Something for the yachtsman

When sailing to windward, the performance of a sailing dinghy or yacht is determined by the relative angle between the boat heading and the apparent wind direction. During a study of the performance of sailing vessels by the Department of Aeronautics and Astronautics at Southampton (England) University, an electronic device for indicating the apparent wind direction was developed. This device (Fig. 2), described in *Wireless World,* is simple enough to be used on even the smallest sailing craft.

The masthead unit consists of a multivibrator whose time constant is controlled by a variable capacitor rotated by a wind vane. A simple zero-center transistor voltmeter measures the variation in the mark-space ratio of the multivibrator signal and indicates it as the angle between the boat heading and wind direction over a range of 0 to 120 degrees.

The capacitor in the masthead unit is a 2-gang 500-pF variable like that found in some old trf broadcast radios. You can substitute a 3-gang 365-pF unit. The vane is formed by extending the capacitor shaft and drilling the extension for a 10-inch length of 18 gauge steel rod. One end of the rod carries a plastic vane and the other a lead counterweight.

It is essential that friction be reduced to a minimum in the capacitor rotor. This can be done by replacing the rotor wipers with flexible copper braid and by cleaning the bearings and re-lubricating with a trace of clock oil. Install a setscrew to limit shaft rotation to 110 degrees. The circuit board carrying the multivibrator is mounted on the tuning capacitor

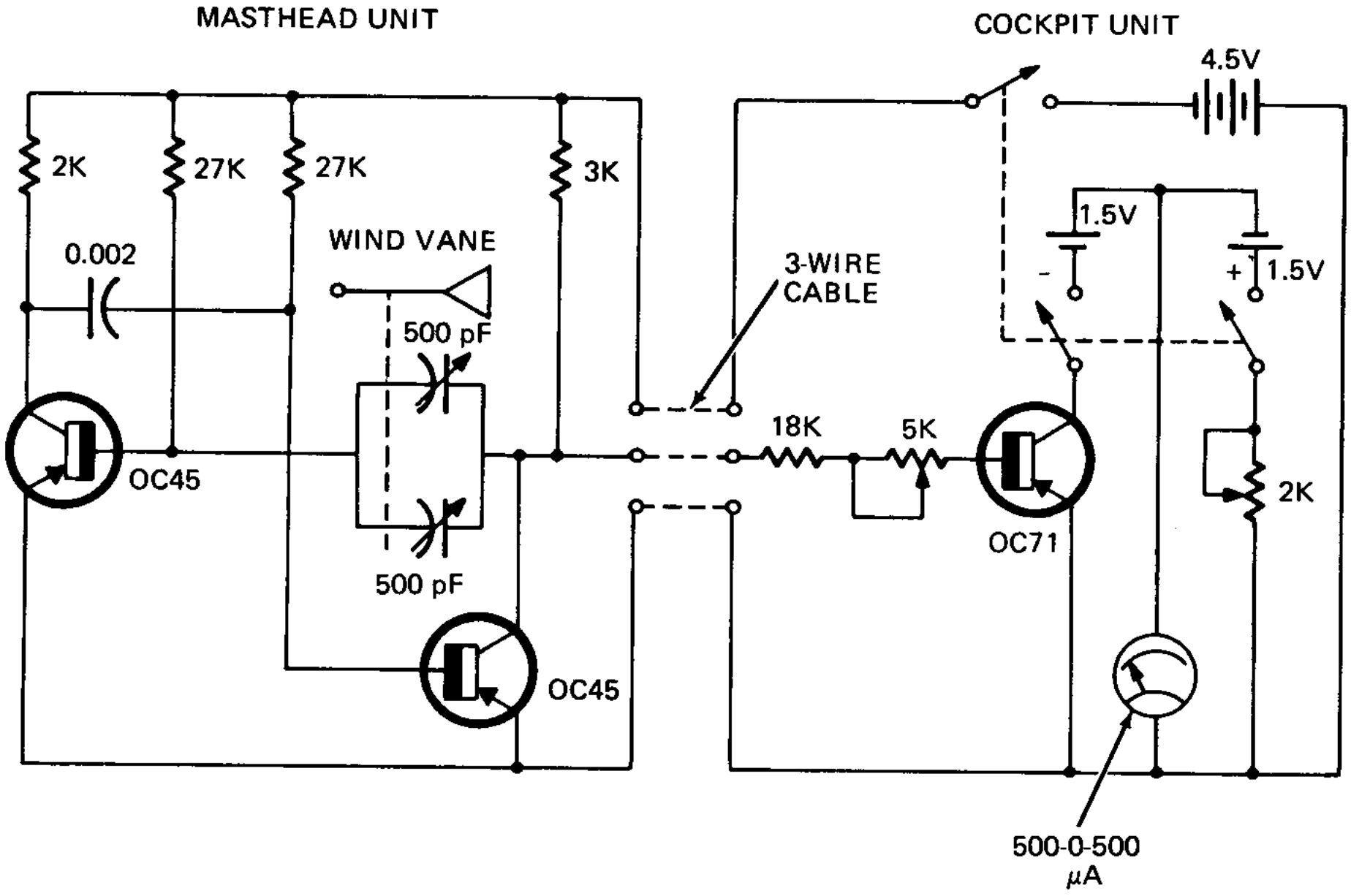

FIG. 2—SAILING DINGHYS and luxury yachts perform best at a critical angle between the heading and apparent wind direction. This circuit helps you get the most from your boat.

and both are mounted vertically on the masthead as in Fig. 3. A 3-wire cable connects the transistor to the indicator.

To calibrate the device, open the capacitor plates 55 degrees, set the wind vane to point directly ahead of the boat and use the 2,000-ohm pot to zero the meter. Turn the vane 45 degrees on *either* side of the "dead ahead" position and set the 5,000-ohm pot so the meter reads plus *or* minus 450 μA as appropriate. As Fig. 4 shows, a 10-μA change is equivalent to a 1-degree change in heading or wind direction.