shield each stage in a single can. However, the intermediate frequency transformers should be in metal cases, and the tubes should be operated in a shielded socket.

SP 122 as an Audio Amplifier

The SP 122 may also be used in circuits requiring a tube of high mutual conductance and high amplification factor such as a resistance, impedance or transformer coupled audio frequency amplifier circuits. When used in this capacity the inter-grid is used as a space charge grid and the outer or shield grid is used as the control grid. The following table shows the proper plate, filament, control grid and space charge grid voltages for the SP 122 when used in an audio frequency amplifier:

Element	Plate Supply	Control Grid (Outer)	Space Charge Grid (Inner)	Filament
Voltage	135 to 180	0 to —2	+22½	3 to 3.3
Supply	B	C or Resistor	B	A
Connection	Plate Prong Base	Grid Prong Base	Metal Cap Top	Large Prong Base

A typical circuit for the use of the SP 122 tubes in a transformer coupled audio frequency amplifier is shown in Figure 2. For use of this tube in a resistance coupled audio frequency amplifier the circuits should be of the type shown in Figure 3.

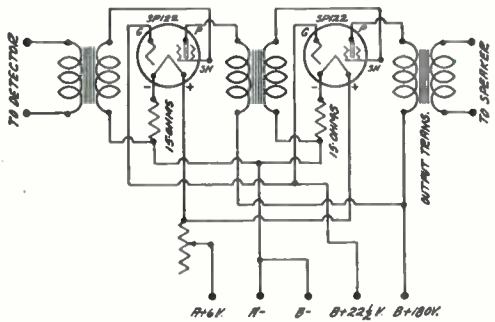

Fig. 2

Typical Circuit for using SP 122 tubes in transformer coupled audio amplifiers

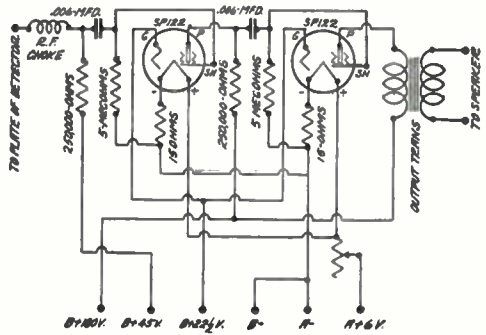

Fig. 3

Typical circuit using SP 122 tubes in a resistance coupled audio amplifier

SHIELDPLATE TUBE CORPORATION

TYPE SP 122

PRINTED IN U.S.A

Shielded Grid Tube
TYPE SP 122

Insist on the Original

Price
$6.50

Manufactured by

Shieldplate Tube Corp.
4049-59 Diversey Avenue
Chicago, Ill.

Shielded Grid Amplifier Tube Type SP 122

The Shielded Grid Amplifier Tube type SP 122 having an amplification constant of 175 is a new and revolutionary development in vacuum tubes. It is primarily designed for use as a radio frequency amplifier, and when used in this capacity in circuits specially designed for it, it is capable of giving ten times the amplification obtainable from the former general purpose type 201-A tubes.

Instead of the usual three elements found in general purpose type of tubes the SP 122 has a filament, a control grid, a plate and a special shield grid completely surrounding the plate. This latter grid acts as a shield between the plate and the control grid, thereby reducing capacity between these two elements to a negligible quantity. Due to the use of this shield grid, circuits, using the SP 122 tube will not oscillate, provided the input is entirely shielded from the output circuit.

Mounting of the SP 122

The SP 122 is mounted on the standard UX type of base. The filament and plate terminals in this base are standard with those of other tubes using the UX base. The shield grid of the tube is connected to the grid prong of the base. The control grid of the tube is connected to a special metal cap mounted on top of the glass bulb.

For best results the SP 122 should be mounted in a vertical position and shielded by a metal case fitting closely over the bulb but having an opening in the top of sufficient diameter to insure clearance of the control grid terminal. This metal shield should extend down at least to the base and should be connected to the negative filament terminal or crown.

Filament

The SP 122 tube has a thoreated Tungston filament with a rating of .133 amperes at 3.3 volts. The tube is not critical in its adjustment of filament voltages.

When used with tubes having a 5 volt filament such as the 201-A, each SP122 should have a 15 ohm fixed resistance unit in series with its negative filament lead. Resistor and filament may then be connected in parallel with the 5 volt filaments of other tubes and operated from the same source of supply. This system of connection is used in all of the schematic diagrams shown in this pamphlet.

For the purpose of calibrating rheostat resistance, two SP 122 tubes with resistance units in series may be considered to draw the same current as one 201-A tube.

When the SP 122 tube is used in dry battery operated receivers no special filament resistor is necessary, the customary rheostat being sufficient for controlling the filament voltage. In this case the filament of the SP 122 may be connected directly in parallel with those of the 199 and 120 types of tube.

The Use of the SP 122 as a Shielded Grid Radio Frequency Amplifier

When used as a radio frequency amplifier in specially constructed circuits the SP 122 is designed to give maximum efficiency with the following filament, grid, shield grid and plate voltages:

Element	Plate	Shield Grid (Outer)	Control Grid (Inner)	Filament
Voltage	90 to 135	+45 to 67½	—1 to —2	3 to 3.3
Supply	B	B	C or Resistor	A
Connection to	Plate Prong Base	Grid Prong Base	Metal Cap Top	Large Prong Base

The negative potential for the control grid is given with respect to the negative side of the filament. A 2-volt negative potential for this purpose may be obtained by utilizing the voltage drop across the 15 ohm resistance in series with the filament as illustrated in figure 1, or else it may be supplied from a C battery.

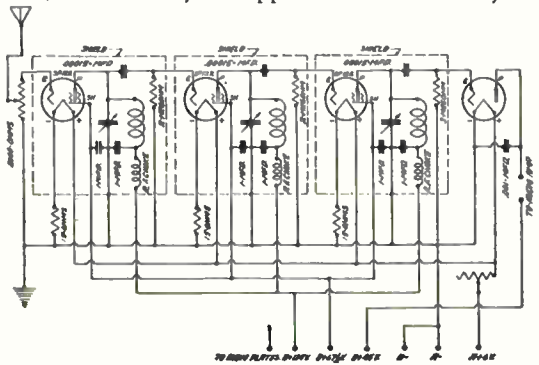

Fig. 1

Typical Circuit for using SP 122 tubes as Shielded Grid RF Amplifiers

Neither plate nor screen grid voltage is critical, although the plate voltage should not be allowed to exceed 135 volts maximum. The same battery used for plate supply may also be used for the shield grid by tapping off at either 45 or 67.5 volts. Both of these voltages should be tried in the operation of the set and use made of the one that gives the loudest signal.

Internal shielding by the shield grid makes it unnecessary to neutralize the grid to plate capacity. However, it is extremely important to shield the control grid circuit from all other circuits. This shielding may best be accomplished by building each stage of the radio frequency amplifier in a metal can and by the proper use of by-pass condensers and choke coils, etc., to prevent coupling in the battery leads as illustrated in the schematic wiring diagram of Figure 1. This complete shielding is extremely important if high amplification is to be obtained and disturbing oscillations entirely prevented.

SP 122 as an Intermediate Frequency Amplifier

The SP 122 tube is ideal for use as an intermediate frequency amplifier in circuits such as the super-heterodyne. When used to amplify frequencies lower than 100 K. C. it is possible to obtain an actual gain per stage of 100 to 150. The circuit recommended for using the tube in this capacity is similar to the circuit shown in Figure 1 for radio frequency amplification. However, at the lower frequencies it is not necessary to completely