

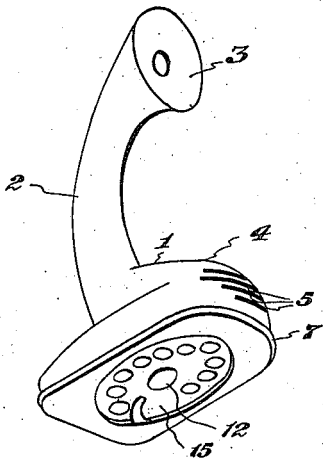
Aug. 6, 1946.

K. H. BLOMBERG

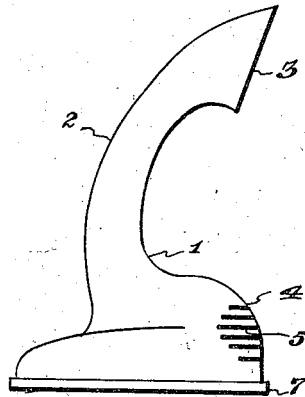
2,405,543

TELEPHONE SET

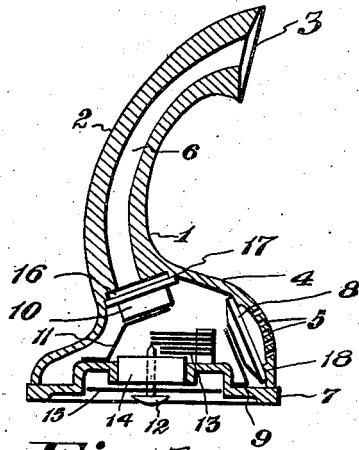
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*Fig. 1.*



*Fig. 2.*



*Fig. 3.*

Inventor,

*K. H. Blomberg*

By:

*Glascok Downing & Setbold*

Attorneys.

# UNITED STATES PATENT OFFICE

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## TELEPHONE SET

Knut Hugo Blomberg, New York, N. Y., assignor  
to Telefonaktiebolaget L. M. Ericsson, Stock-  
holm, Sweden

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4 Claims. (Cl. 179—103)

1

This invention relates to telephones, and more particularly to hand sets of the type wherein such essential parts as the switch, calling dial, receiver and transmitter are supported within the body of the instrument which latter is constituted partly by a handle for convenience in dialing operations and holding the instrument in an appropriate position for conversation.

The object of the present invention is to improve hand telephone sets of this type by arranging the receiver in the base of the body and constructing the usual handle in the form of a tube for the passage of sound, without distortion, from the receiver to the ear of the subscriber.

A further object of the invention is to provide a telephone instrument which is light in weight for convenience in handling and which, by virtue of the location of all essential parts in the base thereof, has a low center gravity thereby insuring stability of the instrument and materially reducing the possibility of accidental tilting or upsetting thereof.

A further object of the invention is the provision of a telephone set wherein the calling dial, receiver, transmitter and all other essential parts thereof are supported upon a plate so that the external body of the instrument may be utilized solely as a cover or enclosure for these parts.

In the accompanying drawing wherein an improved embodiment of the invention is illustrated,

Figure 1 is a perspective view of the improved telephone tilted backwardly substantially in the position which it occupies during dialing operations.

Figure 2 is a side elevation thereof, and

Figure 3 is a vertical sectional view through the telephone.

Referring to the drawing in detail, the improved telephone instrument comprises a body 1 formed throughout of plastic material or cast metal and including an upright medial portion 2, an upper end 3, and a lower end 4.

The upper end 3 is in the form of an ear piece which is preferably non-circular in shape, as in the case of usual hand sets, but has a shape substantially conforming with that of the ear for convenience in use and to improve the acoustic quality of the tone reception.

The medial portion 2 constitutes a combined handle and sound tube and for this purpose it is of hollow form. The lower end 4 of the instrument is enlarged and hollow and constitutes a base, the entire body 1 being of hollow form and presenting a passage extending from the sound aperture of the ear piece 3 to the open lower

2

portion of the hollow base 4. The front part of the wall of the hollow base is formed with slot-like sound openings 5 constituting the mouth piece of the transmitter and, as apparent from Figure 1, the relative position of the ear piece 3 and sound openings 5 is such that the user may conveniently speak into the sound openings while maintaining the ear piece 3 in listening position over the ear.

The hollow base 4 constitutes an enclosure or housing for the electrical components of the hand set, such as the transmitter 8, receiver 10, hook switch 14 and dial 15. These parts are arranged and supported on the bottom plate 7. The transmitter 8 is preferably of the capsule type which is held in position behind the sound openings 5 by a spring 9 attached to the bottom plate 7. The receiver 10 is also of the capsule type and is held by a spring 11 attached to the rear part of the bottom plate 7, the diaphragm of the receiver facing upwardly. The switch consists of a spring actuated push button 12 which normally projects slightly below the lower surface of the bottom plate 7 so that when the instrument is placed on the table or other support the button is pressed inwardly by the weight of the instrument thereby actuating the contact springs 13 and changing the electrical connections in such manner as to switch from the talking to the ringing condition. The dial 14 is mounted in the bottom plate 7 with the disc facing downwardly so that, when the instrument is held in the hand of the operator and tilted rearwardly to the approximate position shown in Figure 1, it is clearly visible and disposed in position convenient for dialing operations.

