

What about carbon?

Chemical analysis shows that all lubricating oils are composed of about 85% carbon and 15% hydrogen in chemical combination.

All lubricating oils form carbon when burned in the combustion chamber. The important thing to determine is the amount and kind of carbon formed by the oil.

Some oils form a good deal of carbon, some a small amount; some produce hard, flinty carbon which will cause a great deal of trouble; others produce a soft, flaky carbon that will do no damage.

The important factors determining the amount and kind of carbon formed by a lubricating oil are the crude from which it is made, the process and care of refining it, its purity and stability.

Advantages of Crude and Vacuum Refining

Great care is exercised in selecting the crudes from which Zerolene is made, to secure only those which contain the most desirable lubricating values and at the same time as little as possible, if any, of the undesirable hydrocarbons such as wax and asphaltum. In selecting crudes for Zerolene, the Standard Oil Company has the advantage of its own large production of practically every type of crude oil. For this reason the company is not compelled to use any particular crude because it happens to be the only one available.

These selected crudes, carefully refined by our own patented, high-vacuum process, produce in Zerolene, oils of the highest lubricating value, which, when burned in the combustion chamber, develop a very small amount of carbon of a soft, flaky nature, which can do no harm and usually blows out entirely with the exhaust.

Board of Lubrication Engineers
STANDARD OIL COMPANY
(California)

more power & speed ~
less friction and wear ~
thru Correct Lubrication

RADIO

CRYSTAL DETECTOR EASY TO CONSTRUCT

Telephone Condenser and Receivers Can Better Be Purchased—Mounting the Set.

The material needed to construct a simple crystal detector is as follows:

Piece of silicon or galena moulded in a metal button, 25 cents.

Two binding posts, 20 cents.

A block of shellacked or stained wood 3 by 3 1/4 inches.

A thin strip of sheet copper or brass 3/8 inches wide by two inches long.

Mount the two binding posts on the block of wood as shown, fastening under one binding post a strip of copper or brass—see sketch—and under the other binding post a coiled up spring of fine springy copper or brass wire. By placing the button of metal con-

ments, the tuner, the crystal detector and the telephone condenser, can be mounted on a stained base of wood, say, eight inches square and one-half inch thick. This will keep the component parts of the set together, making a compact unit of the whole and also be advantageous in that it will hold the instruments while adjustments are being made.

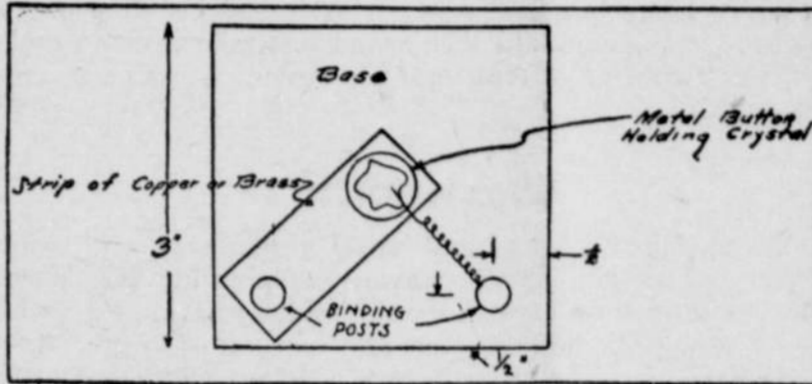
The sketch shows how the instruments are connected with each other and to the ground. The condenser is connected to one side of the tuner and to the crystal detector. The ground is connected to the other side of the phones and the condenser and the tuner.

Lamp cord is excellent for connecting up small radio sets of this kind—it being a good conductor, well insulated and easy to handle.

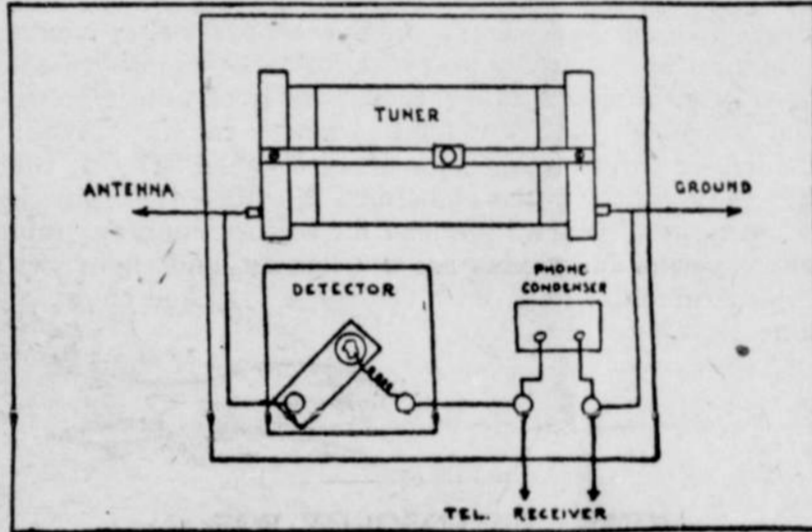
HOW TO LISTEN IN

There are two variables in our radio receiver that require adjustment when it is desired to listen-in; first, the detector, and second, the slider position on the tuner. Once the slider position has been determined for any given transmitting station, it is only necessary to adjust the detector to pick up that same station again.

