A Fire Alarm That Dials Your Phone

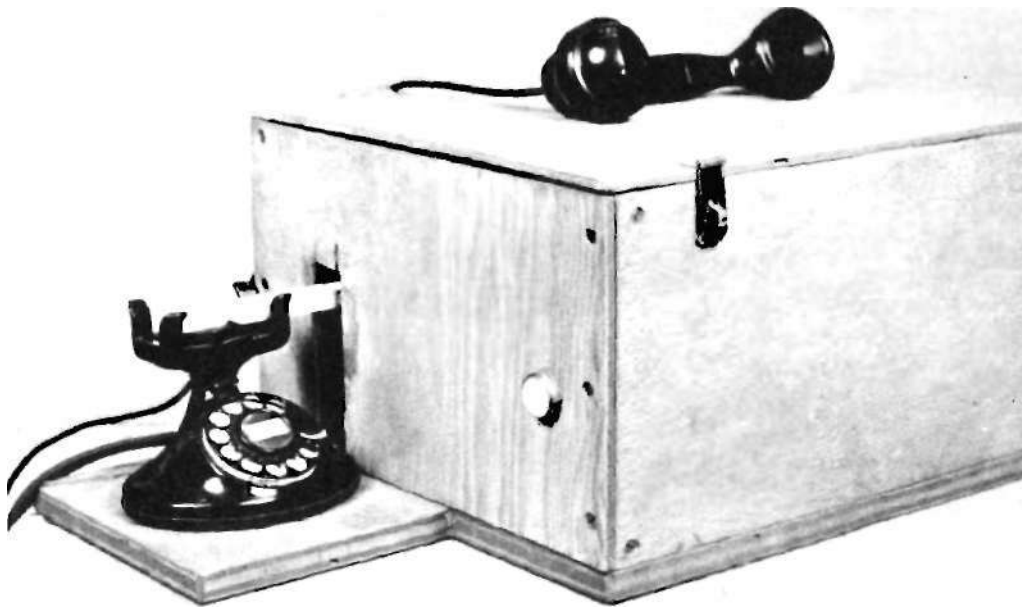
By Tracy Diers

Protect your store or office with a unit that will dial your home number and buzz a warning.

IF you own a business, store, or home, you are concerned about the ever-present danger of fire. You can build a simple fire alarm that will work 24 hours a day for only a few cents worth of electricity, little enough, considering that it will telephone you and report a fire at the moment the trouble starts. However, you must have an alarm on the premises or construct one to use with this device.

Also you must have a dial telephone at the place to be protected. You may be surprised to know that you don't need the

The telephone If placed on the wooden platform with "dialing arm" resting In the cradle. Handset remains atop cabinet and picks up the buzzer sound



nose pliers or some other type of heat sink on such lead, leaving it in place until the connection has cooled.

Small size and low value do not go hand in hand in potentiometers but this requirement is admirably met for R7 by one of the inexpensive hum reducing variable resistors used in the filament circuits of many amplifiers. The one in the illustration is called the Humdinger. The meter may be any size or shape. Any value under one milliampere may be used by reducing the value of R6 to shunt more of the current. The recommended meters are; 0-1 milliammeter for 12 volts and a 0-500 microammeter for 6-volt systems.

Installation consists of mounting the meter either through the instrument panel or in a small box which may be attached wherever convenient. The negative lead goes to any nearby ground point and the positive lead should be connected to the ignition switch terminal which is "hot" only when the ignition is on. The pulse terminal connects via a well insulated lead to the ungrounded side of the breaker points in the distributor. It is from this point that a lead goes to one of the low voltage terminals of the ignition coil and the connection can be made at either point.

