

E. A. GRAHAM.
TELEPHONIC APPARATUS.
APPLICATION FILED DEC. 1, 1911.

1,047,788.

Patented Dec. 17, 1912.

2 SHEETS—SHEET 1.

Fig. 1.

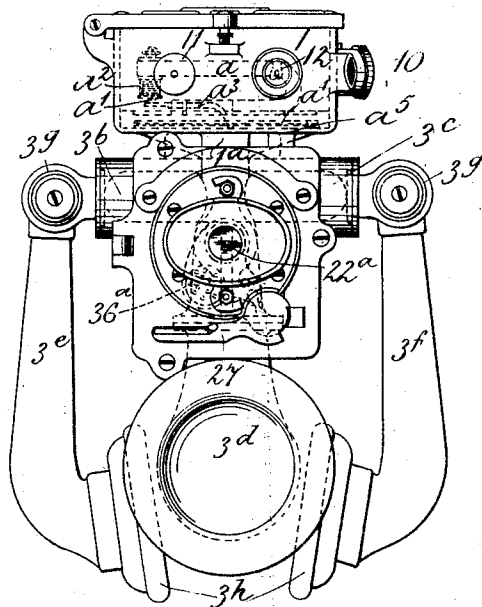
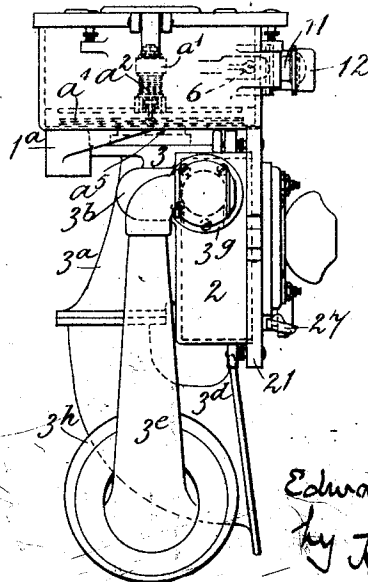


Fig. 2.



Witnesses:
E. R. Peck
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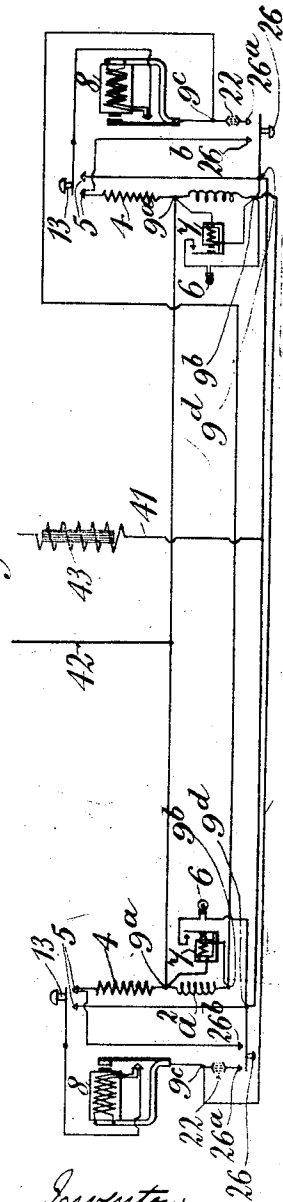
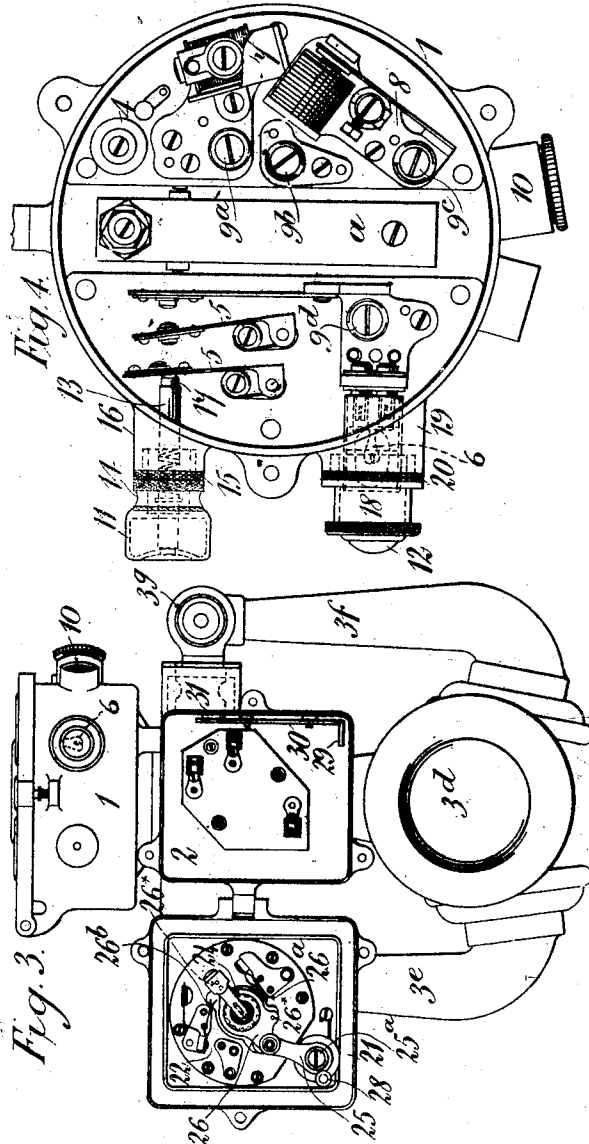
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UNITED STATES PATENT OFFICE

