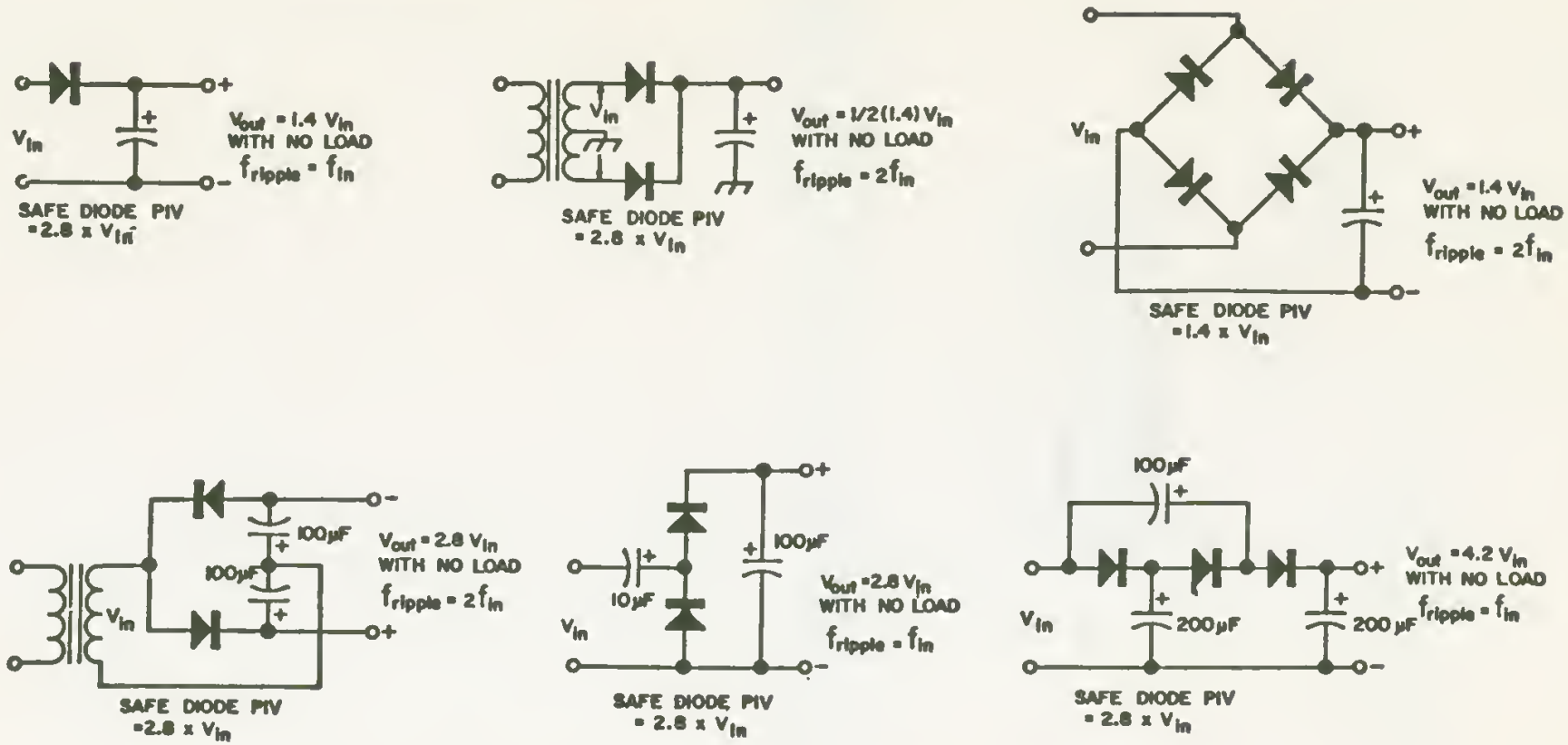

Fig. 21-1. The most popular rectifier circuits with their output voltages and minimum safe diode PIV rating.

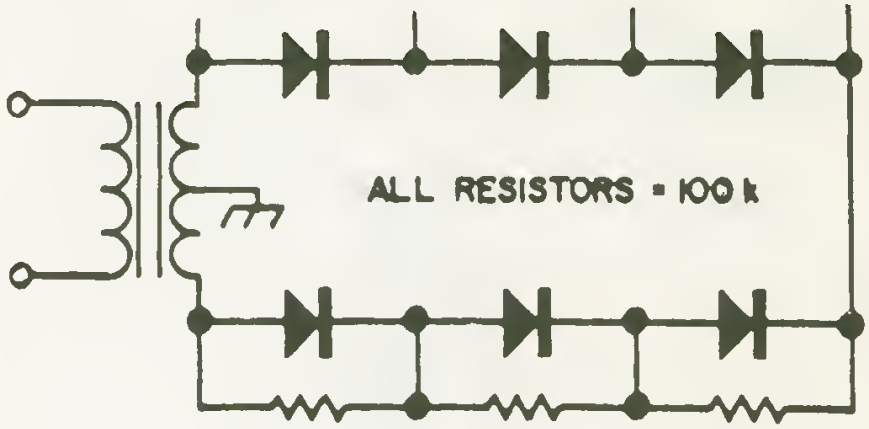

Fig. 21-2. Resistors are used across series diodes to equalize reverse voltage drop.

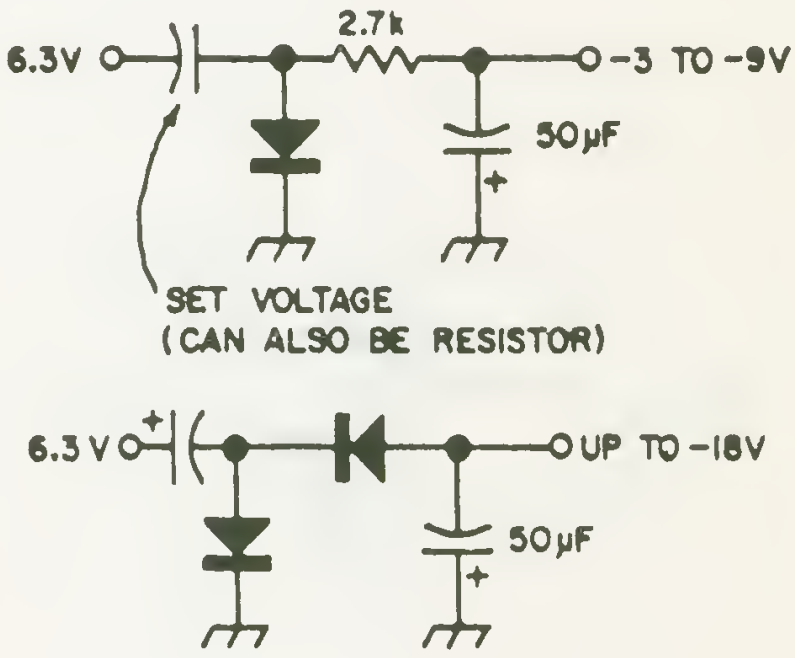

Fig. 21-3. Simple shunt rectifiers can provide low bias voltages.

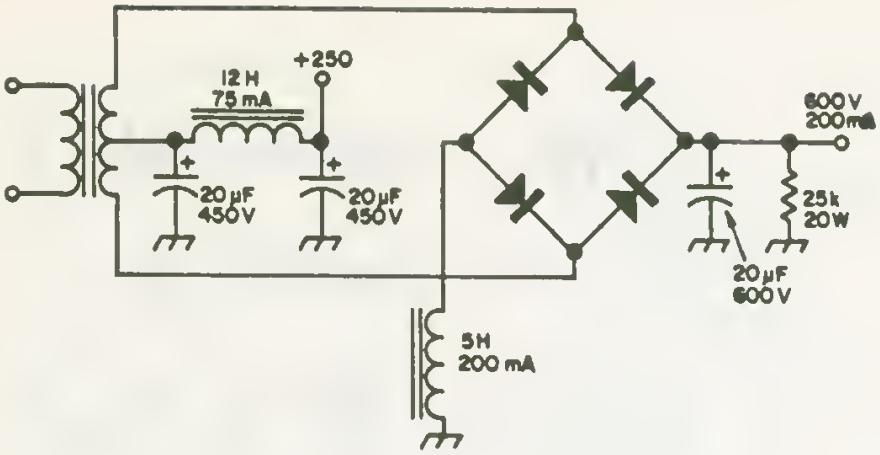

Fig. 21-4. This circuit gives two outputs, 600V and 250V.

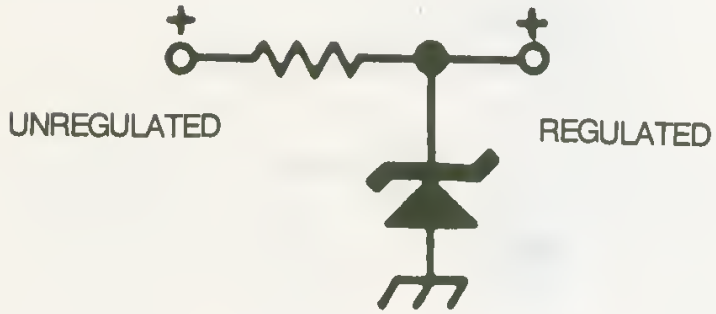

Fig. 21-5. A basic zener regulator. The values depend on input and output voltage, current, etc.

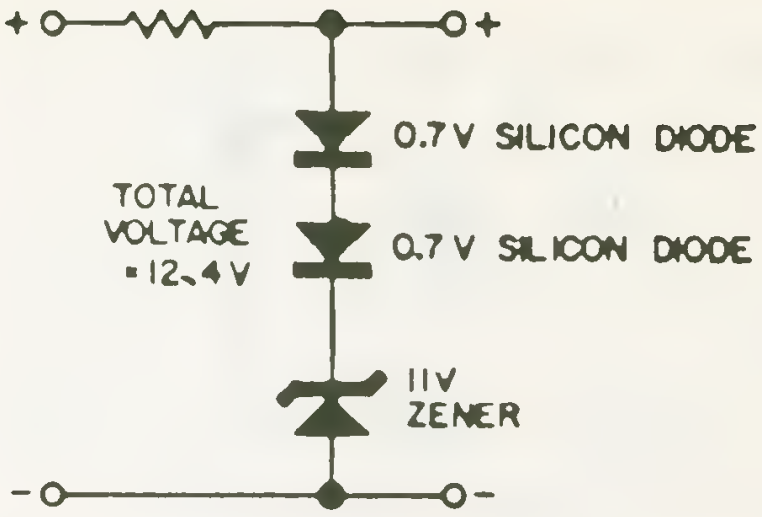

Fig. 21-6. Forward-biased silicon diodes can be used as low-voltage zeners. Their temperature drift is opposite that of regulators with breakdown voltages over 6V, which is convenient for temperature stabilization.

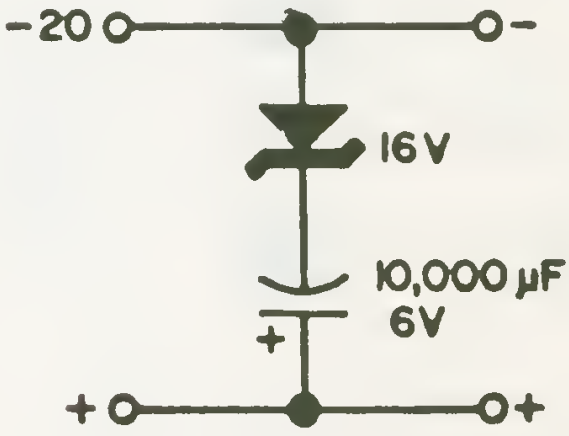

Fig. 21-7. A zener can be used as a ripple filter and to "increase" the voltage rating of a capacitor.

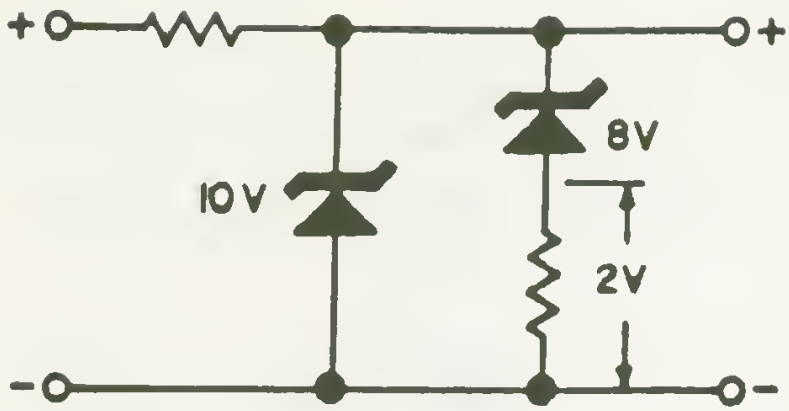

Fig. 21-8. Two zeners can furnish a regulated low voltage.

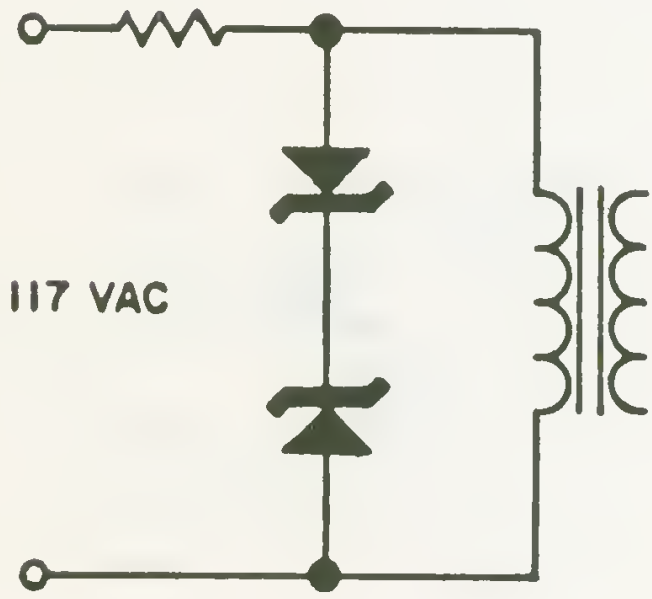

Fig. 21-9. Zener regulators can be used on AC, too.

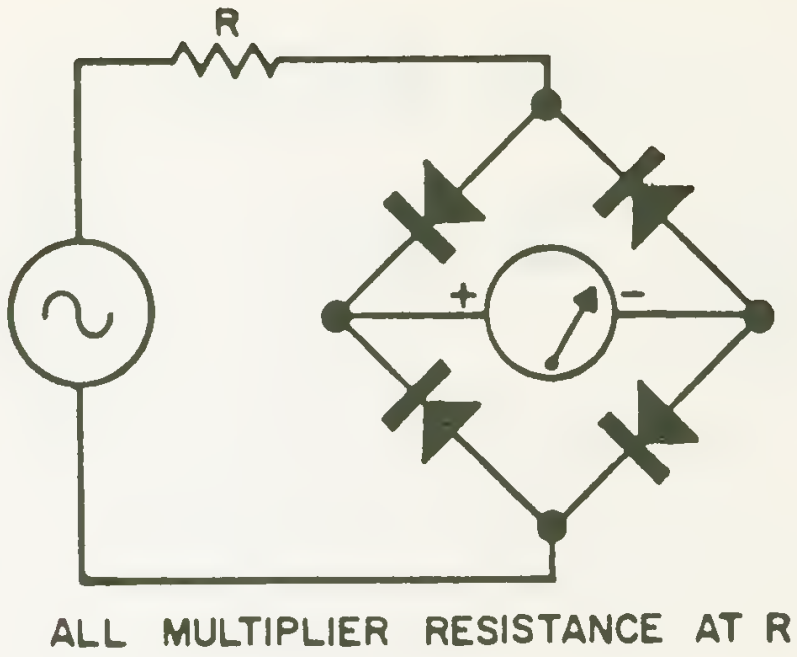

Fig. 21-10. A bridge average-reading AC meter.

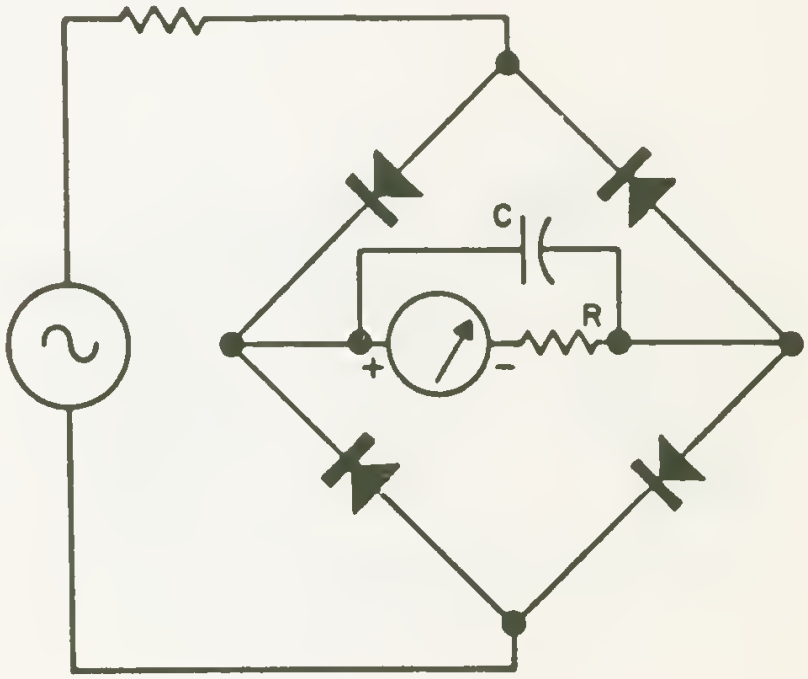

Fig. 21-11. A bridge peak-reading AC meter.

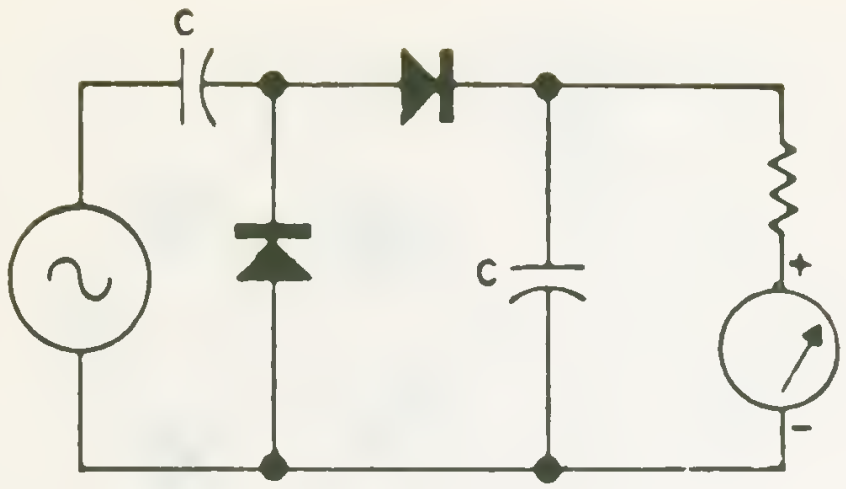

Fig. 21-12. A peak-to-peak AC meter is simply a voltage doubler.

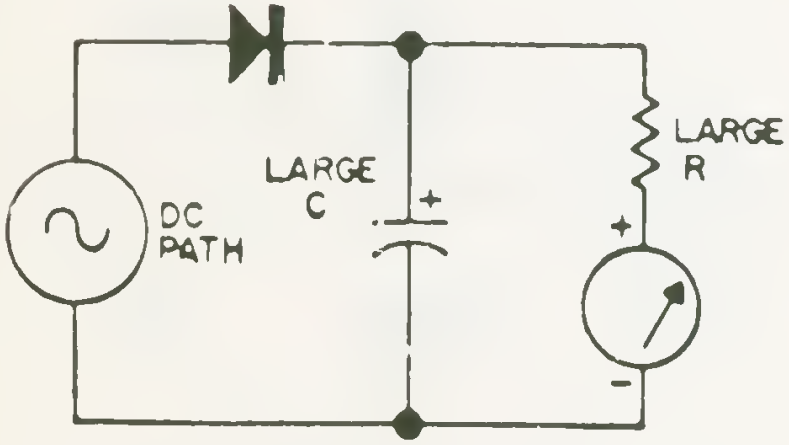

Fig. 21-13. A half-wave peak-reading AC meter.

