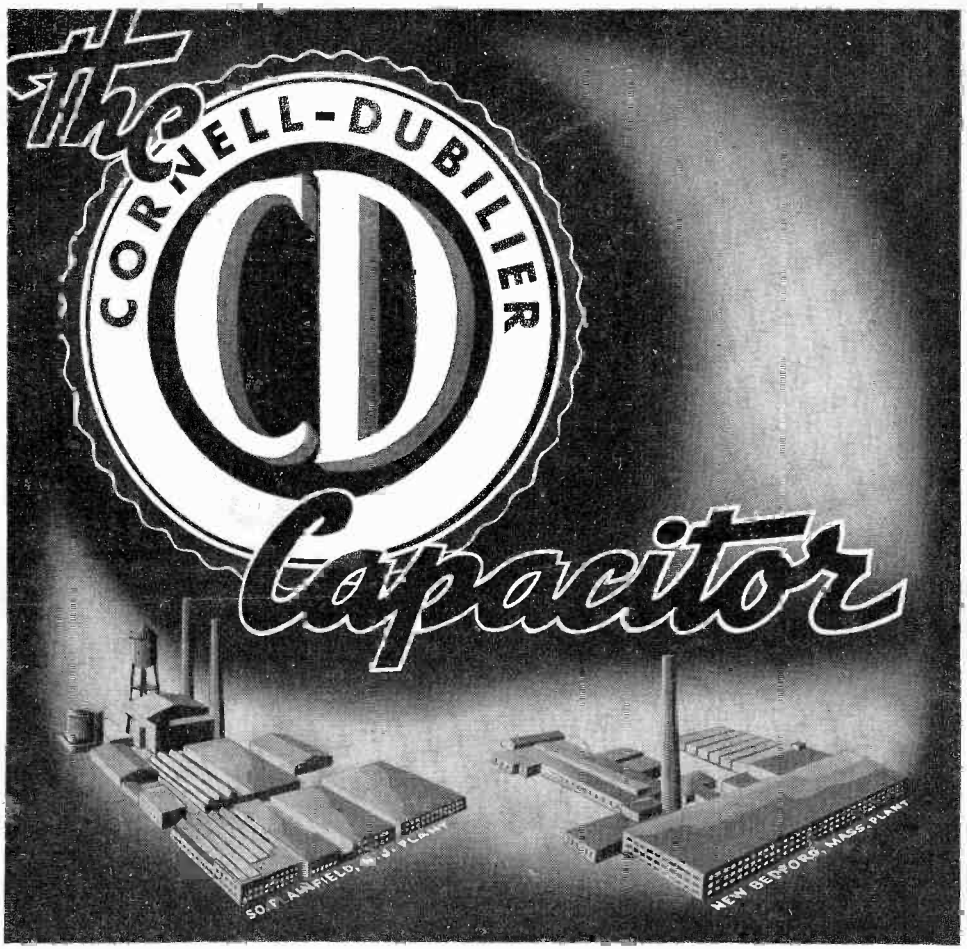

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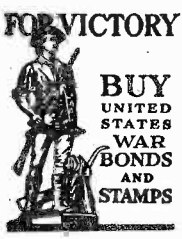

Mr. L. J. Morrice
3547 North 21 St.
Milwaukee, Wis.

LABORATORY HINTS*

A laboratory test setup that will prove of value in many kinds of tests is a magnetic comparator (Fig. 1). For one thing, it is useful in checking air-cored windings for shorted turns. A balanced magnetic structure is assembled from lamination stock, such as a good grade of silicon steel. It is essential that the two outer legs have equal magnetic susceptibility so they must have the same cross section and length and be of the same material.

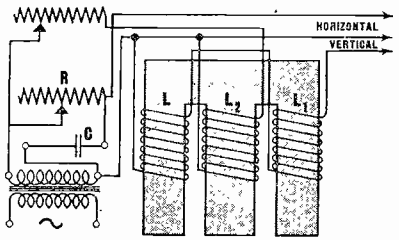

Fig. 1

Two identical coils L and L_1 having a great many turns (say several thousand), are inserted on the outer legs. They should be tight-fitting. Windings from two high-resistance chokes, such as the replacement components for small ac-dc receivers provide satisfactory coils here. The center leg can be a similar winding or a larger one but should fit the center leg rather tightly.

A suitable ac potential that does not get the winding overly hot is connected to this coil, as shown in the circuit. The two outer windings are connected series-opposing, to the vertical deflection system of an oscillograph.

The windings on the outer legs are positioned so that no deflection is noticed on the oscillograph when the inner coil is energized with a 60 cycle potential. This balancing is rather critical and when once found the coils can be blocked or cemented tight so that they are immovable. A typical assembly is shown in Fig. 2.

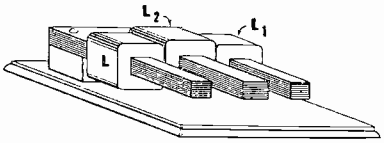

Fig. 2

To test, a short-circuited turn of No. 30 copper wire can be placed on one of the outer legs of the core, and a substantial deflection should be noticeable on the oscillograph. A turn of No. 36 wire should also produce a measurable deflection. The sensitivity depends upon the magnetic density produced by the center winding, the number of turns on the pick-up coils and the sensitivity of the oscillograph. In use the winding to be tested is dropped over the core, whereupon a deflection occurs if any shorted turns are present.

The same device is also useful in comparing magnetic material samples. Place two razor blades, hacksaw blades, or laminations across the open ends in symmetrical positions. If the size, material, and temper are alike no deflection should be noted. Unlike samples produce an oscillogram similar to that shown in Fig. 3. For best results in comparing magnetic characteristics it is desirable to apply a 60 cycle sinusoidal potential to the horizontal deflection system through a phase shifting circuit RC such as shown in Fig. 1, where R (max) equals 100,000 ohms and C equals 0.05 mfd. R is adjusted so that the variations in the oscillogram resulting from magnetic variations show up to best advantage.

* *By courtesy of "Electronic Industries."*

For production testing of magnetic materials the magnetic structure can be changed from the elongated E

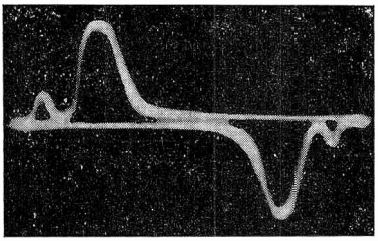

Fig. 3

shape, shown in Fig. 2, to any other balanced arrangement that will accommodate the shape of the material to be tested. An H shape, such as in Fig. 4, is often satisfactory.

