

# Ham Shack Design for Beginners

## — Novices, take note!

One set of questions usually asked by new hams concerns the practical aspects of setting up a new station. These questions are often difficult to answer since they can affect the new ham's entire family, assuming the station is to be located at home.

**Question:** I just got my call in the mail and now want to set up my station. What is the minimum I need for the operating position?

**Answer:** I have seen ham shacks ranging from a separate building containing a TV set, stereo, bathroom, and refrigerator to one built into a single desk drawer. However, at a minimum you need an ac line outlet, a

ground wire, and a way to run your antenna feedline.

**Q.** Let's take these one at a time. What about the ac line?

**A.** It would be nice if you had a single 120-volt line direct from your house fuse box with 20-Amp service and a second 240-volt line for a linear amplifier. However, most of us end up plugging in a distribution box containing four or eight outlets, a fuse or breaker, a switch, and a pilot light. If you want to use a commercial box, there are several available, but they are only fused on one side; you really want fuses on both sides. See Fig. 1.

**Q.** Why fuse both sides? I

thought that most 120-volt ac lines have a neutral or common which is grounded.

**A.** It is a matter of safety. If you get a lightning strike that enters your home wiring, it is nice to have both sides of the line fused so that there is a chance the fuses or breakers will blow and protect your equipment.

**Q.** I take it that when I want to operate the station I simply have to flip one switch and I now have power to all the equipment?

**A.** Yes, but you will also want to have one or two ac sockets which bypass the switch so that power is

always available to your clock, desk lamp, or any other equipment which you might want to use independent of your rig. You also might consider using a key switch if you have any small children around so that they cannot turn on your station.

**Q.** How much power should I plan on?

**A.** As a rough approximation, complete a table for your station such as the one shown in Fig. 2.

**Q.** Well, just how many outlets do I want in total?

**A.** No ham in history has ever had enough outlets or current available. It is getting a little better now since many hams are also wiring

