Aug. 5, 1930. R. P. A. ANDERSSON 1,772,198

TELEPHONE

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Fig 1.

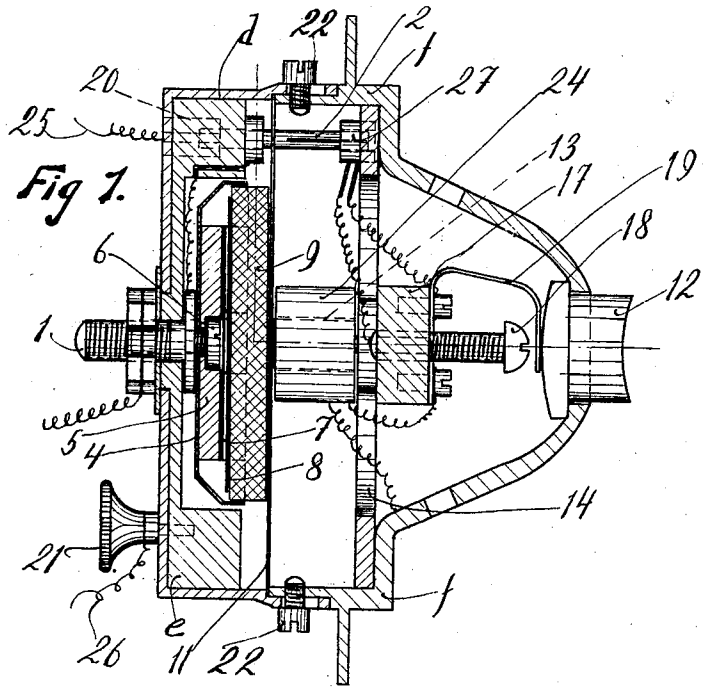
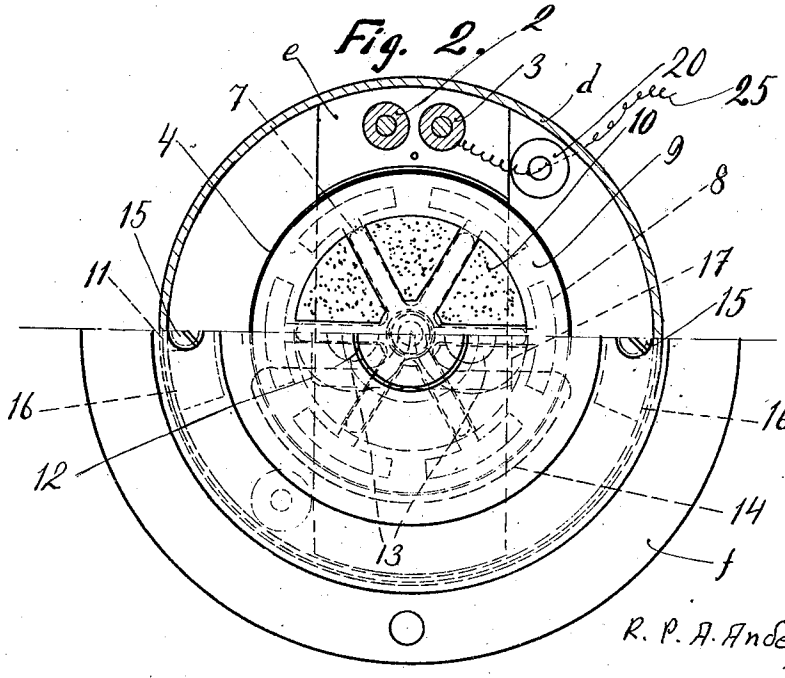


Fig. 2.



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Fig. 3.