It is not difficult to mount a small balanced magnetic structure on an extension cord so that the thickness of paint on a magnetic base can be estimated, by noting the deflection produced by known thicknesses of finishes.

If a magnetic core can be assembled that is precisely symmetrical as to its structure, a turn "counter" can

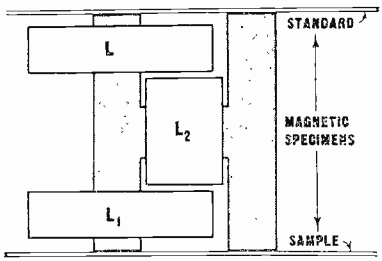

Fig. 4

be set up. Coil L_2 is mounted as in Fig. 1, together with L, a coil whose turns are known. L_1 is an unknown coil whose turns are nominally the same as L. Here the deflection amplitude that occurs when the turn ratio is not in unity is calibrated in terms of percentage of the turns in L.

Simplified Tests on Electronic Components

A cathode ray oscillograph provides an excellent means for the production testing of many forms of apparatus, inasmuch as the indication is instantaneous and there is no necessity of waiting for the needle of a measuring instrument to come to rest. However, practically, there is a lack of a standard calibration that stays constant under the hazards that production test apparatus may undergo.

This can be overcome by making tests on a comparison basis, where the characteristics of one item are visually "balanced" against a standard item. An ordinary automobile vibrator unit used as a continuously operating transfer switch will sometimes simplify the most elaborate test. These units, operating on 6 volts, transfer the oscillographic leads from one part of the circuit to another or from the standard to the item being tested so rapidly that both records appear superposed on the screen. In some cases, a vibrator can be used that has extra contacts on it, connected so as to alter the horizontal deflection displacement enough to offset one of the two vertical deflections so as to simplify comparisons.

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Be sure to notify the Mailing Dept. of "The C-D Capacitor," Cornell-Dubilier Electric Corp., South Plainfield, New Jersey, giving the old as well as the new address, and do this at least four weeks in advance. The Post Office Department does not forward magazines unless you pay additional postage, and we cannot duplicate copies mailed to the old address. We ask your co-operation.

WANTED: Signal Corps Equipment

You may have Radio-Amateur and Photographic equipment that is urgently needed by the Army Signal Corps. The Army will buy the following from private individuals.

Radio: Standard and commercial built short wave transmitters (such as Hallicrafters HT-1, etc.; Temco and Collins Model 32 and 30) and Standard and commercial built short wave receivers (such as Hallicrafter, National, RCA, RME, Hammarlund or Howard); AC and DC Voltmeters, Ammeters, Milliammeters, Radio Frequency Meters and Volt-ohm-milliammeters; Oscilloscopes, 2-3 inch; Audio sig. gen. 30-15,000 cycles; RF sig. gen. 15-215 megacycles; late model Tube Checkers, and other test equipment.

Photographic: 35 MM Motion Picture Cameras (such as Mitchell (all models), Bell & Howell - Standard Professional, Akeley-Professional (all models) and Eyemo (all models) Bell & Howell Mfg.), etc., and 16 MM Motion Picture Cameras (such as Cine-Kodak Special, Magazine Cine-Kodak, Filmo 70.D or Filmo Auto Master); Tripods; Lenses, all types for 35mm and 16mm equipment; Exposure Meters; and Cameras (such as Speed Graphic 4" x 5", and Speed Graphic 2¼" x 3¼" with or without flash synchronizers) and Leica Model III (F) or 11B (C), or equal; Range Finders; Pack Adaptors and Cut Film Holders.

If you have this type of equipment, you can assist the war effort materially by selling it to the Army. Write to:

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PHILADELPHIA SIGNAL CORPS PROCUREMENT DISTRICT
5000 WISSAHICKON AVENUE, PHILADELPHIA, PA.

briefly describing the equipment you have and stating the price at which you can offer each item, FOB Philadelphia. Do not ship any material without specific directions from that office.

Price consideration is based upon your net cost less reasonable depreciation for use, age, and condition of equipment. Inasmuch as all equipment is being purchased FOB Philadelphia, cost of packing and shipping can be shown separately so that an allowance for the costs can be made when material is accepted.

A Free Market-Place for Buyers, Sellers, and Swappers.

These advertisements are listed FREE of charge to C-D readers so if there is anything you would like to buy or sell; if you wish to obtain a position or if you have a position to offer to C-D readers, just send in your ad.

These columns are open only to those who have a legitimate, WANTED, SELL or SWAP proposition to offer. The Cornell-Dubilier Electric Corp. reserves the right to edit advertisements submitted, and to refuse to run any which may be considered unsuitable We shall endeavor to restrict the ads to legitimate offers but cannot assume any responsibility for the transactions involved.

Please limit your ad to a maximum of 40 words, including name and address. Advertisements will be run as promptly as space limitations permit.

WANTED—Knight Little Giant 7 watt amplifier for 110-120 volts a.c. Must be complete with speaker and mike. Cash, state price, condition first letter. J A. Texeira, Jr., 28 Prospect St., Somerville, Mass.

WANTED — Typewriter and ohmmeter, state price wanted. Milton Farber, 454 Ocean Ave., Jersey City (5), N. J.

FOR SALE—Modern radio course National Radio Institute, good condition, $25 COD; 0-1 ma. Weston meters, etc. Write for list of sets, parts, etc. Need camera, projector, tripod, etc., similar to Kodak, Monitor or Vigilant. R. D. MacPherson, 69 Nichols Avenue, Brooklyn, N. Y.

WANTED—Hickock or Weston late tube tester and good signal generator. Have speakers, tubes, books, parts, motor, jig saw and radios for sale or trade. Royce Saxton's Radio Shop, Rt. 1, Pontiac, Illinois.

WANTED—Will pay cash for late model Hickok tube checker. Rider's manuals, any vol. Must be in good condition. What have you in radio equipment? Vernon Taylor, Box 9, Elgin, Texas.

