June 7, 1938. G. McL. COLE 2,120,126

POWER TRANSLATING DEVICE

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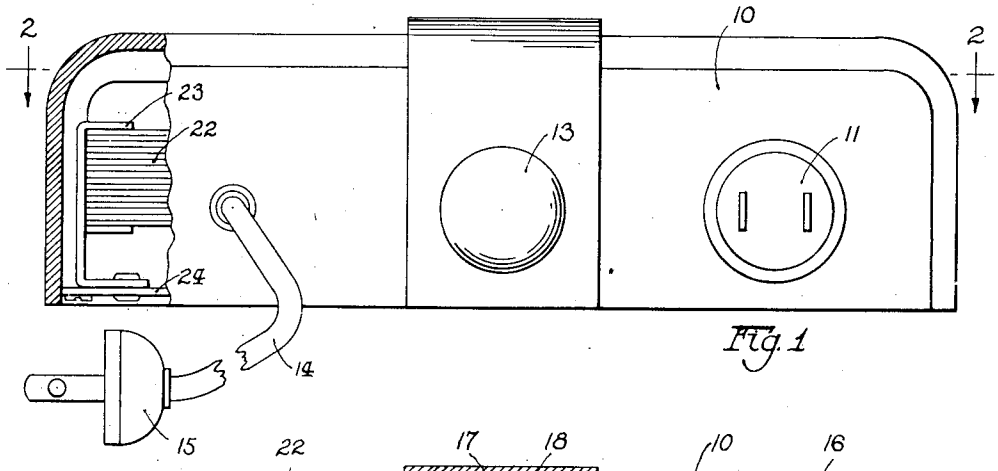


Fig. 1

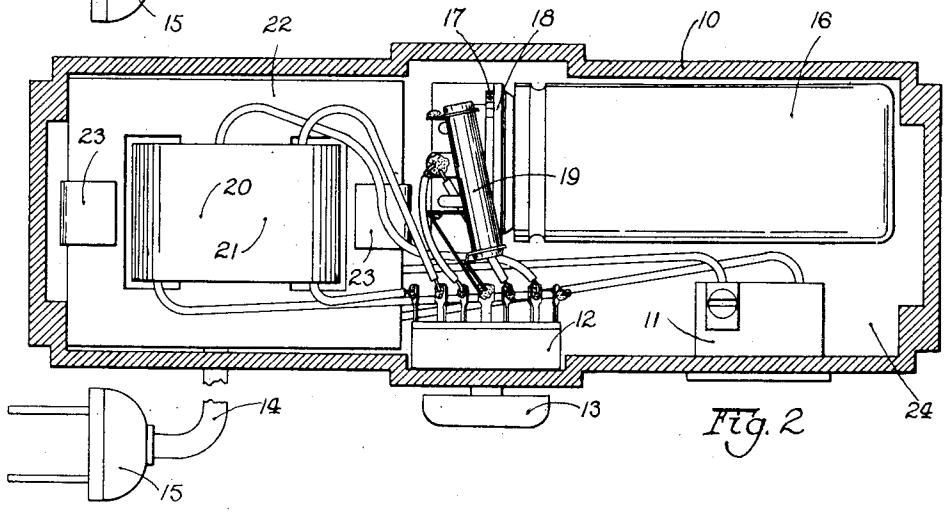


Fig. 2

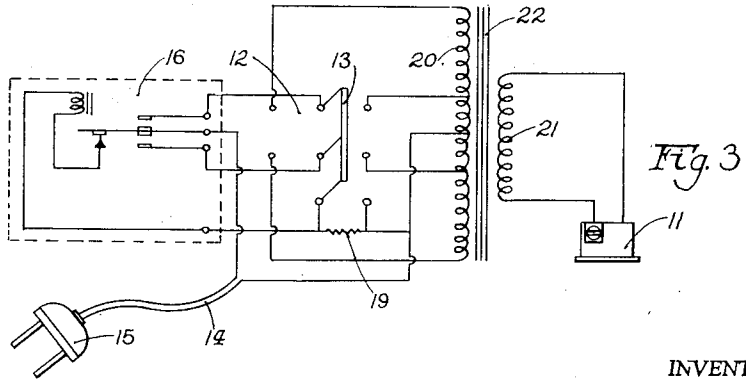


Fig. 3

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POWER TRANSLATING DEVICE

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6 Claims. (Cl. 175—365)

My invention relates to power units and is particularly adapted for use as a power translating device for electrical shavers and other devices of a similar nature.

The purpose of my invention is to fill a need, specifically for illustration a need which has grown out of the increasingly common use, for personal shaving purposes, of the electrical shaver, over a million of which, of one make alone, are now in daily service. A weakness of the electrical shaver, and a serious disadvantage, is that a proper current supply must be readily at hand, or it is useless. Up to the present time it has not been commercially possible to build an electrical shaver which will operate on more than one voltage.