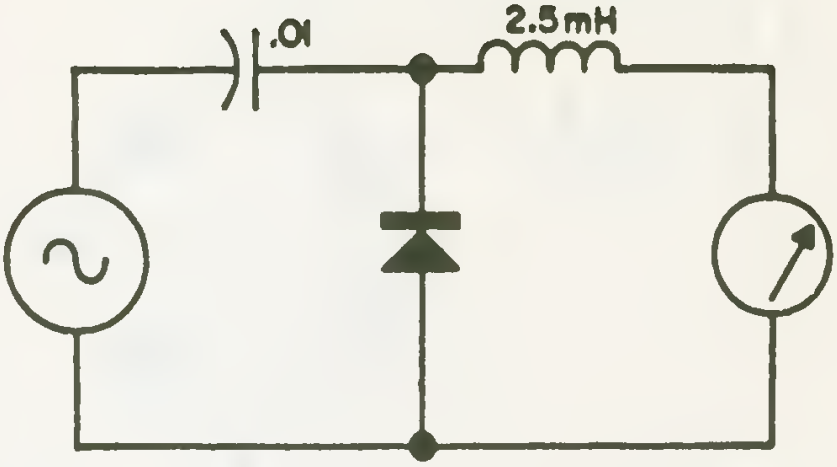

Fig. 21-14. A half-wave peak-reading AC meter that requires no DC path.

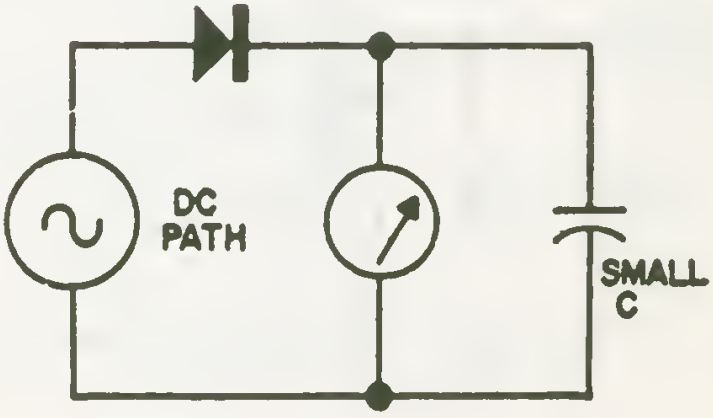

Fig. 21-15. A semi-rms AC meter.

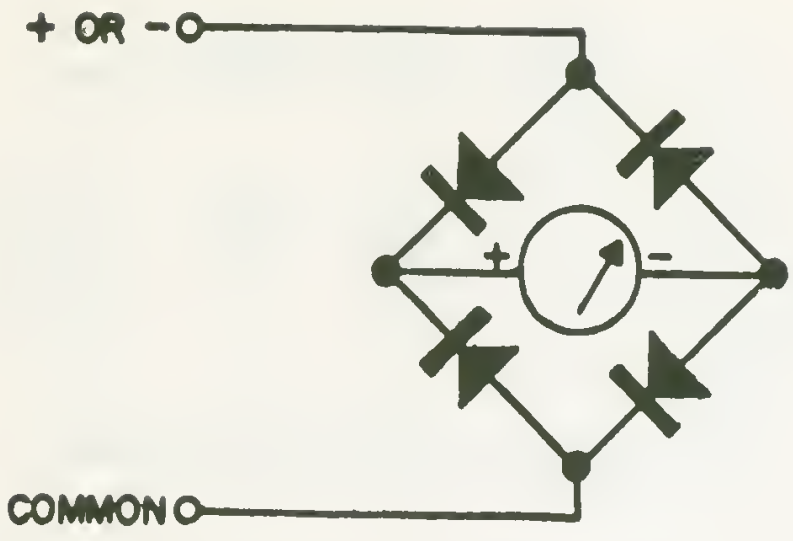

Fig. 21-16. A meter for AC, or either polarity DC.

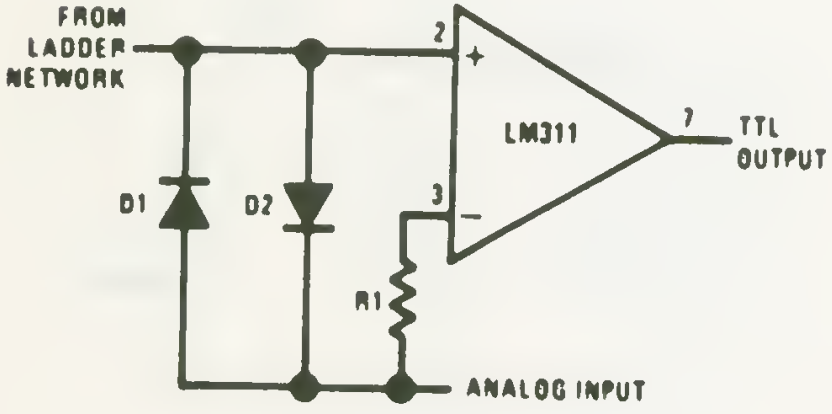

Fig. 21-17 Using clamp diodes to improve response.

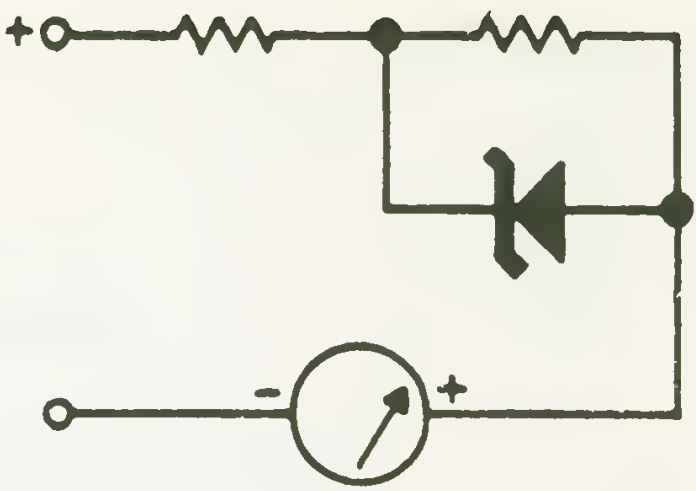

Fig. 21-18. This circuit partially suppresses the low end of a range.

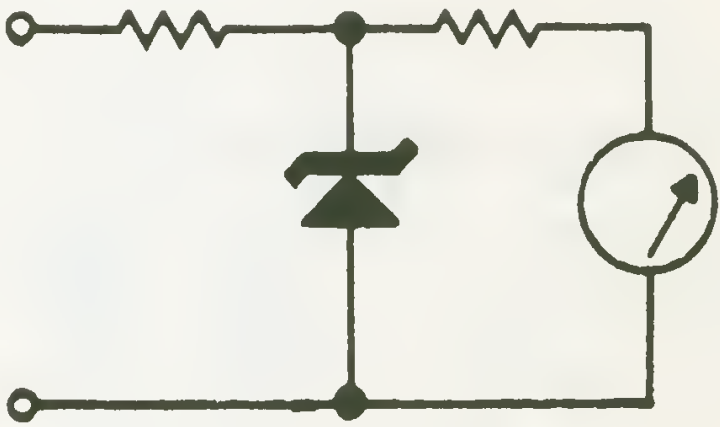

Fig. 21-19. This is a meter-protective circuit. The zener should be tapped on the resistor chain at a point that provides conduction when the meter pointer is pinned.

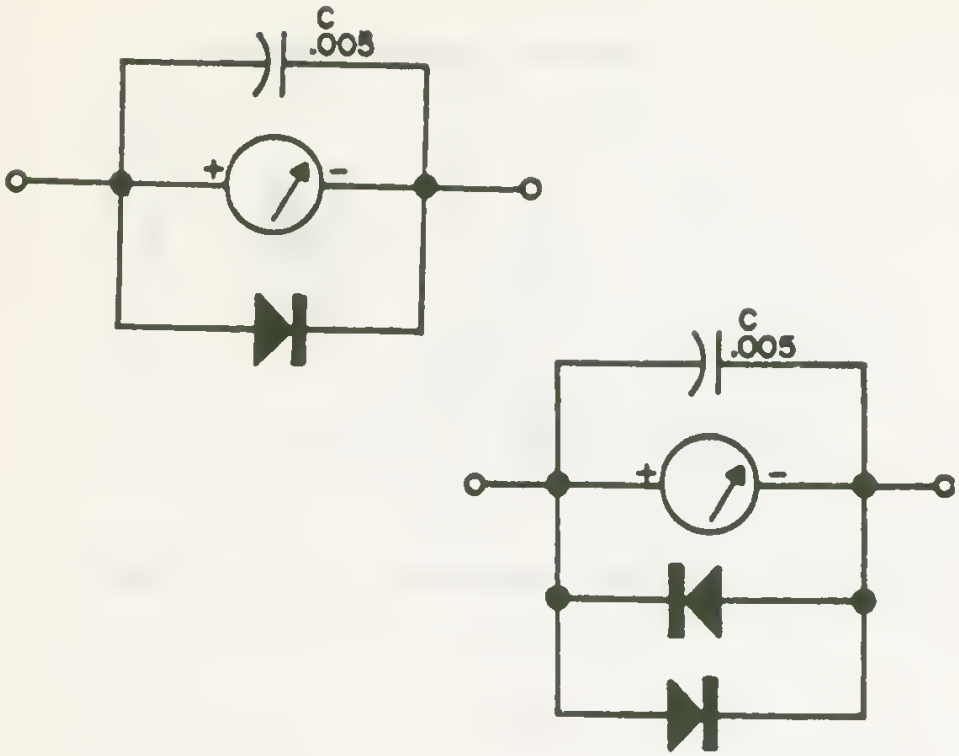

Fig. 21-20. Conventional silicon diodes can protect a meter movement, too. The 0.005 μF capacitor bypasses rectified rf.

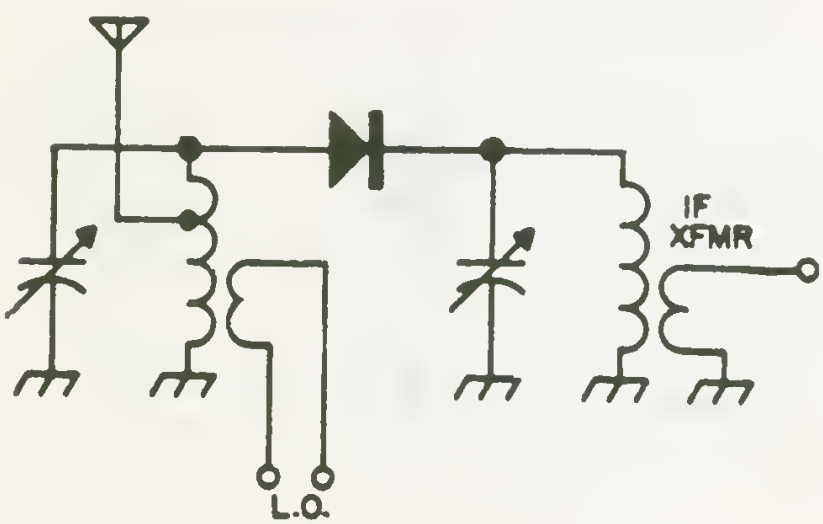

Fig. 21-21. A basic diode mixer as used at UHF and microwave.

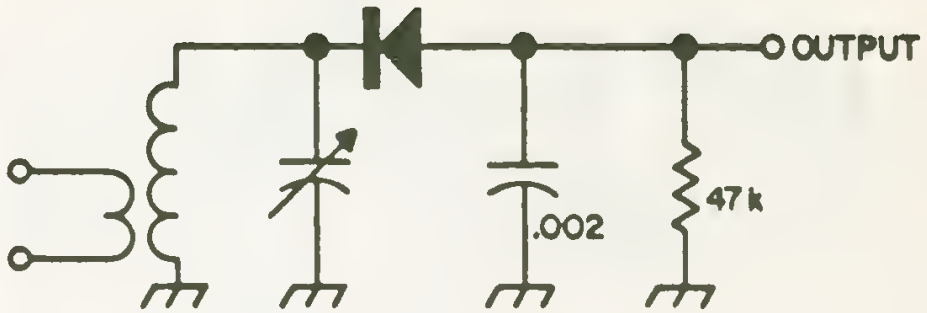

Fig. 21-22. A half-wave detector. This can be used as a crystal set, too.

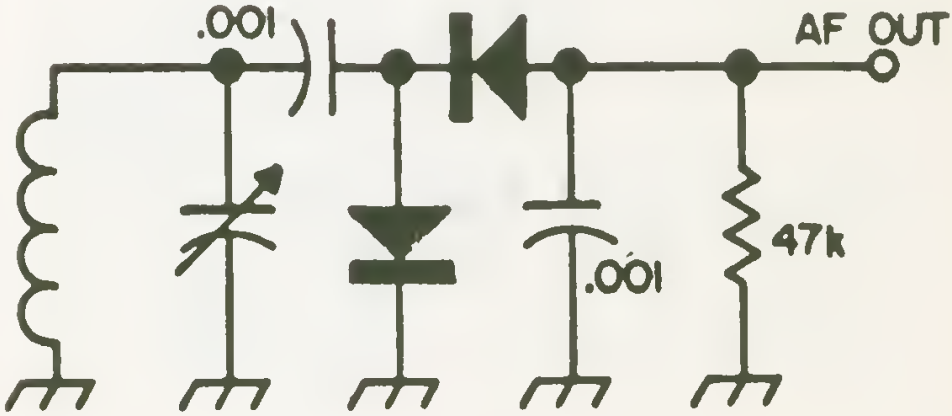

Fig. 21-23. This detector provides better results.

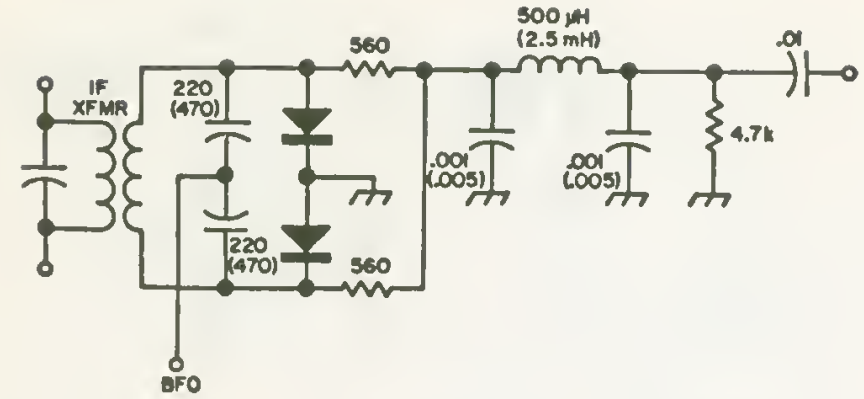

Fig. 21-24. A product detector for 9 MHz SSB. The values in parentheses are for 455 kHz.

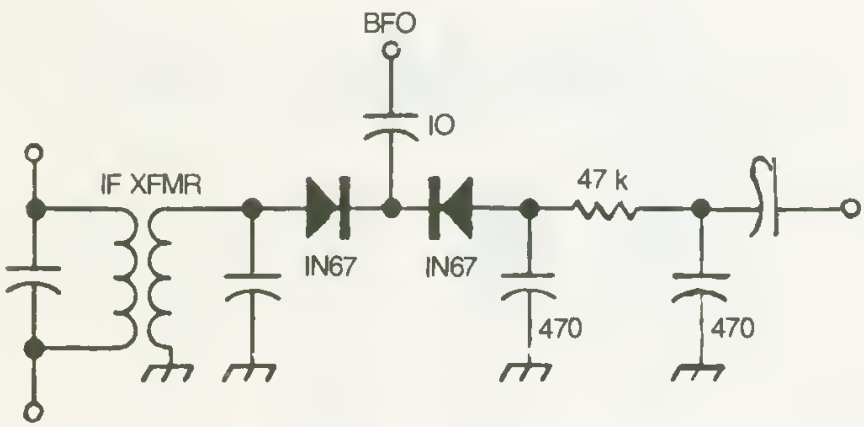

Fig. 21-25. A popular product detector for SSB.

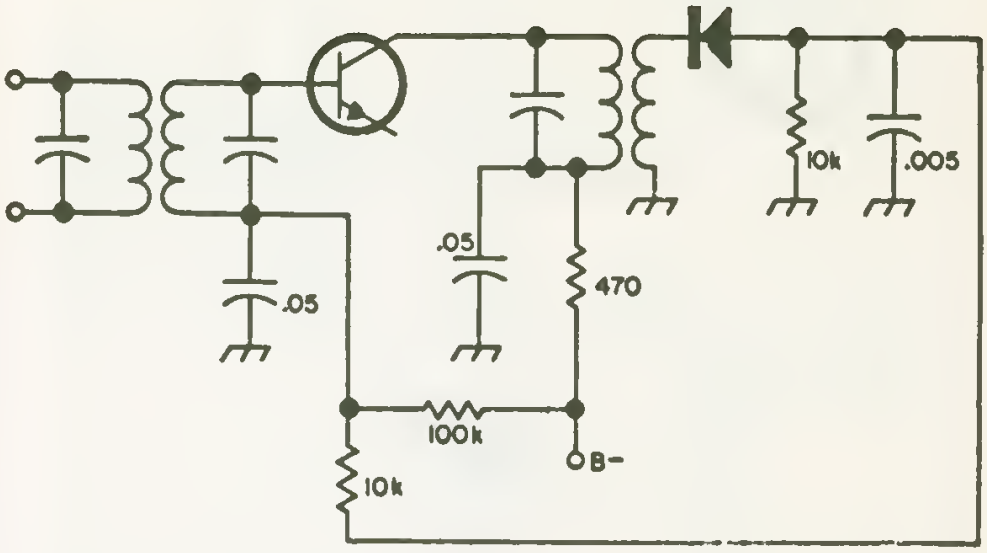

Fig. 21-26. Forward transistor agc.

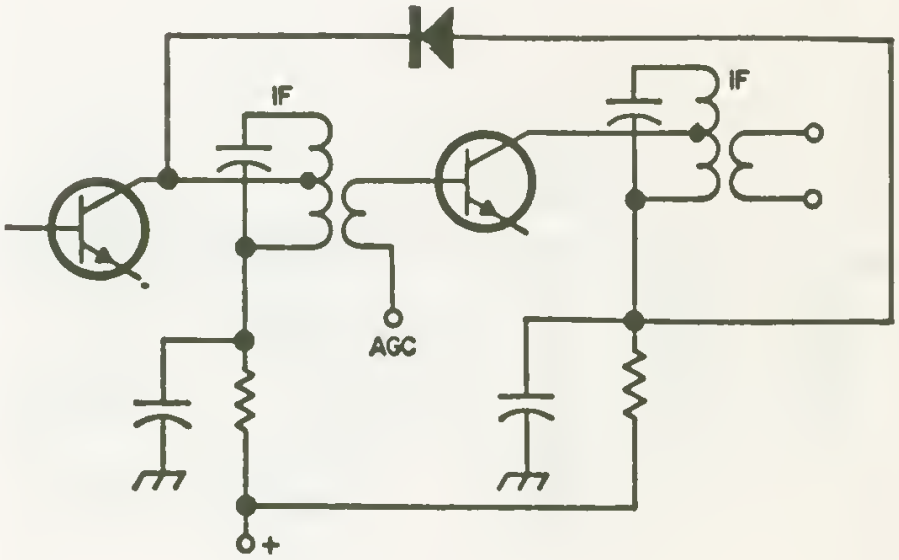

Fig. 21-27. An auxiliary agc diode improves agc action.

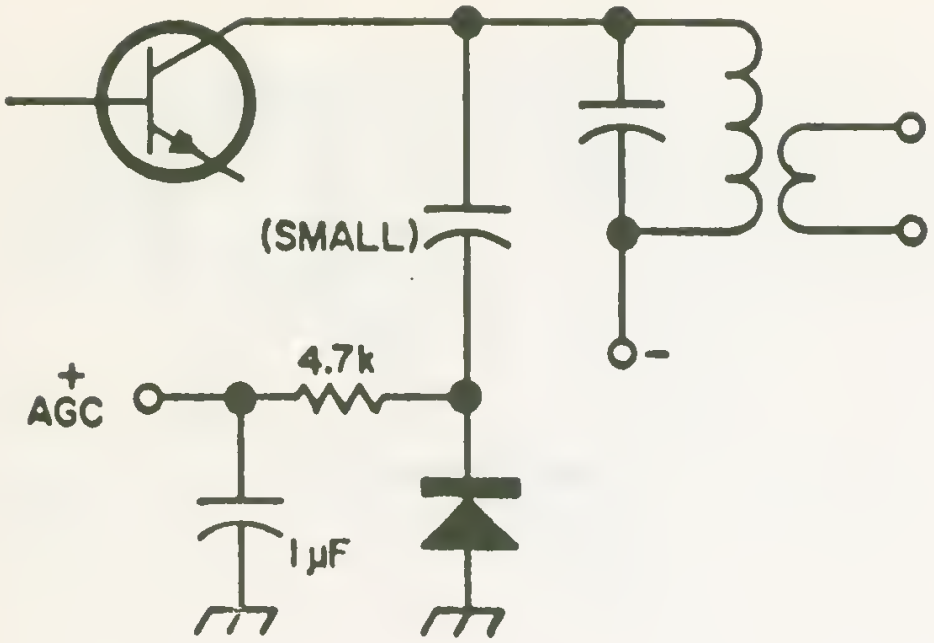

Fig. 21-28. An auxiliary agc detector can be used with a product detector for SSB/CW.

