C. H. LEHMAN.

TELEPHONE SET.

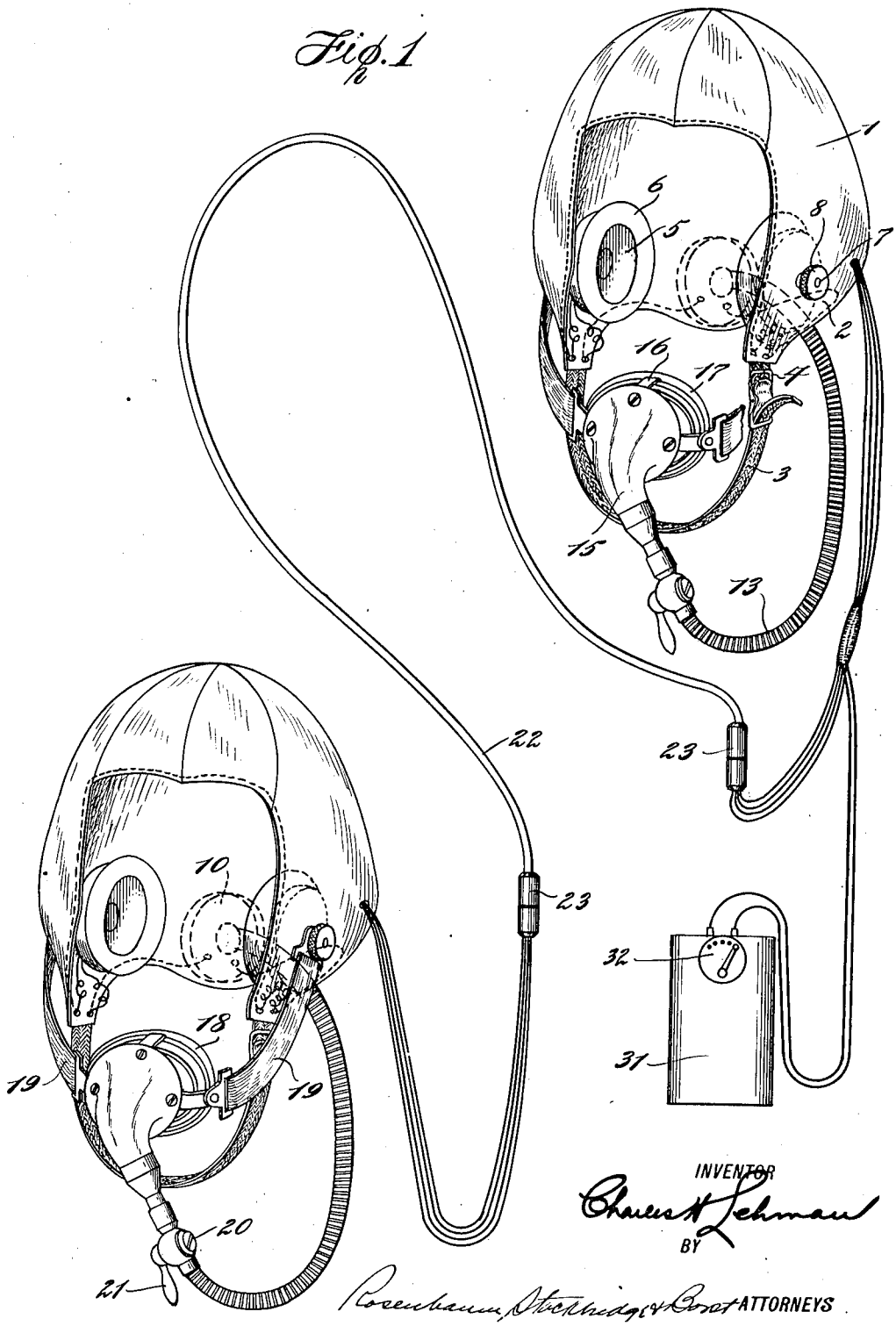
APPLICATION FILED AUG. 21, 1917.

1,314,819.

Patented Sept. 2, 1919.

2 SHEETS—SHEET 1.

Fig. 1



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2 SHEETS—SHEET 2.