The ordinary electrical shaver is designed to operate on the 110 volt house current commonly supplied in metropolitan areas. When the user travels, or spends any time away from the city, he is obliged to use an ordinary razor which is noticeably difficult when the face has become accustomed to "dry shaving." Electric current, it is true, is nearly always at hand, but not of the proper voltage for the shaver. An object of my invention is to make every common source of electric current available for use with an electric shaver regardless of the voltage for which the shaver is designed, and such other objects, advantages and capabilities as are inherently possessed by my invention.

Among the common sources of current not usable in an electrical shaver designed for the common 110 volt current, but which can be converted by my invention to the proper voltage for use with such a shaver, are automobiles, watercraft and ships, airplanes, dry batteries, farm lighting systems and Pullman cars, as well as certain metropolitan or suburban areas not supplied with the usual type of current. My invention further meets the test of practicability in that it is small, light, easily portable, decorative and marketable at a price commensurate with use in connection with a personal shaving device.

In carrying out my invention I employ an interrupter for producing a pulsating current from a direct current source, a transformer with primary winding tapped to accommodate a multiplicity of input voltages, a resistor or other means of limiting the flow of current through the actuating coil of the interrupter, a switch for directing the input current through the proper circuits as required, all being enclosed in a decorative case and provided with a suitable means for introducing and extracting electric power.

I will further describe the preferred form of my invention by reference to the accompanying drawing, wherein Fig. 1 is a side elevation; Fig. 2 is a section substantially on the line 2—2 of Fig. 1; and Fig. 3 is a wiring diagram of my invention.

Referring now in detail to the embodiment selected to illustrate my invention, I show a casing 10 apertured to receive the receptacle member 11 and the switching device 12 which, as shown, are secured to the casing 10 in a suitable manner. The casing is further apertured to admit the power supply cord 14, to which is attached the plug 15. Affixed to the switching device 12 is a knob 13 for actuating said switching device.

The interrupter unit 16 (as shown clearly in Fig. 3), equipped with terminal plugs at one end, plugs into socket member 17, and can therefore be easily removed or replaced. The socket member 17 is secured to a base plate by the bracket 18. The resistor 19 limits the current in the actuating mechanism of the interrupter when the device is used on a supply source the voltage of which is higher than that on which the interrupter is designed to operate normally. This resistor is substantially short circuited by the switching device 12 when it is not required.

The transformer consists of suitable windings indicated generally at 20 and 21, and a core 22. The core consists of laminations which are substantially rectangular in shape, with a web portion on which the windings 20 and 21 are wound. I prefer to hold the laminations in position by the clamps indicated by the numeral 23. These clamps hold the laminations snugly and are secured in a suitable manner to the base plate 24. However, other methods of clamping or securing these laminations may be employed without deviating from the spirit of my invention.

Referring now to Fig. 3, one side of the power source is connected, through the plug 15 and the supply cord 14, to the center of the primary coil 20, to one of the poles of the switching device 12, and to the resistor 19. The two end terminals and the intermediate terminals of the primary coil connect to other poles of the switching device, substantially as shown.

Further poles of the switching device are connected to the resistor 19 and the interrupter 16. The pulsating reed of the interrupter is connected to the second wire of the supply cord 14.

The secondary winding 21 of the transformer has its opposing ends connected to the terminals of the receptacle member 11.

Referring further to Figs. 2 and 3, when power is applied to the plug 15 the interrupter alternately makes and breaks contact, allowing a pulsating current to flow in the primary winding of the transformer. This current is then translated in the secondary winding to a voltage suitable for operating electric shavers, and delivered to the receptacle member 11 where it is readily accessible.

The tapped transformer-primary, in conjunction with the switching device 12 and limiting resistor 19, allows selection of any one of a multiplicity of input voltages, while maintaining an output voltage of the desired value. It will be understood by those skilled in the art that whereas the diagram of Fig. 3 shows an arrangement to accommodate either of two input voltages, this arrangement may be expanded, through the use of additional taps on the transformer primary, in conjunction with additional poles on the switch 12, to accommodate a larger number of input voltages. It will be further understood that the limiting resistor 19 may be eliminated by employing a tapped actuating coil 16, properly connected to the switch 12. This construction, however, may be less desirable than the preferred form shown in Fig. 3.

The device described is operated by adjusting the switch 12 to the position required by the input voltage available, connecting the device to that voltage through the cord and plug, 14 and 15 respectively, and connecting the electric shaver, through the cord and plug provided with such shavers, to the device at the receptacle 11.

From the above description the construction and operation of this device will be clear to those skilled in the art, and its advantages readily apparent.

While I have shown herein a preferred form of my invention I wish it understood that the same is susceptible of modification and change without departing from the spirit of my invention.

