

NATIONAL BROADCASTING COMPANY, INC.

ENGINEERING DEPARTMENT

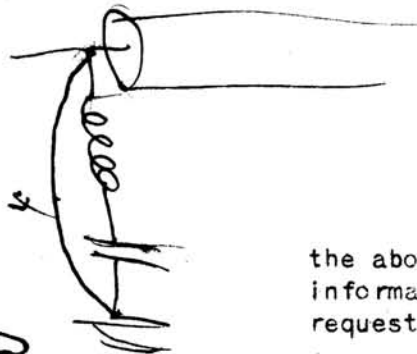
TO ALL DIVISION ENGINEERS & ENGINEERS IN CHARGE

DATE March 5, 1935

FROM J D'AGOSTINO

NOTICE NO. 26 ADDENDA -- BINDER NO. 1

SUBJECT Special Anti-Side Tone Circuit

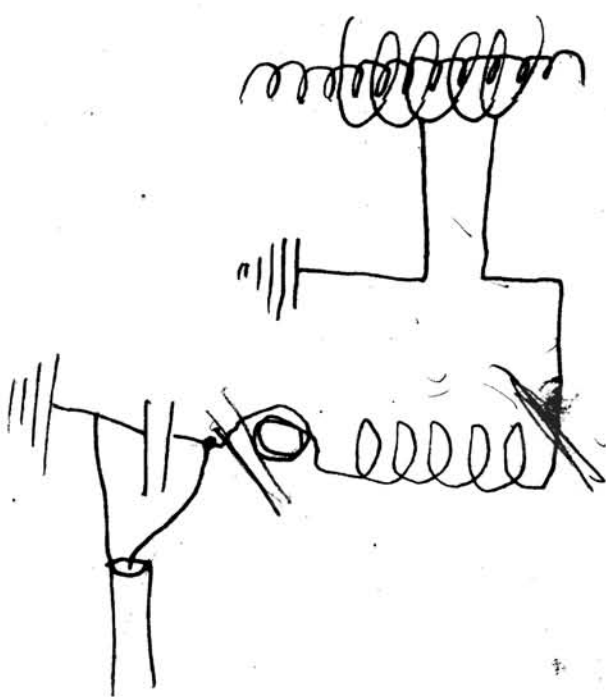


Attached please find a description of the above subject, submitted to you as general information. Additional copies may be had upon request.

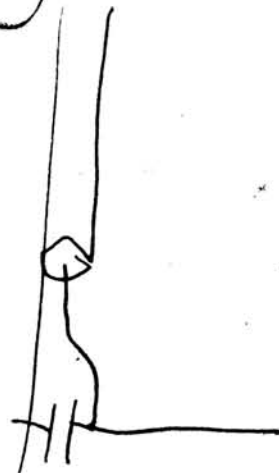
Credit for a working application of this data should go to Mr Raymond A Monfort and Mr Donald H Castle of the New York Maintenance Group.

Vertical handwritten text on the left side of the page, possibly a name or initials, written vertically.

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Handwritten signature: *Jos D'Agostino*  
 J D'AGOSTINO



## SPECIAL ANTI SIDE TONE CIRCUIT

### Purpose

The circuit described herein is designed to provide two-way conversation on the air or three-way conversation with loudspeakers at all points, the loudspeakers and microphones being open at all times. This is made possible without cut-off or switching systems.

### General

Referring to figure 1, if we assume that  $R-1$ ,  $R-2$  and  $R-3$  are all of equal value and  $R-1^1$ ,  $R-2^1$  and  $R-3^1$  are of equal value then, if a voltage be applied across  $R-1$ , a voltage will be observed across all other resistances of the network except  $R-1^1$ . This will be apparent with reference to Wheatstone Bridge circuit theory. If, now, the resistance  $R-1$  represents a microphone output and the resistance  $R-1^1$  be a loudspeaker input then when the microphone represented by  $R-1$  is spoken into no feedback will be noted from the adjacent loudspeaker represented by the resistance  $R-1^1$ . Similarly,  $R-2$  and  $R-3$  may be microphones and  $R-2^1$  and  $R-3^1$  may be adjacently mounted loudspeakers.