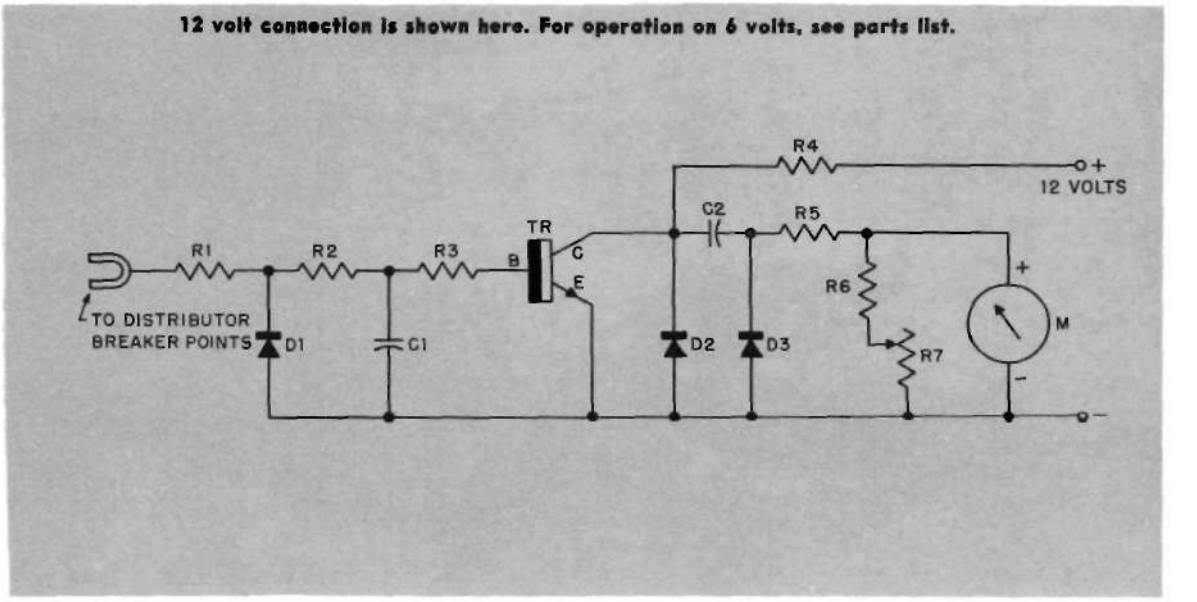
Calibration can be carried out at the nearest garage. Have the mechanic attach his tachometer, rev up the engine and adjust R7 so the meter agrees with the garage instrument.

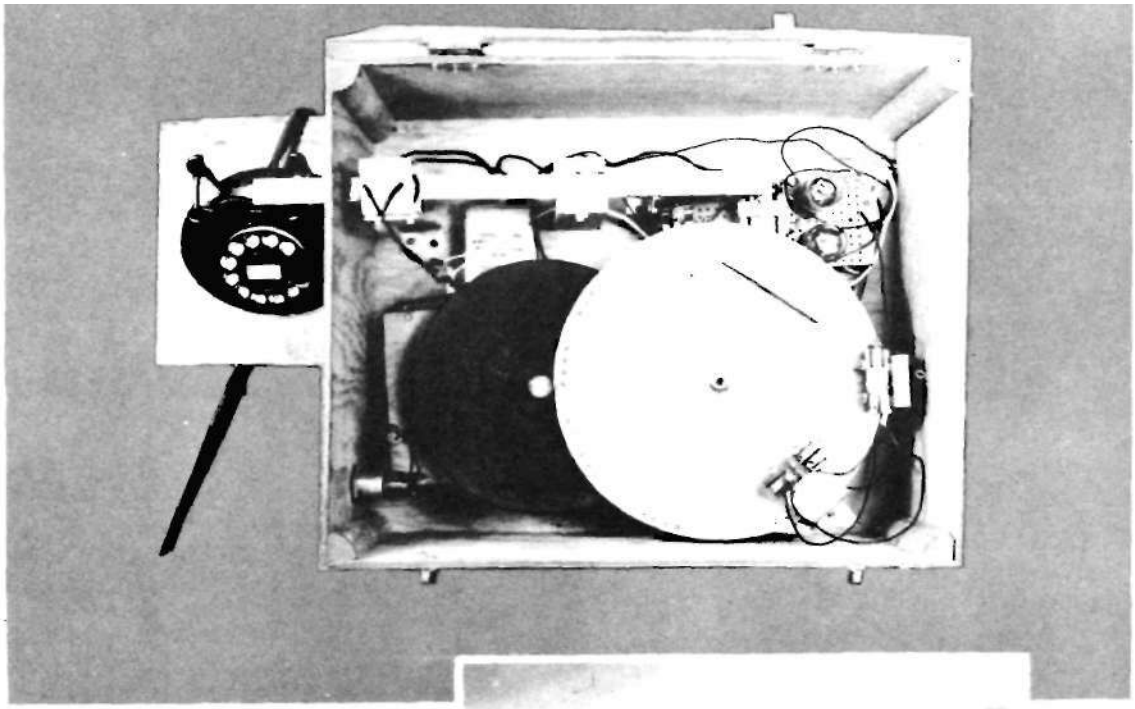
Variations in the value of the components may require a change in the value of R6 to place exact calibration within the range of R7. If, by adjusting R7, the tach reads too high, R6 should be reduced in value. Conversely, if the tach cannot be adjusted to read high enough, increase the value of R6 •

