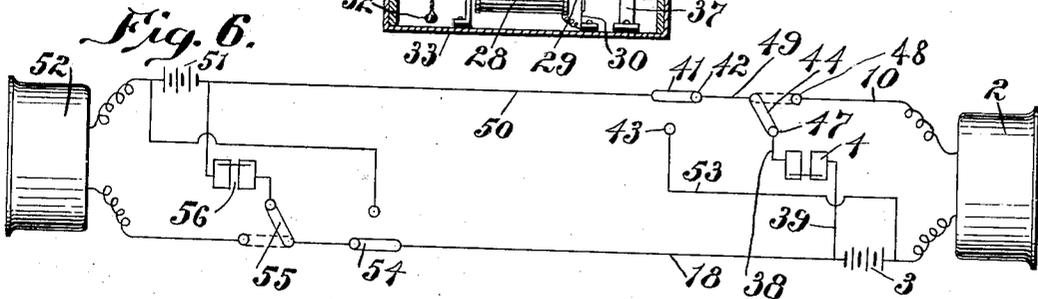
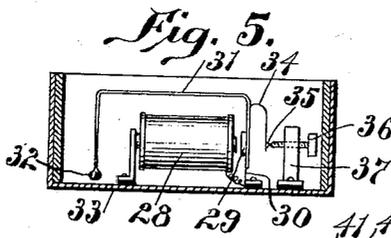
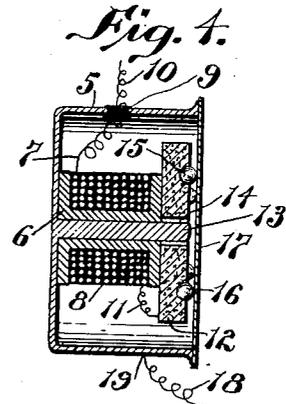
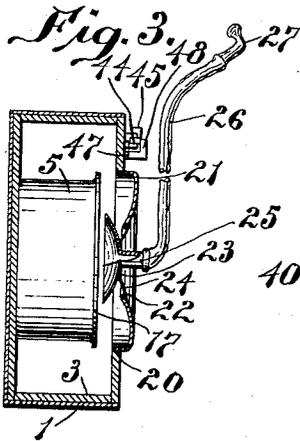
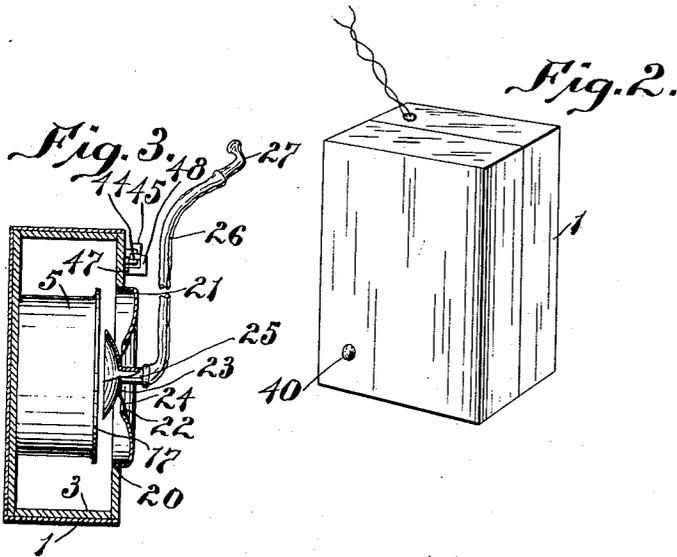
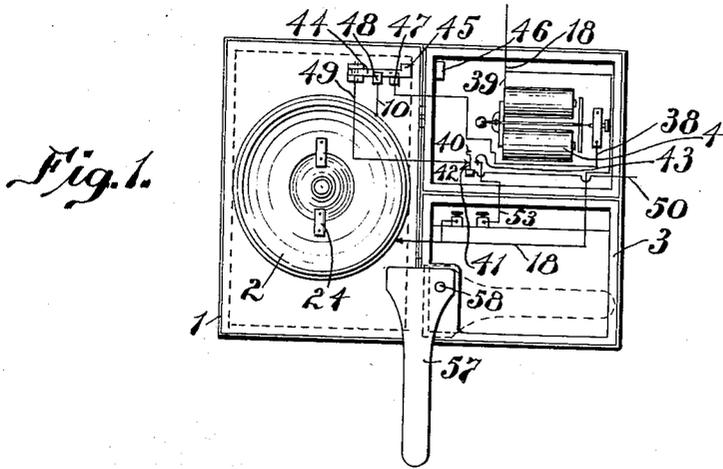


F. F. STRONG.
 PORTABLE TELEPHONE APPARATUS.
 APPLICATION FILED APR. 3, 1905.

898,699.

Patented Sept. 15, 1908.