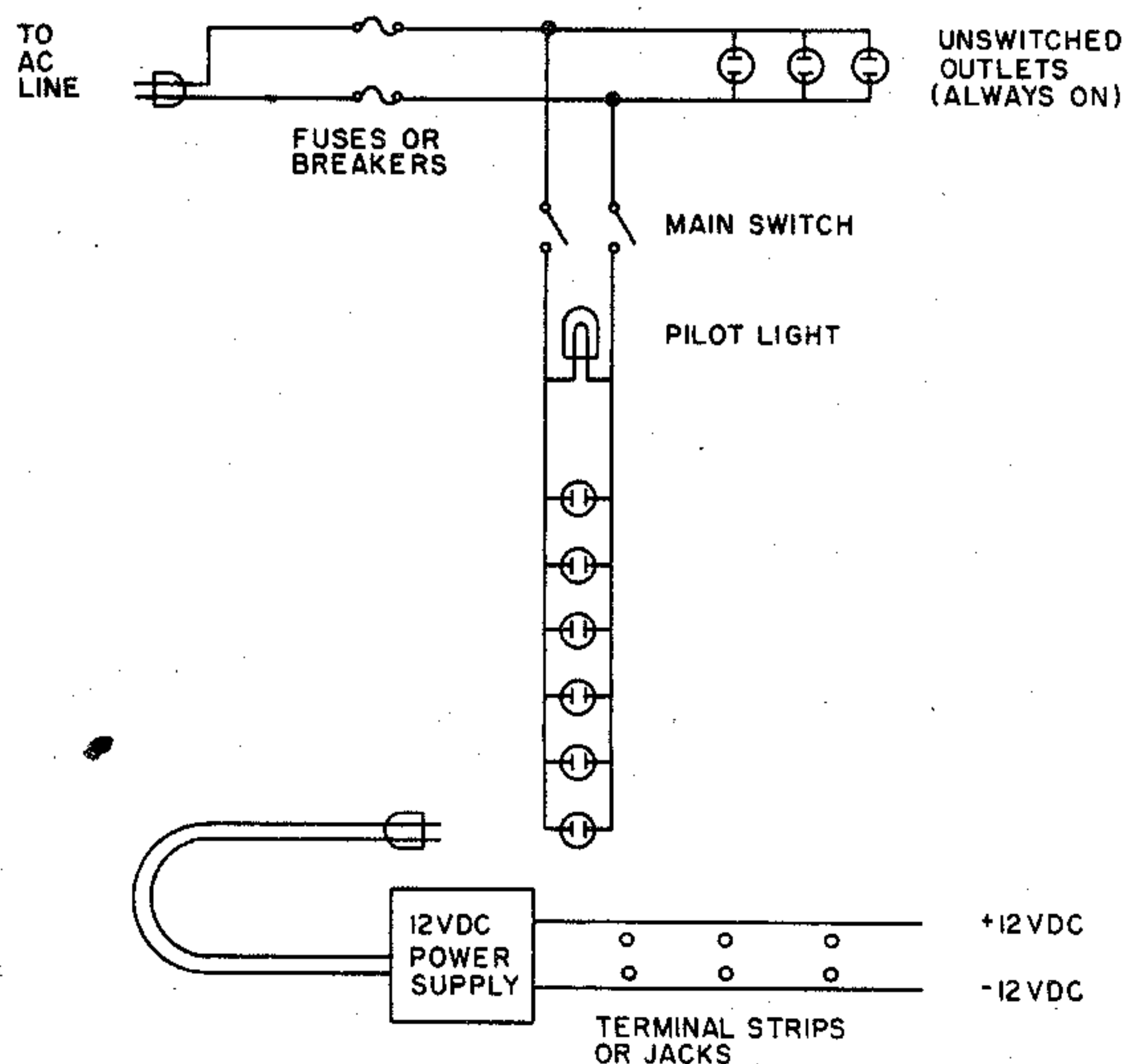


Fig. 1.

	Example (Watts)	Your Station
Rig	400	
Keyer	20	
Clock	10	
Outboard Active		
CW Filter	10	
Antenna Rotor	75	
Desk Lamp	100	
Total	615 Watts	

Example:  $615/120 = 5.125$  Amps       $5.125/0.8 = 6.4$  Amps total  
 Your Station:  $\text{_____}/120 = \text{_____}$  Amps  
 $\text{_____}/0.8 = \text{_____}$  Amps total

Take the total power and divide by 120 to get the current, and then divide by 0.8 to account for any power factor. The number you get is the Ampere load you will have to supply from the ac line.

Fig. 2.



their shacks with both 12 and 5 volts dc.

Q. Why would I want to do that?

A. Typically, you will end up with a main rig and then a half dozen solid-state accessories. If you build them independently, there also will be a half dozen small dc supplies, each of which must be plugged into the ac line. If you plan ahead a little and set up a 12-volt power supply at a few Amps, you can power all of these units from the one supply. Most of the circuits around these days use 12 volts dc, with the exception of those using 5-volt digital logic. You can add a separate 5-volt dc supply or include a dropping resistor and voltage regulator in each of the 5-volt units.

Q. Will I be safer if I connect the ground bus to the ac power system?

A. Unless you are an experienced electrician, the only grounds you should use with the ac line are those built into the three-wire cords common on some equipment. Keep your ground bus separate.

Q. Since the ground bus is not connected to the ac line, what do I need it for?

A. You need a good ground primarily for safety. I use a 1" x 1/2" aluminum bar, running the length of my operating table. Every 6" I have drilled and tapped it to connect braid from the bus to each of the pieces of equipment. When I put a piece of equipment down on the operating table, I connect it to the ground bus before I plug it in, and when I want to remove it, I unplug before I disconnect the ground. If anything goes wrong, at least I don't end up with the 120-volt line voltage on the front panel of the equipment. See Fig. 3.

Q. Where is the ground bus connected to? Can I use a

hot-water pipe rather than a cold-water pipe? How about the radiators? How about the this or the that?

A. Yes, yes, yes. If in doubt, connect it to all of them. No one has an ideal ground and you cannot hurt anything by connecting it to more than one ground. Just stay away from the ac wiring. The most important thing is to use wide braid or heavy aluminum wire, securely clamped. You should also remember that these mechanical (non-soldered) connections corrode and should be cleaned and tightened periodically.

Q. Is this ground bus the same ground that is shown in the pictures of antennas?

A. If you are using a coax-fed antenna, such as a dipole or beam, the shield of the coax will be connected through your rig or matchbox to the ground bus. But the bus plays little if any part in the antenna performance. However, if you are using a matchbox to feed a long wire with no radials, the ground bus provides the other end of the antenna circuit and is doubly important. See Fig. 4.

Q. What about antennas in setting up my shack?

A. Your shack must be located in such a way that you can run your antenna feedlines to the operating position. For this reason it is always nice to be close to an outside wall. Remember that no ham in history has ever had enough antennas, either. Plan ahead, and if you expect to run three lengths of coax into the shack, plan for at least six or eight and make whatever opening you drill through the wall big enough for the additional feedlines. It is much easier to stuff the extra space with loose fiberglass insulation than to go back and drill some more. Fig. 5 shows one possibility.