PARTS LIST

RI—3300 ohm >/i w resistor
R2,R3—22O0 ohm *1/1* w
R4—480 ohm >/t w
R5—330 ohm '/, w
R4—48 ohm i/2 *
R7—100 ohm potentiometer (Mallory type U-I)
CI—.1 mfd 15 volt capacitor
C2—.5 mfd 15 volt
DI.D3— Diode INVO
D2—For 12 volts use Zaner diode 9 volt (Texas Instruments IN757 or Transitron SVII). For 4 volts, Zaner diode, 5 volt (Texas Instruments IN75IJ
TR—Transistor 2N3S
M—For 12 volts use 0-1 DC milliammeter. For 4 volts use 0-500 DC microammeter

12 volt connection is shown here. For operation on 6 volts, see parts list.

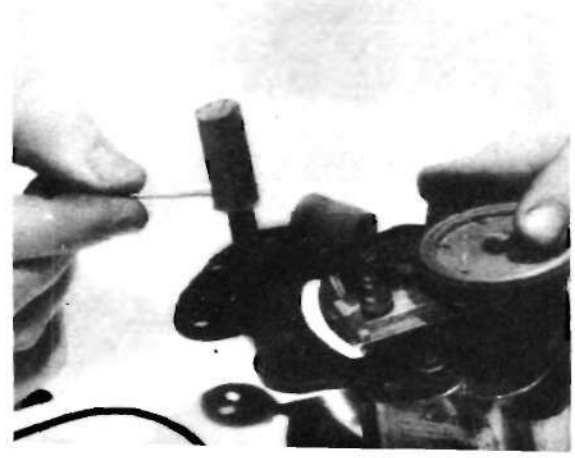


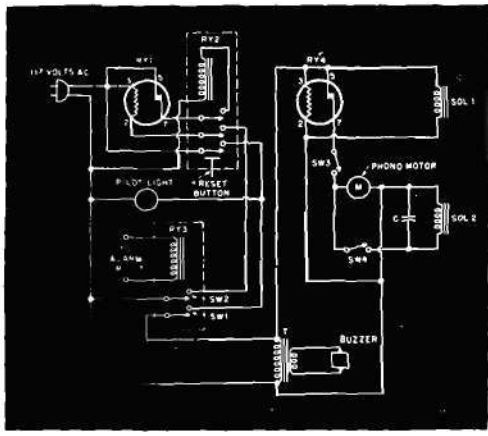


Above, the large code wheel may be seen. Brass screws along its circumference are arranged to correspond to phone number. See diagram

A small hole is drilled through the end of the phono center post. It will receive a metal pin used to hold a wood dowel shown at lower right.