FOR SALE — RCA capacity electronic control model no. 41903, new in case. Two GTC model G Porta-Power and 3 model I packs, six audio transformers, four Motorola auto radio control heads and cables; one BOP control head with cables, set panel plates for auto dash mounting. Several 6 volt auto speakers. Edwin T. Larason, Martinsburg, Ohio.

FOR SALE OR SWAP — Servicing by Signal Tracing, Servicing by Means of Resistance Measurement, Automatic Freq. Control, Math for Elect. and Radiomen, Radio Physics Course, Reson. and Alignment. Sadler, 1112 Benton, Kansas City, Mo.

FOR SALE — NRI fundamental radio course and 11 lessons in advanced course $10. Superior set tester $24; Readrite 0 to 50 volt meter, Gibson model L50 guitar with case, $45. All in excellent condition. Robt. Joe Helderman, Box 1, Lowell, N. C.

WANTED—Majestic radio, model 250 or 250-M 5 tube ac-dc receiver complete with tubes and in good working order with or without cabinet. Will pay reasonable cash price. Drop me a line. O'Brien's Radio, 609 W. 1st St., Fulton, New York.

FOR SALE—RME99 deluxe receiver like new with speaker to match, cost $160 sell for $110, terms $25 down balance COD, also DB20 Preselector 6 bands $25 cash. E. L. Shafer, rm2c, U.S.C.G.R., 2889 E. 116th St., Cleveland, Ohio.

FOR SALE—RCA Sr. Voltohmist; Triplett 1200C VOM; Triumph sig. gen.; 115 v. a.c. phono motors and relays; ATI 7" CR tube, 1500 v. power supply; saw tooth sweep; transformers; vel mike; tubes, resistors, capacitors. L. DeZube, 3900 N. Franklin St., Philadelphia, Pa.

WANTED — Thordarson T-90S13 or 3S22 output transformer. Send price and condition. John E. Loraine, 211 Summer Ave., Newark, New Jersey.

FOR SALE—Fundamentals of Radio, by Everitt $4; Aircraft Inspection $2.50, both new; micro-tube lab., hearing aid kit with all parts except battery cable and case; 2 M74 and 1 M54 microtubes; 1 CK503 tube and socket; two 1 meg midget volume controls; one hearing aid audio transformer. Edwin Larason, Martinsburg, Ohio.

FOR SALE—One RCA 3-inch oscilloscope, model TMV 122B. Good condition. Make me a cash offer. Write. G. J. Dohm, 438 West King Street, York, Pa.

FOR SALE—60 late phono records like new, mostly dance bands, 10c each, also 40 Edison cylinder records, bands, vaudeville, etc., in perfect shape 10c each, Lot of magazines. Best offer takes them. E. P. Schoeneck, Route 2, Box 16, Wahpeton, N. D.

SELL — Best offer will take: Clough-Brengle oscillator (model OM), Shure Uniplex and Astatic R3 crystal microphones. Meissner FM tuner, Hallicrafter S 19R, Astatic AB 8 pickup. All in perfect condition. All letters answered. Bob Joines, 236 North Palm, Upland, Calif.

FOR SALE — Clough Brengle Model 88 Vacuum Tube Voltmeter in excellent condition, no scratches and not shop worn and used but little. 0-1.2 RMS volt scale and 0-10, 0-100 peak volt scales. $45. Fox Radio Service, 435 So. 5th St., Richmond, Indiana.

FOR SALE—Neon sign and transformer 5" letters Radio Shop, $15. Carter genemotor six volt input 90 and 250 output, $10. Reids Radio Shop, Parkersburg, Iowa.

FOR SALE—All in new condition 1 yr. old: 1 Supreme multitester 592-593 $50, 1 Precision 200E signal generator $35, 1 Triplett tube tester No. 1613 $35. W. J. Luckas, 56 Spooner St., Floral Park, L. I.

FOR SALE—New, complete G. E. 5 in. television console with tubes, price $99.00. M. Abramovich, 894 Riverside Drive, New York City.

WANTED—New and used meters and test equipment, will pay very good prices, write details, M. Abramovich, 894 Riverside Drive, New York City.

WANTED—Will buy Riders manuals 9 to 13, signal generator, also RCA volt ohmyst and modern tube tester. Must be perfect Eugene Gilbert.

WANT—Astronomical or terrestial telescope with 3 inch or larger achromatic lens. Describe fully. Have new tubes, test equipment, many usable articles, cash, etc. F. Madlinger, 1704 Palmetto St., Brooklyn, N. Y.

FOR SALE—These are all Weston meters 2 model 301, 0-25 ma, 1 model 301 0-10 ma, 1 0-50 ma, 2 0-100 ma, 1 0-300 ma, 1 0-5 amps dc, 2 model 425 current squared thermo galvanometers, 1 model 269 0-350 ma. fan type milliammeter. Prices on request. Karl Neuwirth, 16 May Place, Nutley, N. J.

WANTED—Late model communications receiver. Please send particulars to Lieut. Leo Meister, Proving Center, Aberdeen Proving Ground, Md.

WANTED—Rider Chanalyst or other signal tracer. Will pay cash up to $50. Will consider home-made device if good. Henry Burwen, 17 Sheffield Road, Melrose, Mass.

FOR SALE—Electric Specialty Co. rotary converter, 115 dc to 110 ac voltage, 60 cycles, 160 watts.

FOR SALE—RCA portable model 4816 record player, 110 volts, 12" turntable. Burcher's Electrical Store, 513 Main St., Honesdale, Pa.

WANTED — Meters, signal generators, tube checkers, VC meters, VTV meters, receivers, etc., firearms, tools of all kinds, paint brushes, wool sponges, electric drills, etc. Describe fully. Roby's Swapmart, 3569 Cottage Grove, Chicago, Illinois.

FOR SALE — W.E. model 18-B 30 MC mobile receiver complete with dynamotor. G.E. 3 winding dynamotor 24, 750v, 750v-250-125 ma. Weston model 269 0-5 a. RF ammeter with external thermocouple. Splitdorf 0-50 v. dc. voltmeter. Rola F-4, Jensen D-12 and Jensen D- speakers. Any reasonable offer considered. G. H. Underhill, 2 North Randolph Ave., Poughkeepsie, New York.

WANTED — Model 1280 Superior set tester. Will pay cash. Please state price and condition. Could also use Superior model 1230 signal generator. White John O'Reilly, 1823 White Plains Road, Bronx, N. Y.