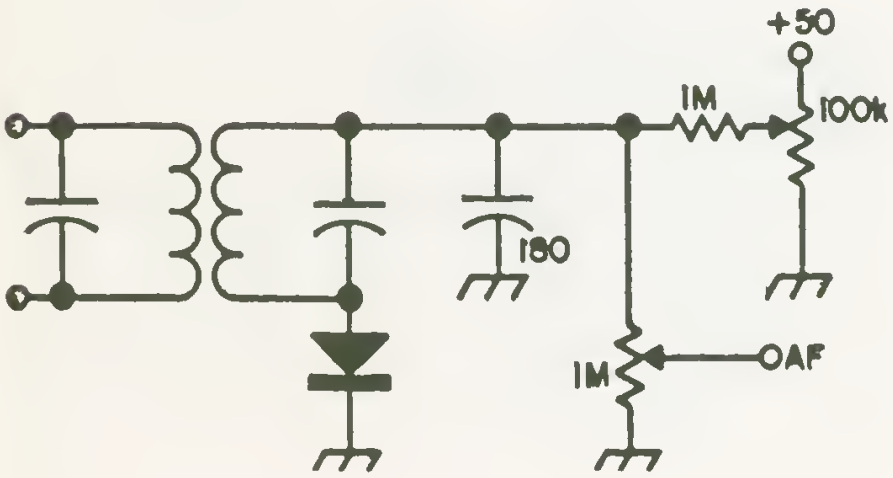

Fig. 21-29. Simple diode squelch.

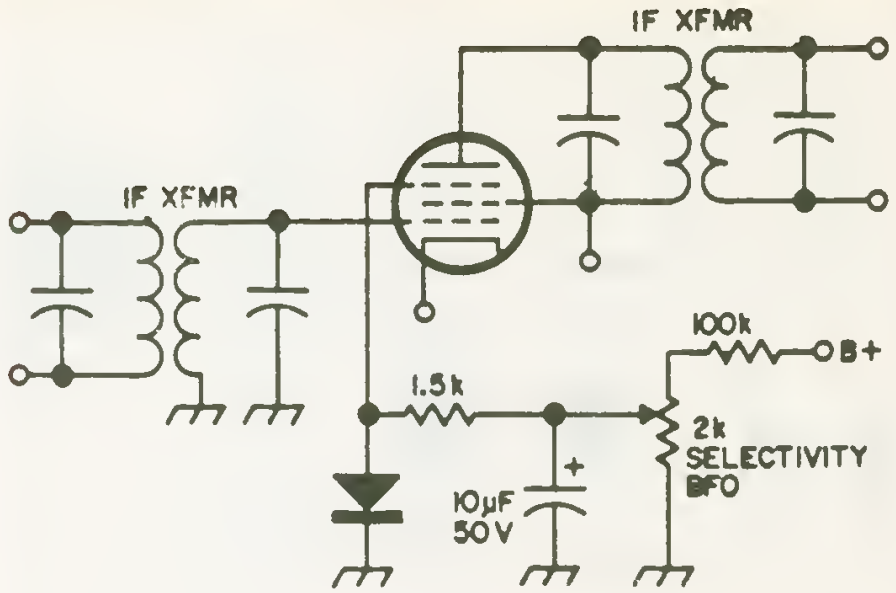

Fig. 21-30. Adapter to provide SSB/CW reception and Q-multiplication in a receiver.

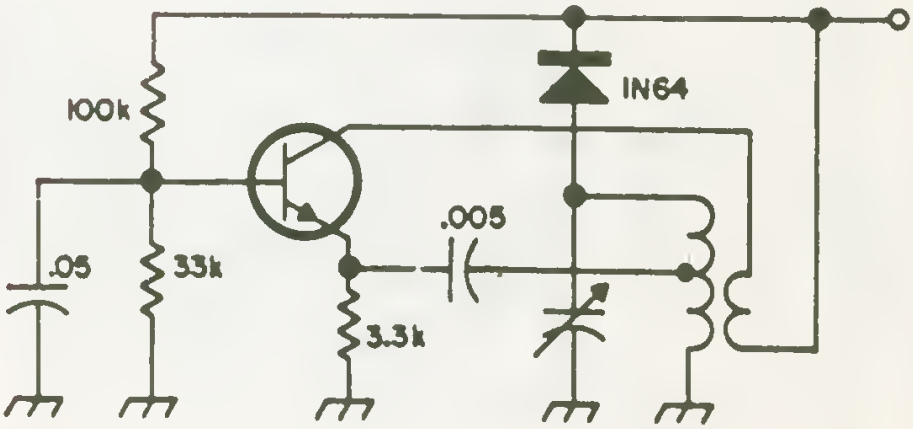

Fig. 21-31. This circuit uses a diode to limit the output of an oscillator.

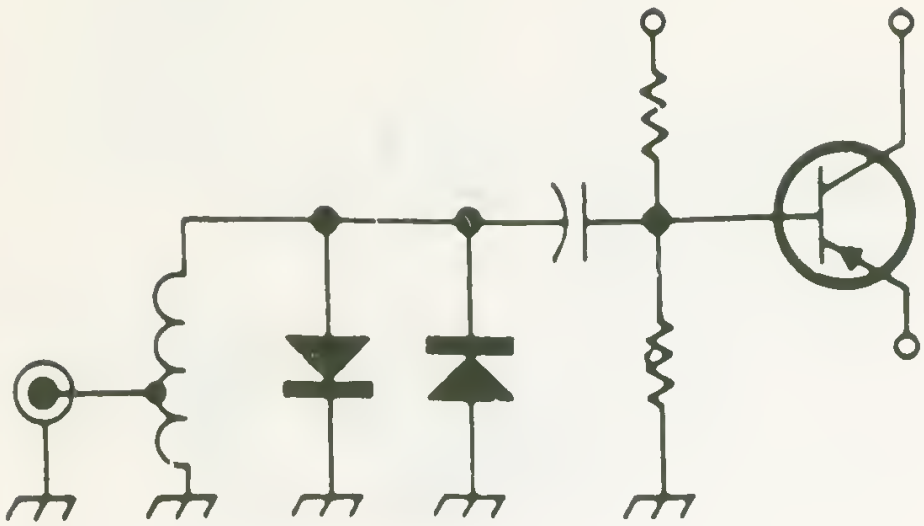

Fig. 21-32. Diodes can be used to protect a transistor rf amplifier from burnout.

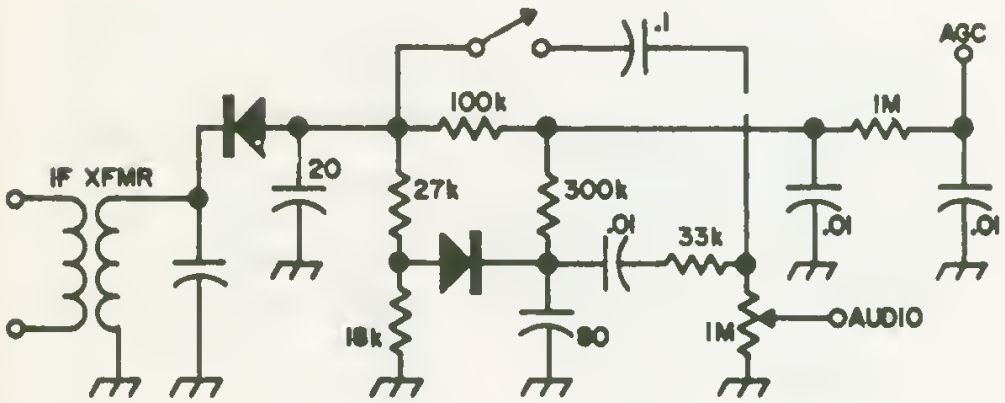

Fig. 21-33. One of the best noise limiters is the rate-of-change limiter designed for TV audio in England.

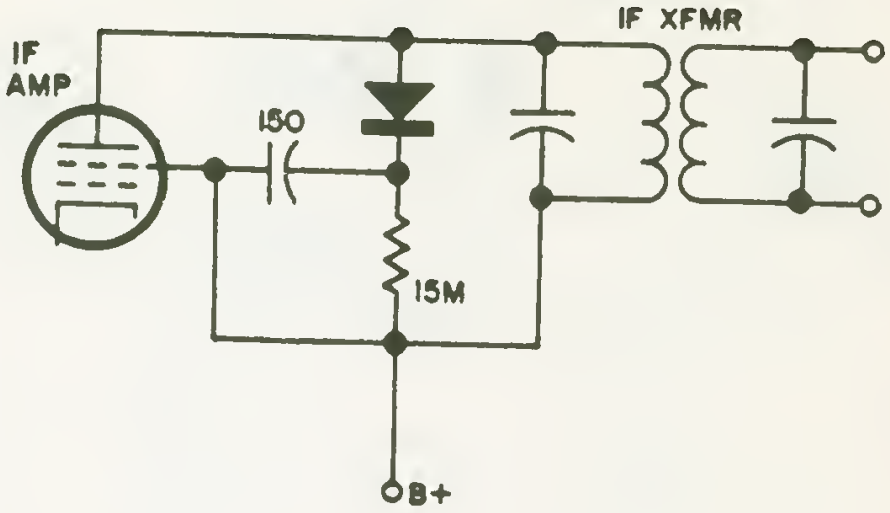

Fig. 21-34. This simple noise limiter is installed in an i-f stage for SSB and CW.

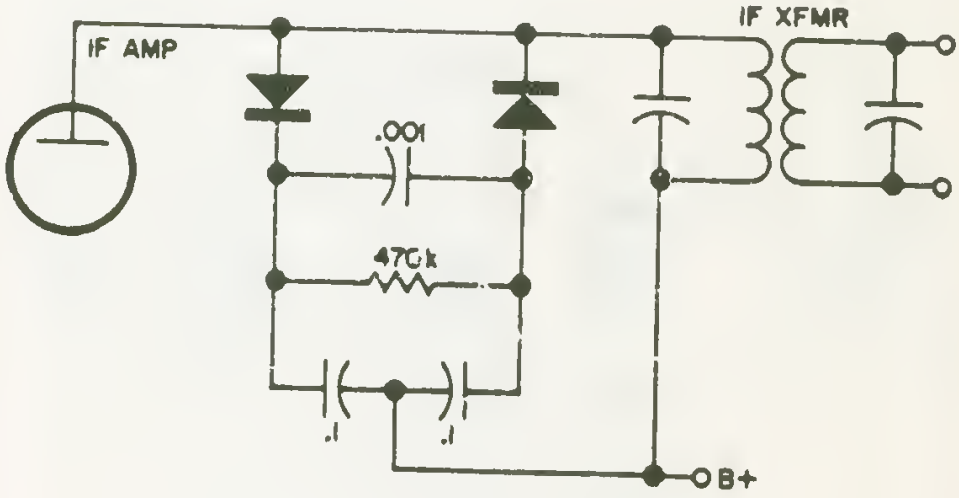

Fig. 21-35. This is an improved version of the SSB i-f noise limiter.

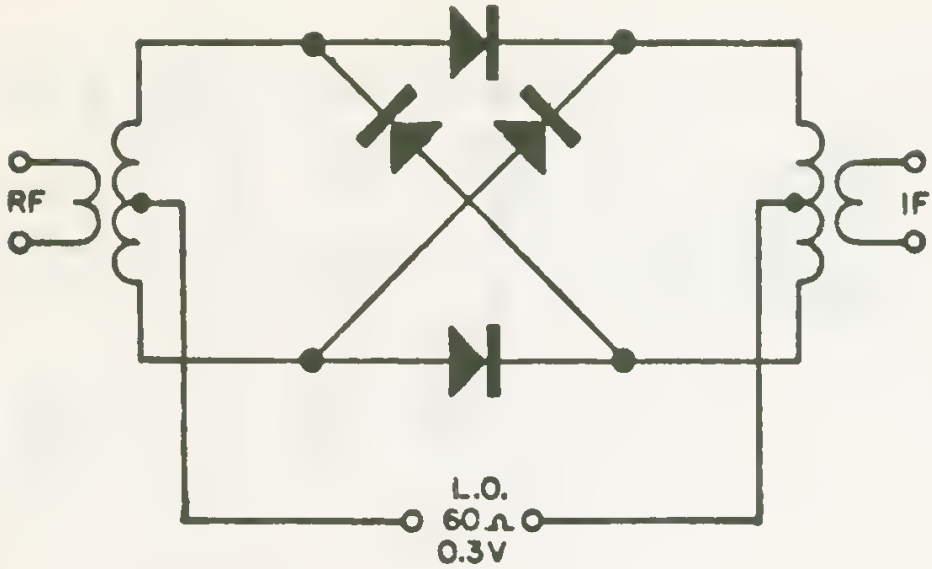

Fig. 21-36. A diode ring balanced modulator.

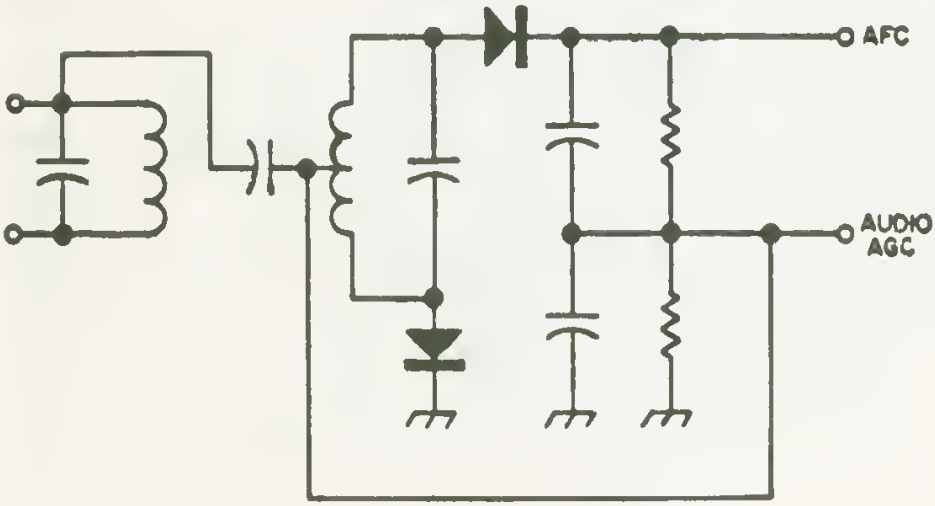

Fig. 21-37. Foster-Seeley FM discriminator.

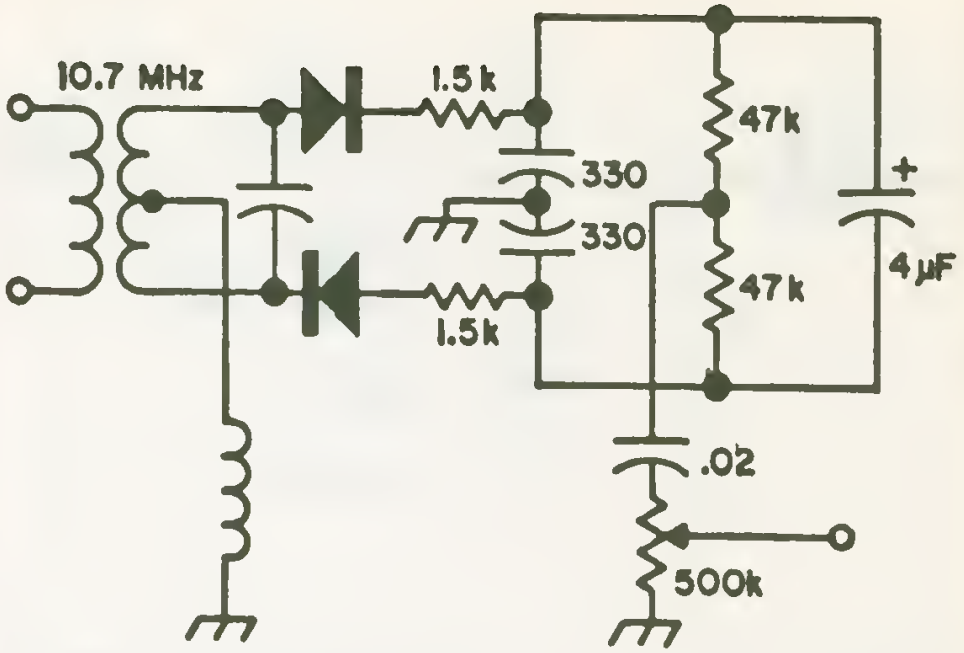

Fig. 21-38. A 10.7 MHz FM ratio detector.

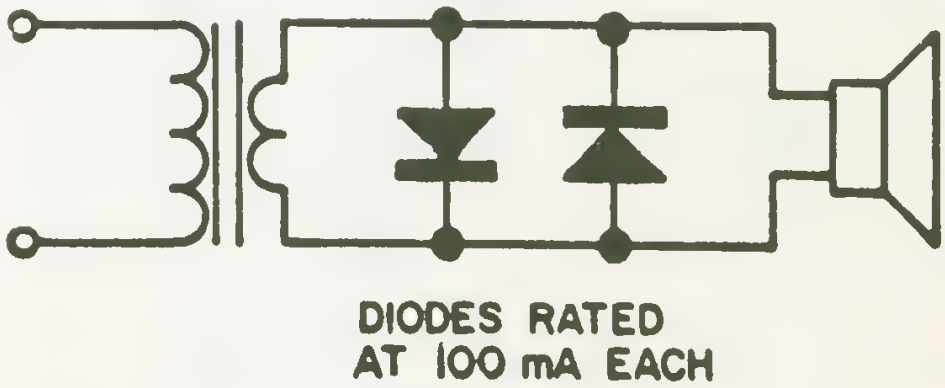

Fig. 21-39. Shunt diode noise limiter for use across a loudspeaker.

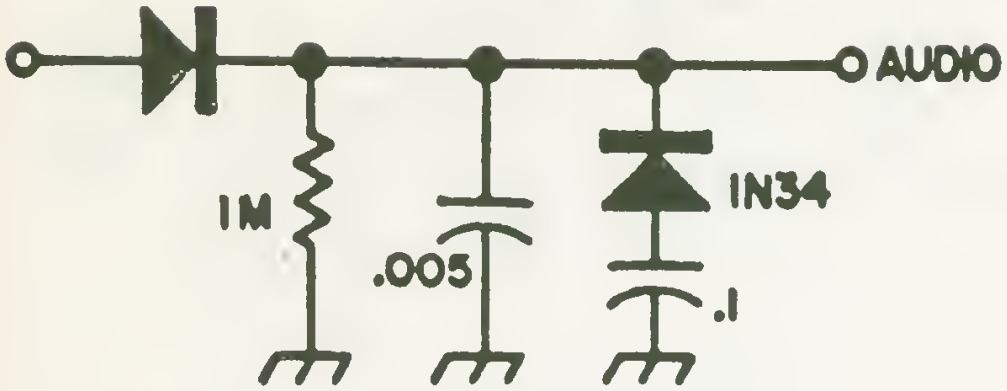

Fig. 21-40. Shunt diode noise limiter that can be easily added to the input of an audio amplifier.