Q. I keep seeing pictures of

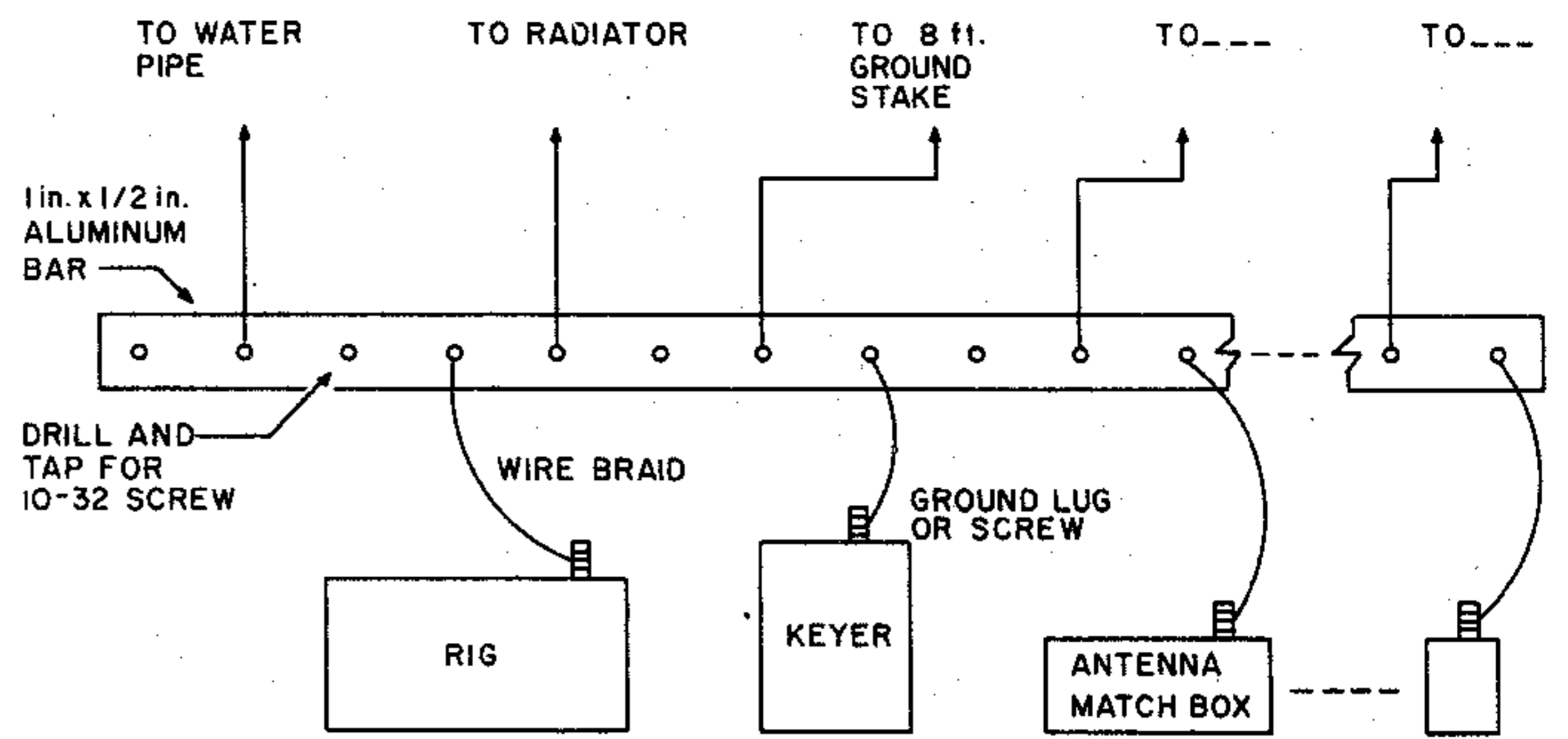


Fig. 3.