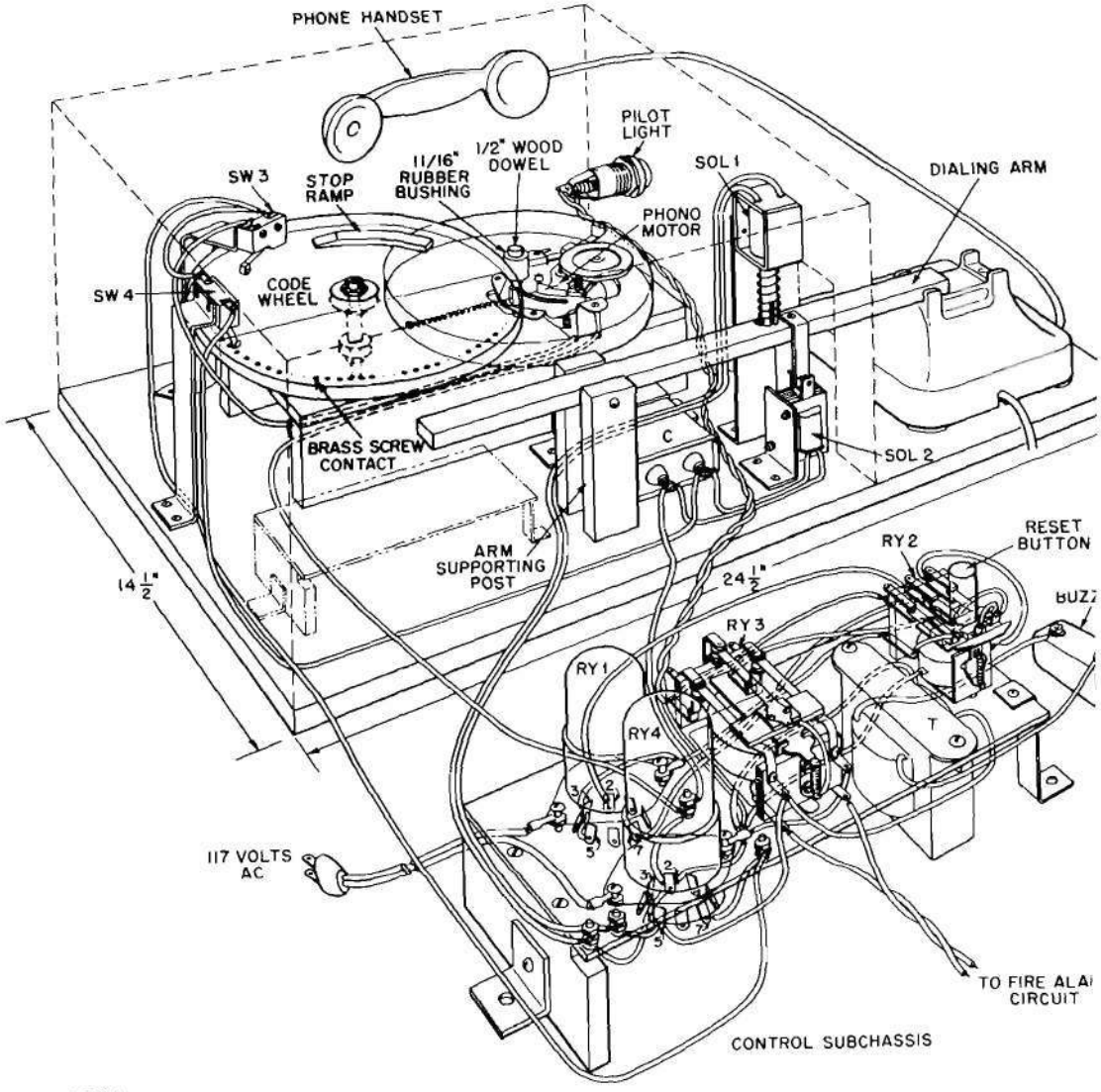
After the wood dowel has been prepared according to specifications it is slipped over the phono center post. The metal pin prevents any slippage.

