

determined by the setting of the oscilloscope sweep controls. Such a signal can be used for signal substitution in the vertical and horizontal systems of a TV receiver. Although the sawtooth signal does not match the normal signal found in these systems, it can be used for troubleshooting purposes.

#### **RETRACE BLANKING**

Retrace blanking (item 15) is usually included as a feature of most oscilloscopes. In some examples the blanking operates continuously, and in others, it may be turned on or off by means of a switch. Usually the retrace period is an extremely small fraction of one sweep cycle and does not interest the oscilloscope operator. In such cases, retrace blanking eliminates any confusion or distraction that might result if the retrace were visible. When the retrace period occupies a greater portion of the cycle, it may be desirable to turn off the retrace blanking so that no part of the signal will be lost during retrace. The waveform visible during retrace may be more difficult to interpret than that shown on the normal portion of the sweep because the retrace is usually non-linear in nature, but it is usually possible to determine facts of a quantitative nature, such as the number of cycles of signal lost during retrace.

#### **PHASING CONTROL**

The phasing control (item 16) is useful when a line sweep is used. At this position of the sweep controls, a sine-wave signal is taken from some point of the oscilloscope circuits (usually a winding on the power transformer) and used to drive the horizontal deflection system. The phasing control is used to vary the particular point on the sine-wave signal at which the sweep begins.

#### **SPECIAL TYPES OF OSCILLOSCOPES**

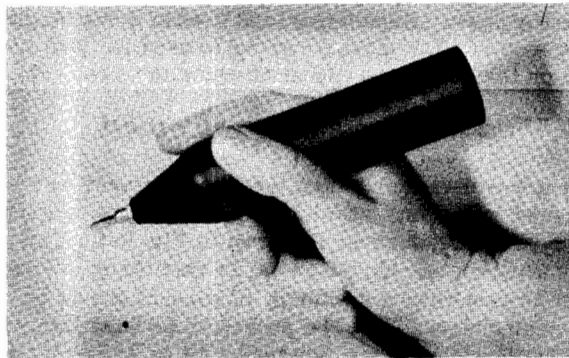
The general-purpose oscilloscope is sometimes modified or redesigned with some special purpose or application in mind. One such type of oscilloscope is shown in Fig. 6-6. This oscilloscope, the Probescope Model PO-1, is smaller in size and more convenient to use, with a minimum of connections to be made to circuits under observation. The probe can be hand-held, and consists of a 1CP1 cathode-ray tube mounted in a mu-metal shield. The probe tip is applied directly to the point in the circuit where the test lead of a general-purpose scope would normally be connected. A number of controls are provided on the front panel of the instrument, and their function is the same as those used on a normal instrument. These controls include vertical gain, horizontal gain, vertical positioning, horizontal positioning, intensity, sync amplitude, vernier frequency, and sweep rate. The sweep-

rate control is a five-position switch calibrated for ranges between 20 cycles and 30 kilocycles per second.

Because the focus is sharp for all positions of the intensity control, no focus adjustment is provided. The trace is brilliant



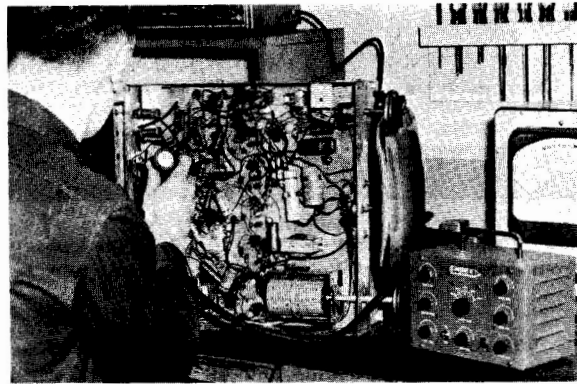
**Fig. 6-6. Probescope Model PO-1 oscilloscope.**



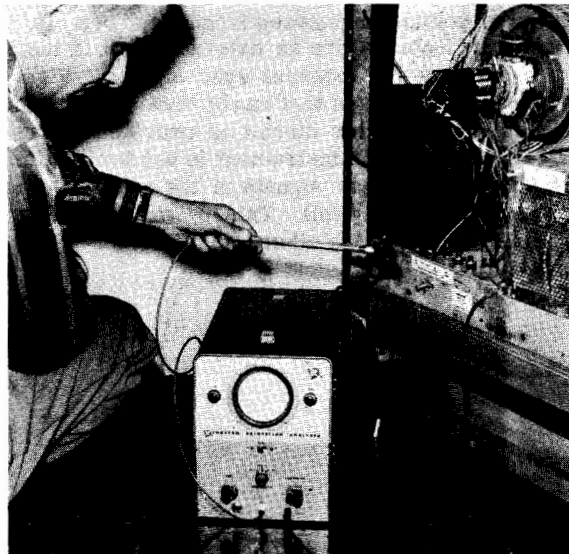
**Fig. 6-7. Probe assembly of the Probescope Model PO-1.**

and can easily be seen under normal viewing conditions. An idea of the size of the instrument can be had from the illustrations. Figs. 6-7 and 6-8 show the probe being hand-held and used on a receiver.

A highly specialized form of oscilloscope is shown in Fig. 6-9. This instrument, the Kingston Absorption Analyzer, is designed for ease and speed in signal tracing electronic circuits, especially TV receivers. Signal pickup is by means of capacitive



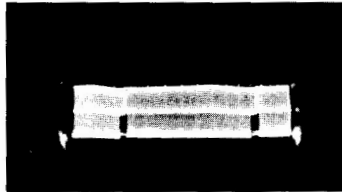
**Fig. 6-8. Probescope Model PO-1 being used to view waveforms in a TV receiver.**



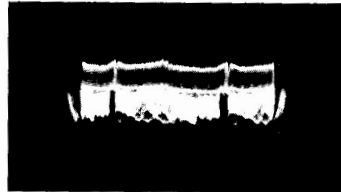
**Fig. 6-9. Kingston absorption analyzer has a unique pickup device.**

pickup rings or crescents that can be slipped over tubes or held next to the circuit components. In addition to the vertical amplifier system normally found in oscilloscopes, a Standard Coil TV tuner is used for tuned amplification of a number of frequencies. Fre-

quencies covered are all commercial VHF channels plus 20, 40, 3.58 and 4.5 megacycles. Signals can be fed to this tuner or directly to the vertical amplifier. The frequency response of the vertical amplifier extends to 300 kc.



**Fig. 6-10.** TV signal picked up directly from antenna transmission line.



**Fig. 6-11.** Signal observed with ring probe over tube in video IF strip.

The horizontal sweep system covers the frequencies from 20 to 120 cps for vertical fields and 4000 to 40,000 cps for horizontal scanning signals. The controls this instrument has in common with general-purpose scopes are the intensity, focus, vertical and horizontal centering, vertical amplitude, sweep amplitude, sync amplitude, and sweep frequency controls.

Two other features are an external input to the horizontal amplifier and a jack for external sync signals. Figs. 6-10 and 6-11 show typical waveforms that can be obtained with this instrument. An internal detector circuit is provided for detection of modulated RF signals. The instrument is not limited to RF signal frequencies, however, since signals in the audio frequency spectrum can be picked up as well. This permits signal tracing of a receiver from one end to the other.