How to Build a "Junkbox"
ELECTRIC GUITAR

If, like author Chambers, you have had a "yen" to own an electronic music instrument, you probably will be interested to learn how amateur operator W9BMN constructed an electronic guitar, complete with pickup and amplifier, at almost no cost, by using spare parts.

FRANK E. CHAMBERS, W9BMN

EVER since those instruments of torture known as *electric guitars* made their appearance to crucify the ears of aesthetic musicians, I have had a yen to own one. Not that I am in favor of crucifying musicians, you understand; —at least not all of them!

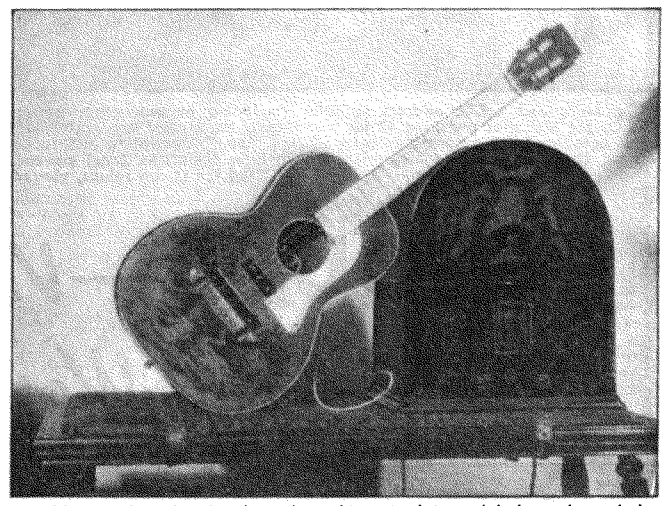
However, one large fly was present in the ointment—the cost! What with buying new gadgets for the rig, corsages for the girl friend, and an occasional pair of sox for myself, the state of the personal exchequer was in precarious straits. I could amplify this statement, but most hams will know the feeling.

The "junkbox," however, was in good shape; so good that some grumbling had been heard anent the amount of room required to store the treasures, some relics of 15 years a ham, and other more recent acquisitions. But a survey seemed to indicate that about everything needed to build the amplifier and pickup for the guitar could be taken from this storehouse of retired radio parts.

The guitar itself was of rather ancient vintage, and had a pleasant tone, but was very anaemic, and unable to lift its voice above a whisper. It, like myself, was battle scarred, and beginning to feel its age. But I figured that an amplifier would bring the tone up to where it could be heard above the blare of the neighbor's radio, and since completion, I am so satisfied with the result, that I thought some of the other boys might be interested in the details.

The first thing was to decide on what type of pickup to use, and this soon boiled down to the electromagnetic type, as the crystal pickups cost too much, and I was rather dubious about using an electrostatic type, which would be f.b., but would require the first amplifier stage to be built into the guitar itself, and I anticipated difficulties in running the output of this stage into the main amplifier as the filament leads for this stage would be of necessity, run through the same cable that would carry the output to the main amplifier, and that looked like a hum problem to me. So the magnetic type was chosen, and has worked out very nicely.

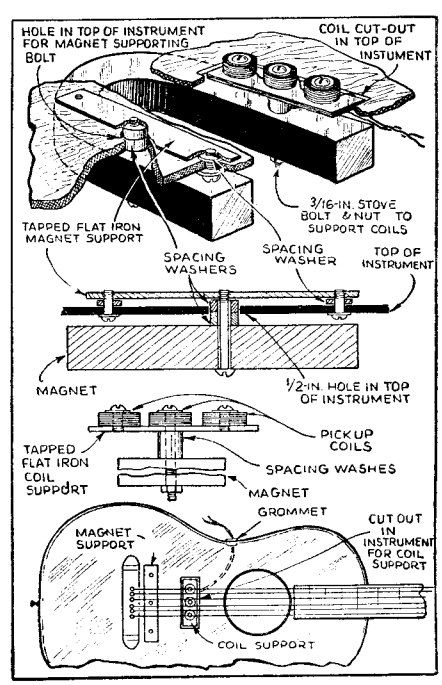
The amplifier was built into an old mantel type set, which originally used a pair of 45's in parallel, and was in the junkbox, minus a speaker. Most of an old Majestic 90 was there, and the speaker from the 90, with its input and output transformers, was used. The circuit used is given in Fig. 1. This, of course, is not the only way to build the amplifier,



The old anaemic guitar has been brought up-to-date and is here shown being used in conjunction with an ordinary home receiver. Its tunes are reproduced electrically now.

and certainly is not the best way, but it suited the parts on hand best. If a single output tube is used instead of push-pull, 2 high-gain stages can be used ahead of the output stage, and using a 6L6 output, it might be possible to get enough grid drive with only 1 pentode stage ahead of it. However, use what you have; I did. The first tube is a 57, because the power supply in the set had a 2½-volt filament supply, and I had a 57, which also helped. This was originally resistance-capacity coupled to a 56 which was coupled to the 45's through the input transformer, but the gain was not quite enough, so the second 56 stage was added. Likely a 53 as

(Continued on page 308)



Showing the construction of the pickup units and their location on the guitar with respect to the strings.