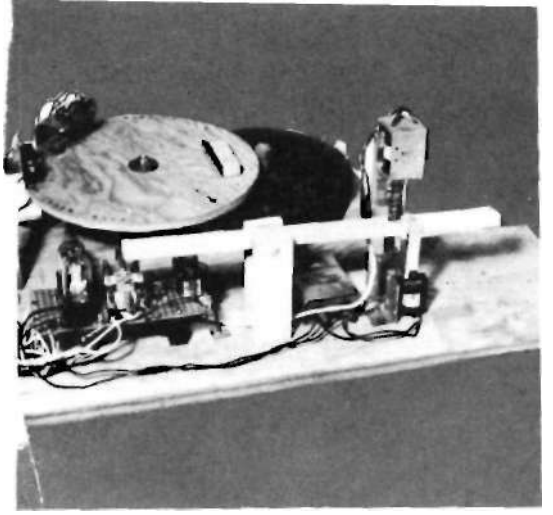




Locate "TO ALARM CIRCUIT" in schematic. Fire alarm must supply proper voltage to RY3.

The control subchassis containing RY1 and RY4 has been displaced to clarify the wiring guide.





The cabinet hai been removed to show location of the major components mounted **on** base.

The spring keeps the turntable firmly pressed against the code wheel which is mounted later.

dial on your telephone to call. When you lift the handset two black buttons (or lever) pop up on the cradle. If you tap one of these buttons rapidly up and down with your finger at the right speed you will be doing the same thing that the dial does.

The "heart" of the device is a group of thermal relays, a slowed-down phono motor, and a microswitch adjusted to send pulses of current to a "dialing" solenoid.

Actual construction is begun with the baseboard. Study all the illustrations in this article since they give complete construction details and dimensions. The board is cut from %" plywood and the phono timing mechanism is mounted first. The end of the turntable shaft must be cross drilled to receive the metal pin, to hold the wood dowels as shown in the photos. Then, slip a piece of rubber tubing over the dowel to provide a friction drive.

The motor assembly should be mounted on a piece of wood 13" by 5%". Drill a hole about %" in diameter in this piece. If you have facilities to turn metal on a lathe, prepare a brass shaft as shown. These dimensions were chosen to enable a piece of threaded brass nipple to fit snugly over the brass shaft. If you don't have lathe facilities use a threaded bolt %" in diameter and about 3" long. The brass shaft or threaded bolt should be placed in its hole and firmly bolted to the board.

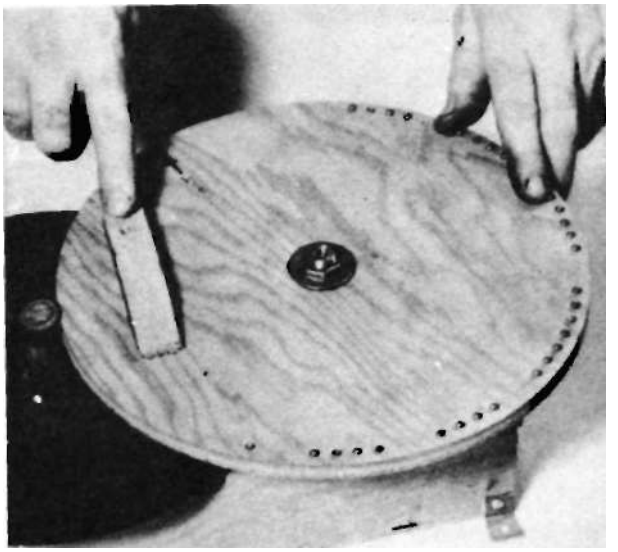
Still working on the same piece of wood, you must now cut a hole in it for the motor assembly. Also cut slots in it to receive the motor assembly support screws. Mount the motor assembly on the board and arrange the holding bolts to be a "sliding fit." The motor assembly must be free at all times to slide about %". One end of a small spring should be connected to the motor assembly and the other end is attached to a fixed point.