The open base 4 of the body is mounted over and encloses the electrical parts of the telephone and the edge engages the rim of the bottom plate which latter is preferably surrounded by a soft or resilient material such as rubber, the base and bottom plate being secured together by such means as attaching screws.

The center of the diaphragm of the receiver 10 is disposed directly in front of and in line with the opening constituting the sound passage 6 with an appropriate air chamber 16. The spring 11 presses the rim of the receiver against the shoulder 17 thereby insuring a tight joint between the receiver and the body 1. The shoulder is preferably provided with a layer of rubber or other suitable material to prevent the admission of dust to the interior of the base.

In a similar manner the rim of the transmitter 8 is pressed by the spring 9 against a shoulder

3

or seat 10, a rubber packing being also provided to prevent the admission of dust to the interior of the body through the openings 5 and secondly to permit the sound of the voice of the calling party to go through the air in the set to the receiver or through the sound tube directly to the ear. Acoustic side tone or feed back are therefore eliminated. As the body is pressed tightly not only to the transmitter and the receiver but also to the bottom plate 7, all electric components and connections of the set are completely covered and enclosed. The body of the telephone set thus serves as a means of enclosing the electrical parts of the instrument without, however, being burdened by supporting them.

In use the telephone set is held in the hand by grasping the handle 2 or base 4 or both and thus a comfortable grip is obtained which will enable the ear piece 3 to be pressed against the ear with the sound passage 6 situated in front of the opening of the auditory canal. With the hand set held in this position, the sound openings 5 are disposed at an appropriate distance and position with respect to the mouth. Due to the fact that the receiver 10 is not close to the ear, as in the usual forms of hand sets, but at a distance therefrom, the incoming sound will be of the same character as that transmitted directly through the air from the mouth of the speaker to the ear of the listener.

In Figure 3 the sound passage 6 is shown as in the form of a cylindrical tube in order to simplify the illustration, but in practice it is like the air chamber 16 given a form that constitutes the smallest acoustic attenuation, highest degree of receiving efficiency and the best acoustic quality of the set. The tube may, for example, have the form of a cone or an exponential horn. Furthermore, the response of frequency of the tube can be accommodated by appropriate dimensioning in such way that it will be a complement to the response of frequency of the receiver itself in order to obtain a better response for the complete device than of the receiver alone.

Also instead of the passage 6 being completely open at its upper end, it may be closed by a cover piece with small openings therein or by a thin soft diaphragm. It may also be possible to design the sound passage 6 in such manner that it will be in resonance with the dial tone for improving the audibility of this sound.

It is thus evident that the hand set constructed in accordance with the invention offers numerous

4

possibilities for improving the acoustic properties of the sound received as compared with the narrow limitations imposed by telephone sets of conventional form.

It is also evident that the transmitter, as well as the receiver, may be of any convenient type. Normally the transmitter is in the form of a carbon microphone and the receiver is of the electro-magnetic type, but it is evident that the transmitter may be of an electro-magnetic type or both the transmitter and receiver of the electro-dynamic or crystal type. If they are both of the same type they may be combined in one unit so as to serve both as transmitter and receiver. In this latter case the unit so constructed may be arranged in the base 4 and connected through appropriate sound passages with the openings 5 and the passage 6 communicating with the ear piece 3.

The telephone according to the invention is also highly suitable for use as a loud speaking set. Instead of the usual receiver, a loud speaker unit is arranged in the base and the sound passage 6 may be in the form of a horn.

What I claim is:

1. In a telephone instrument of the hand set type, a base plate, a receiver and a transmitter attached to said base plate, a body separate from the base plate forming an enclosure for and electrically independent of the receiver and transmitter and constituting the handle, the ear piece and mouth piece of the instrument, said body having sound passages related with the receiver and the transmitter.

2. A telephone instrument as claimed in claim 1 wherein said base plate also constitutes a support for the dial and switch.

3. A telephone as claimed in claim 1 wherein said body is provided with means constituting seats for the receiver and transmitter.

4. In a telephone instrument of the standing hand set type, a base assembly and an enclosing part, said base assembly including a base plate and a transmitter and a receiver attached to said base plate, said enclosing part being removably applied over the base plate and forming a protective enclosure for the transmitter and receiver, integral portions of said enclosing part constituting a handle and an ear piece and a mouth piece, the ear and mouth pieces being operatively related with the receiver and the transmitter.

KNUT HUGO BLOMBERG.