

The Ericofon—the New Telephone Set

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Some years ago the problem of developing an improved version of the well-known Ericsson plastic-encased telephone set came up for consideration. It soon became clear that the technical prerequisites for the creation of a radically new design were at hand. Great advances had been made in the development of ferromagnetic materials, so that smaller, lighter receivers and induction coils were possible; the use of aluminium alloys as constructional materials was making rapid progress; and new types of plastics suited to telephone design had become available. The possibility of reducing the weight and size of the components and parts of a dial telephone set meant that the design of the new instrument could be approached from entirely new directions.

The Fundamental Idea

The main principle enjoined on the designers was that all parts handled by the subscriber when making a telephone call should be combined into a *single unit*. This was a complete departure from the conventional two-piece desk type dial telephone with transmitter and receiver mounted in the handset and dial and cradle switch in the main case of the instrument. We believed that a one-piece telephone would be much more convenient and more efficient to use.

The idea was that the instrument should consist of a desk-handset incorporating at least the dial and switch with the transmitter and receiver, while the remaining components could be mounted in a wall terminal box. The subscriber would hold in his hand the entire desk unit, and the set must therefore not weigh more than an ordinary handset alone.

Since the chief requirement was convenience in handling, the best design proved to be a kind of *standing microtelephone*, which we call the "standset". It was from this point of departure that the problem was attacked; it resolved mainly into a question of designing a unit of modern and attractive appearance.

Fig. 1 x 7707
Some early clay models of the Ericofon



The relative positions of the transmitter and receiver were virtually predetermined, whereas the placing of the dial allowed various alternatives. Since it was desirable to retain roughly the existing form of finger wheel—the diameter of which is considerably larger than that of the receiver and transmitter—the most appropriate position for the dial was found to be on the bottom of the set, with the finger wheel facing downwards. In other words, the base of the set would be constructed on an inverted dial. The “standswitch” was to be located in the base and to be actuated by the weight of the set when placed on the table.

Considerable advantages were gained by this arrangement of the dial. Its low placing meant that its comparatively large size and weight would impart stability to the telephone. During conversation it would be out of the line of saliva spray from the speaker’s mouth. When the set was not in use, the dial would be protected from accidental operation and dust.

Under these conditions the immediate task was to design an attractive instrument case. It should be easy to grasp the set, lift it from the table, bring the finger wheel to convenient dialling position and—still without shifting the grip—hold the set in a good speaking position. In addition, the case must contain the receiver, transmitter, dial and switch with their wiring and terminals.

The design was based on the commonly made observation that many people, when using an ordinary telephone, do not hold the microtelephone by the actual handle but at the end, by the mouthpiece. The case was therefore shaped so that it could be grasped at the base, where the greatest weight is concentrated.

Some clay models, early versions of this design, are shown in fig. 1. The first model used in actual telephoning is shown in fig. 2. After many years of experimentation and practical tests the new telephone set—the *Ericofon*—can now be presented.



Fig. 2
The first working model

X 6399



Fig. 3
The characteristic lines of the Ericofon

The Construction of the Ericofon

The Ericofon consists of three parts:

1. the set, which stands on the table and is picked up and used by the subscriber,
2. the wall terminal box,
3. a cord connecting the two.

1. *The Standset*

Appearance and operation. The exterior of the set is shown from various angles in figs. 3, 4 and 5.

When the set is standing on a table, only the plastic case is visible. Out of the substantial base a horn-shaped neck with a slight forward slope arises, growing broader towards the top. The transmitter is located in the front of the base, and the receiver at the upper end of the neck. The case is fully symmetrical and can be grasped easily with either hand.



Fig. 4

The Ericofon is made in several colours

The base is designed to enclose the various components and at the same time fit the hand naturally. At the juncture of base and neck there is a rounded depression in the front face (fig. 5) which serves as a thumb grip. When the thumb of the left hand is placed here, the palm lies against the slightly curved rear of the base and the fingertips against the side, as seen in fig. 6. The conspicuous thumb grip tends to indicate to the new user of the Ericofon that the set should be grasped around the base and not at the neck, like an ordinary handset. The Ericofon may, of course, be held in this way if desired, but the lower grip is much more convenient. After thorough experimentation and study of various types of hands, a form was arrived at which fits a large male hand and a small female hand equally well.

The earpiece of the Ericofon has been given an entirely new shape. In place of the ear cap of the ordinary telephone instrument, the earpiece of the Ericofon is formed by the upper end of the horn-shaped neck. It is not circular, but has the form of a shell to fit the auricle, with the sound holes immediately opposite the auditory duct. Thus it provides good acoustic transmission and at the same time fits the ear very comfortably.

The colour problem has found a simple solution in the Ericofon, since the case consists of a one-piece moulding. A common difficulty in the use of light colours for conventional telephone sets is that most of the plastic parts are visible, and it is difficult to obtain an exact colour match when a part has to be replaced. This problem does not exist with the Ericofon. A colour may be easily replaced without needing to maintain a large stock of spare parts.



