

Aug. 27, 1963

E. IVENS ET AL

3,102,169

LOUDSPEAKING TELEPHONES

Filed Dec. 14, 1959

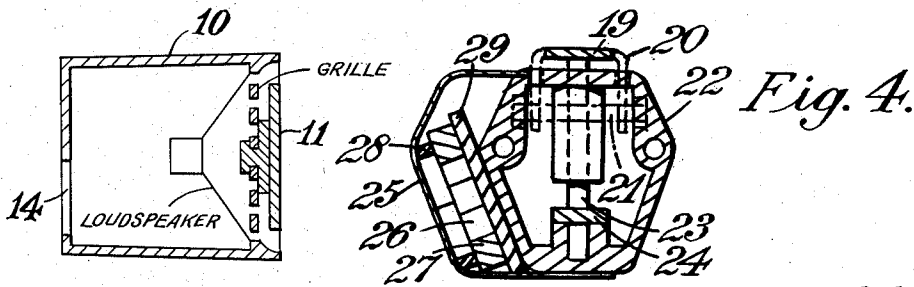
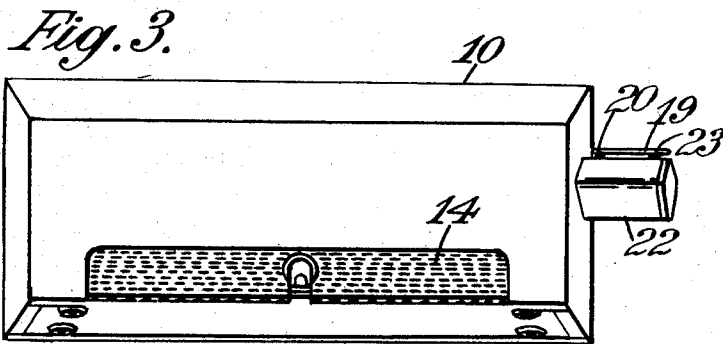
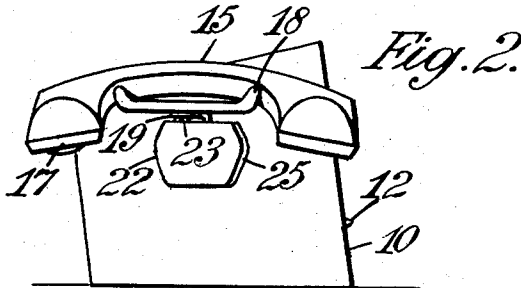
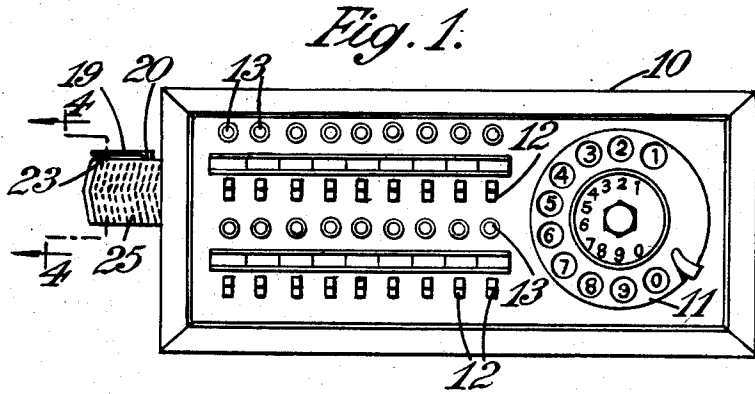


Fig. 5.

EDGAR IVENS AND
ARTHUR IAN FORBES SIMPSON
INVENTORS
E. J. Kalil
AGENT

1

3,102,169

LOUDSPEAKING TELEPHONES

Edgar Ivens and Arthur Ian Forbes Simpson, London, England, assignors to Modern Telephones (Great Britain) Limited, London, England, a British company
 Filed Dec. 14, 1959, Ser. No. 859,405
 5 Claims. (Cl. 179-100)

This invention relates to loudspeaking telephones of the kind having a loudspeaker and a separate microphone.

In a loudspeaking telephone system having a loudspeaker and microphone adjacent one another, there is acoustic coupling between the loudspeaker and microphone and, to avoid instability in the system when two stations are in communication, it is important to keep this coupling as low as possible to minimise the loop gain of the electro-acoustic circuit around the complete loop formed by two stations. The present invention has for its principal object to provide an improved construction of loudspeaker and microphone assembly in which there is small coupling between the loudspeaker and microphone.

According to the invention, a loudspeaking telephone comprises a cabinet with a loudspeaker mounted behind an opening in the front face of the cabinet near one end thereof and a microphone on the outside of the end wall of the cabinet at the opposite end to the loudspeaker. It has been found that by suitably positioning the microphone on the end wall, which position may readily be found empirically, there may be obtained a very substantial reduction in the acoustic coupling compared with the coupling which would exist between the loudspeaker and the microphone if they were directly spaced apart the same distance in air. The higher frequency sounds are reduced by masking whilst, for the lower frequency sounds, the cancelling effects of the sound travelling along different paths give a position of minimum intensity where the microphone can be located.

In a loudspeaking telephone having also a handset with a transmitter and receiver, as is often required in loudspeaking telephone systems, there may be provided a cradle-rest for the handset which cradle-rest is mounted on a support permitting the necessary movement of the cradle-rest and arranged in a housing on said end wall of the cabinet and the microphone may be arranged in a housing adjacent to and at least partly formed by the support housing. This arrangement thus provides a particularly neat and convenient form of construction in which the cradle-rest and microphone housing together form a single unit projecting from the end wall to the cabinet. Most conveniently the cradle-rest is arranged so that the handset extends with its longitudinal axis substantially parallel to the end wall of the cabinet and preferably substantially horizontal.