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TELEPHONIC APPARATUS.

1,047,788.

Specification of Letters Patent.

Patented Dec. 17, 1912.

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To all whom it may concern:

Be it known that I, EDWARD ALFRED GRAHAM, a subject of the King of Great Britain and Ireland, residing at Brockley, in the county of London, England, have invented Improvements in or Relating to Telephonic Apparatus, of which the following is a specification.

Hitherto it has been common to provide a telephonic instrument with a sound amplifying trumpet for use in quiet situations, and another type of instrument, provided with side hearing tubes, for use in noisy stations, such as in the engine rooms of a ship, machinery spaces, gun turrets and the like.

Many situations, particularly on board ship, may however be generally free from noise while at times there may be considerable noise occasioned as by machinery for training gun turrets, the working of capstans and so forth, and in these positions the provision of a telephonic instrument by which instructions can be received without the necessity of placing the receiver or receivers to the ear or ears in the ordinary course, and may yet be rendered audible even when there is considerable noise, would be advantageous.

The present invention has for its object to provide improved telephonic apparatus specially suitable for use in situations which are at times comparatively quiet and in which at other times there is considerable extraneous noise. For this purpose, the receiving portion of telephonic apparatus according to this invention comprises a telephonic receiving device, a sound amplifying trumpet whereby the sounds reproduced by the telephonic receiver when suitably constructed, can be heard at a considerable distance away from the instrument when comparative quiet reigns in the vicinity thereof, and one or more hearing tubes adapted to be placed to the ear or ears in order to hear reproduced sounds distinctly when the extraneous noise is such as would otherwise prevent these sounds being heard. Such telephonic receiving apparatus can be used in conjunction with a telephonic transmitter, and other device or devices usually associated with telephonic apparatus, and can be directly combined therewith as one structure or not, as may be found convenient or desirable.

In the accompanying illustrative draw-

ings, Figures 1 and 2 are front and side elevations respectively of an instrument embodying the invention. Fig. 3 is a view similar to Fig. 1 with the instrument partly open and Fig. 4 is a plan view with parts removed. Fig. 5 is a diagram of connections pertaining to a pair of such instruments.