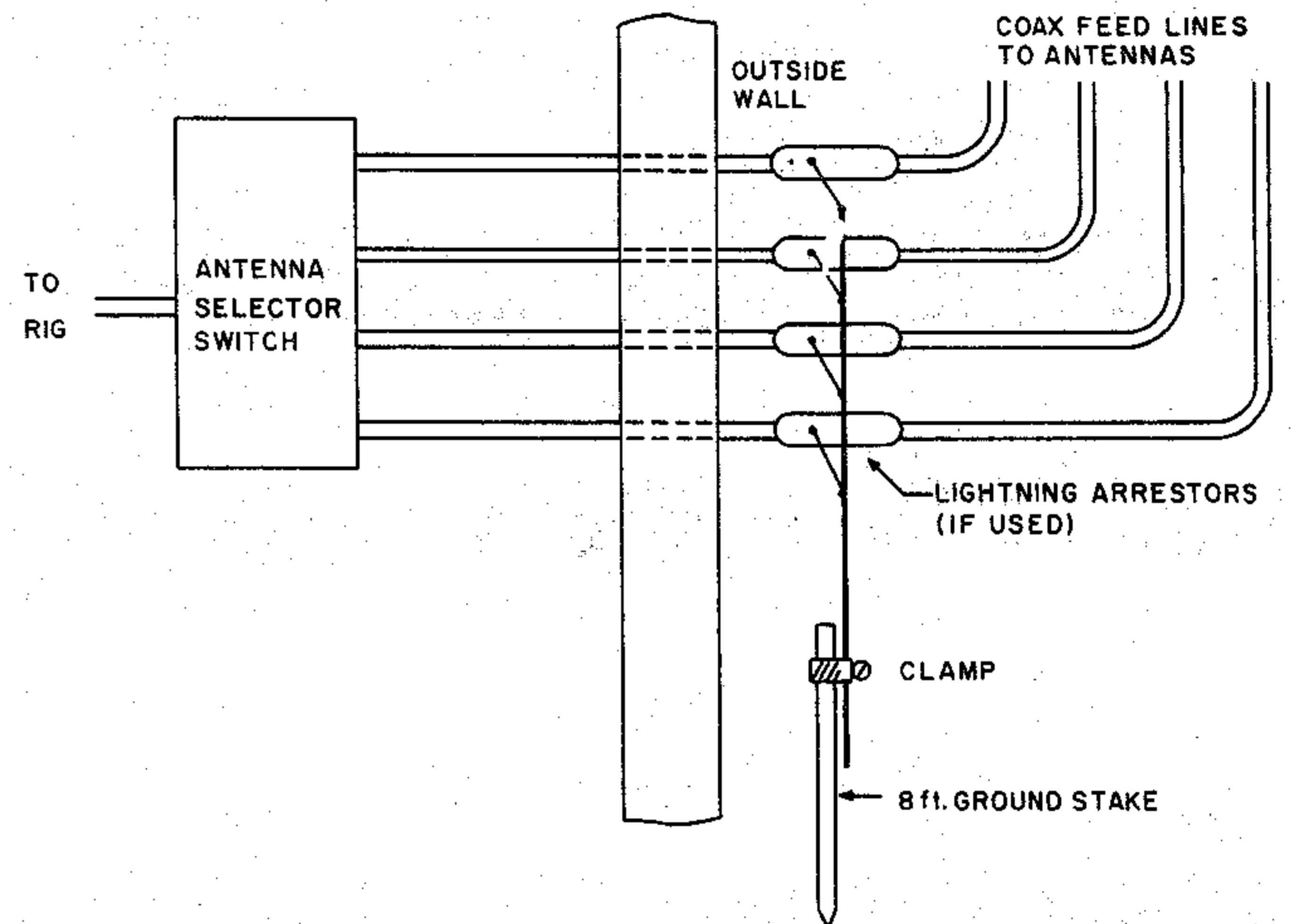


Fig. 4.