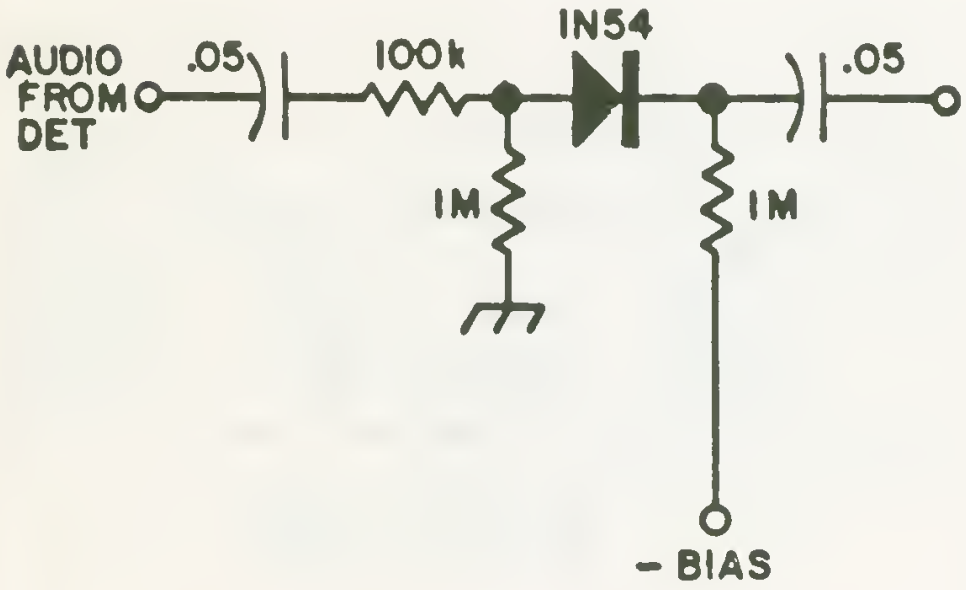

Fig. 21-41. Half-wave series noise limiter with adjustable clipping level.

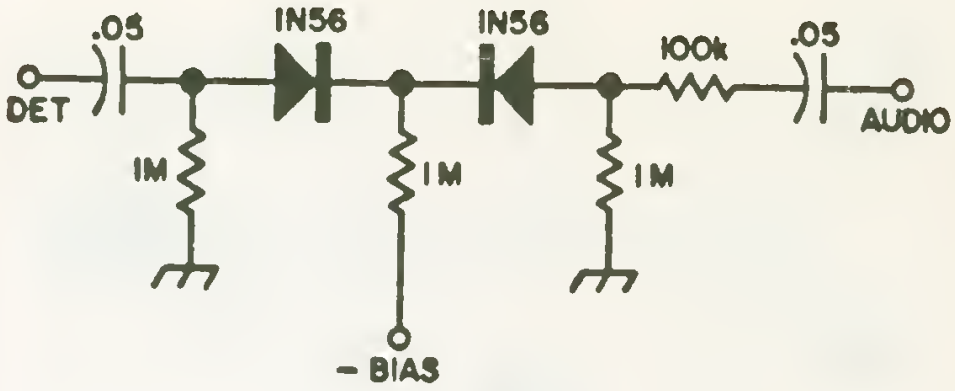

Fig. 21-42. Full-wave series noise limiter.

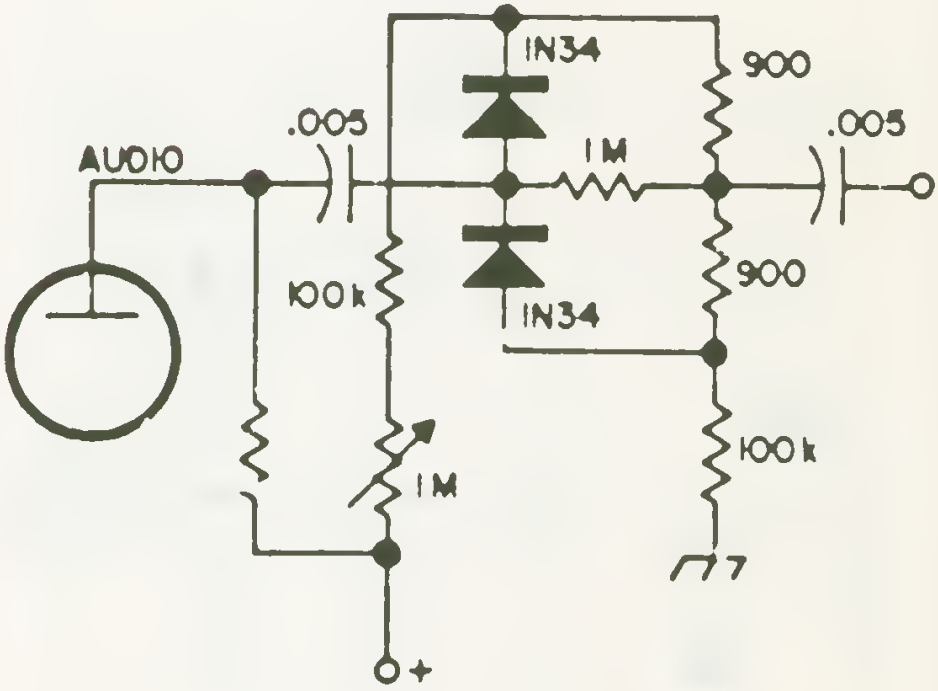

Fig. 21-43. This trough limiter will eliminate the background noise that is ignored by conventional limiters.

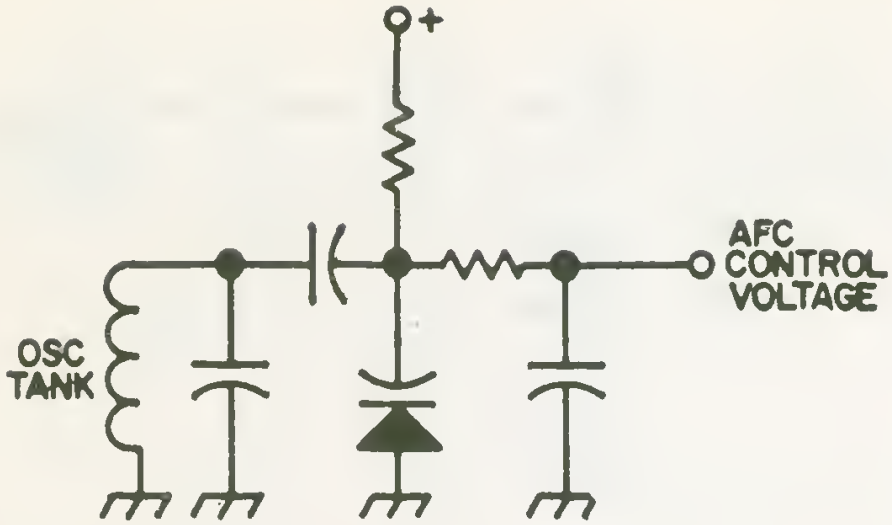

Fig. 21-44. A varactor is often used to provide automatic frequency control. The control voltage is provided by a discriminator.

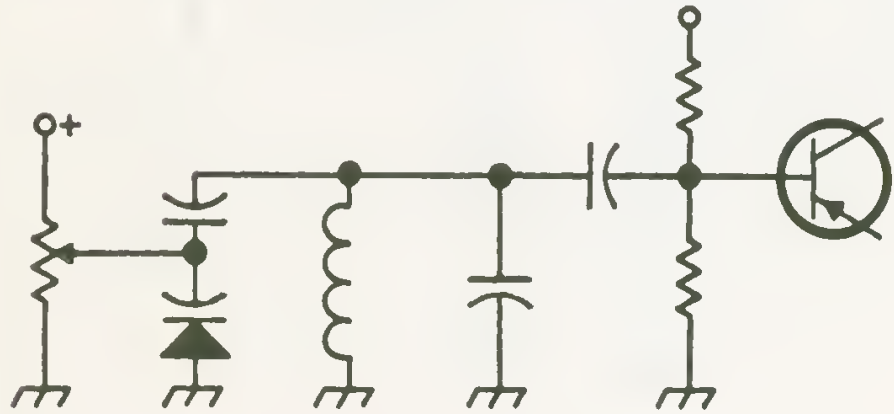

Fig. 21-45. An rf stage or oscillator can be tuned with a varactor.

Fig. 21-46. Simple clippers can be made from zener diodes or silicon diodes.

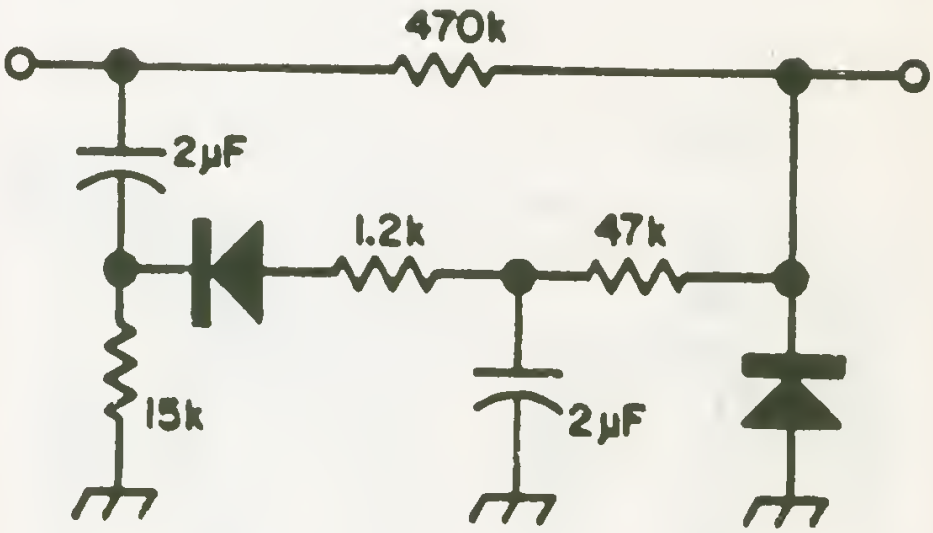

Fig. 21-47. The compressor can provide 25 dB of compression, but the expense of up to 60 dB loss.

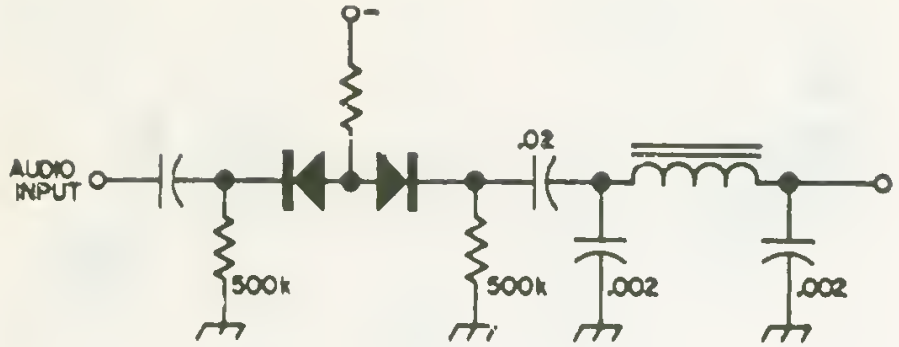

Fig. 21-48. A good clipper for AM or FM use includes adjustable clipping level and a harmonic filter.

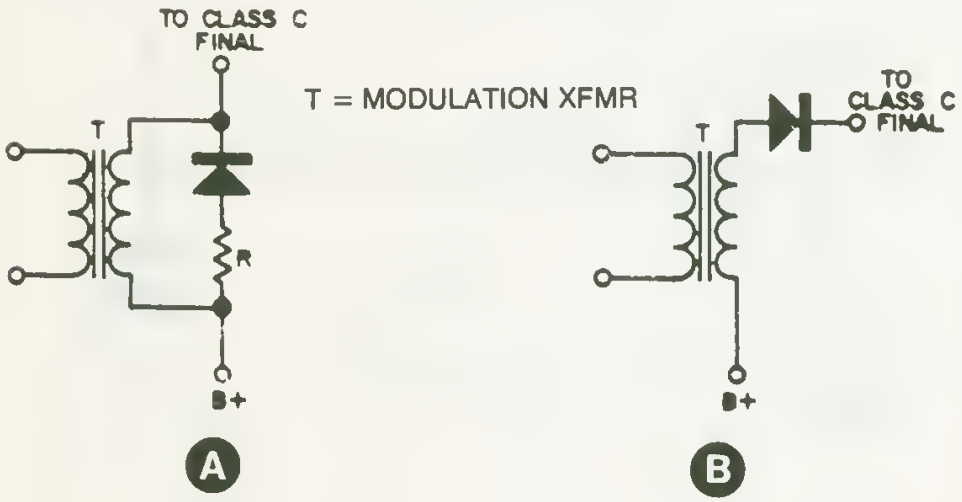

Fig. 21-49. The need for high-level negative-peak clipping is often debated, but its value is championed by many.

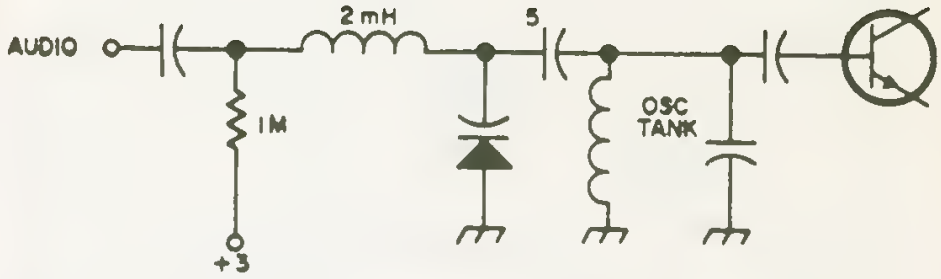

Fig. 21-50 A diode can be used for direct frequency modulation.

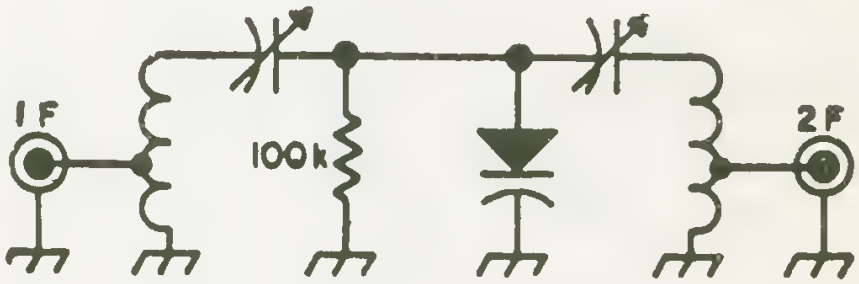

Fig. 21-51. This is a basic varactor doubler.

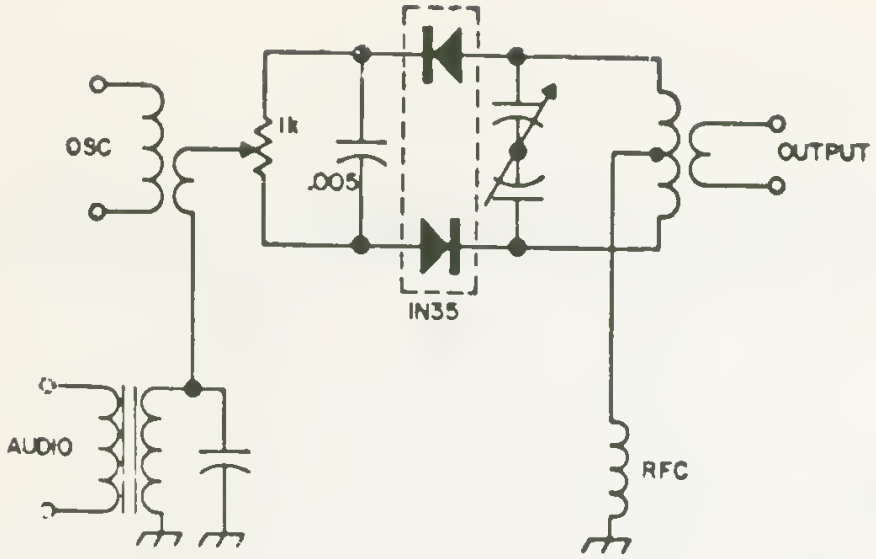

Fig. 21-52. This is a popular balanced modulator for generating DSB (and eventually SSB).

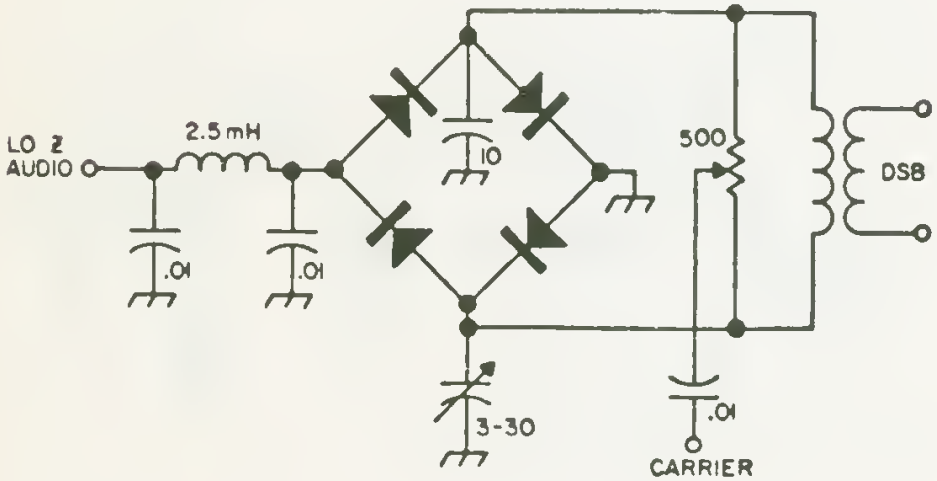

Fig. 21-53. Bridge balanced modulator for SSB.

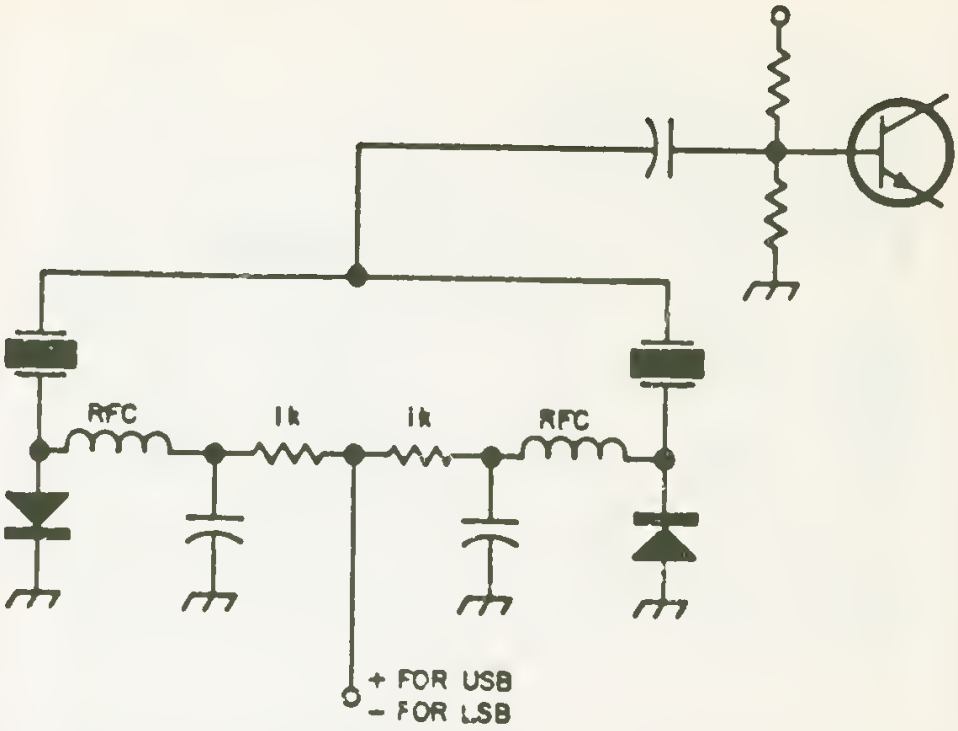

Fig. 21-54. A pair of diode switches can be used to select upper- or lower-sideband-generating crystals.