Fig. 2

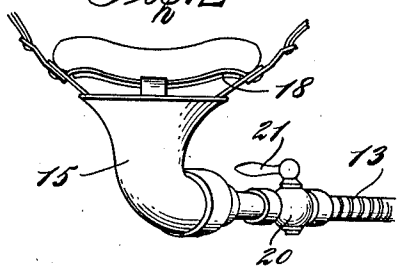


Fig. 3

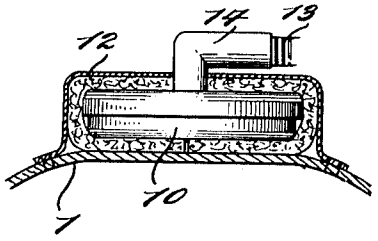
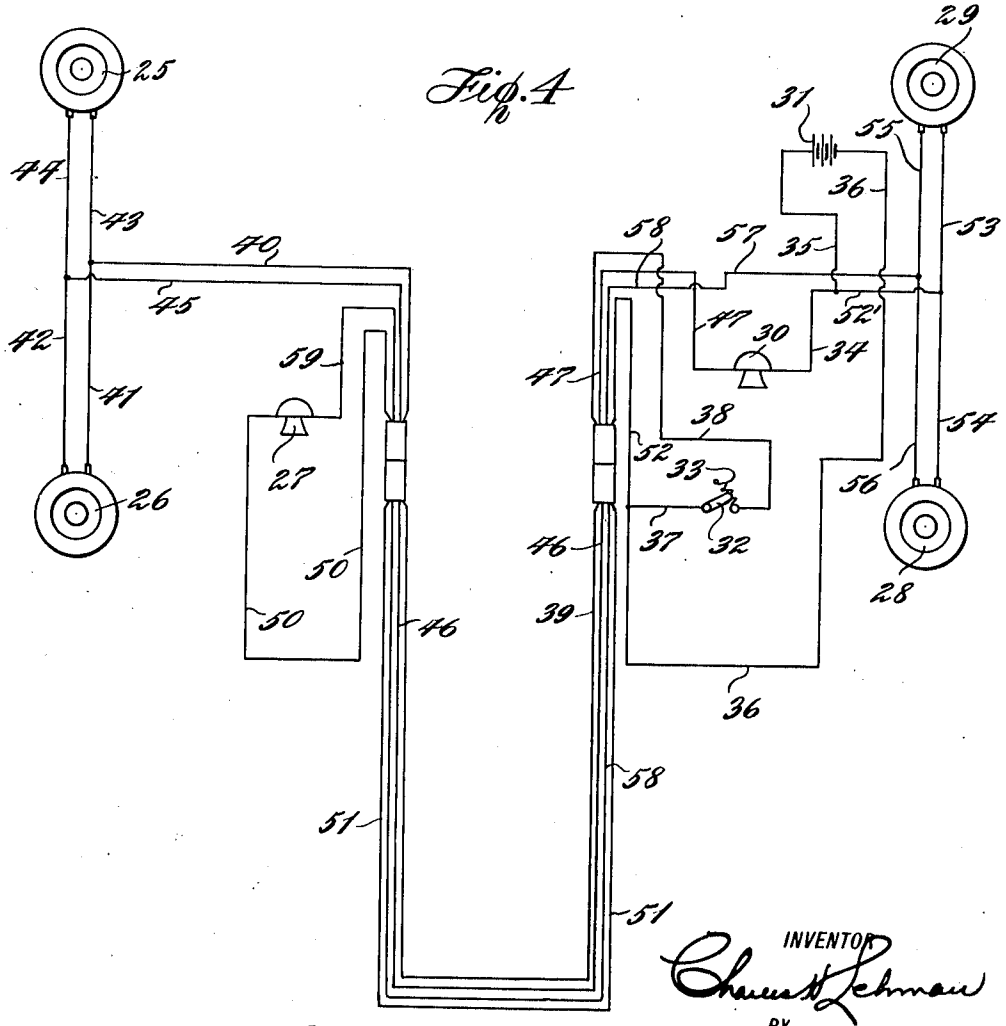


Fig. 4



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UNITED STATES PATENT OFFICE.

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TELEPHONE SET.

1,314,819. Specification of Letters Patent. Patented Sept. 2, 1919.

Application filed August 21, 1917. Serial No. 187,369.

To all whom it may concern:

Be it known that I, CHARLES H. LEHMAN, a citizen of the United States, residing at the city of New York, in the borough of Manhattan and State of New York, have invented certain new and useful Improvements in Telephone Sets, of which the following is a full, clear, and exact description.

This invention relates to telephone sets and more particularly to sets which are adapted to be used under conditions which render the transmission of speech difficult, as, for example, for communication in aeroplanes; in the presence of gun-fire both on ship board or with coast or field artillery or in the presence of other deafening sounds or noises.