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UNITED STATES PATENT OFFICE.

FREDERICK F. STRONG, OF BOSTON, MASSACHUSETTS.

PORTABLE TELEPHONE APPARATUS.

No. 898,899.

Specification of Letters Patent.

Patented Sept. 15, 1908.

Application filed April 3, 1905. Serial No. 253,539.

To all whom it may concern:

Be it known that I, FREDERICK F. STRONG, a citizen of the United States, residing at Boston, in the county of Suffolk and State of Massachusetts, have invented an Improvement in Portable Telephone Apparatus, of which the following description, in connection with the accompanying drawings, is a specification, like letters on the drawings representing like parts.

My invention is a portable telephone outfit for pocket use, having for its object the provision of means for providing telephone facilities in cases of emergency of temporary need such as for military service, sickness, factory use, construction work and the like. For example in the case of sickness when a nurse is called to the patient's residence, the nurse is obliged to be absent from the patient more or less and accordingly my invention provides means for enabling the patient to communicate instantly with the nurse whenever within reasonable distance. So likewise in constructing a high building, for example, my invention enables the contractor to communicate with his foremen at any floor. To accomplish this object I provide a box or case containing a transmitter and receiver so constructed that they can be carried conveniently in the pocket, said box or case containing all the necessary signal apparatus, battery etc. In other words, I provide in the small space convenient for the ordinary pocket all the necessary apparatus for a complete and satisfactory telephone system.

To this end I have devised a single-article device which combines in itself a transmitter and receiver, this single article performing the functions of both a receiver and transmitter, thereby eliminating not only the necessity of two devices, but saving the space, weight and complications of these two usual pieces of apparatus. This feature of my invention is claimed in my present application, and the more general features relating to my system are reserved for a copending application.

The constructional details of my invention will be pointed out more at length in the course of the following description, reference being had to the accompanying drawings in which I have shown a preferred embodiment

of my invention and later will be more particularly defined in the appended claims. 55

In the drawings, Figure 1 is a plan view of the telephone box and contents opened for use. Fig. 2 is a perspective view of my mechanism closed. Fig. 3 is a sectional view of the box showing the transmitter and receiver in side elevation. Fig. 4 is a cross sectional view of the transmitter-receiver. Fig. 5 is a sectional view showing the bell mechanism in side elevation. Fig. 6 is a diagrammatic view showing the complete 65 system.

In a box 1 of any desired shape suitable for the purpose, I mount on one side a combined transmitter and receiver 2 and on the other side a battery 3 and bell apparatus 4, each of suitable construction required in order to carry out my invention. 70

The receiver comprises a cup-shaped shell 5 on which is mounted an electro-magnet in the form of a wooden spool 6, one terminal 7, of whose winding 8 passes through an insulated bushing 9 to the main line 10 and the other terminal 11 of which is secured to a carbon disk 12. The core 13 of the electro-magnet extends beyond the face of the disk 12 which is provided with an enlarged aperture 14 for this purpose, out of contact with said core 13, and on the outer face of the disk are a series of hemispherical cavities 15 containing carbon balls 16. Secured to the rim 85 of the shell 5 is a diaphragm of japanned iron, such as is used for ferro-type plates, this diaphragm being scraped clean of the japan on its inner side and covered with graphite, and the balls being covered also with graphite for producing sensitiveness of operation. 90 The pressure of the balls on the diaphragm is very slight, being just sufficient to hold them in place without pressing them in their sockets or cavities. The shell 5 is preferably made of hardened cast iron and formed integrally with the core 13 to which the carbon disk 12 is secured and the opposite line wire 18 is connected directly to the shell as indicated at 19, so that the magnet winding 8, the carbon disk, balls, diaphragm and shell 100 are in series from one line wire 10 to the other line wire 18. The compartment containing the above described transmitter is centrally apertured at 20 and provided with a mouth-piece for covered annulus 21 having 105

a central opening 22 in which is suspended an equalizer and sound condenser 23 by any suitable means as by straps 24. This sound condenser is concavo-convex in shape having its concave side facing the shell 5 and is provided centrally with a tubular nipple 25 to which is secured a sound transmission tube 26 terminating in an ear-drop 27 for insertion in the ear of the user; this construction forming a combined transmitter and receiver, the user talking directly against the mouth-piece. As the sound waves strike the convex side of the device 23 they pass between the annular opening beneath the annulus 21 and reach the receiver diaphragm uniformly approximately opposite the balls instead of being directed at the center of the diaphragm, thereby producing better results than if the voice were directed against the center of the diaphragm. On the other hand the sound transmitted to the receiver is collected by the concave side of the device 23 and is transmitted readily by the tube 25, 26, and 27 to the ear.

The box is preferably made of sheet metal or at least the compartment containing the bell is made of thin sheet metal so as to act as a gong for this purpose.

