prongs of said electrical device, an autotransformer situated within said enclosure, a double pole, double throw slider switch connecting selectively either pair of said two pairs of terminal prongs to said autotransformer, a second slider switch having four positions, eight points and two sliders connecting selectively taps on said autotransformer to said electrical outlet and operating levers for both of said switches situated exteriorly on said enclosure.

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