One of the objects of the invention is to provide a transmitter for such a set which will exclude all the surrounding noise but will transmit clearly and distinctly the sound waves which are impressed upon the transmitter by a person talking into the same.

Another object of the invention is to provide a telephone transmitter which is carefully and thoroughly protected against the extraneous sound waves or vibrations which would be occasioned by violent sounds or noises in the vicinity.

A further object of the invention is to provide a telephone set having a transmitter with the above characteristics which transmitter is, together with the receivers of the set, mounted upon a head-gear in such a manner as to leave both hands free and so as not to inconvenience to any material extent the wearer, the telephone set being thus adapted for use in conjunction with an aviator's helmet, with a gas-mask and for like purposes.

Other objects of the invention will be apparent from the detailed description hereinafter to follow.

In order to provide a transmitter which will exclude all foreign sounds, the invention contemplates a transmitter which consists essentially of a telephone transmitter, in conjunction with a speaking tube, the sound waves being carried through the speaking tube to the transmitter. More specifically, the invention contemplates providing a sound collecting trumpet at the end of the speaking tube which is preferably provided with slots or openings therein adjacent the point at which the voice enters the same to avoid the resonance or other sound disturbances which would impair the clearance of speech transmission.

The invention further contemplates a valve in the speaking tube which is adapted to be moved to vary the effective cross section of the tube through which the sound waves pass.

When the telephone set forms a part of a headgear, the telephone transmitter is arranged upon the headgear preferably adjacent the back thereof and is protected by a sound-deadening medium, such as a layer of felt or the like. The speaking tube in this instance consists of a flexible tube which leads from the electrical transmitter to a sound-collecting trumpet which is adapted to be held over the mouth of the wearer by means of a strap or other suitable device.

In the drawings, one embodiment of the invention is shown in which the telephone set is shown associated with the usual type of aviator's helmet, which embodiment is intended to be illustrative and not as limiting the invention to this particular use.

In the drawings:

Figure 1 shows the equipment for a pair of aviators' helmets and the connections therebetween;

Fig. 2 is a detail showing the sound-collecting trumpet at the end of the speaking tube;

Fig. 3 is a detail showing the telephone transmitter, the sound-deadening medium surrounding the same being shown in section; and

Fig. 4 is a diagrammatic view of the electrical connections.

The aviators' helmets shown in Fig. 1 are of the same construction and are similar to the usual type of helmet at present used comprising a skull-cap 1 having ear-flaps 2 which are connected by a chin-strap 3 having a buckle 4 for firmly securing it upon the head. The telephone receivers indicated at 5 are each provided with a tubular rubber flange or rim 6 which permit the receiver to fit closely against the ear and to exclude all sounds other than those which emanate from the receiver. These rims also serve as a cushion to protect the ears and the portions of the head adjacent thereto. The telephone receivers are fastened to the ear-flaps 2 by means of a post 7 which passes through the

ear-flap and carries a knurled head or nut 9 for securing it in place.

The telephone transmitter 10 is preferably of the sensitive type, which is utilized in "dictograph" systems, and which is known as the "carbon ball" transmitter. This transmitter is preferably located upon the back of the helmet adjacent the lower end thereof so that the transmitter will rest against the neck of the wearer of the helmet. This position is chosen because it will permit the head to be moved with a minimum amount of movement of the transmitter and also because the transmitter will be more protected at this point than if located upon another part of the helmet. The transmitter 10 is preferably surrounded by a layer of felt 12 or other suitable sound-deadening medium so that the transmitter will be only slightly affected, if at all, by outside sounds or noises which would make the transmission of speech difficult. Connected to the transmitter 10, is a flexible speaking tube 13 which is connected by an elbow 14 to the transmitter and is of a length to curve around the neck to a point adjacent the mouth of the wearer. This tube may be of any desired cross section depending upon the usages to which the instrument is to be placed, and is provided at its front end with a sound-collecting trumpet 15 which is of a somewhat similar construction to the ear-trumpets which are in general use. Fastened to and forming the mouth of the trumpet, is a mouth-piece 17 which comprises an elliptical ring having a tubular rubber rim 18 which is adapted to rest against the mouth of the wearer, the trumpet and mouth-piece being held against the mouth by elastic straps 19 which pass from ear-flap to ear-flap. The mouth-piece is preferably secured to the trumpet by straps 16 so as to provide openings through which any sound waves may emerge which would tend to cause resonance in the speaking tube. Within the speaking tube 13 is a valve 20 which valve may be of any suitable kind, and is provided with an operating handle 21 for opening and closing the same to obtain a variable aperture through which the sound waves emanating from the speaker must pass in order to strike the electrical transmitter 10; or in other words, to vary the effective cross section of the tube.