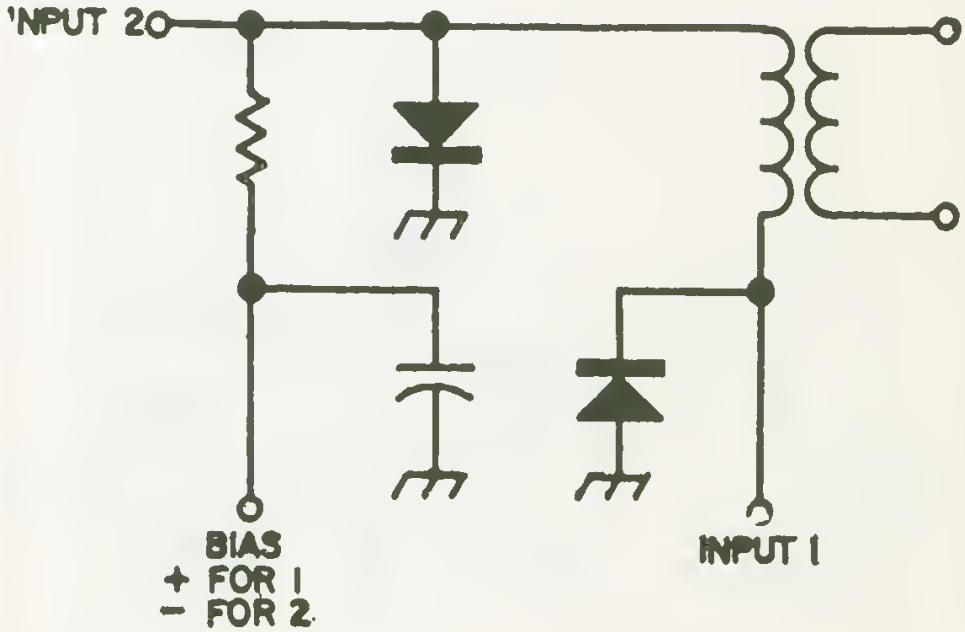

Fig. 21-55. These diode switches can be used in a transceiver or other type of equipment to select either of two inputs.

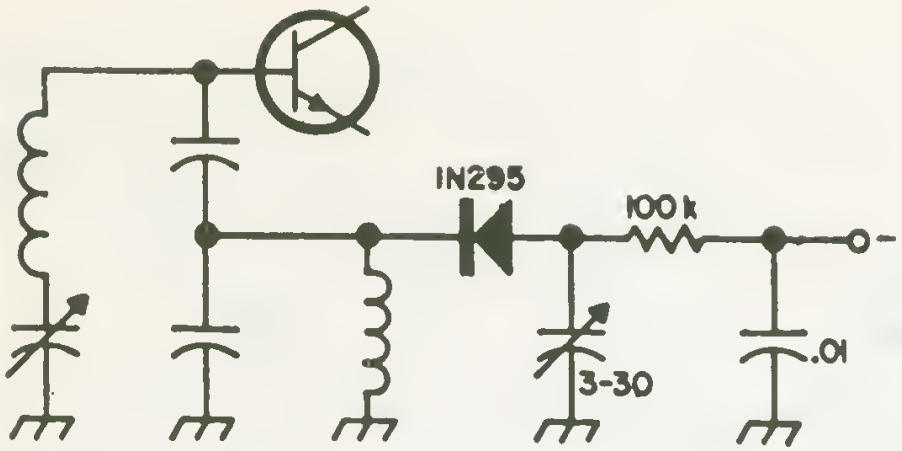

Fig. 21-56. A diode switch is used to connect a small capacitor to a VFO to shift its frequency slightly for radioteletype.

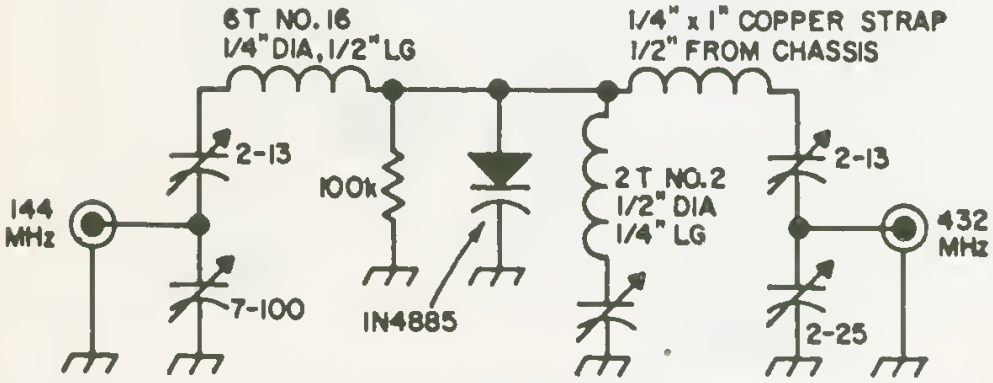

Fig. 21-57. A practical high-pe varactor tripler.

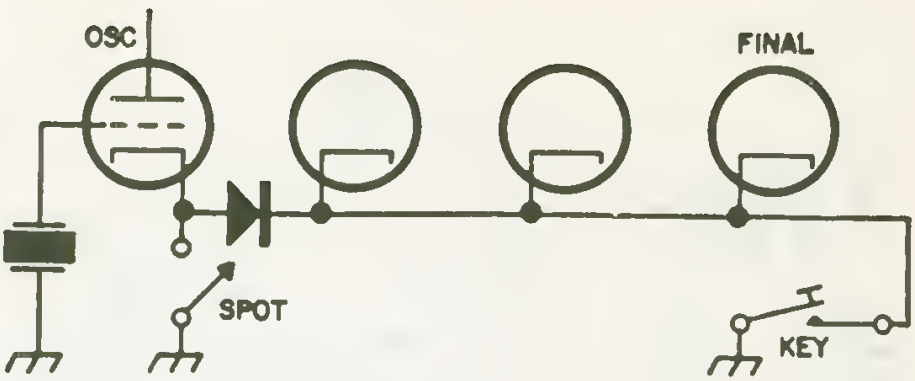

Fig. 21-58. A diode can be used for very simple spotting in a CW transmitter.

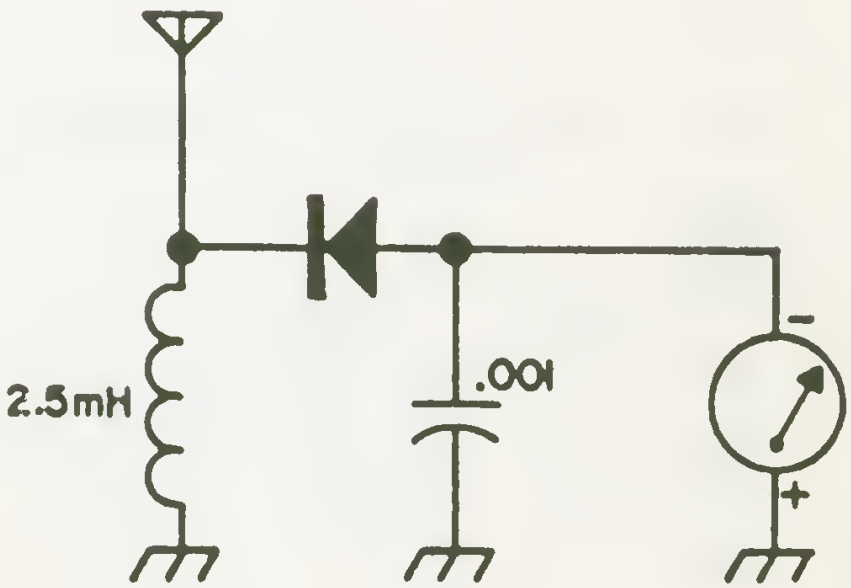

Fig. 21-59. A simple field-strength meter.

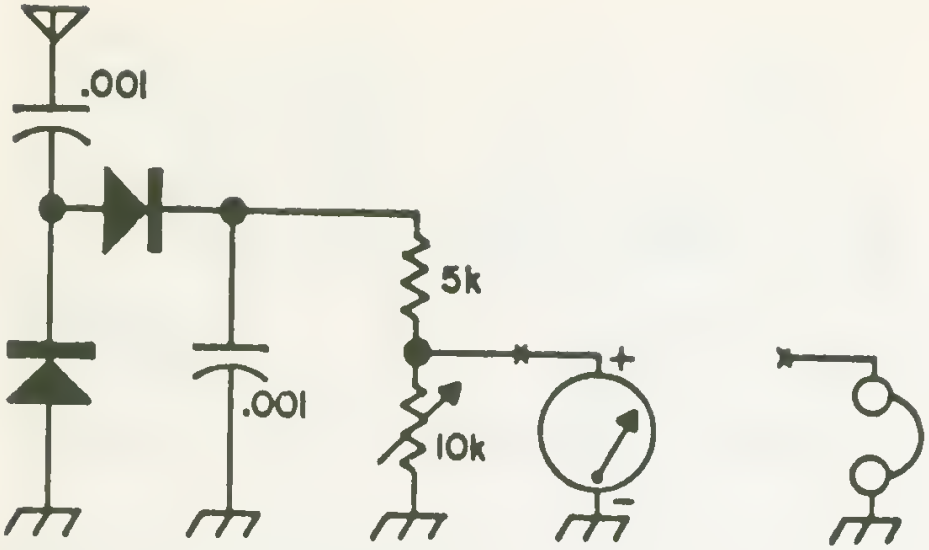

Fig. 21-60. This voltage-doubling field-strength meter is not frequency-selective.

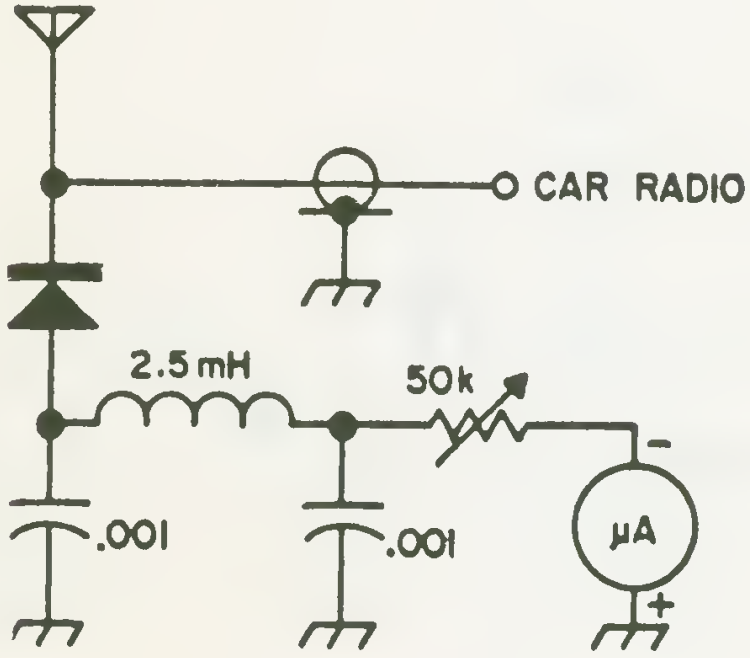

Fig. 21-61. A special type of field-strength meter for use in a car.

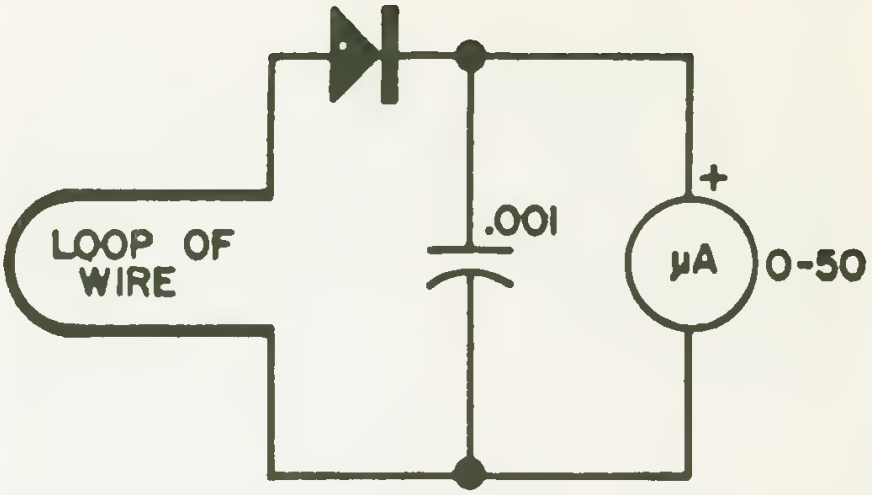

Fig. 21-62. The rf sniffer is a wide-range sensitive rf detector.

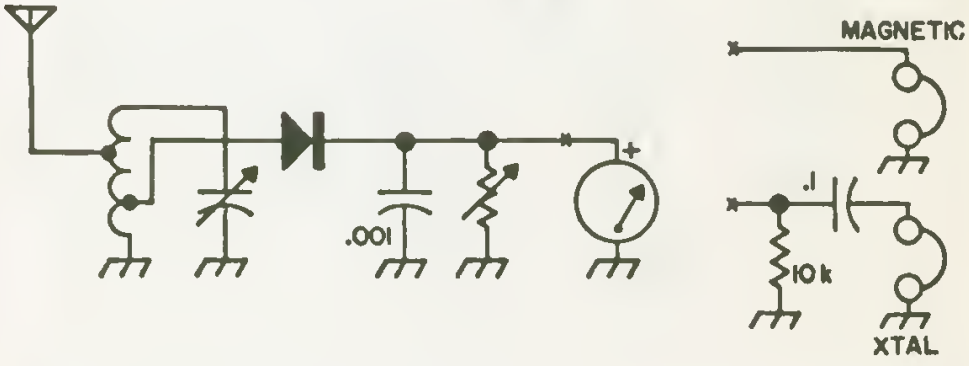

Fig. 21-63. A wavemeter is simply a field-strength meter tunable to frequency. It is especially useful for checking transmitter harmonics.

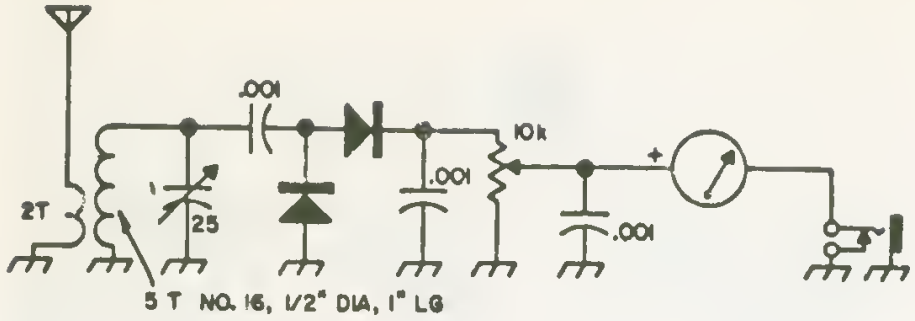

Fig. 21-64. This tunable VHF wavemeter/FSM/monitor covers 6 and 2 meters.

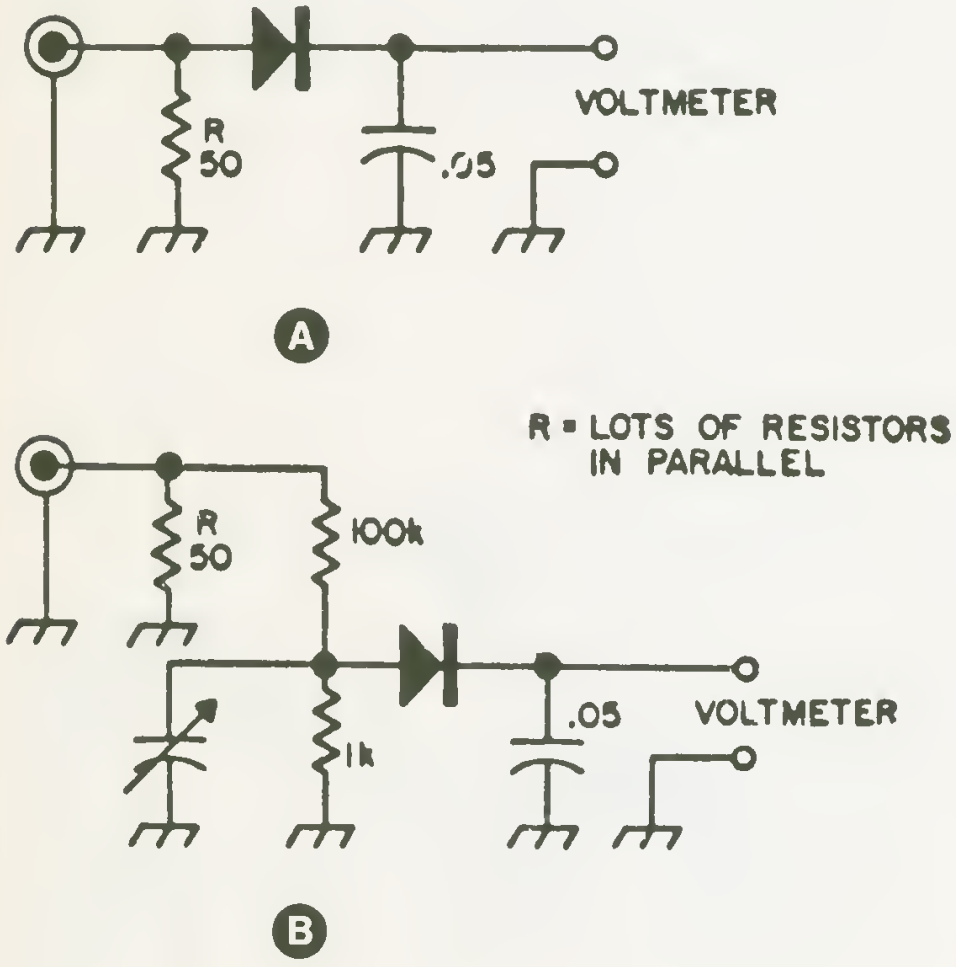

Fig. 21-65. A dummy load should be used for all possible transmitter testing. An rf voltmeter connected to the dummy load makes it a wattmeter. A single diode is limited in voltage rating, so a voltage divider must be used for high power.

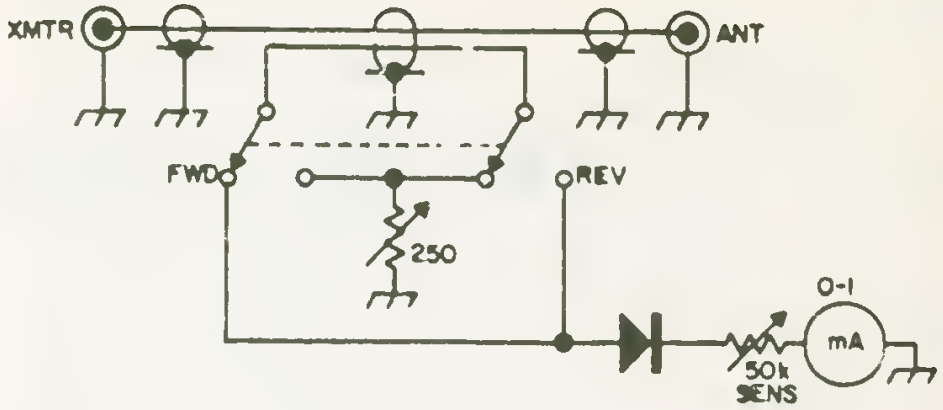

Fig. 21-66. An SWR bridge is valuable for adjusting an antenna. The critical part of the bridge is a piece of coax cable with an extra wire inserted between the cable dielectric and the shield.

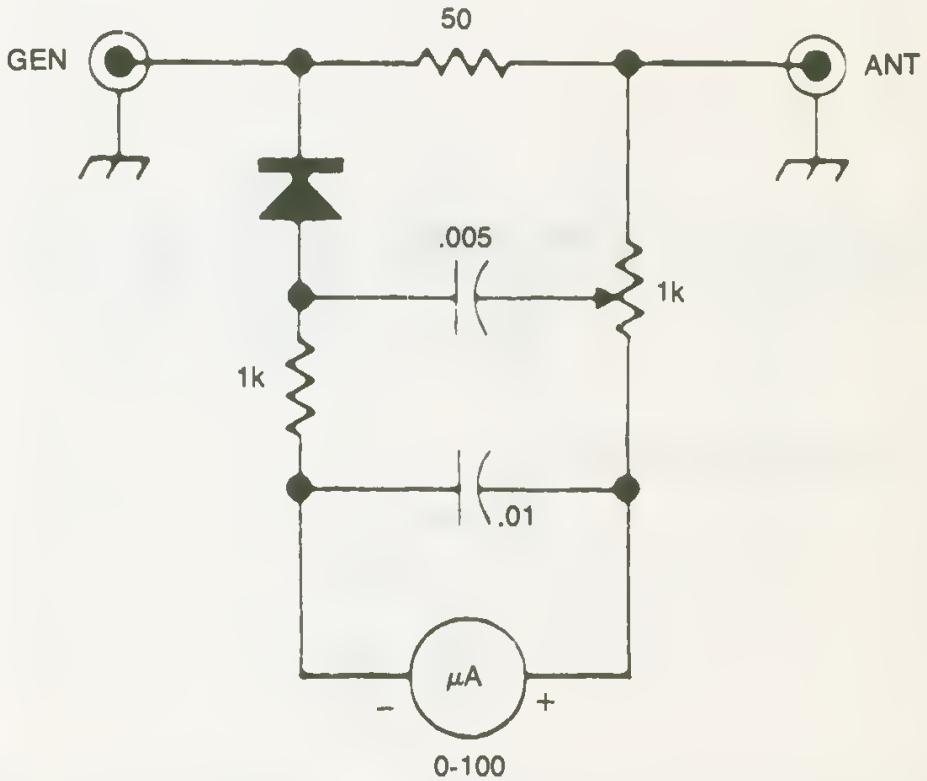

Fig. 21-67. This antennascope is a simple antenna impedance bridge. It should be constructed compactly for best high frequency use.