WANTED—955 and 954 Acorn tubes. Fox Radio Service, 435 South Fifth Street, Richmond, Indiana.

WANTED — All kinds meters and test equipment, new and used, pay very good prices. Electronics Service and Supply, 264 West 40th St., New York, N. Y.

FOR SALE—Have 9 Dunco relays 24 v. ac coils (can be operated 110 ac by series resistor). Contacts handle 30 amps. 110 ac. Single pole, double break contacts in good condition. H. Ursillo, 85 State St., E. Providence, R. I.

(*Continued on page* 14)

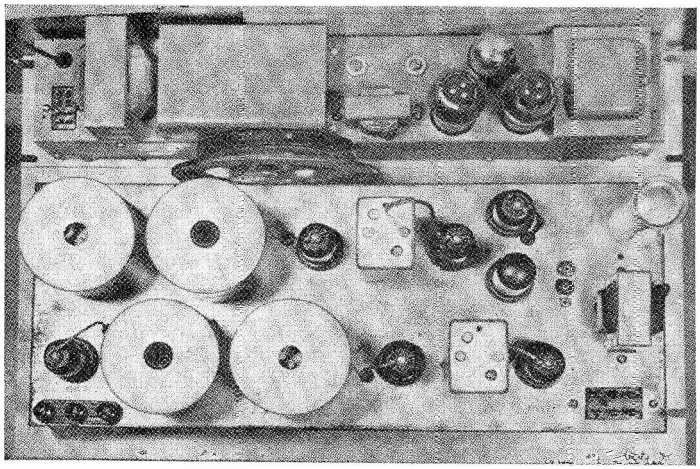
AIR-RAID ALARM CIRCUIT *

Alert alarms are vital for the protection of many of our coastal regions. Herein described are several proven designs used for civilian defense.

Since it is necessary to activate countless areas for air-raid warnings practically instantaneously, a swift medium of notification must be used. In radio, we have one of these lightning means of contact.

It has become the duty, therefore, of many types of transmitting stations, to maintain a constant listening watch for such warnings. Since it is impossible for the central air raid information supply source to reach all of these stations at once, a linking or network system must be used. Stations with wide coverage are used as key stations. These key units transmit a warning tone, when so notified. It is these warning tones that the other stations pick up, that completes the cycle of notification, and alerts the area. Since these notes, transmitted on the key station frequency, may come at any time, the listening-in post station must provide a constant watch. This can be done by either of two ways: a crew of operators or an automatic listener-in.

Many stations have selected the automatic operator or listener-in method, for it has proven not only to be very efficient, but a man-power saver. And both of these features are certainly essential today. While the automatic operator or listener-in takes many forms or circuits, its basic mode of operation is the same. For it is linked to the receiver and tuned to the key station frequency constantly. When the tone is picked up, an alarm

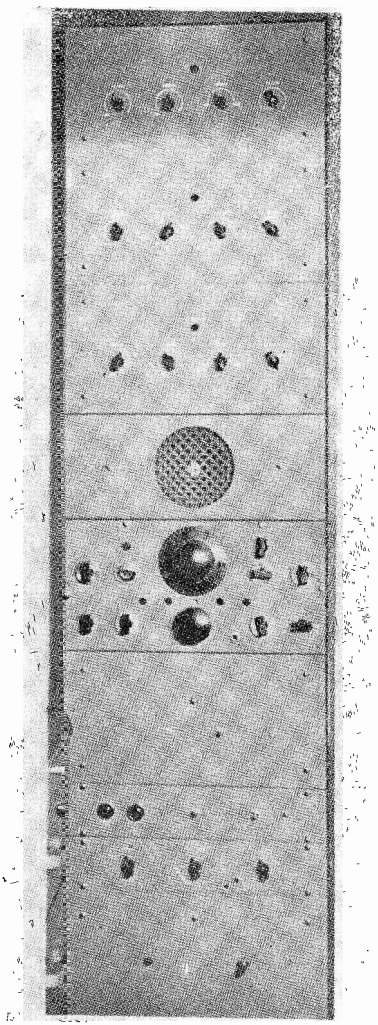


Top view of the Missouri State Highway Police alarm unit.

* *By Willard D. Stewart in "Radio News."*

is activated. Then the wheels of the air-raid warning service start flashing around.

The circuits used in these air-raid alarms have a variety of interesting features of design. Incidentally, although these systems have been adopted for use in listening-in post stations, they can be applied to the receivers in the home, too.



Panel layout of the fixed-tuned receiver and alarm system of the Missouri State Police.

Now, let us take a look at some of these circuits. All circuits have a basic purpose, as we mentioned previously. That is, they must respond to the warning tone. That means that none but the frequency of this tone must alert or actuate the circuit. It is in the means of actuating that most of the circuit variance exists.

In the unusually simple, yet effective alarm system, developed by Lieutenant Arthur H. Vickerson and Sergeant Robert L. Gray of the Boston Police, we find many interesting features. Relays are, of course, essential units in most alarm devices. We say most, for there are some that do not use the relay. This will be discussed later. In those alarms that do use the relay, the contacts of a relay may be connected to the output of a receiver. The contacts of this relay may then be made to energize the field of a second relay, using the voltage obtained from the "B" supply of the receiver. Across the winding of this second relay can be placed a large electrolytic condenser and resistor in series with each other. Then the contacts of this second relay can be used to turn on a speaker or a bell.

We obtain this result (Fig. 1A) because the normal output of a receiver is not continuous. Instead it varies according to modulation. Therefore the first relay has an opportunity to frequently come to rest on its back contact, recharging the condenser across the second relay. This, in turn, causes the armature of the second relay to remain energized, until a sustained tone arrives, which keeps the first relay from recharging the large condenser. Then the condenser discharges slowly through the resistor and the field of the second relay drops, releasing the armature which then closes the alarm circuit. The time period is determined by the capacity of the condenser and the resistor in series with the resistance of the field of the second relay. This condenser

has an action which is similar to that of a storage battery. For circuit diagram refer to Figure 1(A).

It is necessary in actual practice to use the proper relays and the correct value of resistors and condensers, and in addition, arrange them so that maximum efficiency results. For, for instance, to obtain sufficient voltage to operate the first relay in the Vickerson-Gray system shown in Figure 1 (B), it was necessary to insert a step-up transformer T2, which is a plate-to-5-ohm voice coil transformer. And, instead of connecting it as usual, it was connected in reverse. To make the operation of this relay consistent, rectification was used. This was done by rectifying the output of the step-up transformer by means of a rectox unit. In this instance, this unit was obtained from an old battery charger.