The microphone is preferably a crystal microphone and it may be mounted in rubber or rubber like material to minimise any possibility of it being influenced by sounds transmitted through the interior of the cabinet from the loudspeaker.

Preferably to minimise air vibrations in the cabinet due to the loudspeaker, the cabinet is provided with an opening in its back wall of substantially the same size as the opening in the front face of the cabinet. This not only reduces column resonance of the air in the cabinet but also assists in producing the cancelling effect to give a position of minimum sound intensity where the microphone is located in the end wall of the cabinet. The loudspeaker opening is conveniently covered with a grille which may serve as a support for a dial assembly if the loudspeaking telephone is to form part of an automatic telephone system.

2

The following is a description of one embodiment of the invention reference being made to the accompanying drawings in which:

FIGURE 1 is a front elevation view of a loudspeaking telephone;

FIGURES 2 and 3 are respectively an end view and a rear view of the telephone in FIGURE 1;

FIGURE 4 is a sectional view through the microphone housing assembly along the lines 4-4 of FIGURE 1; and

FIGURE 5 is a sectional end view of the cabinet showing the loudspeaker in relation to the grille and the dial assembly.

Referring to the drawings, there is illustrated a loudspeaking telephone comprising a cabinet 10 which is of tapered shape in plan view and which has a loudspeaker (note FIG. 5) arranged behind a grille which serves as a support for a dial assembly 11. The loudspeaker and dial assembly are arranged towards one end of the front face of the cabinet 10 and, at the other end, the front face carries two rows of keys 12 and two rows of indicators 13 which may, for example, be signalling lamps. As seen in FIGURE 3, the rear of the cabinet has an opening 14 of substantially the same size as the opening in the front of the cabinet to minimise air vibrations in the cabinet due to the loudspeaker.

The loudspeaking telephone apparatus shown in the drawings also incorporates a handset 15 having a receiver 16 and a transmitter 17. The handset 15 is carried on a cradle 18 which is pivotally supported for up and down movement by a member 19 having two lugs 20 pivotally carried on a pivot pin 21 secured in a housing 22. The cradle in the known way operates a push rod 23 connected by a link 24 to a switch mechanism (not shown) inside the cabinet 10. The housing 22 carries a grille 25 which forms a front face for the housing 22 and which contains a crystal microphone 26. This microphone 26 is placed in an aperture in a sponge rubber sheet 27 which is sandwiched between two further sheets 28, 29, the front sheet 28 having an opening in front of the microphone which is thus totally enclosed by the rubber except for the exposed front face. The wires from the microphone 26 to the cabinet are taken from the outer end of the microphone assembly along the top of the microphone assembly inside the grille 25, suitable channels being provided in one of the sheets of rubber so as to minimise any possibility of acoustic coupling between the loudspeaker and microphone along this path.

The cabinet 10 also houses any necessary amplifier and switching equipment. By mounting the microphone in this manner on the end of the cabinet remote from the loudspeaker and taking the above described precautions to minimise acoustic coupling through the leads to the microphone and also to minimise air vibrations inside the cabinet, it has been found possible to mount the microphone on the end of the cabinet in a position shielded from direct sound radiation from the loudspeaker such that there is only a small acoustic coupling between the loudspeaker and the microphone. The acoustic coupling is very substantially reduced compared with that if the microphone and loudspeaker were directly spaced apart from the same distance in air.

We claim:

1. A loudspeaking telephone comprising a cabinet having front and rear walls and end walls with an opening in the front wall near one end thereof and an opening in the rear wall of substantially the same size as the opening in the front wall, a single loudspeaker mounted in the cabinet behind said opening in the front wall, a handset with a transmitter and a receiver, a microphone on the outside of an end wall of the cabinet at the opposite end to the loudspeaker, a housing at said end wall for said

3

microphone, and a cradle-rest for said handset mounted on a support associated with said microphone housing, said support being adapted for movement in conjunction with the use of said cradle-rest.

2. A loudspeaking telephone as claimed in claim 1, wherein the cradle-rest is arranged so that the handset extends with its longitudinal axis substantially parallel to the end wall of the cabinet.

3. A loudspeaking telephone as claimed in claim 1, wherein the microphone is a crystal microphone mounted in rubber like material.

4. A loudspeaking telephone as claimed in claim 3, wherein the microphone is totally enclosed in said rubber like material except for an opening to expose the front face of the microphone.

5. A loudspeaking telephone comprising a cabinet, a single loudspeaker mounted in said cabinet near one end thereof to radiate sound outwardly of said cabinet through an associated wall opening, a wall opposite said associated

4

wall opening, said opposite wall having an opening therein to minimize air vibration in the cabinet due to the loudspeaker, a handset, a cradle-rest for said handset, a cradle-rest support housing mounted on the outside of said cabinet at an end opposite to the end at which the loudspeaker is mounted, and a microphone in said housing.

References Cited in the file of this patent

UNITED STATES PATENTS

2,177,769	Erickson	Oct. 21, 1939
2,277,907	Goodale et al.	Mar. 31, 1942
2,500,264	Souget	Mar. 14, 1950
2,542,922	Giannini	Feb. 20, 1951
2,844,659	Shaw	July 22, 1958

FOREIGN PATENTS

614,638	Great Britain	Dec. 20, 1948
148,308	Australia	Sept. 27, 1952