To operate the receiver for the first time it is best to wait until some station like KDKA is transmitting between 8:30 and 9:30 p. m. Then ad-



The Crystal Detector.



Set Mounted on Base, With Connections Shown.

taining the crystal of silicon or galena on the strip of metal and allowing the spring to make contact with the surface of the crystal the detector is complete and ready for operation.

A complete crystal detector can be purchased from 75 cents to \$2, depending upon the type.

Two other pieces of apparatus are necessary that cannot be readily constructed—they are the telephone condenser and the receivers. A telephone condenser to be used in shunting across the phones can be purchased for about 50 cents.

For use with a radio receiver of this type it is recommended that a pair of 3,000-ohm, Murdoch type, No. 56 receivers, costing \$6, be purchased. These are all the necessary parts needed for the complete receiver.

If it is desired, the three instru-

ments, the tuner, the crystal detector and the telephone condenser, can be mounted on a stained base of wood, say, eight inches square and one-half inch thick. This will keep the component parts of the set together, making a compact unit of the whole and also be advantageous in that it will hold the instruments while adjustments are being made.

After a station is once picked up it is an easy matter to adjust the detector and slider position until maximum response is obtained in the telephone receiver. With a simple set of the kind described in this and preceding articles and a little practice one soon becomes adept at picking up a given station. The entertainment derived from listening-in is usually well worth the time spent and the money invested.

VAGARIES OF VACUUM TUBES

Peculiar Actions That Always Astonish and Sometimes Frighten the Amateur Radioist.

Everybody who has had anything to do with vacuum tubes has from time to time had them do unexpected things and give results that at the moment seem beyond explanation.

The explanation of several characteristics of these miniature giants which are met with in daily operation is sure to prove of great interest to the amateur. In cases where the actions of the tube are not understood these peculiarities have sometimes frightened people.

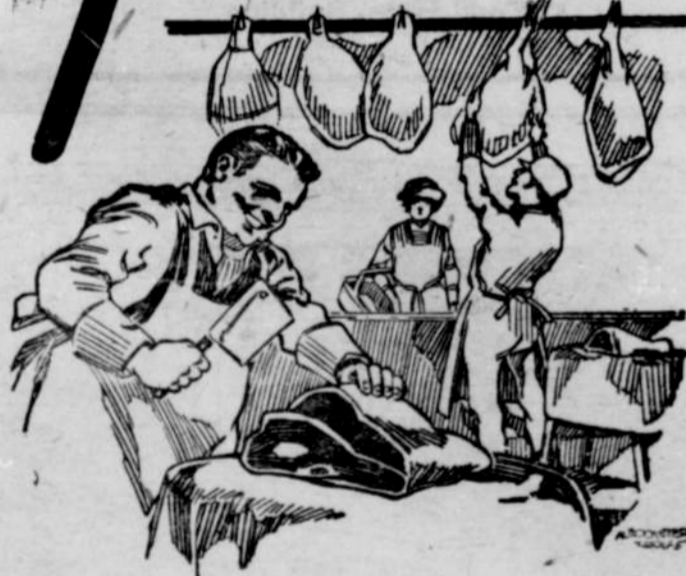
One instance of a newborn fan's fright was brought to attention in a letter of inquiry. The instrument had just been set up and was being operated for the first time. The tubes had been firmly adjusted and were just at the spilling point and—over they went, giving vent to the most unearthly sounds. The embryo enthusiast who looked upon the audion tube as an electric light, thought it was going to explode. He jumped away from the instrument and out of the room, and did not venture near it for several hours, and then only after reaching round the corner of the door with a long stick and pulling the battery switch off.

Similar instances have come to attention when bulbs generate var-colored vapors in the vacuum chamber.

Moonshiners Using Radio.

Revenue officers seeking distillers of the far-famed and hardbitting "white lightning" in the mountains of Kentucky say that many raids made in the last few months have proven unsuccessful, due to the adoption of radiophone as a means of communication among the moonshiners.

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\$1000 ————— \$1000

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Tillamook JULY 4th



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FOR FURTHER INFORMATION APPLY TO C. H. COE, Chairman

\$1000 ————— \$1000