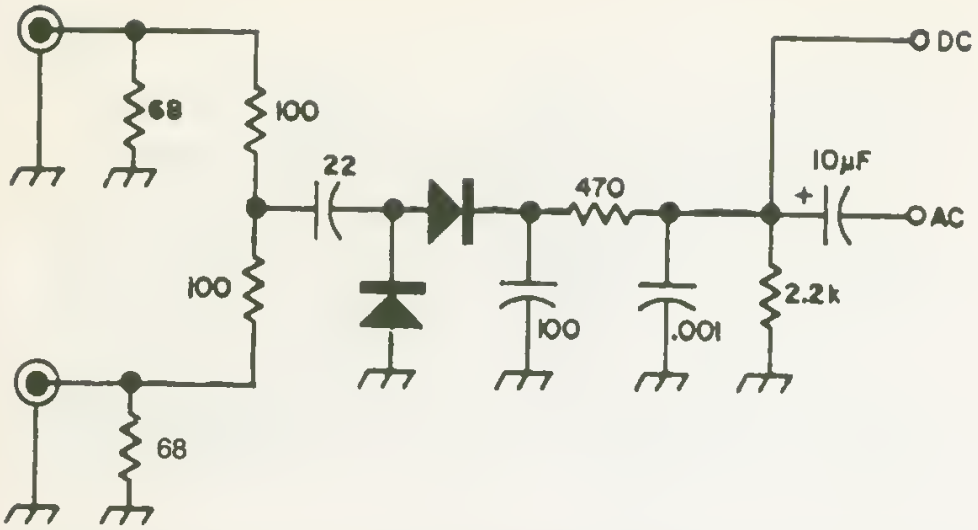

Fig. 21-68. The James Dandy mixer is a general-purpose untuned mixer useful as an impromptu frequency meter, receiver, detector, etc.

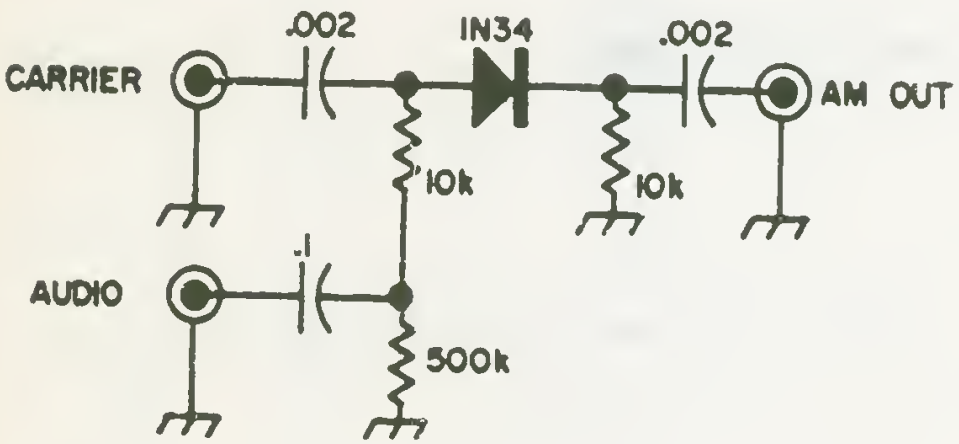

Fig. 21-69. This amplitude modulator can be used to modulate the output of any low-level CW source.

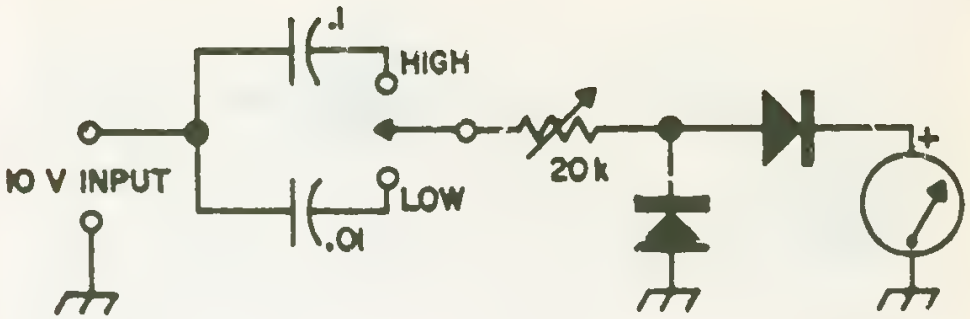

Fig. 21-70. This audio frequency meter must be calibrated before use. It requires an input of 10V.

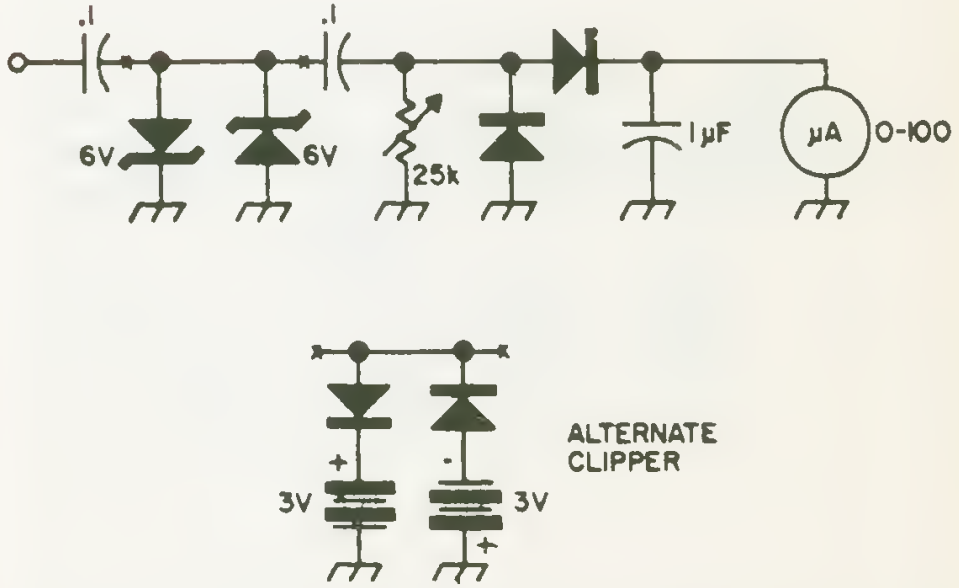

Fig. 21-71. This audio frequency meter/tachometer is self-limiting and linear reading. Either two zeners or two conventional diodes and batteries can be used to set the proper input voltage.

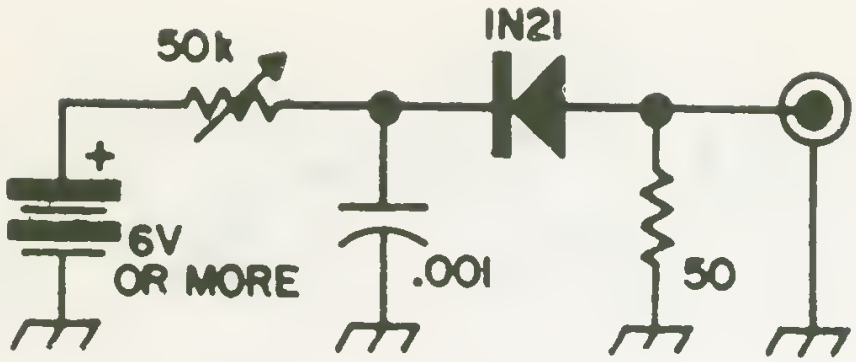

Fig. 21-72. A diode noise generator is very useful in aligning a receiver for lowest noise figure.

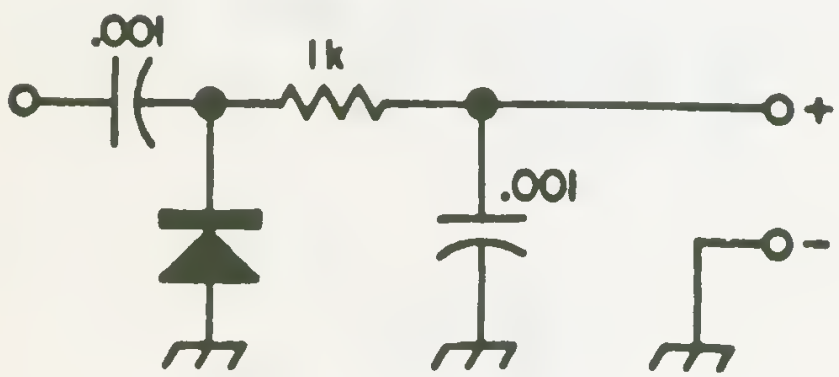

Fig. 21-73. A general-purpose rf detector probe for use with an oscilloscope or voltmeter.

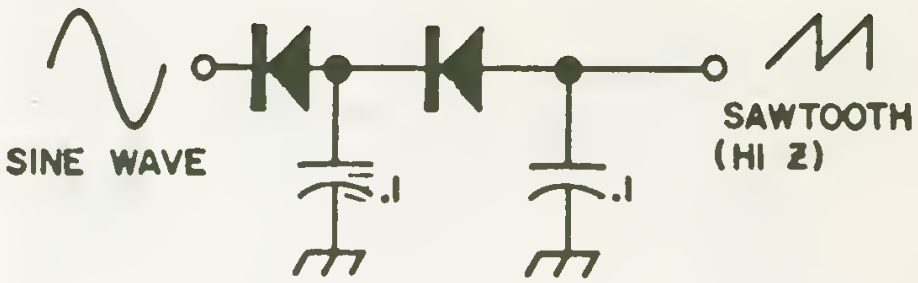

Fig. 21-74. This simple sawtooth generator could be added to a monitor oscilloscope.

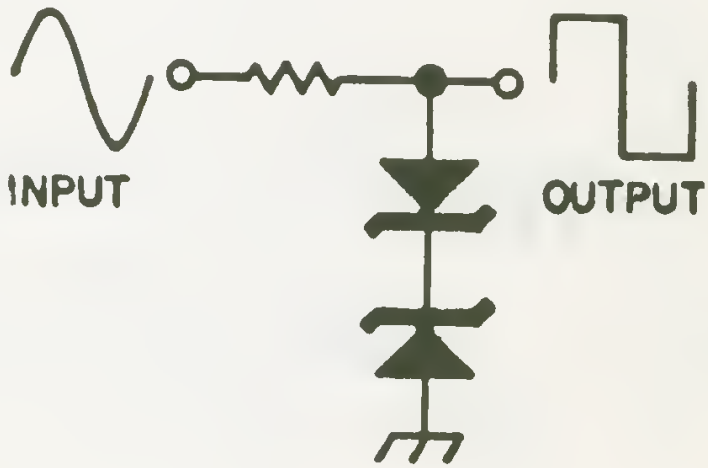

Fig. 21-75. Two zeners can be used to produce a highly clipped sine wave very similar to a square wave.

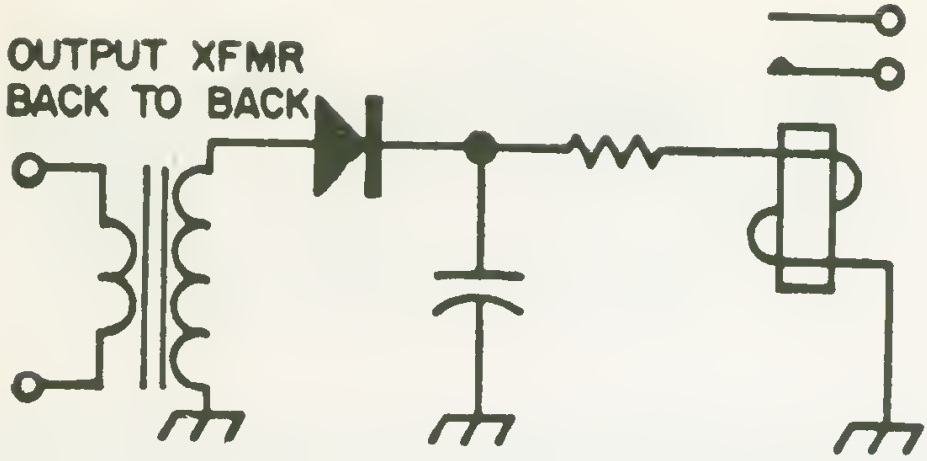

Fig. 21-76. A transmitter can be keyed by a tape recorder for automatic code practice with this circuit.

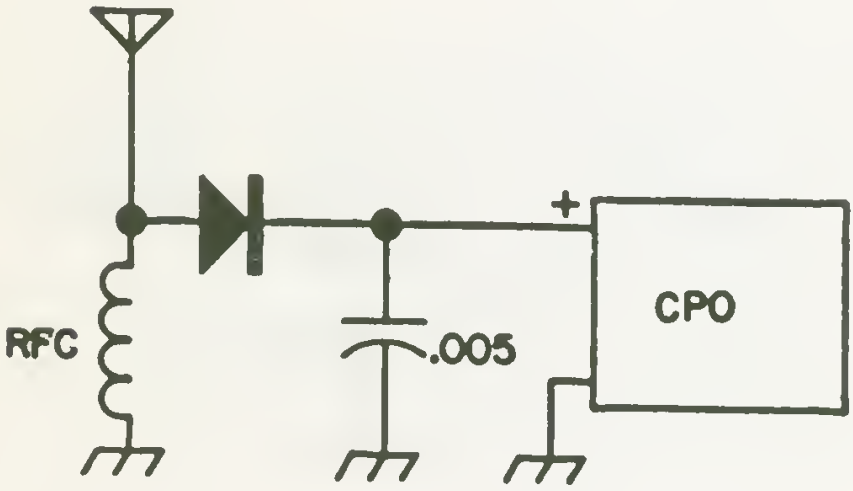

Fig. 21-77. A field-strength meter can key a code oscillator to form a CW monitor.

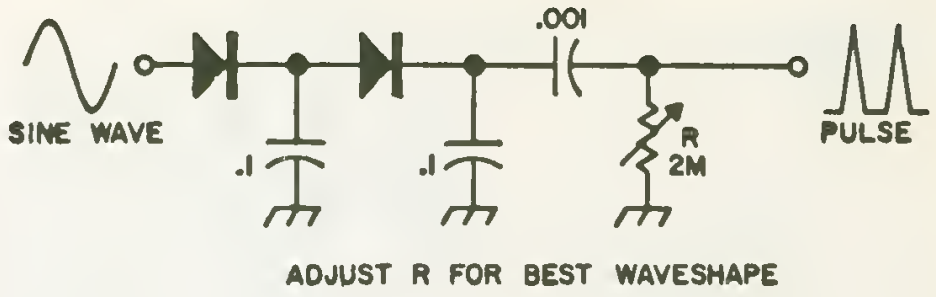

Fig. 21-78. A pulse generator is needed to adjust noise limiters for best results.

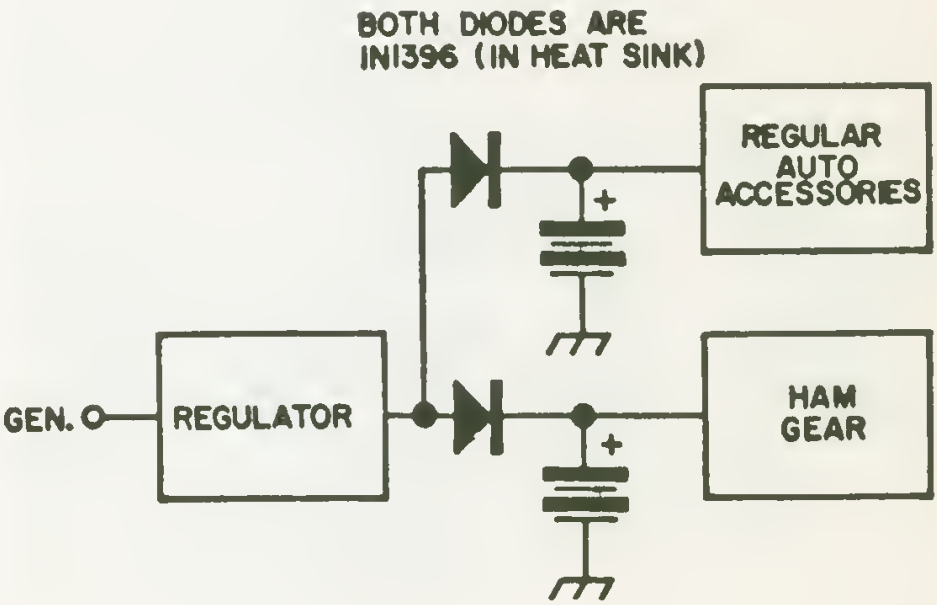

Fig. 21-79. Here's how to use two batteries in your car, one for communications gear and one for the rest of the car needs. The diodes act as oneway switches, keeping the batteries charged, yet preventing any power from flowing from one to the other.

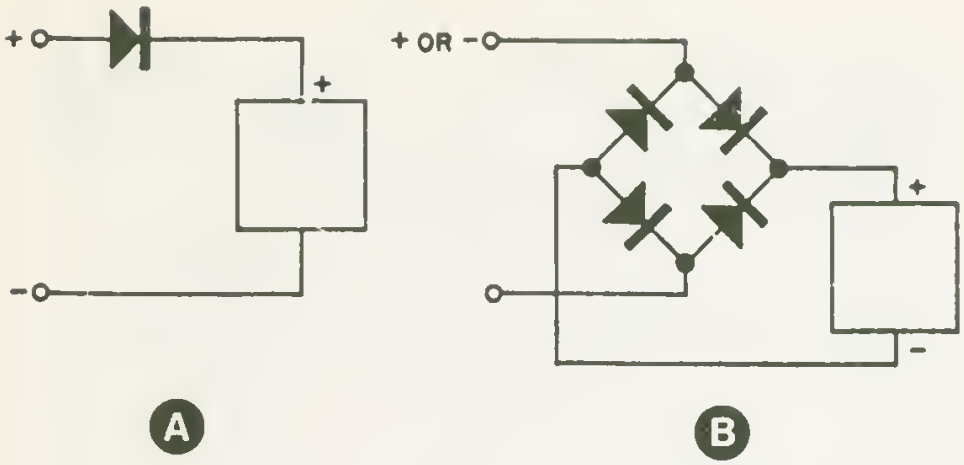

Fig. 21-80. These two circuits protect equipment from incorrectly polarized voltage. The single diode keeps the equipment from working when the polarity is wrong, while the bridge automatically selects the proper polarity.

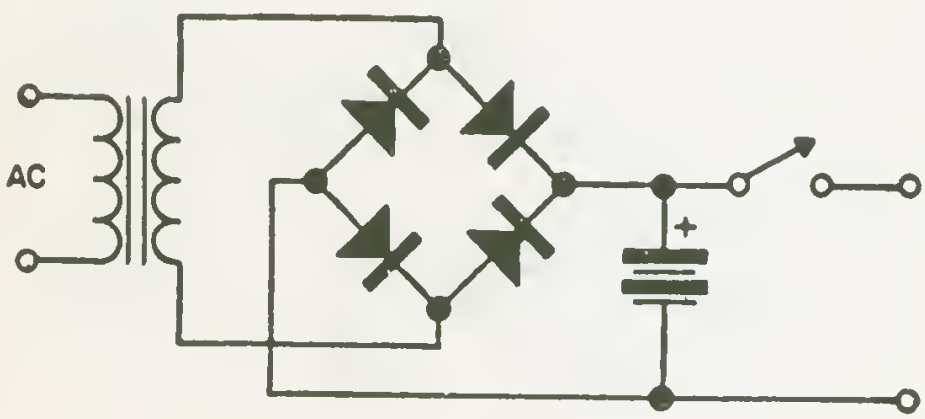

Fig. 21-81. A battery can be floated across a power supply, keeping it charged and providing automatic switching from ac to battery power.