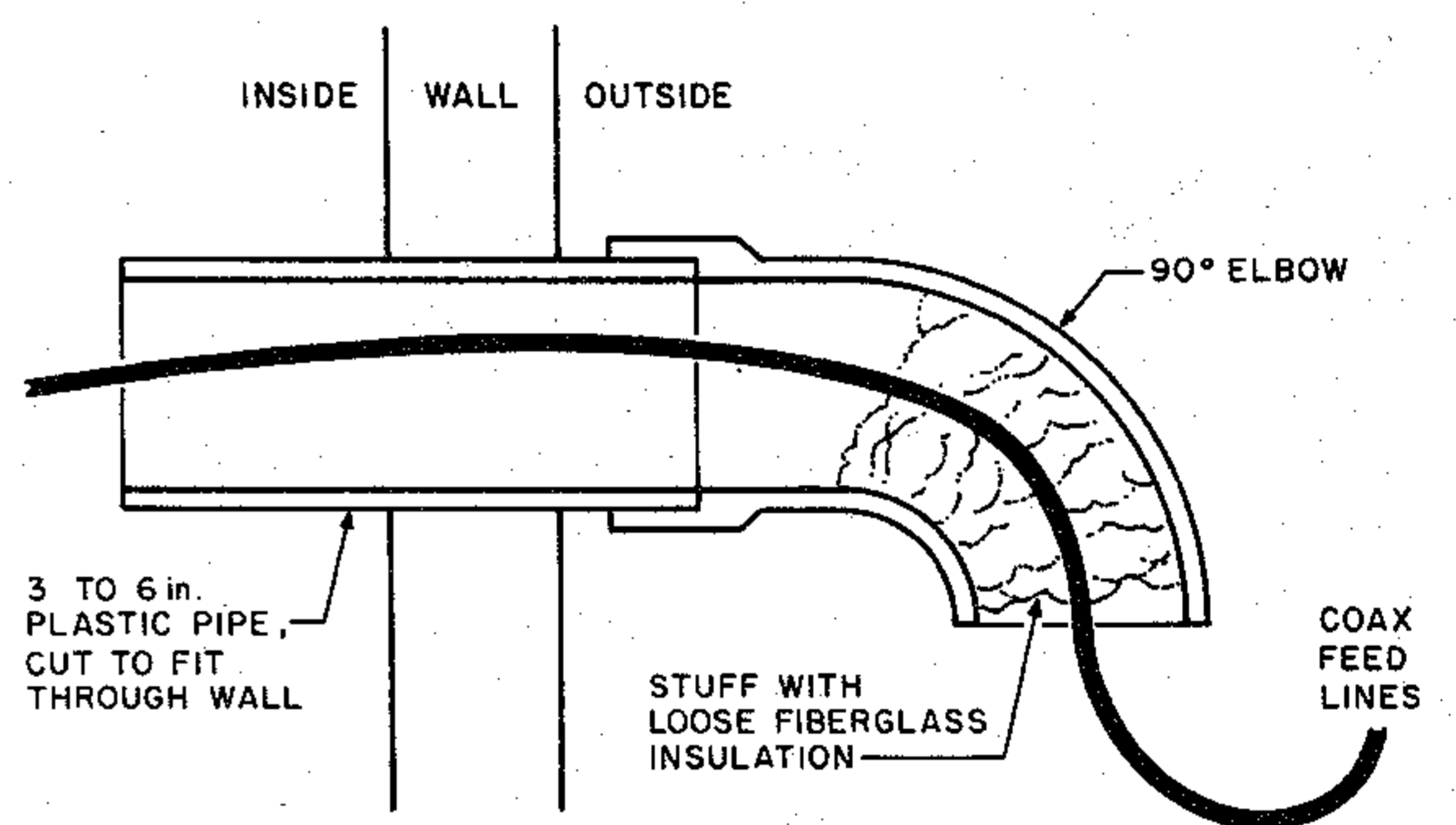


Fig. 5.

ham shacks where the antenna coax, ac line, ground bus, and all of the wiring is hidden behind custom-made panels. Some of these shacks would put the best commercial installation to shame. Is this what I should plan on?

A. There is no question that designing and building a neat, custom-made installation provides some hams with just as much fun and challenge as working for DXCC. However, most hams "rack it and stack it" in the most convenient way.

Whatever you do, remember that you will be making changes in your equipment, adding boxes and replacing boxes, so that you want the flexibility to change without major woodworking. If you do decide to "build it in," remember to leave room to get behind the units to work on the wiring.

Q. What about furniture?

A. My shack consisted of a folding cardtable for many years. I am now using an old desk with a spare door screwed on top to provide



# FAST SCAN ATV

## WHY GET ON FAST SCAN ATV?

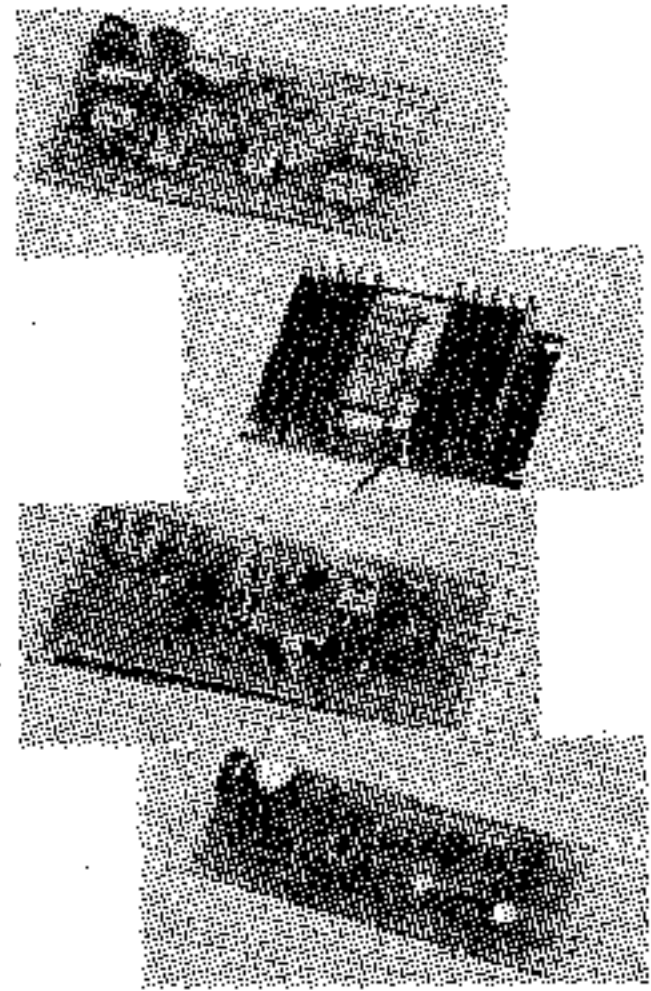
- You can send broadcast quality video of home movies, video tapes, computer games, etc. at a cost that is less than sloscan.
- Really improves public service communications for parades, RACES, CAP searches, weather watch, etc.
- DX is about the same as 2 meter simplex — 15 to 100 miles.