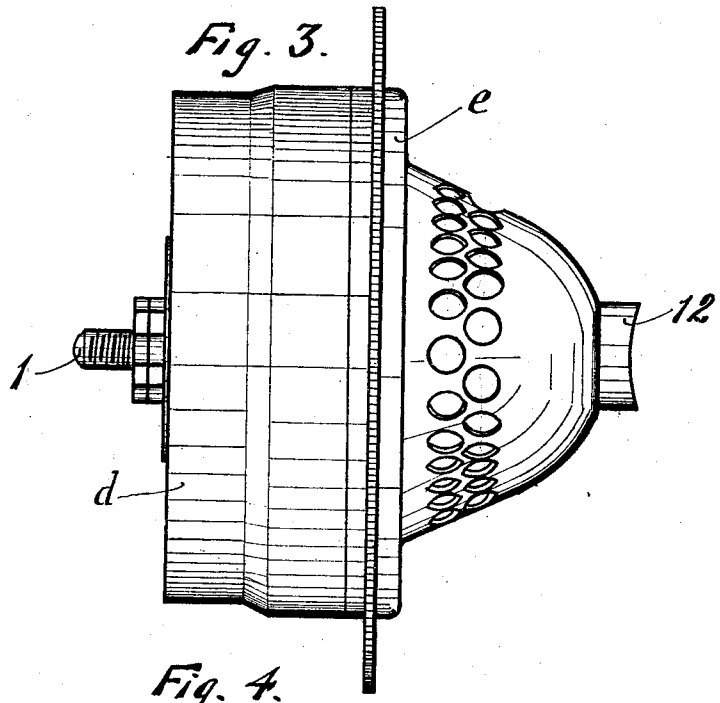
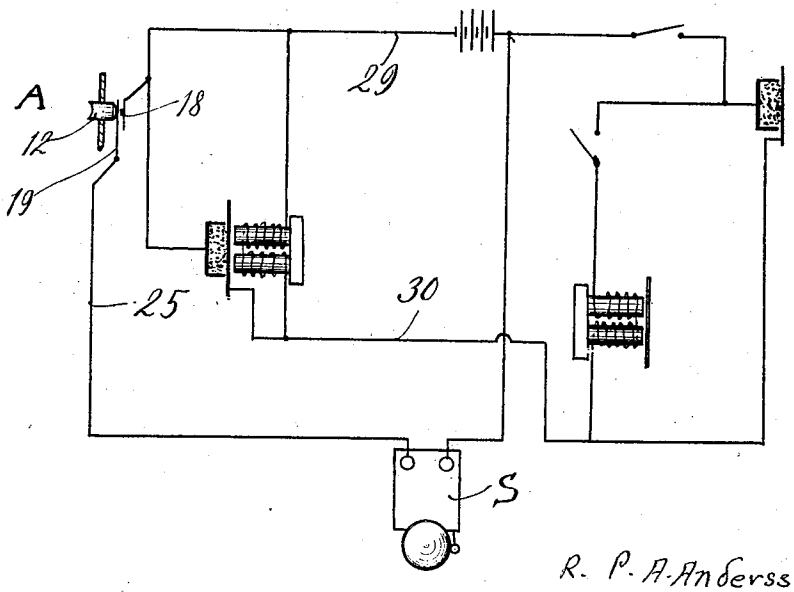


Fig. 4.



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UNITED STATES PATENT OFFICE

RINGHALD PER ALFRED ANDERSSON, OF STOCKHOLM, SWEDEN

TELEPHONE

Application filed September 6, 1927, Serial No. 217,795, and in Sweden July 13, 1921.

The invention has for object a push button microtelephone, that is to say, a combined microphone and telephone-receiver, similar in shape and size to a push button for electric bells, and intended to be used as a local telephone for different purposes. By the invention it is made possible to combine the microphone and telephone receiver within the same covering in such a way that the microtelephone thus formed, in shape and size, most resembles an ordinary push button for electric bells, and in many cases it can be suitably arranged instead of such.

It is characteristic of the invention, that a common membrane is used, which by its one side supports the carbon particles in the microphone and with its other side is near the magnet cores of the electromagnets. This is made possible by the fact that the telephone and microphone are never active at the same time. It is evident that this common membrane must be made of material, which can be influenced by the magnets.

In the accompanying drawing, which shows an example, Fig. 1 is an axial section, Fig. 2 front elevation, Fig. 3 side view and Fig. 4 a diagram of connections for Figs. 1–3.

The device shown in Figs. 1–4 can be used with advantage when a special signalling arrangement (electric bell) is arranged and when signals are only given in one direction. When signalling in more than one direction is desired the device can be provided with a summer or the like.

The device consists of a cylindrical metal box *d*, inside the upper cylindrical edge of which the cylindrical flange of a metal cover *f* fits. In order to prevent the cover's insertion to more than a certain depth in the box a shoulder is arranged in the cylindrical inside of the box as well as on the outside of the cover flange. At the bottom of the metal box an ebony holder *e* is fastened by means of a central sleeve, which serves at the same time as an insulator for a screw 1, belonging to the microphone, and passing through the bottom. The ebonite holder *e* has the form of a middle strip and serves as a support for the microphone. One of the raised parts at the ends of the holder *e* serves as a holder for two slit contact pins 2, 3 (only 2 is seen in Fig. 1) whereof 2 by means of an insulated wire is connected with the screw 1. The microphone consists of a tin box *f*, against the bottom of which a carbon cylinder 5 provided with radial grooves is kept pressed by means of a screw 6, which is screwed into a disc on the upper part of the screw 1. In the radial grooves on the carbon cylinder 5 there are two metal sheets 7 and 8 corresponding in form to the grooves, which metal sheets by their elasticity serve in a known way to prevent the packing of the carbon particles. Said metal sheets are fastened by a piece of felt 9 in the form of a wheel with rim, hub and spokes, in the space between which the carbon particles are lodged. The piece of felt 9 and the carbon particles 10 thus lie tightly against the membrane 11. The membrane is provided with holes for the contact pins which holes either are provided with ebonite sleeves or are so large that contact with the pins need not be feared. In order to connect an outer wire to the screw 1 there are two metal discs and an insulated ebonite disc on the outer side of the tin box. In the bottom of the cover there is located an ebonite sleeve 20 for the passage of an insulated wire 25, which is connected to the contact pin 3, and there is also on the outside a terminal screw 21, directly screwed in the metal for connection to another wire 26.