As here shown the instrument comprises two casings 1 and 2 shaped as shown and secured together, as by screws. The upper casing 1 which is provided with a supporting socket 1^a contains a telephonic receiver preferably such as is described in the specification of my British Letters Patent No. 25112 of 1909 and comprising a permanent magnet *a* to one pole of which is fixed a polar extension *a*¹ carrying the receiver coil *a*² and to the other pole of which is pivoted a lever *a*³ one end of which terminates near to and opposite the polar extension and the other end of which is fixed to the receiver diaphragm *a*⁴ so as to impart an initial mechanical stress thereto. The casing 2 has formed at its rear side a sound passage 3 communicating with the diaphragm chamber *a*⁵ of the receiver and having three branches, viz: a middle vertical branch or passage 3^a and two side branches 3^b and 3^c, the middle branch 3^a passing to a stationary sound amplifying trumpet 3^d and the side branches 3^b 3^c communicating respectively with pendent side sound tubes 3^e, 3^f which are connected to the casing 2 by knuckle or universal joints 3^g. The sound tubes 3^e and 3^f are provided with elastic ear pads 3^h. As will be seen the arrangement is such as will allow of the telephonic sounds being received by the trumpet 3^d, or by the sound tubes 3^e, 3^f, as may be desired. The upper casing 1 also contains a shunt resistance 4 of a non-inductive or substantially non-inductive character, a set of contacts 5 for use in calling a distant station, a signal lamp 6, a relay 7 for closing the circuit of the lamp, a calling vibrator 8 and a set of terminals 9^a, 9^b, 9^c, 9^d serving to connect the line wires which enter the casing 1 through a gland 10. The forward portion of the casing 1 carries the calling push 11, and a lens 12 for the signal lamp 6. The spindle 13 of the push 11 passes through a spring chamber 14 screwed against a packing ring 15 and into a boss 16, and is provided with an insulating top 17. The lens 12 is mounted in a socket 18 screwed into a boss 19 against a packing

ring 20. The lower casing 2 contains, attached to the front cover 21, a transmitter at 22, of the granular type, having a front carbon diaphragm mounted in known manner behind the mouth piece 22^a and having a rear electrode of carbon mounted so as to be intermittently revolved by means of ratchet gear 24 in a known manner.

25 is the lever which operates the switch member 26 connected to the ratchet mechanism 24 and carrying the movable contact pins 26^{*} for engagement with the pairs of stationary switch contacts 26^a and 26^b for closing the electrical circuits of the apparatus. The said lever 25 is arranged to be operated through a spindle 25^a from a thumb lever 27 external to the casing 2 and is also provided with a roller 28 arranged to be operated by a finger or projection 29 on a slide bar 30, which is arranged to be moved by a crank pin 31 connected to the right hand knuckle 3^a of the side sound tube 3^f. Thus, the switch member 26 will be moved to actuate the transmitter agitating mechanism and to close the switch when the said side sound tube 3^f is elevated to the user's ear, or, alternatively by the depression of the thumb piece 27. In both cases a shutter plate 36 which normally covers the front carbon diaphragm and is arranged behind the mouth piece 22^a will be moved so that a series of perforations 36^a in such plate will be brought in front of the transmitter to enable the latter to be used.

The diaphragm Fig. 5 shows how two instruments constructed as hereinbefore described with reference to Figs. 1 to 4 are connected together and to positive and negative supply mains 41 and 42 respectively supplied with current from a dynamo 43 is an inductive line coil, *i. e.* a choking coil, arranged in circuit with the supply main 41 for the purpose of steadying the generated currents, preventing the reproduction in the telephone circuit of disturbances in any part of the circuit, and of preventing cross talking as between different pairs of telephonic instruments that may be engaged at the same time, all as well understood.

As will be seen from the diagram, each resistance 4 is arranged to be temporarily connected by the switch 26, 26^a, 26^b, 26^{*} in parallel with the circuit, or portion of the circuit, which includes the transmitter 22 of one instrument with the receiver coil α^2 of the other instrument in such manner that the inductance, due to the line coil 43, is excluded from the said circuit or portion of the circuit, as described in the specification of my British Letters Patent No. 3935 of 1907. When the instruments are connected in pairs to say a six cell electric battery instead of to a dynamo or the like and the line coil 43 omitted, the shunt resistances 4 are disconnected.

As will be obvious other known or suitable types of loud speaking transmitters and receivers may be used in lieu of the forms hereinbefore particularly referred to, without departing from the essential features of the invention.

What I claim is:—

1. In a loud speaking telephonic instrument, a casing comprising a circular receiver compartment with its axis arranged vertically, a hinged lid closing said compartment and a series of peripheral bosses adapted respectively to accommodate a switch push, a signal lamp and a gland for electric conductors.

2. In a loud speaking telephonic instrument, a casing comprising a circular receiver diaphragm compartment with its axis arranged vertically and having an axially disposed opening in the bottom, a hinged lid for the receiver compartment and a series of peripheral bosses adapted respectively to accommodate a switch push, a signal lamp and glands for electric conductors, a rigid body part adapted to be connected to the receiver compartment and formed respectively with a rectangular transmitter compartment, a passage adapted to connect a stationary trumpet to the receiver compartment through the opening in the bottom aforesaid and branch passages terminating in hollow bosses adapted to receive movable hearing tubes.