### ALL IN ONE BOX



**TC-1 Transmitter/Converter** . . . . Plug in camera, ant., mic, and TV and you are on the air. Contains AC supply, T/R sw, 4 Modules below . . . . . \$ 399 ppd

### PUT YOUR OWN SYSTEM TOGETHER



**TXA5 ATV Exciter** contains video modulator and xtal on 434 or 439.25 MHz. All modules wired and tested . . . . . \$ 89 ppd

**PA5 10 Watt Linear** matches exciter for good color and sound. This and all modules run on 13.8 vdc. . . . . \$ 89 ppd

**TVC-2 Downconverter** tunes 420 to 450 MHz. Outputs TV ch 2 or 3. Contains low noise MRF901 preamp. . . . . \$ 55 ppd

**FMA5 Audio Subcarrier** adds standard TV sound to the picture . . . . . \$ 29 ppd

**PACKAGE SPECIAL** all four modules \$249 ppd

### SEND SELF-ADDRESSED STAMPED ENVELOPE FOR OUR LATEST CATALOG INCLUDING:

Info on how to best get on ATV, modules for the builder, complete units, b&w and color cameras, antennas, monitors, etc. and more. 20 years experience in ATV. Credit card orders call (213) 447-4565. Check, Money Order or Credit Card by mail.



