

Here is some information you might like to have about American and European voltages and what products might not work overseas.

1. Line voltage in the U.S. is 110 volts, alternating at 60 cycles (AC volts). Line voltage in Europe is 220 volts, alternating at 50 cycles (AC volts).

**FACT**—It is clear from the above differences that U.S. electrical devices must use a converter of some type in order to operate in Europe and vice versa.

2. All producers of electricity in the U.S. alternate their voltage at the rate of 60 cycles per second, which the U.S. Bureau of Standards now enforces as a constant. The 60-cycle fluctuations can be used to control the speed of an electric motor and this principle is what keeps an electric clock running on time. This principle is also used to control the speed of record players, tape recorders and cassette players that run on AC voltage.

**FACT**—Since 60 cycles is important in maintaining the speed of certain devices, these devices cannot be used in Europe where the rate is 50 cycles. (Electronic devices that can change the cycle rate exist but they are both complicated and expensive.)

3. There is an exception to the above fact. Devices that run on batteries often come with their own converters that allow the device to operate from a convenient wall outlet. These converters change the voltage from the wall to a safe, usable battery voltage and the converters are not affected by the difference in the cycle rate. This means you can use such devices in Europe by buying batteries for them, by buying a new converter for them, or by using your present U.S. converter and the one we show you how to build. You should *not* use these devices in Europe with the U.S. converter alone! You may burn out the device!

**FACT**—There is an inexpensive converter you can make that will change the 220-volt European line voltage to the U.S. 110 volts. It produces a crude output and thus will only operate certain types of devices safely. If you shop around, you can make it yourself for under \$5. Instructions are on the next page.

4. Below is a chart that, even though minimal, will answer 90% of the questions asked about what electrical products will work in Europe. The row on the left comprises those items that will work well with the circuit adaptor that we show you how to build. The second row lists all those products that you can use in Europe but that require a bulky, heavy TRANSFORMER in order to operate. A transformer (if you decide you can't live without one) should be purchased in Europe as they are too expensive to transport. Better yet, we suggest you give away or sell such items and buy their European counterparts. The last row of items in the chart cannot and will not work in Europe, so leave them home.

**SIMPLE CONVERTER ITEMS**  
(to make one, see next page)

**TRANSFORMER ONLY**

**FORGET IT**

any heating type device  
electric blankets  
coffee percolators  
irons  
toasters  
frying pans and skillets  
any battery-powered that  
has its own converter

anything with a motor  
tube-type radios  
tube-type hi-fi equip.  
mixers  
can openers  
drills and other tools  
typewriters  
hair dryers

electric clocks  
clock radios  
AC record  
players  
AC recorders  
AC cassettes  
timers (photo)  
all TV sets

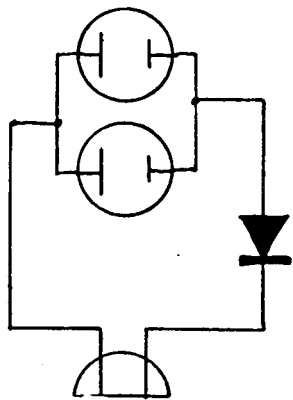
# EUROPEAN CONVERTER: FOR CHANGING 220 VOLTS TO 110 VOLTS\*