The next problem concerned the exact frequency to which the circuit would respond. Thus it was necessary to devise a filter consisting of the audio choke Ch1 and condenser C1. In parallel with each other, they are connected to the screen grid of the output tube and to ground through the back contact of relay RL3. This relay is energized from the "B" supply of the receiver through the back contact of relay RL2. When the relay

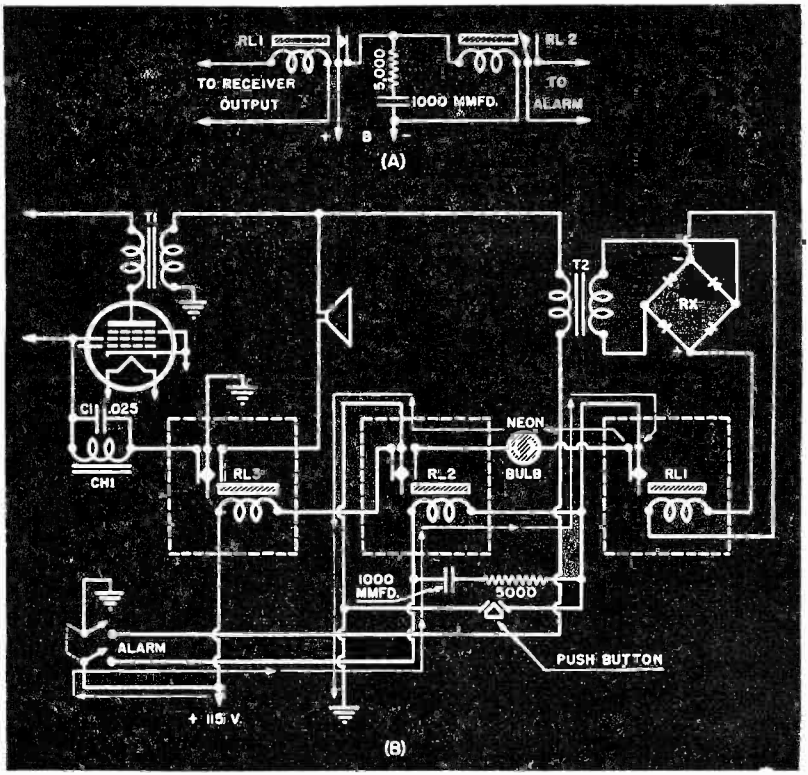


Fig. 1. The Vickerson-Gray alarm system with its basic circuit shown at the top.

RL3 is de-energized, the filter combination is inserted or becomes activated. And all frequencies other than the warning tone are bypassed to ground. When the relay RL3 becomes actuated, the filter combination becomes inoperative, and the speaker is reinstated in the circuit through the front contact of the relay RL3.

To insure positive operation a 1/4 watt neon lamp signal method is used. For, for instance, the neon will flicker when the warning tone is in the receiver output. In this way, it is possible to know when the receiver volume is high enough to insure positive operation and not too high to cause false alarms. The neon lamp is inserted in series with the energizing current being fed to the relay RL2. To reset the relay following receipt of an alarm, the push-button is used.

RL1 is a 2000 ohm relay; RL2 is a 5000 ohm relay and RL3 can be any type.

In this system, the warning tone is heard in the speaker. Thus it is necessary to turn the volume up so that it will be heard. That is why the neon lamp system is so important.

The system developed by Sergeant J. W. Bryant of the radio division of the Missouri State Highway Patrol, is somewhat along the lines of Vickerson-Gray system. In this alarm, the rectified audio operated relay is used to short the bias on the trigger tube, with the bias voltage being supplied by a 6H6 rectifying the 110 ac voltage. When the relay No. 1 is held open by a fifteen-second warning tone, the bias is permitted by the time delay circuit, to build up on the grid of the thyratron and cut off the plate current. Any sustained tone of less than fifteen seconds in length will permit the armature of this relay to drop back against the back contact, short the time delay condenser and force the time delay circuit to start from the beginning on the next tone (Fig. 2).

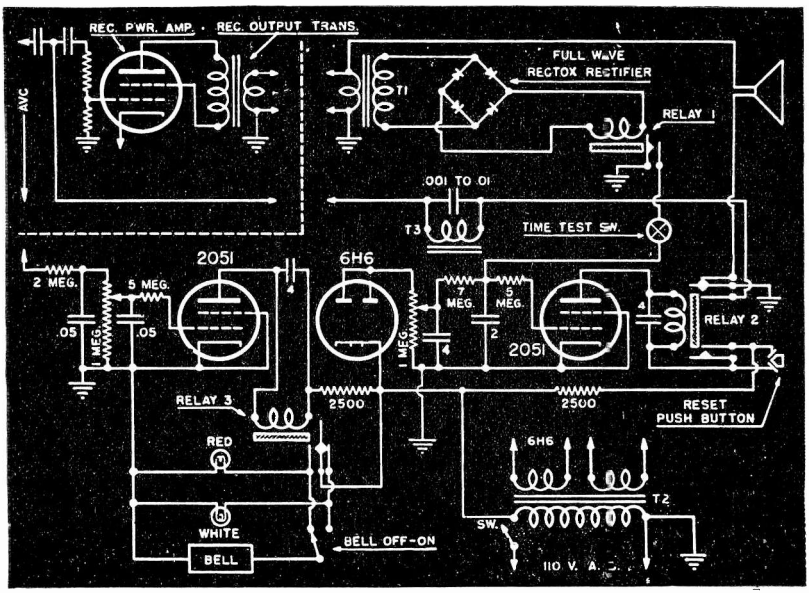


Fig. 2. The alarm system developed by J. W. Bryant as used by the Missouri State Police.