To support this entire assembly cut two pieces of wood 13" by 5%" and attach one of these to each side of the assembly. All of this will become clear if you study the accompanying drawings.

Since the normal running speed of the motor is too fast to be used directly we must slow it down with a gear that also serves as the "code wheel." Cut a circular piece of plywood 10" in diameter. The center hole should be *Vz"* in diameter to receive a %" (I.D.) piece of threaded nipple. This size threaded nipple was chosen because of the brass shaft dimensions. If you are using a threaded bolt of a diameter different from the shaft, then select a piece of threaded nipple to fit this.

Slip the section of threaded nipple through the hole in the code wheel, place a washer on each end and a nut on each end.

The dialing is accomplished by placing *Vz"* round head brass wood screws around the upper edge of the code wheel. The "stop ramp" is a piece of



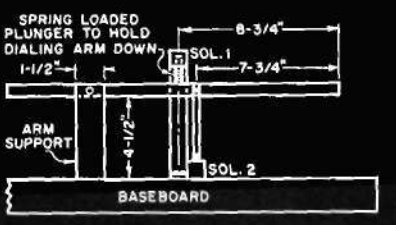
After one rotation of the code wheel, the stop ramp on the left operates mleroiwitch SW3.

%" by 4" with one end beveled. It is placed so that when the machine has dialed the number once it will shut the motor off by tripping a microswitch.

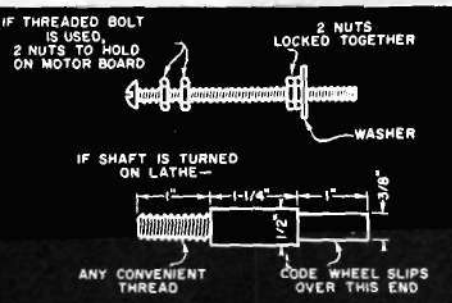
To install the code wheel, pull the motor assembly against the holding spring, drop the code wheel on its shaft and release the motor assembly. The holding spring should keep the rubber covered spindle in good contact with the code wheel at all positions of rotation. Test it once by putting power on the motor.

The "dialing arm" is a piece of wood about 15" long by %" square. It is attached to the baseboard by means of two vertical posts. The "fulcrum" is a 2" No. 8 machine screw. This must be a loose fit so the dialing arm can move up and down easily. Reduce side play to a minimum.

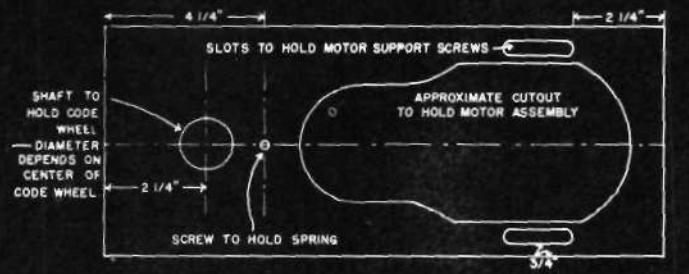
Two solenoids must be attached to this arm. SOL2 is under the arm so that it will pull it down against the telephone button contacts on the cradle. The other solenoid, SOLI is over the arm so that weight of its spring-loaded plunger will hold the cradle buttons down until the