In the case noted above full three-way conversation may be held. If it is desired to communicate between two points and have the resulting conversation transmitted to local or network channels, then we assume that  $R-1$  and  $R-2$  be the two sources of program and  $R-1^1$  and  $R-2^1$  be their adjacently located loudspeakers.  $R-3$  becomes a pure resistance and  $R-3^1$  will be the input to the outgoing line or channel amplifier.

It will be obvious that for proper operation of this circuit all of the resistances shown in figure 1 representing as they do the output of microphone amplifiers or input of loudspeaker amplifiers must be accurately balanced against each other, that is  $R-1$ ,  $R-2$  and  $R-3$  must have very nearly the same values within close limits and the same will be true of  $R-1^1$ ,  $R-2^1$  and  $R-3^1$ . In order to accomplish this close balance it will be necessary in some cases to isolate these circuits by use of balanced H pads.

### **General (Continued)**

It is most convenient, in this connection, to arrange the output of the microphone amplifiers for 125 ohm operation and to terminate the same in a 125 ohm resistor. The variation in balance with this arrangement is reduced to a satisfactory minimum.

The loudspeaker amplifier input is usually of high impedance subject to some variation with a change in the volume control. It is, therefore, found best to isolate the inputs to these loudspeakers with suitable H pads. A 6 db 6000 to 6000 ohm pad is generally sufficient isolation.

### **Typical Circuits**

Figure 2 shows a typical 3 way talking circuit with loudspeakers at all talking points. Figure 3 shows a two way talking circuit feeding a program bus for network or local station feed.

### **Precaution**

Although primary feedback into the talking circuit by the loudspeaker located adjacent to the microphone is eliminated by use of this circuit a source of secondary feedback is possible. This occurs when a signal from, let us say, microphone #1 heard on loudspeaker #2, re-enters microphone #2 and is transmitted back to loudspeaker #1. A judicious choice of loudspeaker levels will minimize this difficulty.

### **Discussion**

This circuit has been used to advantage in such broadcasts as those originating on the yacht "Seth Parker" in which a conversation with the studio is carried on during the broadcast.

No appreciable frequency discrimination is noted by use of this bridge circuit.