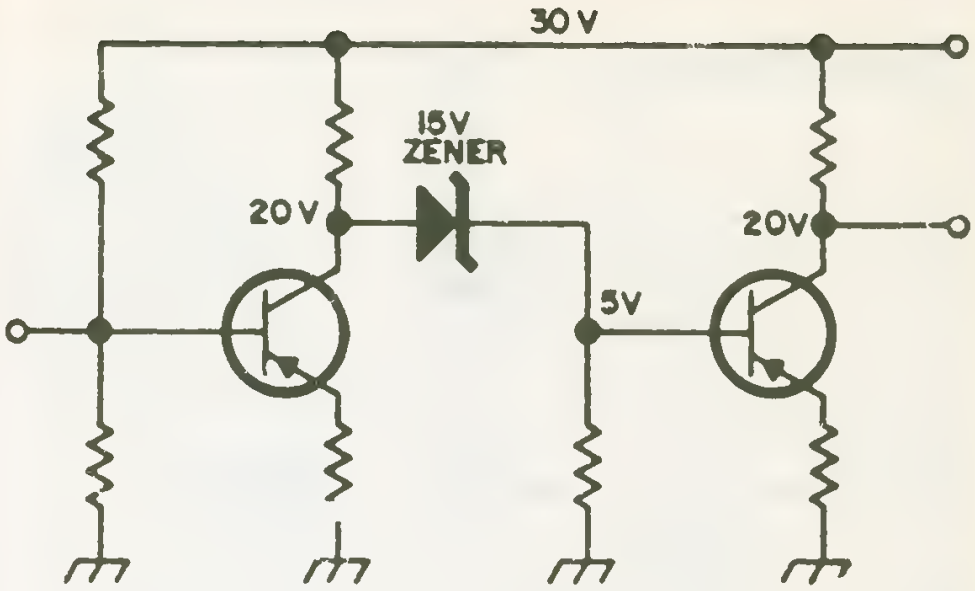

Fig. 21-82. Zeners can be used in dc-coupled amplifiers to replace coupling capacitors.

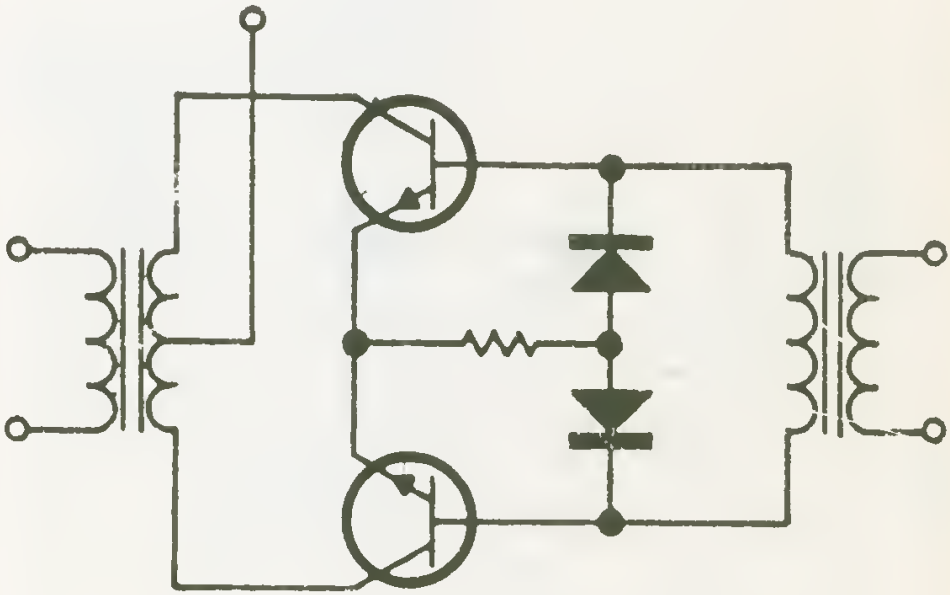

Fig. 21-83. Diodes can provide an artificial centertap for push-pull amplifiers.

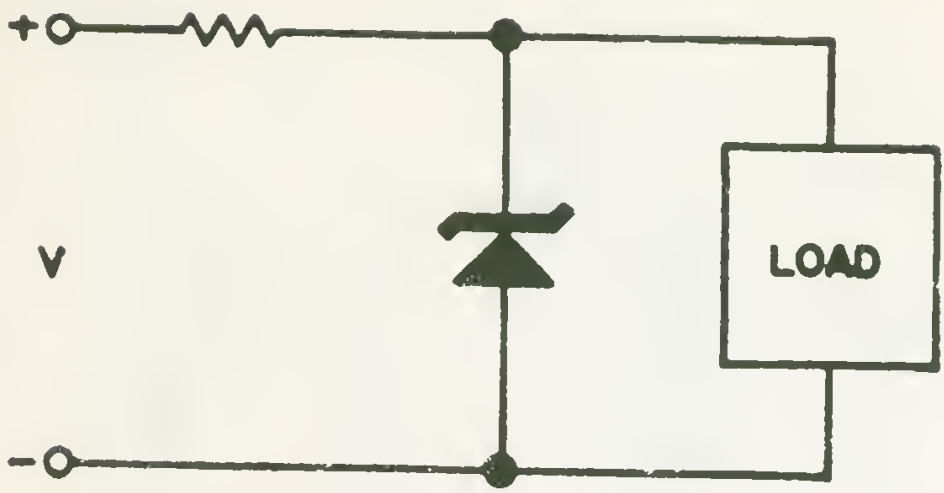

Fig. 21-84. A zener can protect any critical load from overvoltage.

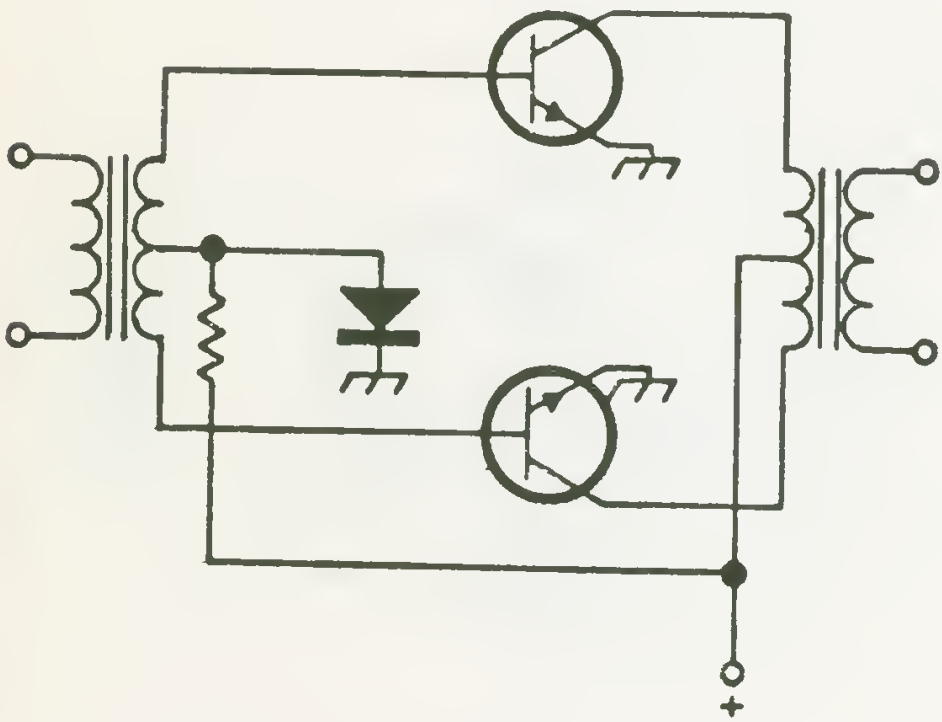

Fig. 21-85. A diode is often used to provide temperature-compensated bias for class B amplifiers.

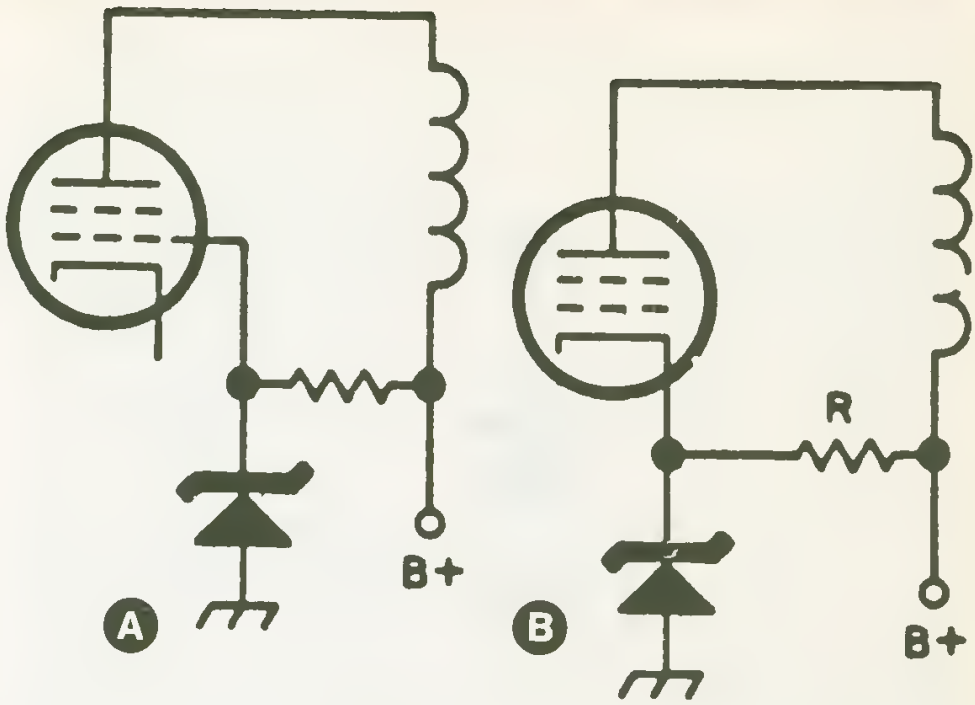

Fig. 21-86. A zener can furnish stable screen or grid bias for a vacuum tube.

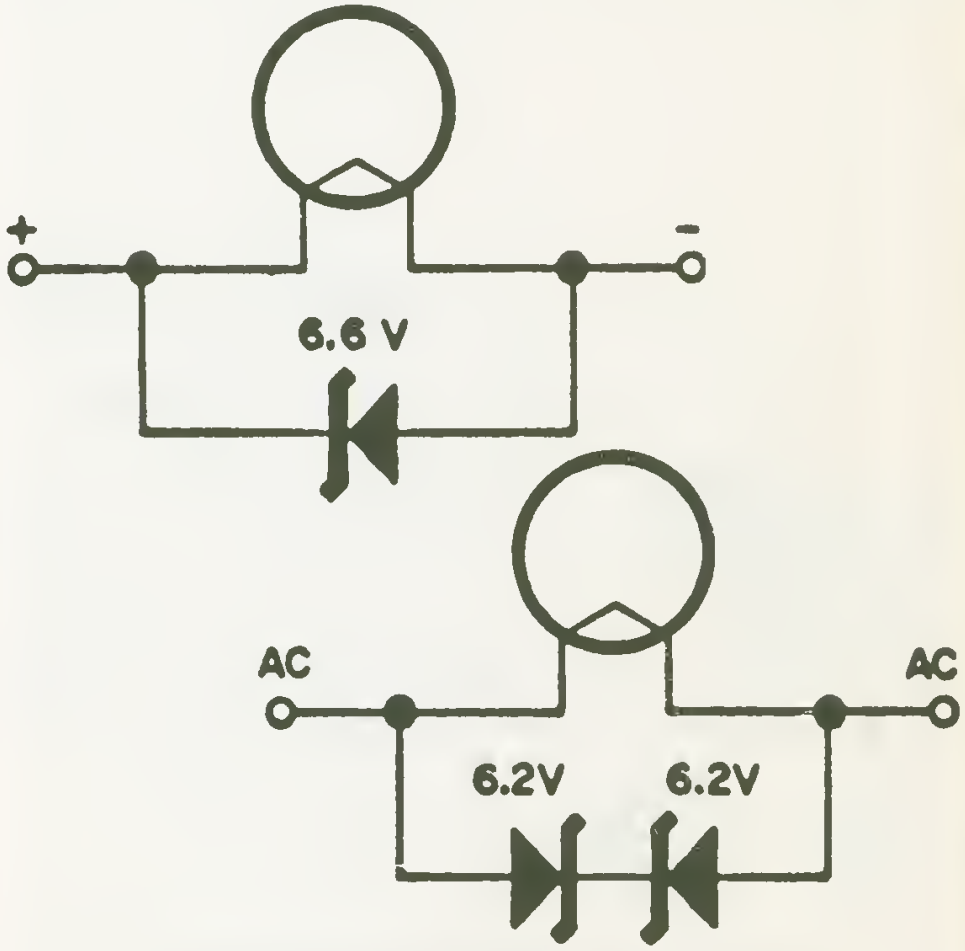

Fig. 21-87. Zeners can protect a delicate filament from overvoltage.

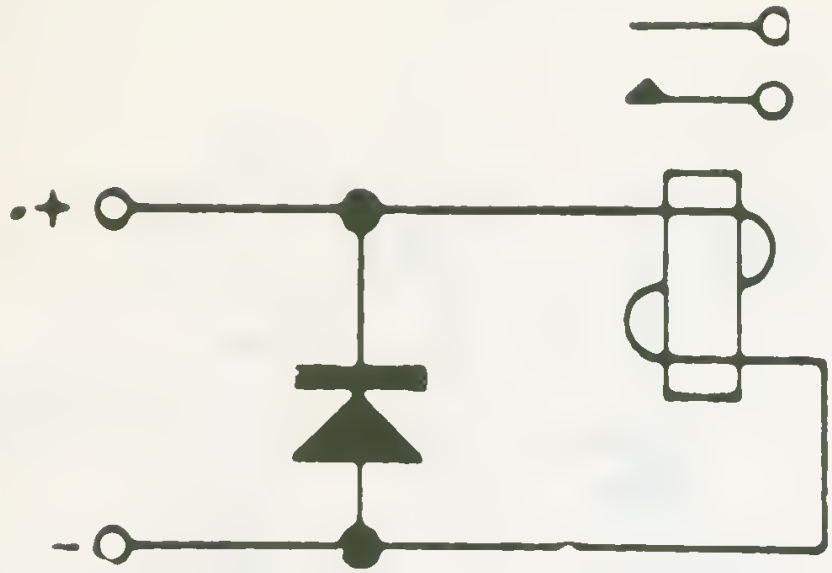

Fig. 21-88. A diode can damp the field generated by a coil when current through it is disconnected.

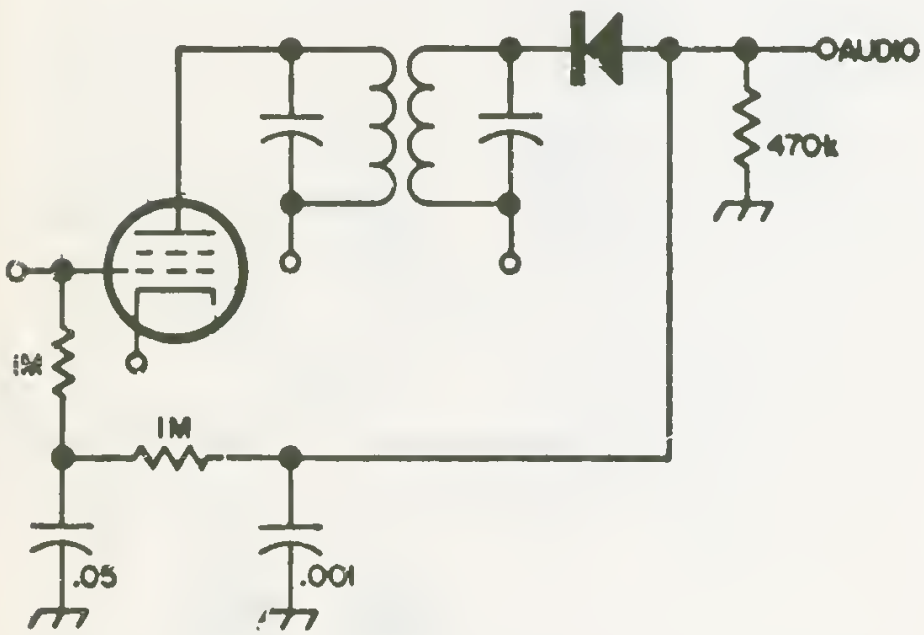

Fig. 21-89. The conventional agc system used in tube-type receivers.

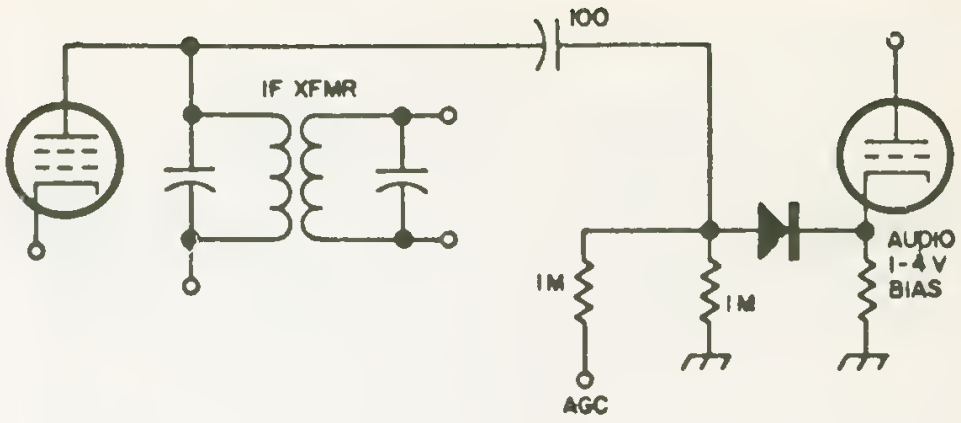

Fig. 21-90. Delayed agc acts only on strong signals.

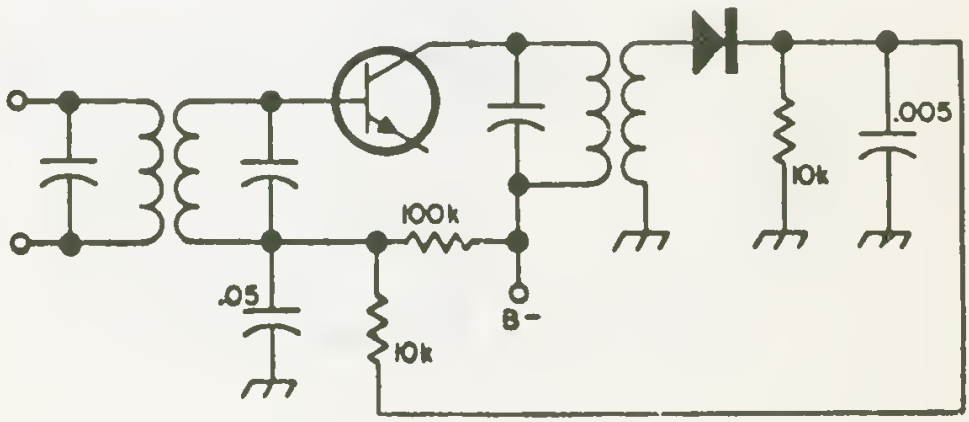

Fig. 21-91. Reverse agc for a transistor/receiver.

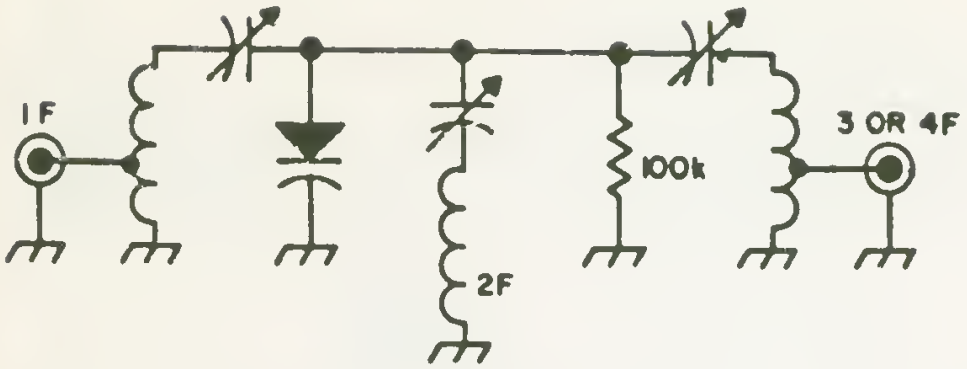

Fig. 21-92. "A" is a varactor tripler or doubler.