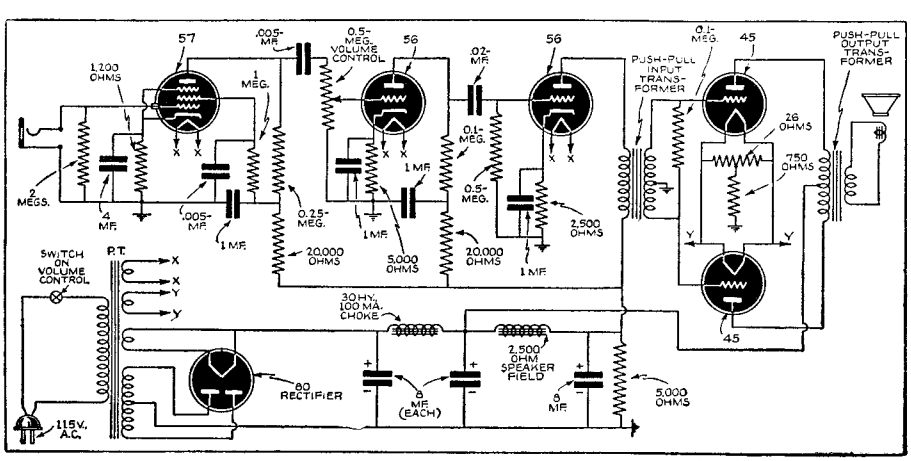


Fig. 1. Schematic diagram of an amplifier suitable for use with the electric guitar.

HOW TO BUILD A "JUNKBOX" ELECTRIC GUITAR

(Continued from page 271)

a phase inverter, would have been sufficient without this extra stage, but I didn't have a 53.

So the lineup as given in the diagram was used. The gain is such that the speaker can be overloaded when talking with normal voice level into a crystal mike plugged into the input. A vicious hum, probably originating in the input transformer, was killed by the 100,000-ohm resistor from grid to grid on the 45's. The amplifier weighs about 50 pounds, and a good portion of this is Mr. Majestic's massive speaker and transformers. If lighter parts are available the weight could be cut down to where the instrument would be portable without the aid of a derrick.

The basis of the pickup were 2 Peerless magnetic speakers, which would no longer speak, but the motors were still OK. Three of the 4 coils, and 1 of the magnets, were used. The coils have a rather small hole through them, and so 3/16-inch screws were the largest I could use. If these coils are not at hand, coils for RCA speakers, which are about the same size are available from supply houses. The 2 plates were made from flat iron, about ¾-inch wide and ⅛-inch thick.

One was cut long enough to accommodate the 3 coils, spaced so each one would be located in the center of a pair of strings, then drilled and tapped for 3/16-inch stove-bolts. Fillister-head machine screws would be better for the screws through the coils, but I had no tap for these so stove-bolts were used. The center bolt is long enough to go through the magnet, and a ⅜-inch spacer (iron or steel) holds the coil assembly away from the magnet, leaving room for the guitar top between the coil plate and the magnet.

The other plate is cut enough longer so that it can be screwed to the guitar top, and two of the spacers are used on this, as this plate should come about even with the tops of the screws on the other one.

A ½-inch hole is drilled between the 2 center strings for the spacers on the plate to pass through, and is fastened to the top with the stove-bolts, using enough washers under the plate to bring it close to the strings. Mount it as close to the bridge as possible. And, when you drill the hole in the top, proceed very carefully; I didn't and had a hole in the back, too.

The front plate is spotted, and a hole cut out with a pocket knife to just pass this plate; the leads from the coils which are all connected in series, are brought out to a terminal block, and the whole thing is screwed in place. The accidental hole in the back was very handy for tightening the center screw. But, if you don't have the hole, an offset screwdriver will do the trick. The whole works can be inserted through the sound hole, and no holes are necessary in the back.

Use a shielded cable, to run from the guitar to the amplifier, or the stray pick-up will be terrible. I used ordinary auto lead-in wire and an auto-radio antenna connector for the shielded plug. Ground the sheath on the cable to the chassis of the amplifier, and connect all the metal parts of the pick-up to the sheath, and the stray pick-up will be very low.

A volume control may be built into the guitar, if desired, about 1 megohm should do; and, a tone control can be added if desired—connect it grid-to-grid, or plate-to-plate of the 45's, depending on the size of control available.

So ends the story of the metamorphosis of the junkbox, and I hope any of you boys who build this will have as much fun, and as little expense as I.