Through the time delay circuit (the 2 μfd.-7 megohm section), the ten or fifteen volts of bias supplied by the 6H6, is applied to the grid of the 2051 tube. When the back contact of the relay No. 1 is held open fifteen seconds, the bias builds up sufficiently to block the 2051 and the armature of the relay No. 2 is released. This disconnects the audio filter, connecting

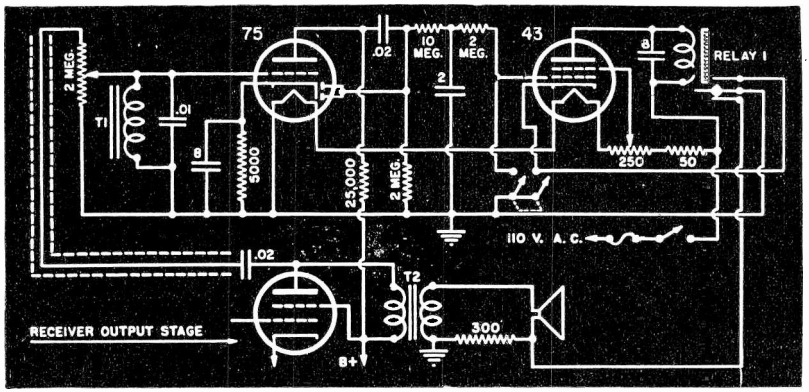


Fig. 3. The Ramsay McDonald air-raid alarm circuit as used by the Indiana State Police.

the speaker and breaking the plate feed to the 2051. By operating the push button, voltage is applied to the plate circuit of the 2051, restoring the unit to operating condition, or alarm-tone receiving condition.

Since it is always possible that the key station being listened to may have to go off the air, it becomes necessary to introduce some emergency system of warning. This is done, with what is known as a "carrier-off" alarm. Thus when the key station carrier leaves the air, the bias on the trigger tube drops to a low value, and the tube draws plate current, exciting the relay No. 3. This turns on the red signal lamp, turns off the white lamp, and energizes the alarm bell. This alarm may be discontinued by throwing the bell "on-off" switch to the "on" position. Then the operator can adjust the receiver to a frequency of another key station and maintain watch. If other stations are also off the air, the operator disconnects the silencing unit of the fixed tuned receiver and stands by on his key station (the key station originally assigned) for further instructions. When the key station returns, the relay No. 3 is relaxed and the bell "on-off" switch, being in the "on" position, causes the bell to ring. This indicates that the station is resuming service. The operator then listens for instructions, if the alert is still in effect.

Any type of relay with sufficient contact spring and resistances of 2500 to 5000 ohms can be used.

An air-raid alarm that uses a minimum of parts has been developed by Ramsey McDonald, supervisor of the police radio station in Richmond, Indiana. Only one relay is used in this system, and according to Mr. McDonald, almost any 115 volt ac type will do. He suggests that the tension spring be adjusted so that the relay will close on about .02 ampere and release on about .007 to .009 ampere. To determine what value of current should release the relay, it is necessary to check the plate current on the 43 tube, with the warning tone signal input on the 75 tube. The value of the current drawn after ten to fifteen

seconds should be the adjustment for the release on the relay (Fig. 3).

The 2-megohm variable control is quite critical, according to Mr. McDonald. Once this is set, you can use the volume controls of the receiver. If the controls are set too high, the relay will release on organ music. But by reducing either the 2-megohm variable control on the alarm or the volume control on the receiver just below this point, only the warning tone will be received. To be sure that the spring adjustment is set right, a milliammeter in the plate circuit of the 43 should be used.

By using another relay and a 43 circuit, a "carrier-off" circuit can easily be added to this system. Incidentally the operating voltage is obtained from the avc bus in the receiver. All values shown in the circuit have 400 volt ratings for the condensers and 1 watt for the resistors, except for the 250-ohm divider, which is a 25-watt affair. The 50-ohm resistor is a 10-watt unit. A 10-henry choke is shunted across the .01 μfd. condenser in the grid circuit of the 75.

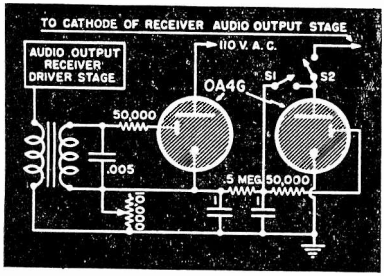


Fig. 4. An alarm system without relays.

During our introductory remarks, we stated that while most alarm circuits used relays, there were some that did not. Here is one of those that does not use relays. It was developed by Ralph Hicks, supervisor of police radio at Tulsa, Oklahoma. The basis of the system has been designed around the operation of the cold cathode tube, the OA4G (Fig. 4).

In this alarm system, the incoming signal from the receiver passes through the single section filter to the control (trigger) starter anode of the first OA4G tube, which passes current only when the warning tone is applied to it. When the current starts to flow, the 1 μfd. condenser bridging the 10,000 ohm variable resistor, is charged positively at 70 volts, since the tube is also a rectifier. Then the 1 μfd. condenser in parallel to it, starts to charge through the ½ megohm resistor. When the voltage comes up to 60, the second OA4G tube triggers into operation and allows the last audio stage of the receiver to operate normally. This permits audible monitoring of the station. Since this second tube is between the cathode of the last audio tube and ground, there is a dc voltage across the tube. It does not cut itself off. But it must be shut off by momentarily opening the switch S2 to silence the speaker. This sets up the unit for warning tone receiving. The switch S1 is used to short out the control tube and permit normal operation of the monitor receiver.

While a sharper input filter than the plate-to-grid transformer and shunting condenser can be used, this one was found satisfactory. If more sections are used, care should be taken to be sure that the audio voltage is impressed between the starter anode and cathode of the first tube, since the cathode is above ground and incorrect connections would affect the amount of voltage on the tube. Incidentally, the plate voltage of the last audio tube in the receiver should not be more than 225, since this is the breakdown voltage of the OA4G. Since the tube replaces the cathode resistor of the last stage, a cathode condenser should not be used in this stage.

Using the values of ½ megohm and 1 μfd. in the series-bridging circuit, the tone will be heard after five seconds of tone, and the static interrupting time. These values can be changed to provide any desired operating time delay action.

The receiver used with this system should have a good avc, particularly if a weak signal is to be monitored.

The 50,000-ohm resistors are the current limiting resistors for the two trigger tubes. Starter anode currents should be a maximum of 200 micro-amperes for both tubes.