## P.C. ELECTRONICS

Maryann  
WB6YSS

2522 PAXSON  
ARCADIA, CA 91006

Tom  
W6ORG

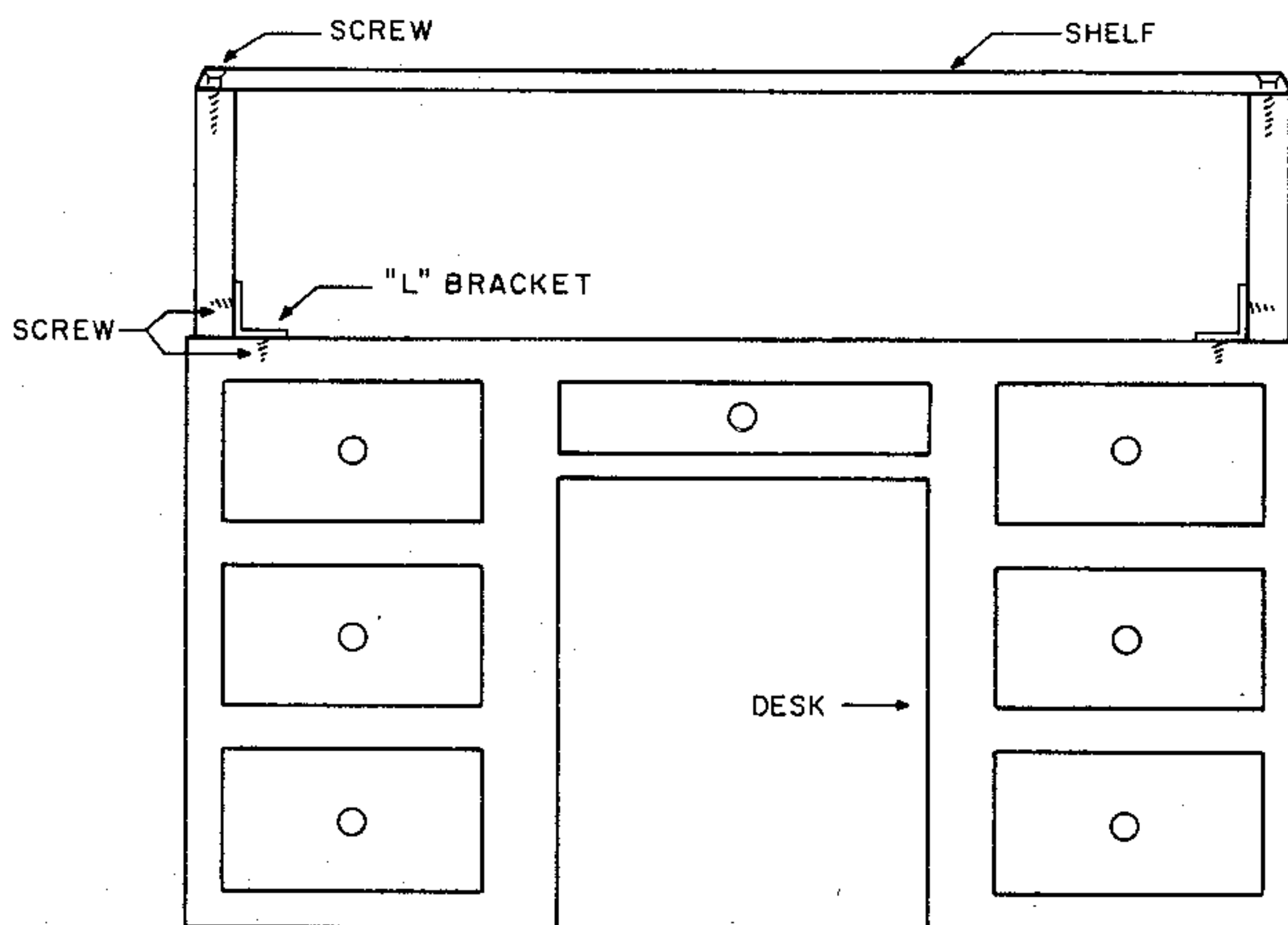


more area (Fig. 6). Old desks are nice since they give you drawers for storing logs, call-books, headphones, and several cubic feet of clutter which otherwise would lay around. You also can get more top area by mounting a shelf above the desktop with sections of 2" x 4" wood and L-brackets. Measure the height of the largest

unit you expect to have on the bottom and then mount the shelf at least 4" above this height to give heat a chance to escape.

**Q.** How about the little things, such as a chair, lights, and such?

**A.** Spend six or eight hours in a contest and you will find these are not such little



POSITION FRONT EDGE OF SHELF 12 in. TO 15 in. FROM FRONT EDGE OF DESK

Fig. 6.

things. Some phone operators literally use large arm-chairs as they claim "arm-chair copy." CW operators usually opt for a stiff-backed chair with a soft cushion. The cushion is optional until contest time. The key thing is to be comfortable for the periods you are operating. For this reason, you also will want to modify your rig to fit your needs.

**Q.** (with horror) Modify my brand new rig? Won't that reduce its value when I want to sell it?

**A.** These modifications won't. First, look at the knobs. On CW I tend to ride both the volume control and the tuning control. I found it much more comfortable to replace the 2"-diameter knob on my Heath SB-102 with a larger, 3" knob, and the fluted volume control with an identical size non-fluted knob. You also can change the height of the knobs by either drilling holes in the desktop for the rubber feet (lower the rig) or by placing the rubber feet on small wooden blocks to raise the knobs. You also can tilt the rig (Fig. 7).

**Q.** Why tilt it?

**A.** Some people are more comfortable with the rig tilted backwards to put the frequency dial more fully in their line of sight. Others like to tilt it down. Since the total investment is a few pieces of

