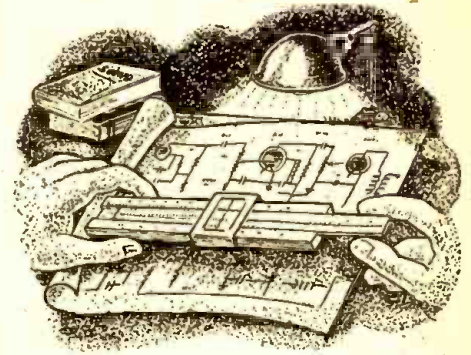


# SOUND ENGINEERING

*Free Design and Advisory Service  
For Radio-Craft Subscribers*

Conducted by A. C. SHANEY



This department is being conducted for the benefit of RADIO-CRAFT subscribers. All design, engineering, or theoretical questions relative to P.A. installations, sound equipment, audio amplifier design, etc., will be answered in this section. (Note: when questions refer to circuit diagrams published in past issues of technical literature, the original, or a copy of the circuit should be supplied in order to facilitate reply.)

## No. 16

### ELECTRIC GUITAR AMPLIFIER

#### The Question . . .

Your writings on amplifiers are read with a great deal of appreciation each month.

I have a problem that is elementary, but nevertheless, one that has had me stumped for 6 months. In attempting to build a small, compact amplifier to use with an electric guitar, it seemed a simple matter for me to assemble the following tube lineup into an A.C.-D.C. job with an output of about 4 watts: 6J7 input, 6SC7 inverter, 2-25L6 as output and 2-25Z6s in parallel, connected for half-wave. All filaments in series should make it unnecessary to use a resistor in the 115-volt line. Would you mail me a hookup using the above tube lineup which would give me the maximum results from the 25L6s in output? My trouble has been lack of volume, and distortion. Would it be better to use 6C5 and an interstage transformer instead of the 6SC7?

D. T. WINSLETT,  
N. Sacramento, Calif.

#### The Answer . . .

Requests for circuit diagrams can not be supplied to individuals by this department through the mails. All such inquiries are

answered in rotation and in order of their general reader interest.

A simple and straightforward circuit diagram of the type you desire is indicated in Fig. 1. Although a 6J7 is indicated, a 6SJ7 will simplify construction by eliminating the necessity of using a shielded grid cap.

All grounded leads need not be connected to the chassis proper unless adequate precautions are taken to insulate the chassis from personal contact. Otherwise, the chassis may become "hot" in relation to external grounds.

You will note that a 30-ohm resistor is inserted in series with all heaters. This precaution is taken for 2 reasons:

- (1) To bring the total required voltage to approximately 118 volts instead of 112.6, as the former more nearly approaches average mean line voltage.
- (2) The series resistor acts as a current limiter so that excessive currents can not flow through the heater circuits, when the voltage is applied while all heaters are cold. Excessive heater currents have been known to displace, or sometimes eject the heater from its normal position.

This amplifier will produce appreciable

distortion if the output is pushed beyond 4 watts.

While a 6C5 with a properly-designed transformer may produce less distortion at the 4-watt level, it will reduce the overall gain of the amplifier by approximately 8 db. As the amplifier hasn't too much gain for some low-level electronic instruments, the use of a transformer and loss of gain is not indicated (unless an additional stage is added).

The dependability of the A.C.-D.C. Audio Amplifier circuit indicated in Fig. 1 can be improved with a slight sacrifice in power output by inserting four 30-ohm resistors in series with each plate of both 25Z6 rectifiers. These resistors will limit the plate current of the rectifiers should the amplifier be turned off long enough for the input 20 mf. condenser to discharge, but not long enough for the rectifiers to cool. Under such conditions of operation, a large instantaneous peak current will flow when the amplifier is turned on again. This large charge current, while flowing for a relatively small time only, may damage the rectifier tubes.

Note: Only half the usual number of questions have been answered this month because of the Sound Editor's limited time. Mr. A. C. Shanley has devoted the services of his laboratory to the U. S. Government for the solution of knotty electronic and amplifier problems in connection with the present Defense Program.—Editor

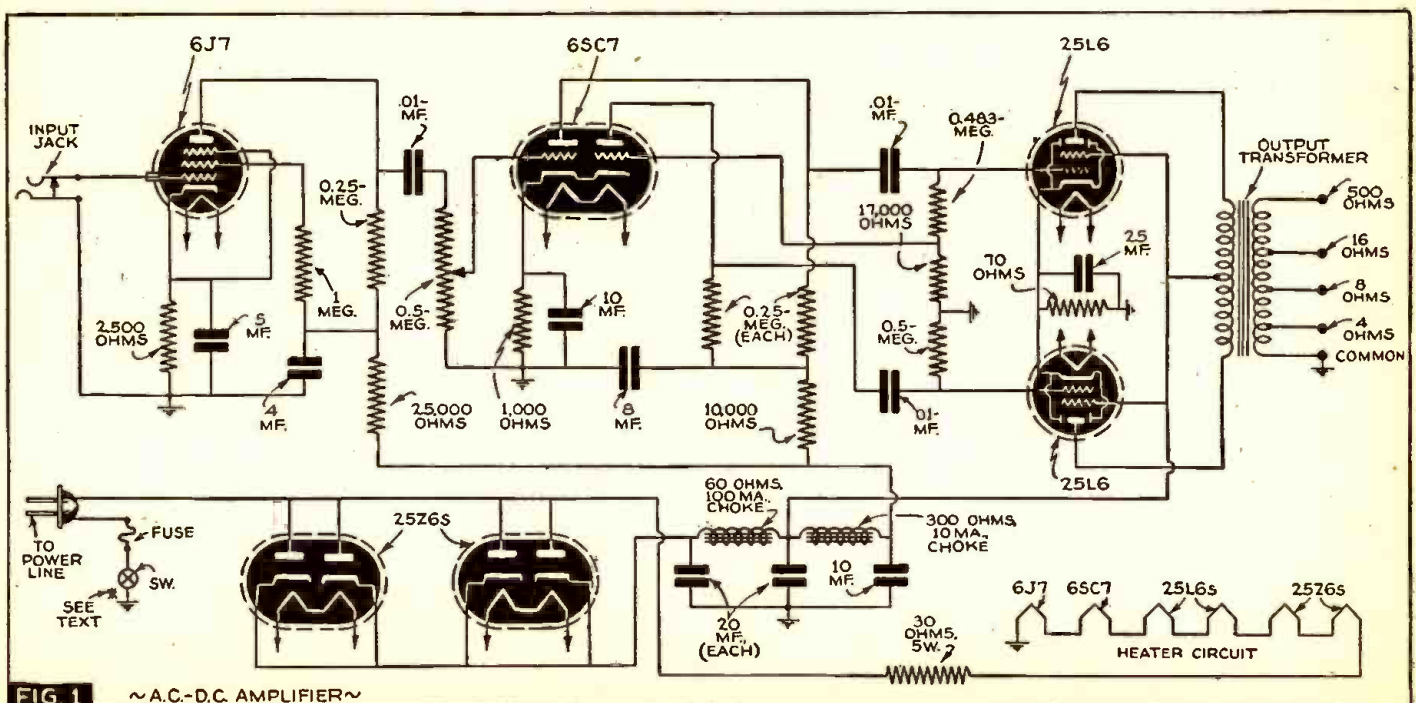


FIG. 1 ~A.C.-D.C. AMPLIFIER~