The outer side of the metal cover *f* is perforated for the passing in and out of the sound waves and has a parabolic form for bettering the sound conditions. In the centre of the paraboloid form is mounted a press button 12 formed from suitable insulating material. In the same way that the microphone is fastened to the metal box *d*, the telephone receiver is fastened on the cover *f*. The inner edge of the paraboloid form is provided with a circular shoulder. Against the shoulder rests the semi-circular shaped bowl magnet 13, and a semi-circular shaped disc of any insulating material. In the middle of the disc 14 there are two holes lined with metal sleeves 27, 28, each of which holes is connected with a metal piece for connection to the metal threads. When the device

is mounted, the contact pins 2 and 3 pass through respective holes and are each in conductive connection with corresponding metal sleeve that is to say, with 27, 28 respectively. In order to prevent contact between these sleeves and the shoulder surface a piece of mica is placed between this shoulder surface and the disc 14. The steel magnet has branches stretching inwardly radially, at the outer ends of which there are holes for the screws 15. By means of these and the metal plates 16 the magnet 13 and the disc 14 are fastened simultaneously by the above mentioned shoulder surface on the cover *f*. On the inner ends of the magnet's radial branches two magnet cores are arranged in the inside that is to say facing the membrane and an ebonite plate 17 on the outside. In this is arranged a central screw 18 which passes through a contact spring 19 fastened by means of screws and intended to be brought into contact with the screw 18 by means of the push button 12. The magnet spools 24 are afterwards arranged around the magnet cores. The contact spring 19, by means of insulated wire, is connected with the metal piece on the metal sleeve 27 and screws 18 are connected in the same way with the metal piece on the metal sleeve 28. The magnet spools are connected in series and one of the free ends is joined with the metal cover *f* and the other with the contact spring 19.

The membrane 11 is in conductive connection with the metal box *d*, thereby that it is held pressed against the carbon particles by means of the inner edge of the cylindrical flange in the metal cover *f*.

For fastening the cover to the box, there are screws 22, which fit axial holes extending lengthwise on the cover's cylindrical flange. The reason of this arrangement is to be able to regulate the distance of the magnet from the membrane by means of shoving the cover inwards or outwards, and afterwards fastening the cover to the box in the most suitable position by means of the screws 22. At the inner end of the cylindrical flange on the cover is a plan circular flange for the fastening of the cover, by screws or the like, to its base.

When a person A (to the left in Fig. 4) presses the button 12, in such a way that the spring 19 touches the screw 18, the bell S rings. The current then goes namely from the battery to the bell S and further through the wire 25, the contact pin 2, the screw 1, and the wire 29 to the battery.

When the person B (to the right in Fig. 4) is thus called, and lifts the receiver of his instrument, which can be of the usual type, a hook current switch is closed in a known way. By means of a press current switch, set in the handle of the receiver or in the microphone's circuit in a known way, conversation can afterwards be carried on undisturbed with the person A.

When the person A speaks, current flows from the battery through the above mentioned hook switch and passes through A's microphone, wire 30, B's magnet coils to the battery.

When the person B speaks, the current flows from the battery through the above mentioned hook switch and passes through the microphone in B's telephone, the wire 30, A's magnet coils to the battery.

Other embodiments than this are possible. Both devices schematically given in Fig. 4 could be of the type the invention intends, whereby the hook switch must be changed for any current switch of another type. Further the plan flange for the fastening of the device to its base need not be arranged on the cover but may be made as a continuation outwards of the box's bottom, whereby the whole device is outside the wall. Instead of having the push button in the centre it can be placed at the side of the device, and in the centre can be arranged instead a regulating screw and springs for adjusting the distance of the magnet core from the membrane, whereby the setting by means of the screws 22 is dispensed with. Also the microphone can be made settable in relation to the membrane in like manner by means of regulating screws. Instead of the parabolic buckling on the outside of the cover, there may be a horn with the wider part facing outwards.

For increasing the sound strength, the receiver, can if desired, be provided with a transformer coupled low frequency amplifying valve.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:

A device of the class described comprising a cover, a telephone receiver and a microphone disposed within the cover, a casing confining the cover, a single plane diaphragm mounted in the casing, said telephone receiver being disposed upon one side of the diaphragm, said microphone being disposed upon the other side thereof, and a felt member adapted to lie against the carbon particles of the microphone and free against the diaphragm.

In witness whereof, I have hereunto signed my name.

RINGHALD PER ALFRED ANDERSSON.