Having thus described my invention, I claim:

1. In a device of the character described for use with an electric source of supply, the combination of an interrupter, a transformer having a tapped primary winding and a secondary winding, a resistor, a multi-pole, multi-throw switch, two of the movable poles of said switch being connected to the stationary contacts of said interrupter, a pair of stationary poles of said switch adapted to be contacted simultaneously by said movable poles, said stationary poles being connected to the low voltage portion of the primary of said transformer, another pair of stationary poles of said switch also adapted to be contacted simultaneously by said movable poles, said other pair of stationary poles being connected across the total primary of said transformer, a third movable pole of said switch connected to one side of said resistor, said resistor being in series with the actuating coil of said interrupter, the other side of said resistor being connected to a third stationary pole of said switch, said third stationary pole adapted to be contacted by said third movable pole of said switch when the switch is in the position so that the two movable poles of said switch are connected with the low voltage portion of the primary of said transformer, and render said resistor inoperative.

2. In a device of the character described for use with an electric source of supply, the combination of an interrupter, a transformer having a tapped winding, a portion of said winding being the primary, and the total winding being the secondary, a resistor, a multi-pole, multi-throw switch, two of the movable poles of said switch being connected to the stationary contacts of said interrupter, a pair of stationary poles of said switch adapted to be contacted simultaneously by said movable poles, said stationary poles being connected to the low voltage portion of the primary of said transformer, another pair of stationary poles of said switch also adapted to be contacted simultaneously by said movable poles, said other pair of stationary poles being connected to the high voltage portion of the primary of said transformer, a third movable pole of said switch connected to one side of said resistor, said resistor being in series with the actuating coil of said interrupter, the other side of said resistor being connected to a third stationary pole of said switch, said third stationary pole adapted to be contacted by said third movable pole of said switch when the switch is in the position so that the two movable poles of said switch are connected with the low voltage portion of the primary of said transformer, and render said resistor inoperative.

3. In a device of the character described for use with an electric source of supply, the combination of an interrupter having a tapped actuating coil, a transformer having a tapped primary winding and a secondary winding, a multi-pole, multi-throw switch, two of the movable poles of said switch being connected to the stationary contacts of said interrupter, a pair of stationary poles of said switch adapted to be contacted simultaneously with said movable poles, said stationary poles being connected to the low voltage portion of the primary of said transformer, another pair of stationary poles of said switch also adapted to be contacted simultaneously by said movable poles, said other pair of stationary poles being connected across the total primary of said transformer, a third movable pole of said switch being connected to one side of the source, a fifth stationary pole of said switch, said fifth stationary pole connected to the low voltage tap of said actuating coil, said fifth stationary pole adapted to be contacted by said third movable pole of said switch when the switch is in the position so that the two movable poles of said switch are connected with the low voltage portion of the primary of said transformer, a sixth stationary pole of said switch, said sixth stationary pole connected to the high voltage tap of said actuating coil, said sixth stationary pole adapted to be contacted by said third movable pole of said switch when the switch is in the position so that the two movable poles of said switch are connected across the total primary of said transformer.

4. In a device of the character described for use with an electric source of supply, the combination of an interrupter having a tapped actuating coil, a transformer having a tapped winding, a portion of said winding being the primary, the total winding being the secondary, a multi-pole, multi-throw switch, two of the movable poles of said switch being connected to the stationary contacts of said interrupter, a pair of stationary poles of said switch adapted to be contacted simultaneously with said movable poles, said stationary poles being connected to the low voltage portion of the primary of said transformer, another pair of stationary poles of said switch also adapted to be contacted simultaneously by said movable poles, said other pair of

stationary poles being connected to the high voltage portion of the primary of said transformer, a third movable pole of said switch being connected to one side of the electric source, a fifth stationary pole of said switch, said fifth stationary pole connected to the low voltage tap of said actuating coil, said fifth stationary pole adapted to be contacted by said third movable pole of said switch when the switch is in the position so that the two movable poles of said switch are connected with the low voltage portion of the primary of said transformer, a sixth stationary pole of said switch, said sixth stationary pole connected to the high voltage tap of said actuating coil, said sixth stationary pole adapted to be contacted by said third movable pole of said switch when the switch is in the position so that the two movable poles of said switch are connected to the high voltage portion of the primary of said transformer.

5. In a device of the character described for use with a direct current source of supply, the combination of a circuit interrupter, a transformer having a tapped in-put winding, a multi-pole, double-throw switch so arranged as to connect said circuit interrupter across either a portion of, or all of the input winding of said transformer, a resistor so connected in series with the actuating coil of said circuit interrupter and to said switch that said resistor will be rendered inoperative when said switch is in the position which connects said circuit interrupter across a portion of the input winding of said transformer.

6. In a device of the character described for use with a direct current source of supply, the combination of a circuit interrupter, a transformer having a tapped input winding and a secondary winding, a multi-pole, double-throw switch so arranged as to connect said circuit interrupter across either a portion of, or all of the input winding of said transformer, a resistor so connected in series with the actuating coil of said circuit interrupter and to said switch that said resistor will be rendered inoperative when said switch is in the position which connects said circuit interrupter across a portion of the input winding of said transformer.

GERARD McL. COLE.