A very unique alarm system is in operation in a broadcasting station in Indiana. Developed by Victor H. Voss, chief engineer of WIND, the circuit (Fig. 5) is designed to operate on a warning tone of 20 to 30 seconds duration. And almost any superheterodyne type of receiver can be used with his system. In this system, a signal from the last i-f stage is fed to one diode section of a 6H6, functioning as a second detector. The audio output of the detector is fed to a 6C5, which is used as a voltage amplifier. This amplifier drives another 6C5 filter tube Then the output of the filter tube is fed into the primary of a transformer. The voltage developed across the transformer secondary is rectified by the other section of the 6H6. The output of the second diode section of the 6H6 is then fed into a relay circuit and travels across a load resistor. This resistor is in series with the grid circuit of the 6C5 relay control tube. The 22.5 v. battery provides sufficient negative voltage to cut off the anode current of the 6C5 relay control tube in the absence of an incoming carrier. The alarm operates if the carrier is cut off. However, in the presence of a carrier, a voltage is developed across the diode detector load. This partially balances out the bias battery, allowing sufficient current to flow in the control tube to close the relay. Thus the alarm circuit then becomes available for the alarm tone. Upon receiving the warning tone, a voltage is developed across the load resistance in the relay circuit of the second 6H6 section. This voltage balances out the carrier voltage developed across the detector diode load resistor allowing the bias battery to cut off the plate current of the control tube and consequently opens the relay and produces an alarm. This alarm is a bell, which rings, until the operator throws

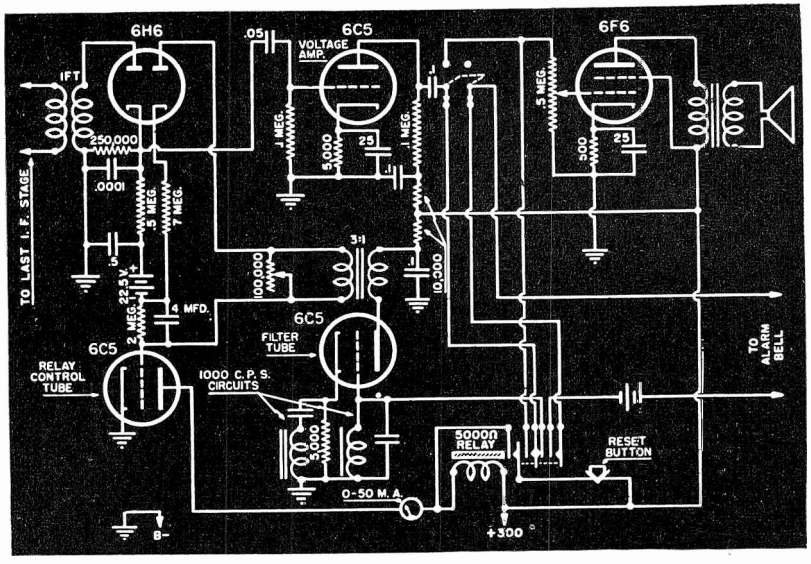


Fig. 5. Schematic diagram of a unique design for use with superheterodyne receivers.

a switch, which removes it from the circuit and connects a monitor speaker over which announcements may be heard. Depression of a reset button when the alarm period is over, restores the system to its original stand-by condition.

Incidentally this unit is so designed that a warning is provided not only when the required warning tone is received, but also in the event that the monitored station carrier, the unit itself or the associated receiver fails.

The relay used has a dc resistance of 5000 ohms. It opens at 6 ma. and closes at 12 ma. If one of lower resistance must be used, a series resistor must be added.

In making the initial adjustments of the receiver, the r.f. gain should be adjusted to give a value of 15 ma. in the plate circuit of the 6C5 control tube.

All of the systems described have gone through an intensive series of tests and have proven themselves extremely reliable. We hope that they will never have to be used for other than tests. But if the critical emergency does arise, they will be ready to serve and serve well.

THE RADIO TRADING POST

(*Continued from page 6*)

WANTED TO BUY FOR CASH—September 1940, October 1940, July 1941, November 1941, July 1942, August 1942 and October 1942 issues of The C-D Capacitor, and any previous issues before August, 1940. All letters answered. State your lowest cash price. Clyde Felty, RR No. 1, Liberal, Mo.

WANTED—Tube tester, multitester, and condenser analyzer or late model combination tube and set tester, preferably dynamic conductance type; also Rider's manuals, vols. 7-13. State condition, price, and year of manufacture of testers. Paul Cumming, 422 Broadway, Peoria, Illinois.

FOR SALE—Turner crystal microphone, model 33X, brand new, $25; Turner dynamic, microphone, model 22D, brand new, $25. Microphone floor stands, from $9.60 on up. All brand new, friction type. Amperite friction type banquet stand, $10. John J. Spankowitch, 239 North 9th Street, Allentown, Pa.

WANTED—Following issues of "Proceedings of the Institute of Radio Engineers": Vol. 18, Nos. 2, 3; Vol. 24, Nos. 5, 7, 8, 9, 10, 11, 12; Vol. 27, Nos. 8, 10. C. G. Conn Ltd., Library, Elkhart, Indiana.

FOR SALE—One Jensen Q8P high-frequency tweeter speaker, never used. Will sell for $5, prepaid anywhere in U.S.A. W. C. Trautman, 119 N. Mansfield, Los Angeles, Calif.

WANTED—Hallicrafters S-22R or similar for cash or will trade Hallicrafters S-20 as part payment. M. J. Dodge, New Windsor, Md.

WANTED—1 all wave signal generator, 1 Precision model 920 mutal conductance tube and set tester. State prices. Frank P. Leamer, Jr., Alexandria, Pa.

SELL OR TRADE—140 pairs Chicago roller skates, perfect condition. Have complete outfit ready to roll. Excellent opportunity for right party. Want radio equipment and parts. Need Chanalyst or Voltomist, also good microphone. W. S. Frank, Route 3, Box 2, Chippewa Falls, Wis.

SELL OR SWAP—Univex Mercury camera 35mm, 3.5 lens, 1500 sec. speed and flash gun unit, leather carrying case, exposure indicator, red filter, 5 flash bulbs, like new. $35 or good radio instrument. George Lang, 32 W. Garrison St., Bethlehem, Pa.

FOR SALE OR TRADE—1 Confidence tube tester with modernization panel; 1 Triplett Lab. complete (175 kc osc.); 1 Briggs-Stratton 1 hp motor, model FH.; 1 Remington repeating rifle, model 12A, with special Marble front sight (like new). Will trade rifle for multitester or condenser tester. Clifford D. Lessig, Frenchtown, New Jersey.