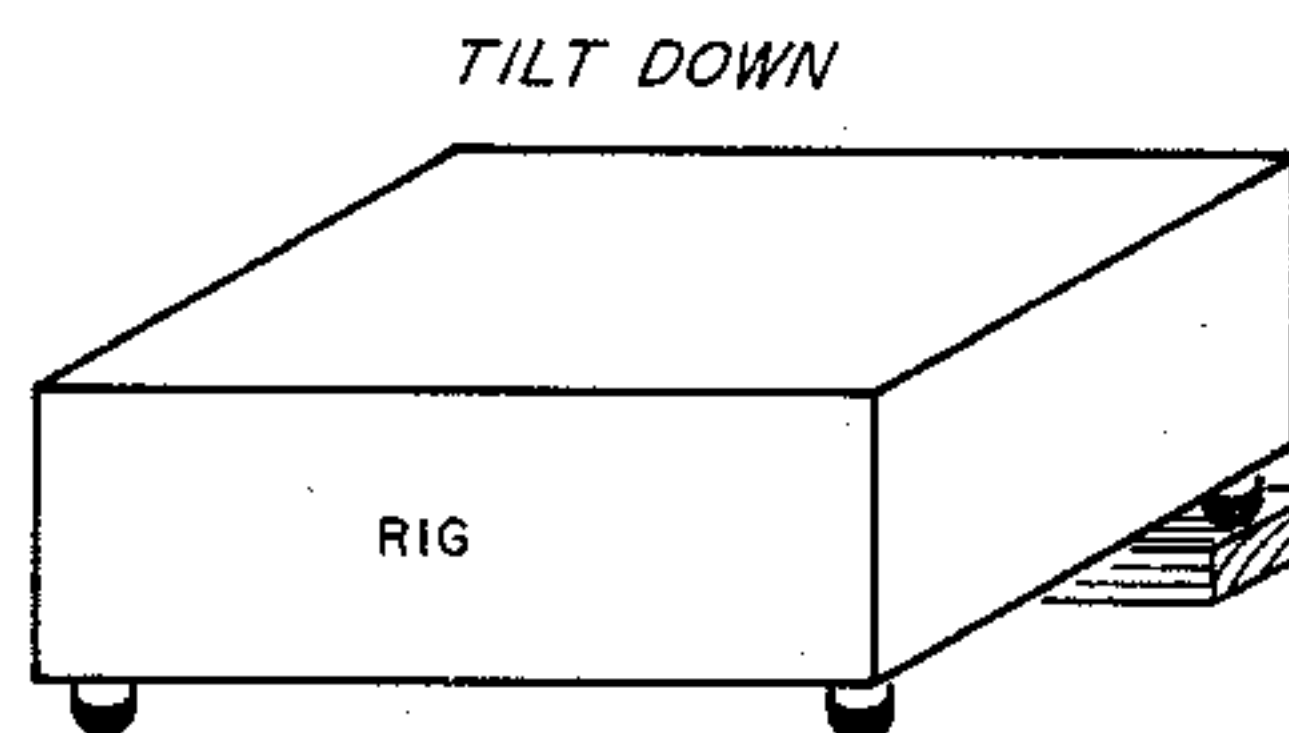
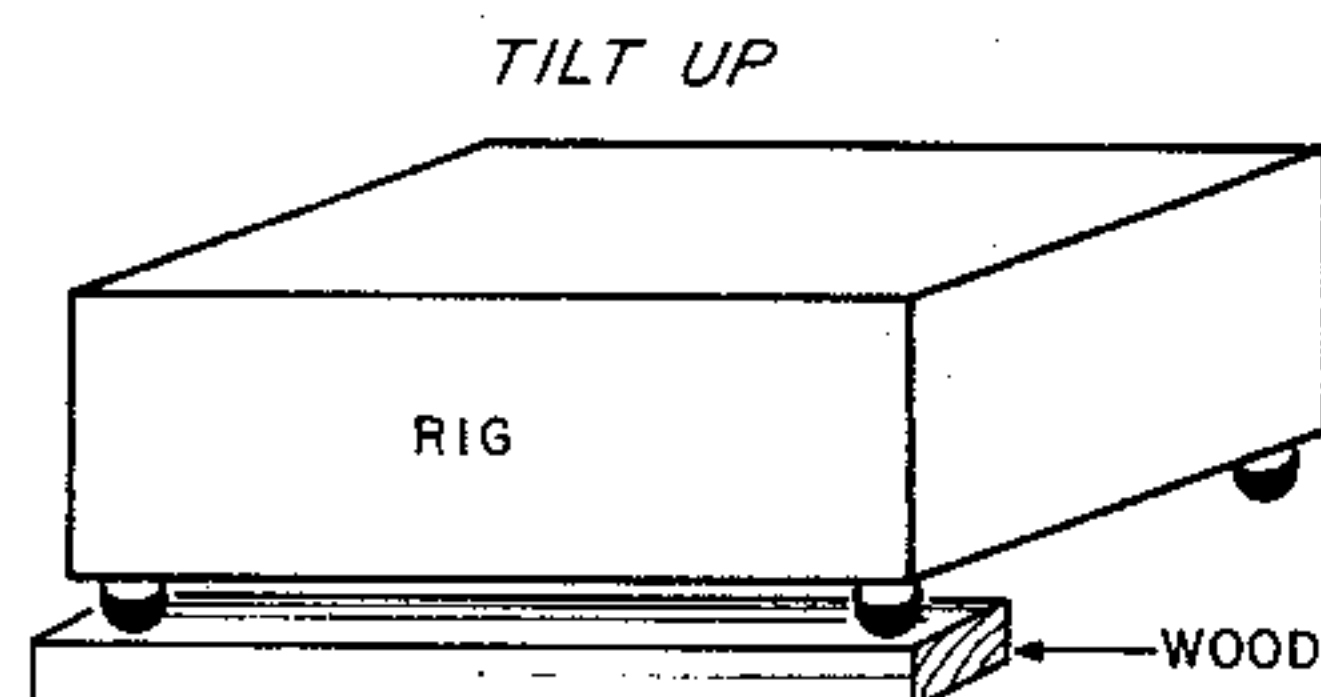


Fig. 7.

wood, it pays to experiment. Also check that the room lights or your desk lamp don't reflect in or wash out the numbers on the new rigs with the digital dials.

**Q.** I already can see that I will run out of space quickly. Where else can I put things?

**A.** If you home-brew some of the station accessories, such as audio filters and keyers, you can mount them inside a 1"-high chassis and slip them under the rig. A second approach is to suspend them from the bottom of the shelf. Separate power supplies can be placed under the operating position on the floor, and you can always hide things such as antenna rotor controls in a drawer.

**Q.** You said that the shack location and arrangement could affect the entire family. How is that?

**A.** Late-night operations with a loudspeaker or most of the old RTTY units pose an obvious problem. If you set up in a remote corner of the basement, consider including an intercom so that you can be called for dinner. An extension telephone is almost a necessity, but be forewarned, it will ring just as it is your turn to call the A9 station on the DX net.

**Q.** Anything else?

**A.** There have been several million ham-years of experimentation with the arrangement of stations. The best bet is to visit a number of stations and see how they are arranged. Don't be overwhelmed by the amount of equipment you see. What you are looking for is how do you sit and how do you reach things. Then experiment before you plug in a single wire. The only thing for certain is that you will change the arrangement before very long and end up with just the right arrangement to suit you. ■