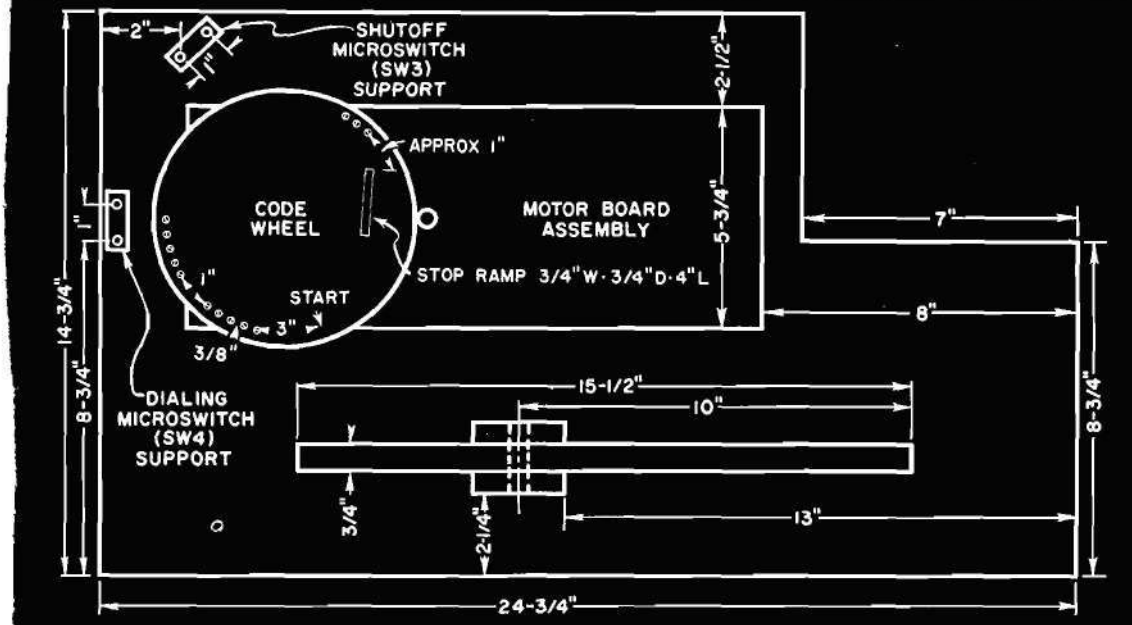
Dimensions for the dialing arm assembly.



Code wheel is supported by this axle shaft.



Top of motor board with location of cutouts.



Overall top view of the baseboard. Position motor board and dialing arm using this guide.

moment when the whole unit goes into action.

After you have mounted the dialing arm and its associated solenoids you can begin wiring. Check carefully when you hook up the relays. There is a possibility here of making some time consuming mistakes.

The entire circuit can be put together on a piece of perforated phenolic board 3" by 7". Mount it on baseboard with aluminum brackets in location shown.

The buzzer is ordinary 6-8 volt household variety. A bell works as well. Any convenient spot on baseboard will do.

Lastly you must mount the two microswitches. SW4 is the dialing microswitch and it should be mounted using a heavy piece of aluminum in such a position that its lever is pushed up and down by the small screw heads on the code wheel. SW3 is mounted in the same way but extends a bit further in on the code wheel. Jt will be pushed up when the stop ramp rides under it.

When you make the code wheel you can decide what number the unit is to call in an emergency. This is done by the arrangement of the small *V\"* screws mentioned before. However, for testing purposes it is a good idea to first set it up for the telephone number of the phone it will work with. In this way you will get a busy signal for checking out the circuit.

Let us say we want to call Hickory

PARTS LIST

RYI—Amperire thermal delay relay, normally closed, J15 volt, ISO seconds
RY2—3-pole doublo-throw IIS volt AC ftlay (Pottef i Brumfiald KAI4AY)
RY3—Double-pola single-throw relay. normally opart (Coil voltage salactad to oparata from voltage supplied by external fira or burglar alarm. Coll should bt selected for continuous (arnica)
RY4—Amperite thermal delay ralay normally open. 115 volt, IS seconds
SWI.SW2—Part of RYJ (tea text)
SV/3—Single-pel* alngla-Mirow miuroiwiteh. Lav#* arm must hava rollar
SW4—Single-pole single-throw mieroswitch with lever
SOLI—Lift solenoid (Suardlan 4AC-II7-I)
SOU—Dialing solenoid {Guardian No. 12)
T—Filament transformer, 117 volt AC to (.3 volts
M—78 rpm turntable motor (Lafayette ML-13)
Pilot bulb—*Vh* watt, 117 volt
C—4 mfd. capacitor, 400 volt
tuner—Household type «-8 volt AC