3. In a loud speaking telephonic instrument, a casing comprising a circular receiver diaphragm compartment with its axis arranged vertically and having an axially disposed opening in the bottom, a hinged lid for the receiver compartment and a series of peripheral bosses adapted respectively to accommodate a switch push, a signal lamp and a gland for electric conductors, a rigid body part adapted to be connected to the receiver compartment and formed respectively with a transmitter compartment, a passage adapted to connect a stationary trumpet to the receiver compartment through the opening in the bottom aforesaid, branch passages terminating in hollow bosses, a pair of hearing tubes and universal joints connecting said tubes to the hollow bosses.

4. In a loud speaking telephonic instrument, a casing comprising a cylindrical receiver diaphragm compartment with its axis arranged vertically and having an axially disposed opening in the bottom, a supporting socket to one side of said opening, a hinged lid and a series of peripheral bosses adapted respectively to accommodate a switch push, a signal lamp and a gland for electric conductors.

5. In a loud speaking telephonic instrument, a casing comprising a cylindrical receiver compartment with its axis arranged vertically and having an axially disposed

opening in the bottom, a supporting socket to one side of said opening, a hinged lid and a series of peripheral bosses adapted respectively to accommodate a switch push, a signal lamp and glands for electric conductors, a body part adapted to be connected to the receiver compartment and formed respectively with a rectangular transmitter compartment, a passage adapted to connect a stationary trumpet to the receiver compartment through the opening in the bottom aforesaid and branch passages terminating in hollow bosses adapted to receive movable hearing tubes.

6. A loud speaking telephonic instrument comprising a circular receiver diaphragm compartment with its axis arranged vertically and having an axially disposed opening in the bottom, a hinged lid for said compartment and a series of peripheral bosses adapted respectively to accommodate a switch push, a signal lamp and a gland for electric conductors, a body part adapted to be connected to the receiver compartment and formed respectively with a transmitting compartment, a passage adapted to connect a stationary trumpet to the receiver compartment through the opening in the bottom aforesaid and branch passages in communication with the first mentioned passage and receiver compartment and terminating in hollow bosses adapted to receive movable hearing tubes.

7. A loud speaking telephonic instrument comprising a circular receiver diaphragm compartment with its axis arranged vertically and having an axially disposed opening in the bottom, a hinged lid for said compartment and a series of peripheral bosses adapted respectively to accommodate a switch push, a signal lamp and glands for electric conductors, a body part adapted to be connected to the receiver compartment and formed respectively with a rectangular transmitting compartment, a passage adapted to connect a stationary trumpet to the receiver compartment through the opening in the bottom aforesaid, branch passages in communication with the first mentioned passage and terminating in hollow bosses, a

pair of hearing tubes and universal joints connecting the hearing tubes to the branch passages aforesaid.

8. A loud speaking telephonic instrument comprising a circular receiver diaphragm compartment with its axis arranged vertically and having an axially disposed opening in the bottom, a supporting socket to one side of said opening, a hinged lid for said compartment and a series of peripheral bosses adapted respectively to accommodate a switch push, a signal lamp and a gland for electric conductors, a body part adapted to be connected to the receiver compartment and formed respectively with a transmitting compartment, a passage adapted to connect a stationary trumpet to the receiver compartment through the opening in the bottom aforesaid and branch passages in communication with the first mentioned passage and terminating in hollow bosses adapted to receive movable hearing tubes.

9. A loud speaking telephonic instrument comprising a circular receiver diaphragm compartment with its axis arranged vertically and having an axially disposed opening in the bottom and a supporting socket to one side of said opening, a hinged lid for said compartment and a series of peripheral bosses adapted respectively to accommodate a switch push, a signal lamp and a gland for electric conductors, a body part adapted to be connected to the receiver compartment and formed respectively with a rectangular transmitting compartment, a passage adapted to connect a stationary trumpet to the receiver compartment through the opening in the bottom aforesaid, branch passages in communication with the first mentioned passages and terminating in hollow bosses, a pair of hearing tubes and universal joints connecting the hearing tubes to the branches aforesaid.

Signed at St. Andrew's Works, Crofton Park London this third day of November 1911.

EDWARD ALFRED GRAHAM.

Witnesses:

EDWARD EUGENE BARNARD,
HENRY WILLIAM DIPROSE.