



String Music Pickup

An Easily-detachable Magnetic Unit

By R. L. PARMENTER

THIS guitar pickup reproduces faithfully the sound of any steel-stringed instrument. It is held to the instrument by suction cups—obtainable at automobile accessory stores—and can be attached or taken off readily. Since it depends on the magnetic principle and not on sound vibrations, the quality of reproduction does not depend on the original instrument.

The unit is built around a piece of Alnico V magnet which is now available from many sources. The size used was $3 \frac{16}{16} \times 5 \frac{16}{16} \times 2 \frac{1}{16}$ inches. It was pre-magnetized and polished on one narrow face. The length of the magnet is important since it must span the strings of the instrument. This $2 \frac{1}{16}$ -inch length is suitable for a 6-string guitar; for a tenor guitar, which uses only 4 strings, a shorter magnet would be better.

The magnet in this case was magnetized longitudinally. While this caused some attenuation on the 2 middle (D and G) strings, it had the desirable result of building up the strength of the tones produced by the outside ones. Since the melody is usually carried by the 2 highest (B and E) strings, this was quite satisfactory; and some unusual effects in bass runs may be achieved by this build-up in bass (E- and A-string) response. If it is possible for the builder to obtain a magnet which is magnetized across the $3 \frac{16}{16}$ -inch face, some other interesting results might be achieved.

If an already magnetized magnet is unobtainable, the builder may magnetize his magnet preferably by using a heavy-duty magnetizer in the local garage. Or a homemade magnetizer powered by a storage battery may be constructed to do the work.

Constructing the coil

The coil form of thin fiber is glued with coil cement and made to fit the magnet slug used. Dimensions of the author's unit appear in Fig. 1. When this form has dried, remove the magnet and replace it with a small piece of wood or bakelite drilled in the center to ac-

commodate a 1-inch 6-32 machine screw. By chucking this assembly in a hand drill it is easy to wind the wire. The coil form is scramble-wound with No. 32 enameled wire. Two short lengths of flexible wire are soldered to the ends of the winding to facilitate making connections.

This winding has a d.c. resistance of approximately 30 ohms. The output will be greater if the builder can wind on more turns of smaller wire. But it is difficult to wind wire smaller than No. 36.

(By winding the coil in a suitable jig, it should be possible to use No. 36, 37, or even finer wire. If heavier wire is used, a step-up transformer such as a 3 to 1, or higher, ratio audio transformer will increase the voltage output noticeably.—*Editor*)

The completed coil and magnet assembly is glued to a $3 \frac{32}{32}$ -inch bakelite or fiber mounting plate. The flexible wires soldered to the winding should now be soldered to the microphone cable, the outside end of the winding going to the shield of the cable. A cable clamp attached to one of the 8-32 screws on the suction cups holds the cable to the assembly. The other end of the cable terminates in a standard phone plug, connected so that the shield will go to ground in the amplifier used. The inner conductor of the cable may be inserted directly into the grid circuit since the impedance of the winding is sufficiently high.

The suction cups holding the unit to

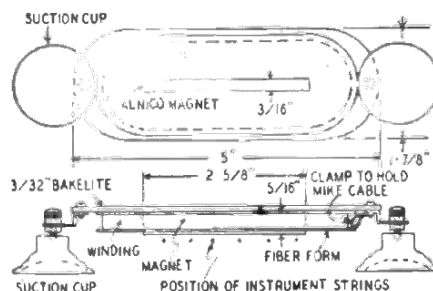


Fig. 1—Construction details of the pickup.

the sounding board of the instrument are then attached to the mounting plate with small brackets. The height of these brackets will depend upon the size of the suction cups used, allowance being made for the fact that compressing the cups will lower the assembly considerably. The unit should be as close to the strings as possible without touching them. The exact height can be adjusted by the 2 nuts on the bolts which hold the suction cups.

The instrument amplifier

The amplifier need not be an elaborate one. A high-fidelity type is preferable, but almost any 2-stage voltage amplifier with a single output tube will do. This unit has also been used with excellent results with a phono oscillator having an extra voltage amplifier ahead of the modulator.

This pickup was tested on both Hawaiian- and Spanish-type guitars. It does not alter the characteristics of rendition. Since the Spanish guitar is essentially a rhythm instrument, the pickup should reproduce a not too sustained tone. When using a steel guitar, a sustained tone is desired and a short snappy tone would not be suitable. This pickup fulfills those qualifications.

The experimenter can build this little gadget at nominal cost. It will electrify almost any guitar and (with a few changes) many other instruments. It may be used with any amplifier used for music amplification.

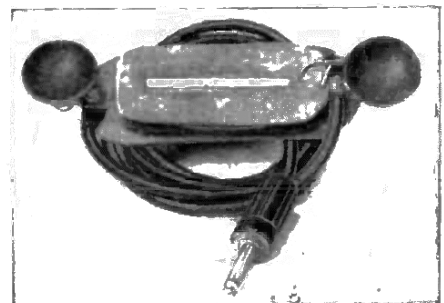


Fig. 2—Bottom view of Parmenter instrument.