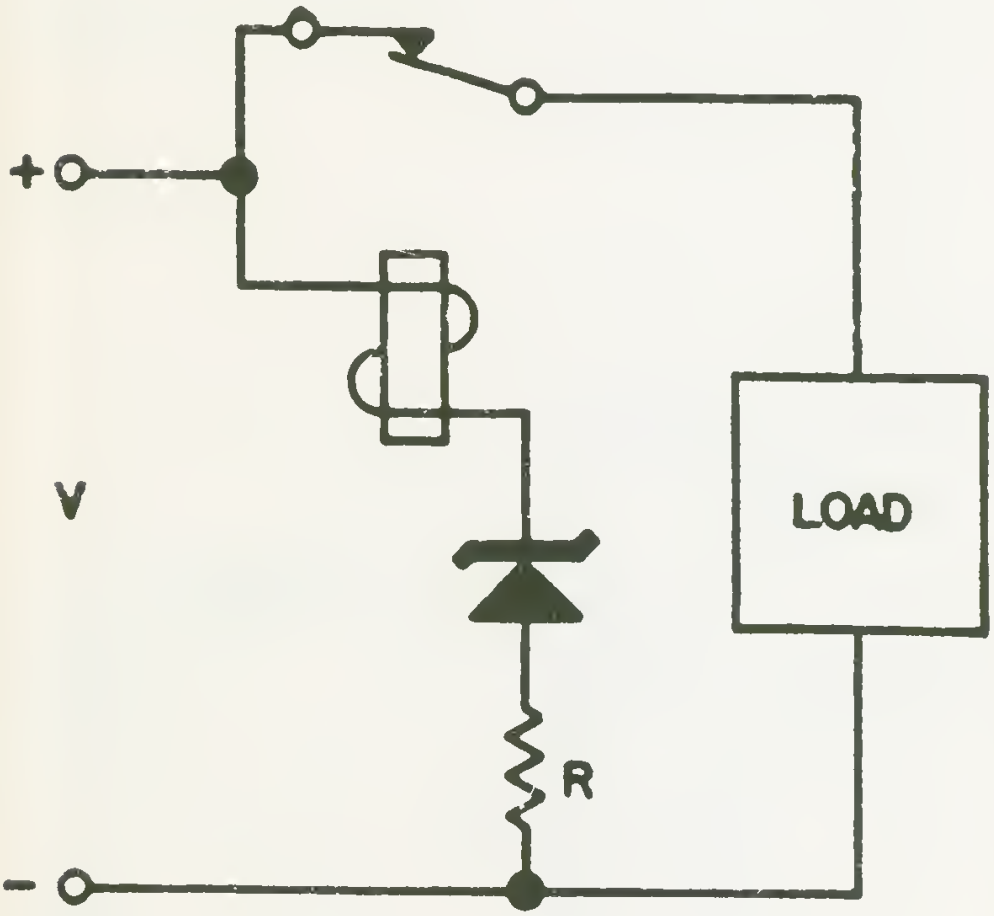

Fig. 21-93. This circuit will disconnect a load when voltage drops below a minimum.

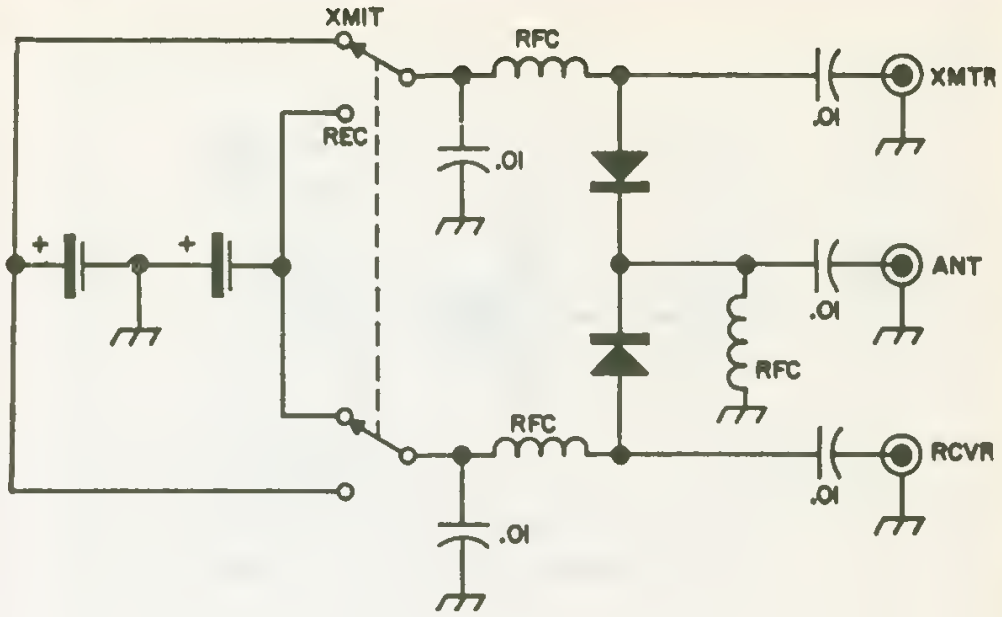

Fig. 21-94. This transmit-receive switch can be used at VHF if it is constructed carefully.

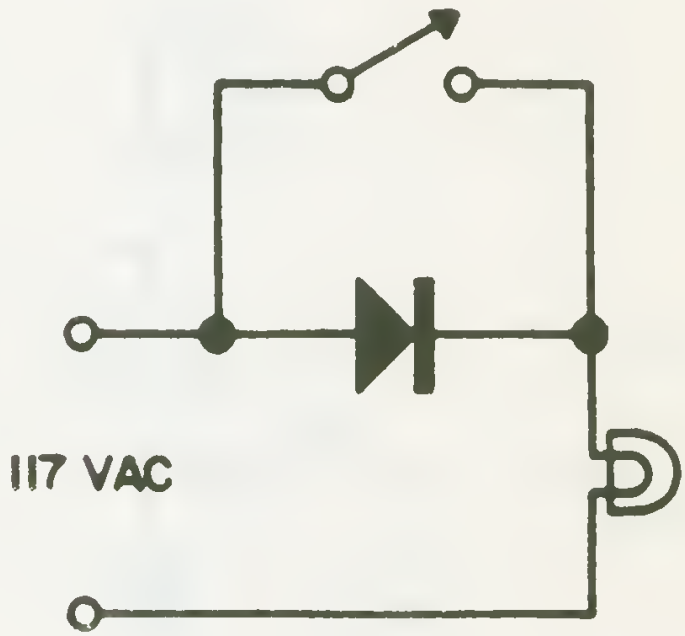

Fig. 21-95. This is a lamp dimmer providing two brillance positions: half on and full on.

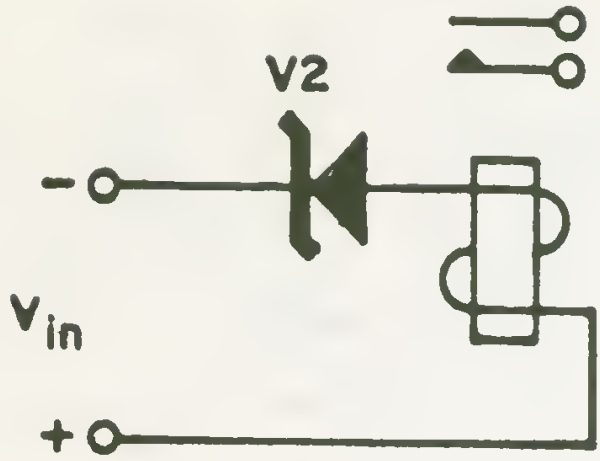

Fig. 21-96. An input voltage over the zener voltage energizes the relay.

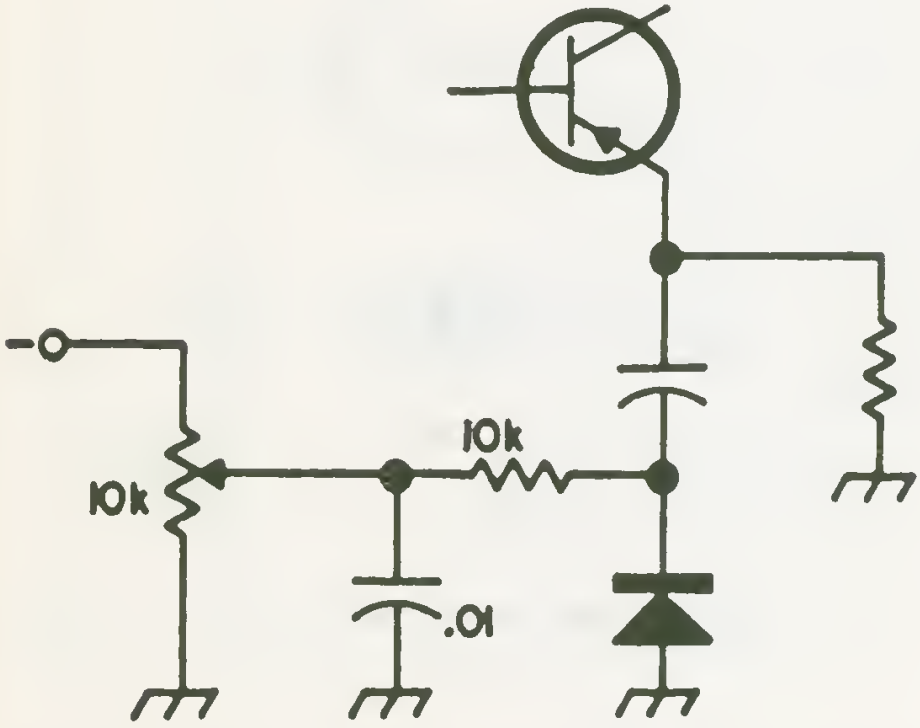

Fig. 21-97. A diode can control the bypassing of an emitter bypass capacitor to change an amplifier's gain.

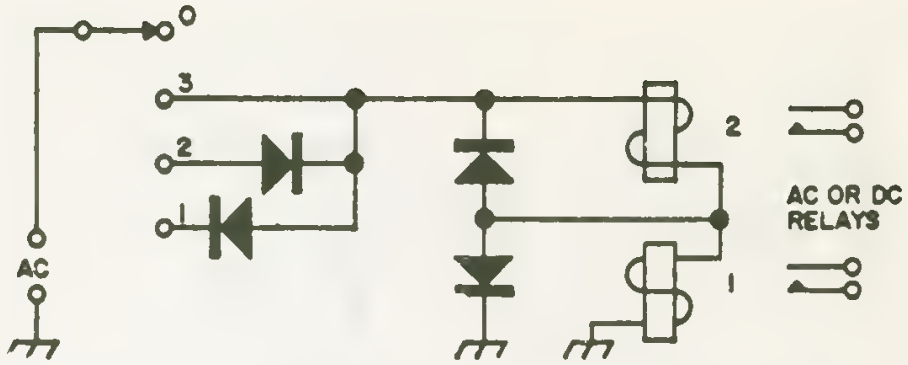

Fig. 21-98. In position 0 neither relay is energized. In position 3 both are energized. In 2, relay 2 is on and in 1, relay 1 is on.

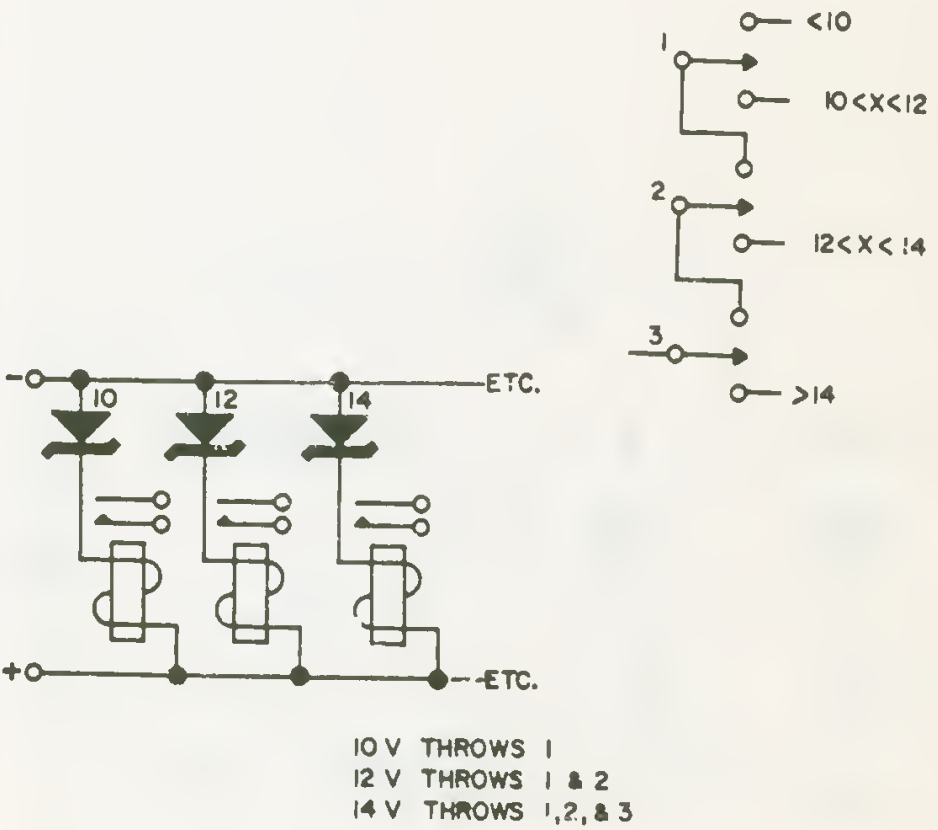

Fig. 21-99. In this scheme, a varying input voltage selects relay contacts in turn.

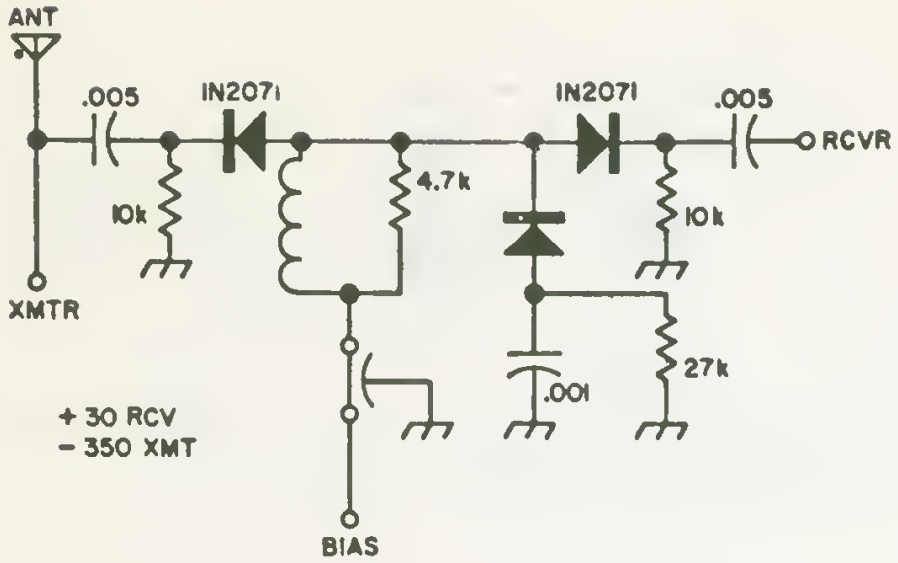

Fig. 21-100. A high-frequency antenna switch using diodes.

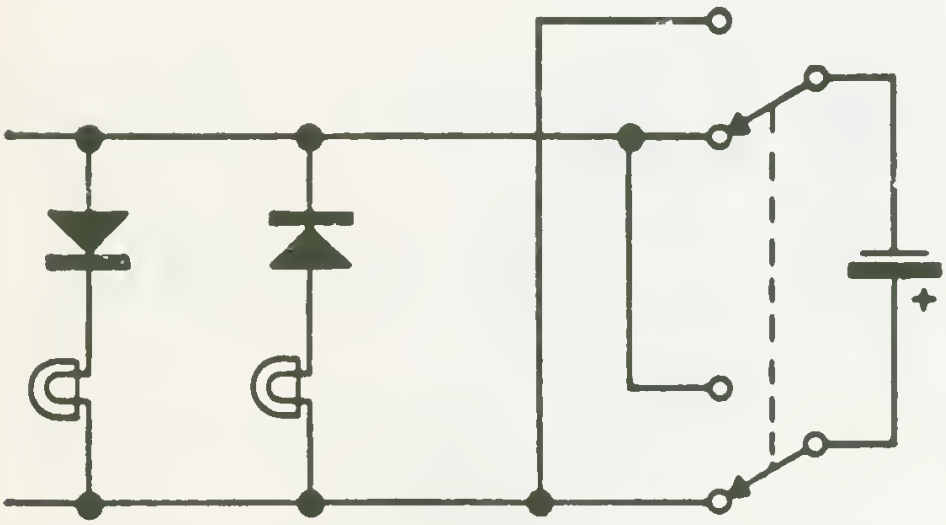

Fig. 21-101. Diodes can be used for mysterious switching of two lamps with one pair of wires.

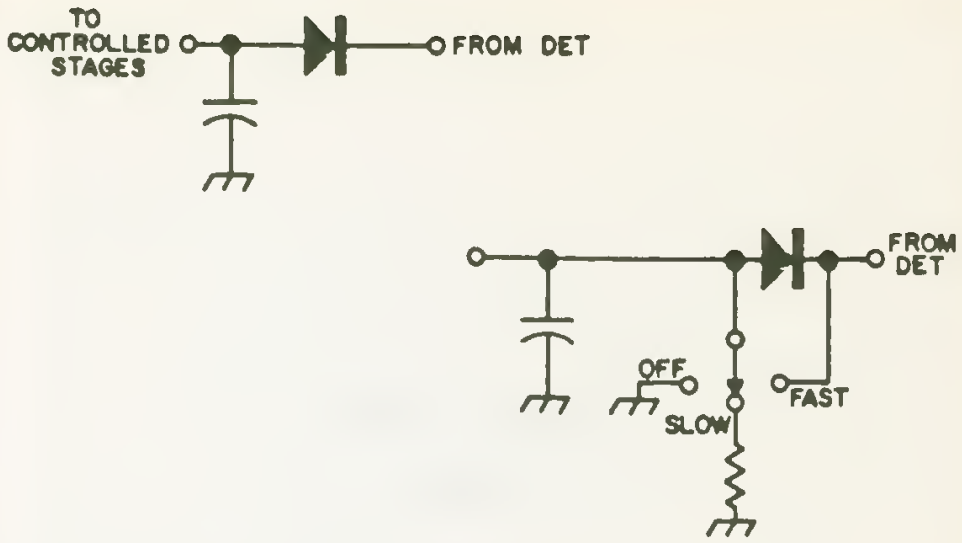

Fig. 21-102. "Hand" agc for SSB/CW reception.

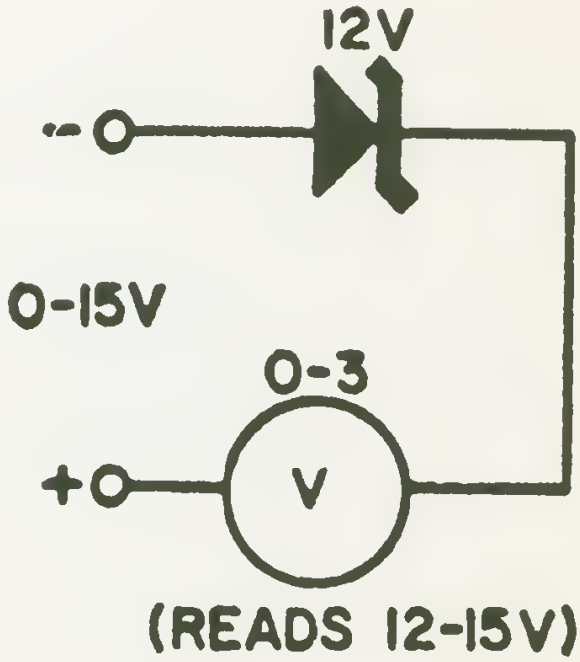

Fig. 21-103. A zener and a low-voltage meter can be used to suppress the low end of a range.