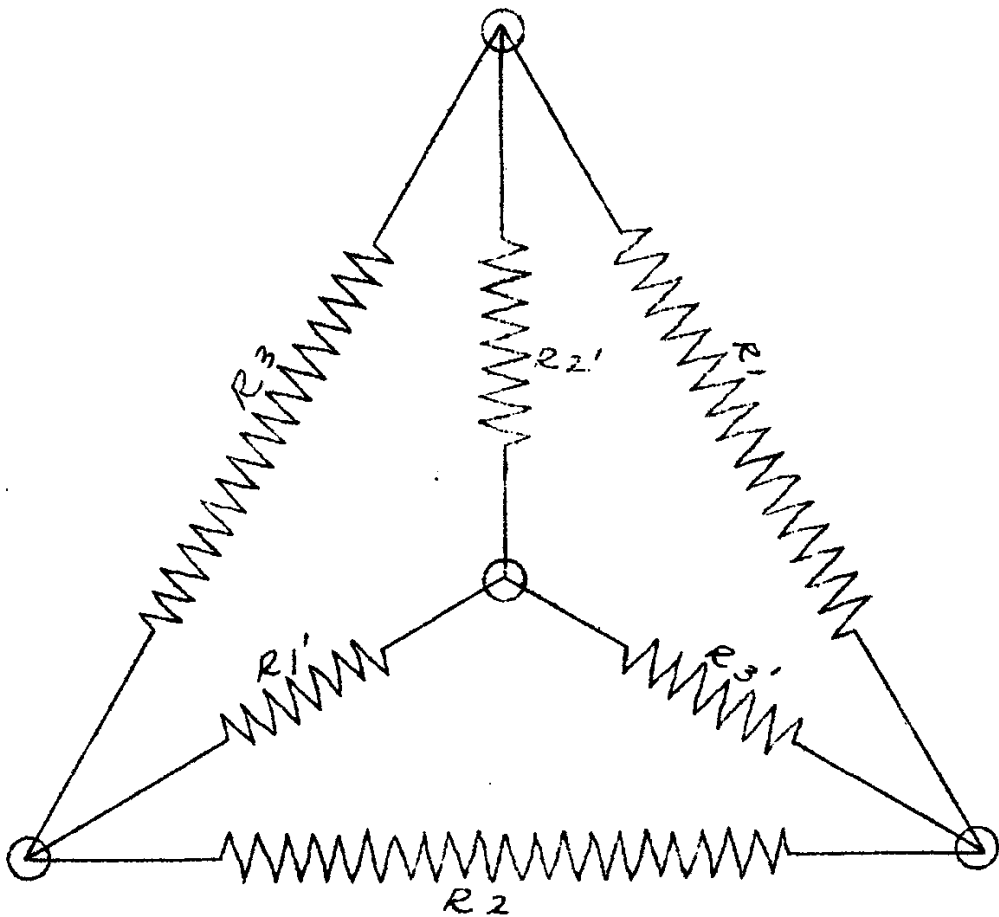


FIG. 1

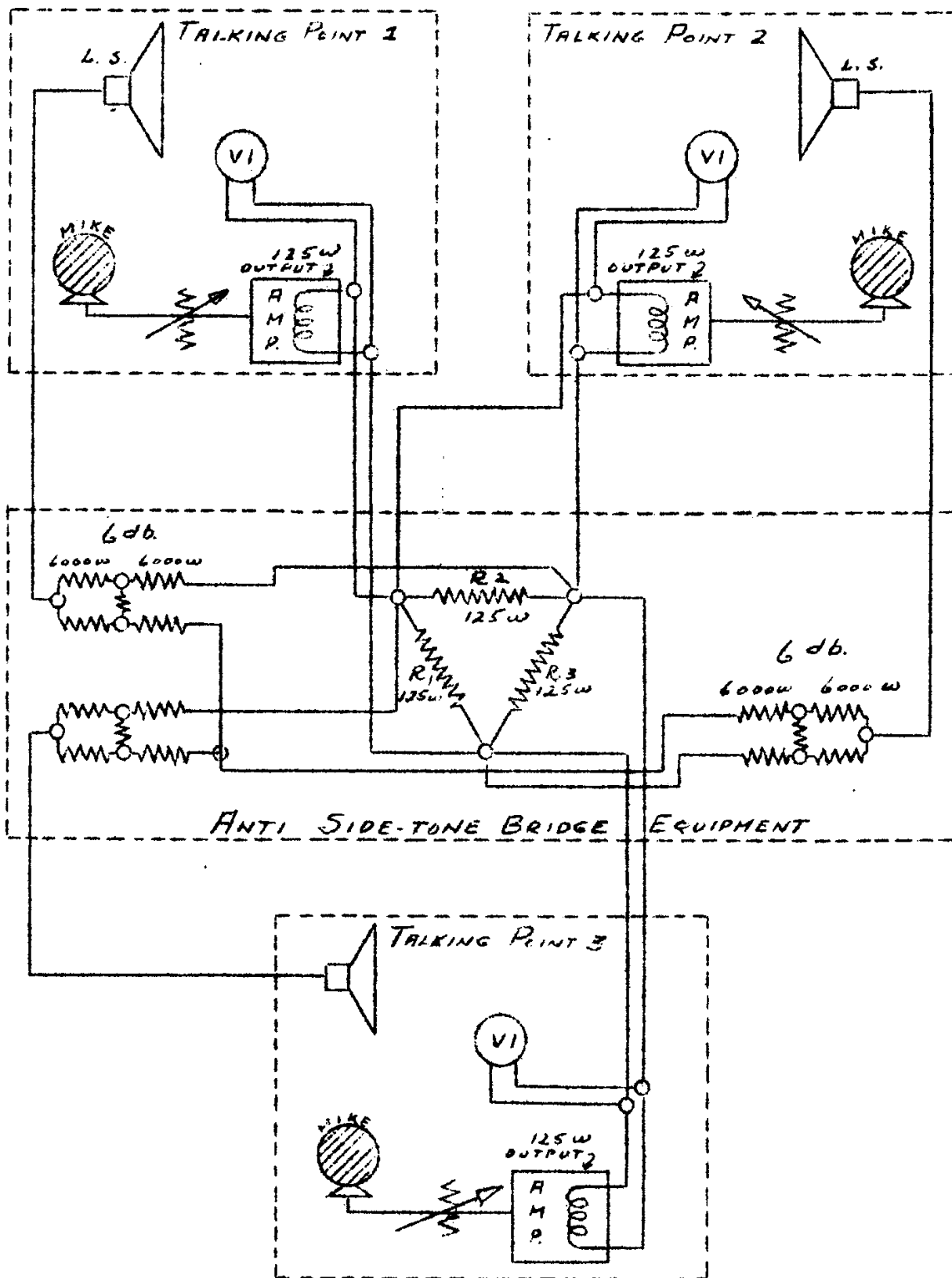