The electrical connections whereby telephonic communication may be obtained between two aviators provided with the helmets of the type described is shown diagrammatically in Fig. 4. In the diagram the receivers of one aviator are indicated 25 and 26 and the corresponding transmitter 27, the receiver of the other aviators are indicated 28 and 29 and the transmitter 30. The battery for the telephone circuit is indicated at 31, the battery being controlled by a switch 32 which controls a resistance 33 for regulating the strength of current. The sound waves are transmitted from transmitter 30 to receivers 25 and 26 by the following circuit. From the transmitter 30 through wire 34, wire 35 to battery 31, wire 36, wire 37, switch 32, resistance 33, wire 38, wire 39, wire 40, wire 41 to receiver 26, wire 42 to wire 45 and also from wire 40 through wire 44 to the receiver 25, wire 44 to wire 45 (the two receivers thus being in parallel) through wire 45, wire 46, wire 47 back to transmitter 30. Speech is also transmitted from transmitter 27 to receivers 28 and 29 over wire 50, wire 51, wire 52, wire 36, battery 31, wire 35, wire 52′, wires 53 and 54 to receivers 28 and 29 and from wires 55 and 56 to wire 57, wire 58, wire 59 back to transmitter 27. It will, therefore, be seen that the two talking circuits are independent of each other so that the vibrations in one transmitter will not affect the receiver of his own instrument in use.

The helmets are adjusted on the head as described, and the battery 31 for the talking circuits is carried by one of the aviators. Instead of the electrical connections described any other desired telephone circuits may be used.

The wires 46, 39, 58 and 51 which connect the instruments are formed into a cable 22 as shown in Fig. 1, which cable is connected to the other wires by plug-switches 23. To mechanically disconnect the instruments, it is therefore only necessary to pull on the cable 22 which will cause the two members of one of the plug-switches to become disengaged. The type of plug-switch utilized is the ordinary type of plug-switch in common use consisting of four plugs fitting into their respective sockets, as its particular construction forms no part of the present invention.

After the head-gear and connections have been established, the aviator having the battery 31 in his pocket by manipulating the switch 32, can control the resistance of his talking circuits until the other party can hear clearly. If the surrounding noises, due to the aeroplane's propeller or from other causes, are very violent, the valve 20 in the speaking tubes should be partially closed. It has been found that if this is done, the surrounding noises will not be transmitted through the speaking tube to the transmitter, which being protected by a felt pad or other sound-deadening means will only transmit the talking current. It is also to be noted that the mouth-piece 18 rests against the face of the wearer surrounding the mouth and yet permits him to talk directly into the trumpet 15 without resonance which would render the sound waves which are transmitted indistinct in their character. This is true because of the space between the

mouth-piece and the mouth of the trumpet and it is not intended to limit the invention to this particular means for permitting the sound waves to escape without causing resonance, since any other opening which would accomplish this would be the equivalent of the spacing of the mouth-piece from the mouth of the trumpet.

I claim:

1. In a telephone set, the combination of a telephone transmitter, a sound conveying tube extending from the transmitter, means for varying the sound carrying capacity of the tube, and a mouth piece at the free end of the tube, an opening being provided adjacent the mouth piece through which extraneous sounds may enter the tube.

2. In a telephone set, an electrical telephone transmitter, a relatively long speaking tube leading from said transmitter, a valve in said speaking tube for varying the effective cross section of said speaking tube, and a sound-collecting trumpet at the free end of said speaking tube said trumpet having lateral openings for the purpose set forth.

3. In a telephone set, a telephone transmitter, a speaking tube leading to said transmitter, a sound-collecting trumpet attached to the free end of said tube, and a mouth-piece attached to the mouth of said trumpet and spaced from the mouth of said trumpet.

4. In a telephone set, a telephone transmitter, a speaking tube leading to said transmitter, a sound-collecting trumpet attached to the free end of said tube, a mouth-piece attached to the mouth of said trumpet and spaced from the mouth of said trumpet, and means for holding said mouth-piece firmly against the mouth.

In witness whereof I subscribe my signature.

CHARLES H. LEHMAN.