## BUY THIS:

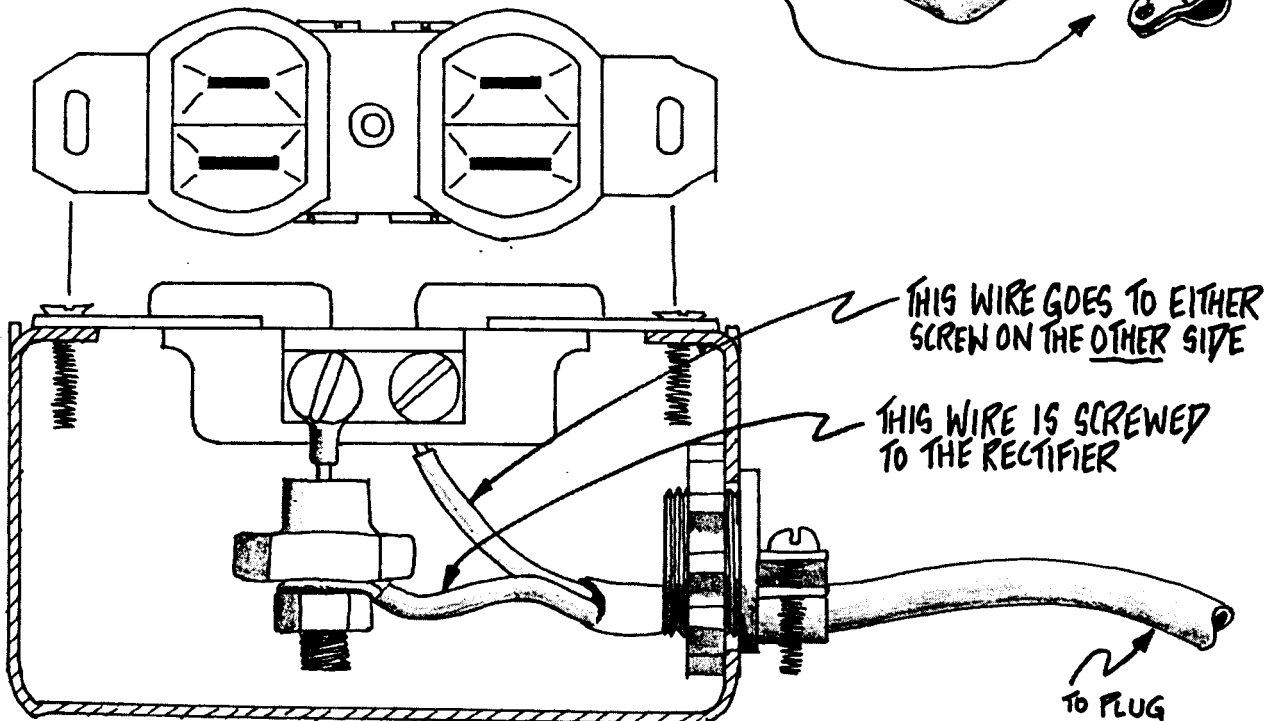
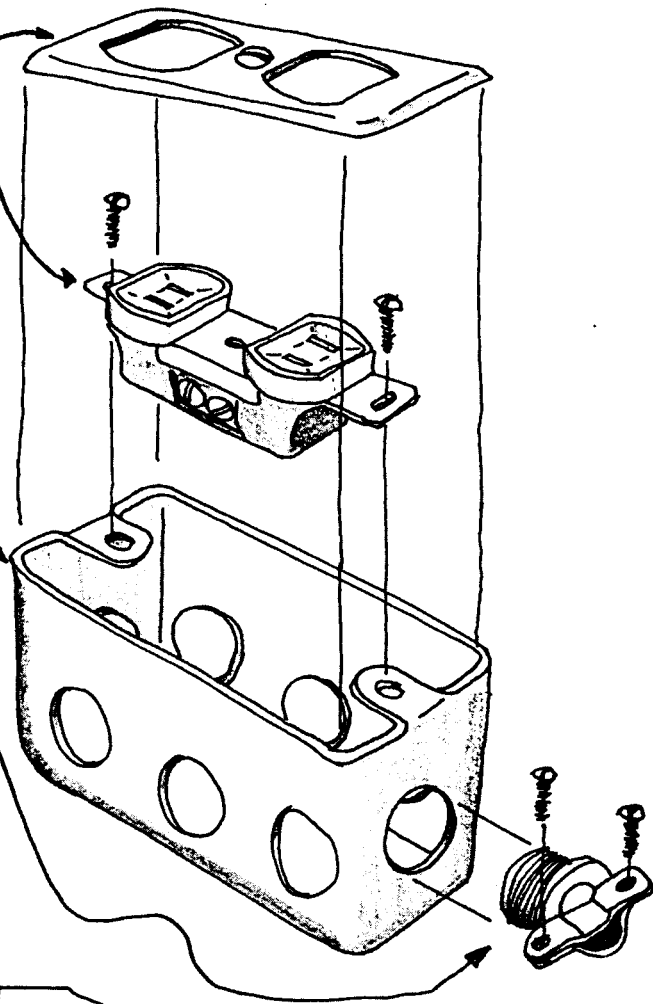
- COVERPLATE (14¢)
- DUPLEX OUTLET (39¢)
- OUTLET BOX (49¢)
- CLAMP (12¢)

## ALSO BUY:

- SHORT LENGTH OF LAMP CORD (6')
- A EUROPEAN PLUG
- A DIODE (RECTIFIER), ANY MANUFACTURER, RATED - 10 or 15 AMPS 300 or 400 PEAK INVERSE VOLTS (PIV). SHOWN BELOW IS A STUD-TYPE RECTIFIER.



THIS SCHEMATIC SHOWS THE WIRING



\* **Note:** THIS WILL NOT WORK ON ALL APPLIANCES! PLEASE READ THE PREVIOUS PAGE.