FIG. 2

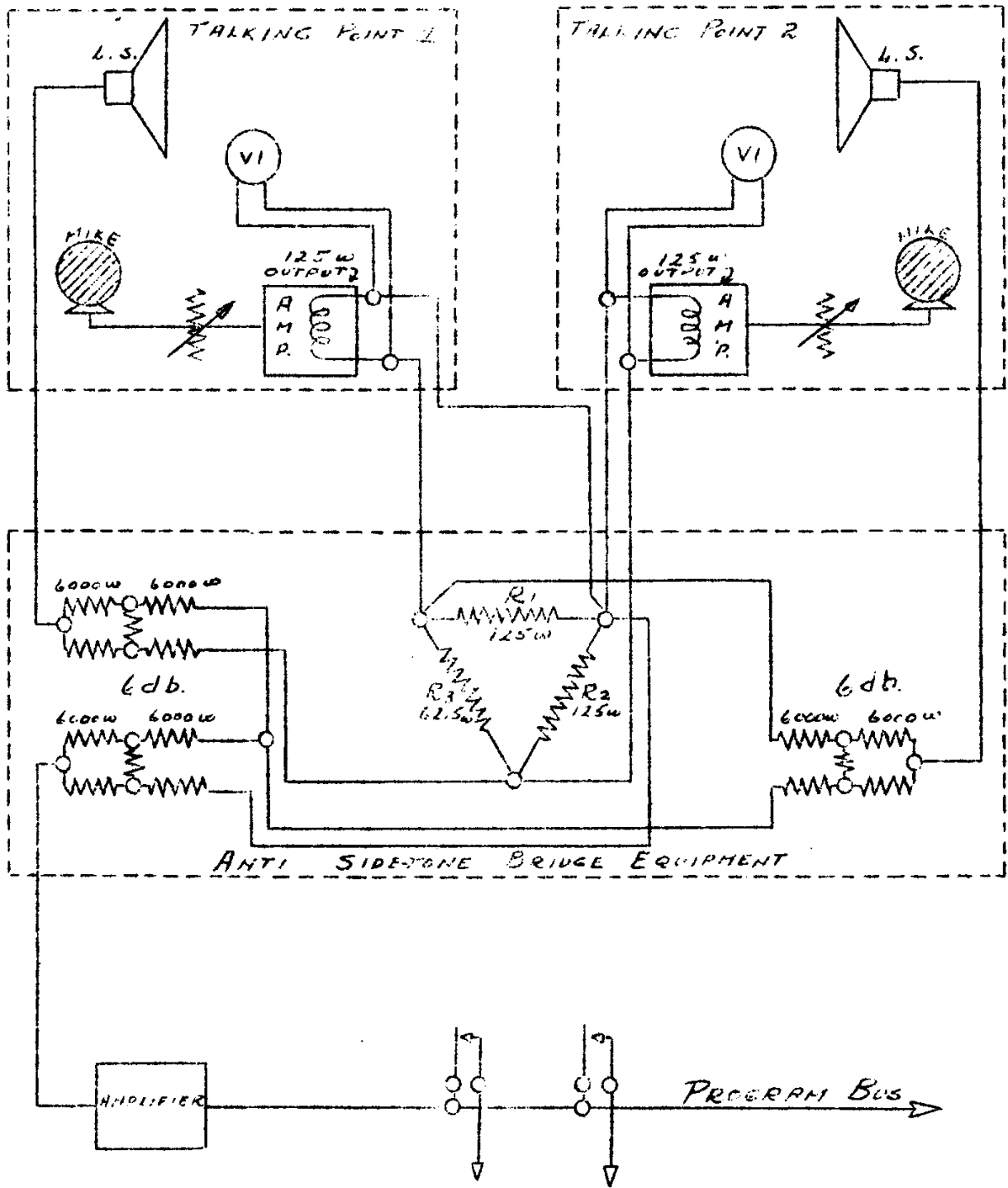


FIG. 3