FOR SALE—2 used power trans. for 5v, 2½v, 1½v tubes, $1.00 each; 2 used 6v genemotors, good cond., $1.00 each; 4 prs. Kline 6 in. longnose pliers (new) $2.25 each; 3 15 in. heavy duty dynamic speakers, no trans., $10 to $15 each. Any of above shipped FOB on receipt of price. M. A. Porter, 1713 Larrabee St., Chicago, Ill.

SELL OR SWAP—Have a good supply of bakelite loctal sockets which take 4-prong UX base tubes. Will swap for any standard bakelite or wafer sockets, or other radio parts. Norbert Rudie, Holdingford, Minn.

TRADE—For late tube tester and oscillator. Speakers ac-dc dynamic and magnetic, dry disc rectifiers, headphones, elec. phono motor and pickup, transformers, radio generators, many used parts. All letters answered. D. Ingersoll, 1741 Lysander, Detroit, Mich.

WILL SWAP—Five 5.50x17 tires and tubes four almost new, for a good two or 3 in. oscilloscope, or a good short wave commercial receiver, or what have you. Joseph Bucca, 1871 W. 13th St., Brooklyn, N. Y.

WANTED — Illuminated window sign, either RADIO or RADIO SERVICE. Will pay cash or what do you want in trade. Also want new or used tubes in good condition. Byron Radio Shop, Byron, Illinois.

WANTED—Dry disc rectifier units with or without transformers, or any pack, A eliminator, trickle charger, field supply, etc., using dry disc units, Sterling, Hoyt, etc.; small 2½" or less; meters dc ma up to 500 ma. Wheel static eliminator springs similar to J.F.D. Masonite regular or tempered. Will buy or swap. See ads in June "Capacitor." Send details. Bob Eubank, 1227 Windsor Ave., Richmond 22, Va.

FOR SALE OR SWAP—No. 6033A Western Electric hearing aid complete. Includes 388W transmitter, 550 BW ear insertion phone, 11A battery box, cables, etc. Uses only three standard D flashlight cells. No tubes or B battery needed. Excellent condition. Sold for well over $100. Want National NC-100X or NC-200 without tubes or speaker or complete. or make offer. R. N. Eubank, 1227 Windsor Ave., Richmond 22, Va.

FOR SALE — Portable Jackson dynamic output radio analyzer, model 535A, $25. F. Combs, 344 Peach Orchard Road, Dayton, Ohio.

FOR SALE—A.K. "B" eliminator with 607 rectifier tube, 7 short wave 4 prong plug-in coils. Bud 2.5 m.h. r.f. chokes, new in original case. 50 radio chassis with half parts still mounted, many later models, 100 used tubes, plenty of hearing aid parts; instrument cases, midget condensers, crystal mike, Astatic crystal ear piece, low impedance magnet ear piece. Edwin T. Larason, Box 46, Martinsburg, Ohio.

WANTED—A Precision tube tester, model 912P, 912CP or 912C, new preferred but will accept one in new condition. Quote price and condition. Anthony Vital, 317 Linden St., Camden, N. J.

WANTED—In good condition a McMurdo Silver Model 6 late or early model receiver, with console. Must be reasonable. Send details. Paul Capito, 637 W. 21st St., Erie, Pa.

FOR SALE — Thordarson Model T30W25 broadcast type high fidelity 25 watt 6L6 amplifier, complete with tubes, in new condition. Original price $95.00. First $50.00 takes it. George E. Beggs, Jr., c/o Leeds and Northrup Co., 4901 Stenton Ave., Philadelphia, Pa.

FOR SALE OR SWAP—1 WE output trans. for PP 211Es, tubes 1 WE 282B, 5 WE 231D, 3 WE 275A, 2 WE 211E. 4 Centralab PA Delta T pads 50 ohm; 3 RCA magnetic phono heads; 1 6v to 180 30 ma genemotor, 1 6v to 225v 50 ma genemotor, various Weston and Jewell meters, 6v pot units for trumpets. H. H. Harrison, 300 37th St., Sacramento, Calif.

TRADE—5 vol. ICS Reference Library in Industrial Management, in very good condition, for Radio Course, radio books or testing equipment or what? R. A. Lorant, Sr., RFD 1, New Kensington, Pa.

FOR SALE OR TRADE—1 Webber oscillator, battery operated, 90 kc to 25 mc range, good working condition, with battery $15.00. 1 No 171 RCA station allocator, ac-dc or battery operation, less battery, new condition $17.50. 40 new and 20 used tubes. Want Rider's 1 to 5 incl. Glandorf Radio, Williamsburg, Iowa.

WANTED—RCA Radiola Model 17 condenser block, test equipment VOM and oscillator, will consider any make. State price and make, all mail answered. John J Puzio, Radio Service, 1250 Franklin St., Taylor, Pa.

FOR SALE OR TRADE—Radio transmitting parts, meters for fast wide angle lens cover 4x5, 127 mm Ektar lens in supermatic, or other photographic equipment or Bantam Special. Gommo' 46 Northwest 94 St., Miami Shores, 38, Florida.

WANTED—Rider's manuals 7 to 13, Rider chanalyst, Jr. voltohmist meter, Precision E 200 series 900 tester, state price. Joseph Trahan, 45 Dyer St., Danielson, Conn.

SERVICEMEN—TUBE DEALERS — Tubes available. Many odd types can be used as alternates for hard to get types. Example—20 types will replace 12Sa7, 12SQ7, 12SK7, 35L6, 35Z5. No set, socket wiring changes. List of nearly 100 alternate types used in our shop and how to use them sent postpaid for 75c. C. E. Ranniger, Gowrie, Iowa.

TRADE—Cinaudagraph 18 in. PM speaker and Radio News hi-fi amplifier for Scott 30 tube Philharmonic, Scott Phantom 19 tube, Phantom DeLuxe 20 tube or Scott 16 tube radio. Cash for difference. Howard Aberrathy, Blakesburg, Iowa.

WANTED—Will pay cash for Rider's Manuals, late model tube checker, output meter, set analyzer and new radio tubes. Eugene Gilbert Radio, 1296 Sheridan Ave., Bronx, New York, N. Y.

FOR SALE—1 Supreme model 505 tube tester up to date, $40.00 cash. Ramm's Radio Laboratory, 218 South Bronough St., Tallahassee, Fla.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