6-7441. Spelled out in numbers this is 4-4-6-7-4-4-1. Put a group of 4 screws in the code wheel, followed by a space and then a group of 4 followed by another space and then a group of 6 screws, etc. The drawing shows the proper spacing.

When you have set up the code wheel with the proper amount of screws, place it in position. You should allow about 3 inches for the wheel to pick up speed before the first screw hits the microswitch.

Place the telephone in the proper position so the dialing arm can press down on one of the cradle buttons. When the handset is removed the dialing arm should take its place and press the button fully down so no dial tone is heard. Lay the handset on top of the cabinet so that it can pick up the sound of the buzzer.

Plug the unit into a 117 volt AC outlet and manually close the armature of RY2. This is the reset button in the wiring guide and made from a plastic or Lucite rod. This rod is then cemented to the armature of RY2. It should stay closed and the red "ON" light will go on.

To simulate a fire or burglary close RY3 manually and keep it closed. The instant you close RY3 the lift solenoid SOLI should lift the weight off the dialing arm and the cradle buttons on the phone should then pop up. Also, at the same time, the buzzer should start sounding.

Keep RY3 closed. At the end of ten seconds the code wheel should start to turn and the dialing arm will move up and down as it counts out the number on the code wheel. Immediately after completion of dialing the code wheel must stop automatically. Listen to the telephone, you should get a "busy signal." Assuming you have it, keep RY3 manually closed. At the end of 3 minutes RY1 should open and shut the entire works off.

Set up the code wheel for the number you want to dial. Connect the fire (or burglar) alarm to RY3. When you close up for the night just press RY2 closed, slip the phone under the dialing arm and place the handset on top of the box.

In the morning replace the handset on the cradle and then pull the plug out of the wall. This will shut everything off.

An understanding of how your unit works will help you trace trouble if any is encountered.

When you press the armature of RY2 closed you will notice that current flows into the holding coil through a set of contacts on RY2. When switch 1 and 2 on RY3 close, then the heater of Rl warms up. When 3 minutes have passed the contacts of RY1 will be forced open. The heater of RY4 has also started to warm up, and current is going to SW1 and to the buzzer.

After 15 seconds RY4 closes and sends current to the phono motor through SW3 which is normally closed. Now SW4 permits pulses of current to go to SOL2, the dialing solenoid. When dialing is completed SW3 will be opened by the stop ramp attached to the code wheel and the motor stops. At this point your telephone at home is ringing.

Meanwhile, the proper temperature is reached to make RY1 open at the end of three minutes. When it opens, RY2 does so also, and the unit shuts off. However, current may still be going to RY3 holding coil. It should be able to carry current continuously. At the end of the above sequence the phone "hangs up." This is important for you because you may want to make some calls.

Earlier we mentioned our choice for a phono motor. This type is not absolutely essential. Any other motor will do as long as your code wheel will run at the right speed. The "right speed" will pass 10 screws under the dialing microswitch SW4 in one second. Some variation can be tolerated as long as it will fit in with the timing cycles set up at your telephone center.

The 15 second delay was put in to be sure that the dial tone is present when the dialing starts. If your home number is busy you will not get the call.

Some individual adjustment may be necessary to get your unit to work. If the springs on the telephone cradle buttons are not strong enough to lift the dialing arm you can correct this by putting a small counterweight on the other end of the dialing arm.*