The bell has a special construction shown in detail in Figs. 1 and 5. Opposite an electro-magnet 28 is a usual armature 29 pivoted on a spring arm 30 and carrying along spring stem 31 bent over the electro-magnet and terminating in a striker 32 adjacent the metal 33 of the box 1. The spring arm 30 has a spring 34 carrying a contact 35 to cooperate with a fixed contact 36 on an insulated post 37. The bell mechanism is connected at one end to a wire 38 and at the other end is connected at 39 to the line wire 18 and is operated in the usual manner.

Adjacent to the bell is a push button 40 shown diagrammatically in Fig. 6 for operating a switch 41 between contacts 42, 43, said switch being normally in engagement with contact 42. I also provide a similar switch 44 operated automatically however by the opening and closing of the box, the free end 45 thereof engaging a block 46 when the box is closed and being thereby pressed against contact 47 which connects with wire 38, when the box is opened the switch 44 springs into engagement with a contact 48 connected to wire 10. A wire 49 connects the contact 42 and the switch 44, and a wire 50 connects from the switch 41 to the battery 51 of the opposite telephone 52 (see Fig. 6). The battery 3 is connected by a wire 53 to the contact 43.

Referring now more particularly to Fig. 6 it will be seen that I provide two outfits connected in series with the respective batteries 3, 51, each outfit being exactly similar, the wire 18 from the transmitter 2 leading directly to the opposite transmitter 52 having

interposed therein a push button switch 54 identical with switch 41 and an automatic switch 55 identical with switch 44, for operating a bell mechanism 56 the same as the bell mechanism 4. For convenience I provide a handle 57 preferably pivoted at 58 on one of the compartments of the box so as to turn down into the position shown in Fig. 1 for conveniently holding the box in open position, while capable of folding up into the battery compartment when the box is to be closed.

In use let it be supposed for the sake of illustration that my invention is being used in the sick room; the patient has at hand the box and apparatus indicated at 2 Fig. 6, while the apparatus indicated at 52 is in the hand or pocket of the nurse and the two telephones are connected by such length of conductors 18 and 50 as are required to accommodate the necessary range of movement of the nurse. Under these circumstances, it matters not where the nurse is, the patient can at any time, simply by pressing on the push button 40 ring the bell in the box carried by the nurse, the striker of said bell pounding on the box and producing the usual buzzing noise. Thereupon the nurse opens the box and presses the ear tube in his or her ear, the patient meanwhile having done likewise with the instrument 2. Conversation can then take place. Both the patient and the nurse simply talk directly into the left hand compartment of the box which acts both as a transmitter and receiver.

When both boxes are closed, the push button of either box will operate the bell of the opposite box. Upon opening either box the automatic switch cuts the battery into the telephone circuit so as to permit the telephone to operate.

As already stated my invention is adapted to a wide variety of uses, and while I regard its compactness, simplicity and cheapness as its most important features, adapting it to portable use as stated, yet it will be understood that my invention is capable of many other uses than those herein mentioned by way of illustration, and that various features of my invention may be employed to advantage in other relations; accordingly I do not intend to limit myself otherwise than as expressed in the claims.

Having described my invention, what I claim as new and desire to secure by Letters Patent of the United States, is:

1. In an apparatus of the kind described, a magnetic shell having centrally and integrally secured on its inner side a core, an electro-magnet, winding and supporting spool, a carbon disk secured to the projecting end of said spool, a thin iron diaphragm secured to the rim of said shell in front of said disk, balls held in slight engagement with said diaphragm, and held loosely in

pockets provided therefor in the face of said disk and circuit wires connected to the shell and to the magnet winding, said winding, disk, balls, diaphragm and shell being in series in the main circuit.

2. In an apparatus of the kind described, a telephone transmitter-receiver, having a sound collector provided with a centrally apertured sound receiving device leading to the ear mounted within the mouth piece thereof.

3. In an apparatus of the kind described, a telephone transmitter-receiver, having transmitter mechanism provided with an externally open mouth piece, a sound collector mounted within the mouth piece thereof, and an ear tube independent of said mouthpiece extending from said sound collector.

4. In an apparatus of the kind described, a telephone transmitter-receiver, having a sound collector mounted within the mouth

piece thereof, said collector having a concave surface facing the instrument, and a tube extending outwardly at the center of said concave surface.

5. In an apparatus of the kind described, a telephone transmitter, and its mouth piece, and a disk mounted centrally within said mouth piece and extending within the inner end of the mouthpiece to a greater diameter than the latter, leaving an annular opening between said transmitter and said mouth piece, said disk having a convex outer surface for directing the sound to the transmitter.

In testimony whereof, I have signed my name to this specification, in the presence of two subscribing witnesses.

FREDERICK F. STRONG.

Witnesses:

GEO. H. MAXWELL,
M. A. JONES.