Fig. 5

The case of the Ericofon is a copolymer of styrene and acrylonitrile—a plastic material which combines a handsome, easily cleaned surface with good impact-resistance and scratch-resistance

The Ericofon is produced in pastel tones—ivory, light grey, light green and light blue—and in a dark blue-grey and a bright red.

After thorough study of the properties of numerous plastics, a copolymer of styrene and acrylonitrile was selected as the material for the case. This plastic has a fine surface with good impact-resistance and scratch-resistance. It is not affected by sweat from the hand, skin creams, lipstick, common detergents, or other chemical agents to which it may be exposed.

When the Ericofon is grasped as described above, a slight twist of the wrist and forearm pivots the set backwards so that the base comes up to meet the user's hand, as seen in fig. 7. The set then rests well balanced in the palm with the dial in a convenient position. The dialler need not worry about the exact position of the instrument, as he unconsciously holds it at the angle and distance most convenient to him from the point of view of vision, illumination and comfort.

The plastic finger wheel is well protected, being recessed in the base of the set. The characters are usually printed round the circumference of the wheel. If the subscriber numbers include both letters and numerals, the letters are located on the surface beneath the finger holes.

Projecting from the centre of the finger wheel is the pushbutton stand switch, which is pressed upwards by the weight of the Ericofon when it is



Fig. 6
The dial comes straight to you, makes dialling simple and sure

placed on the table, and switches the instrument from speaking to signalling condition. The button is made of nylon, it is of large diameter, it slides easily over irregular surfaces, and it does not mark the top of a table or desk. Being coloured red, it stands out clearly from the finger wheel, and accidental contact is therefore unlikely.

Fig. 7
Holding the Ericofon by the base, one can easily tilt the instrument backwards into a convenient position for dialling

X 2709

When the subscriber has listened for dial tone and has dialled the number in the manner related above, he puts the receiver shell to his ear and the transmitter swings naturally into proper speaking position. The same grip can be retained throughout. At the end of the conversation he puts the set down anywhere on the table, as there is no separate handset cradle to look for or reach for.



Since the base of the set is only slightly larger than the dial, the Ericofon occupies very little space—roughly one third as much as an ordinary desk set. It stands very steady, however, and must be tilted to an angle of 45 degrees before it will fall over.

General construction. Enclosed in the base of the housing is the chassis (fig. 9) carrying the dial, standswitch, induction coil—in some cases a capacitor as well—and the terminals and contact springs for connection to the transmitter and receiver.

The frame of the chassis is made of a die-cast aluminium alloy. Attached to its bottom is a thin cup-shaped sheet of transparent acrylic. The sheet completely covers the underside of the instrument, and on its rear are printed the characters of the dial, which are thus visible through the plastic and entirely protected by it. The finger stop is part of this sheet, which, on the back, also contains a pocket into which the telephone number card can be inserted. Thus the parts handled by the subscriber are entirely of plastic.

The edge of the chassis frame is covered by a U-shaped neoprene rubber bumper pedestal. The upper flange of the bumper pedestal serves as a packing between the frame and the plastic case, which are secured to one another from underneath by four screws. By this means a complete seal is obtained; dust, insects, and the like are effectively excluded. The rubber bumper pedestal is at the same time the structure on which the entire set stands. It prevents the telephone from sliding, and softens the impact if the set is dropped. The neoprene rubber does not mark or stain the underlying surface.

Fig. 8

The entire Ericofon is lighter than an ordinary handset, and it lies well balanced in the hand during conversation



The die-cast aluminium frame is formed with the holes, recesses, pillars, and other features required for mounting the various components. Owing to the limited space in the base, the assembly is, of course, extremely compact. However, the parts are accessibly and clearly arranged, while at the same time important simplifications in wiring have been achieved which have reduced the number of soldering points to a minimum. A substantial amount of the available space is, of course, taken up by the dial mechanism, the design of which is described in a separate article.

The standswitch of the Ericofon consists of the aforementioned red push-button projecting from the centre of the finger wheel. It continues in the form of a plunger through the main spindle of the dial and actuates at its other end a springset on the top of the chassis. The button must move a considerable distance from its inner position before switching over takes place. The calling conditions are therefore not affected if the set is placed by mistake on the cord, a newspaper or the like, instead of flat on the underlying surface. The circuit arrangements preclude accidental switching if the button should be involuntarily actuated during dialling.

The springsets of the dial and standswitch are fitted to a single bracket and form an independent unit which is insulated from the frame of the chassis and secured to it by two screws. The springsets require only a few soldered connections, which are made before mounting the unit in the instrument. The unit also contains two silver-plated springs which, when the plastic case is put on, press against the transmitter inset. The transmitter inset is held in position in the front of the case by a simple locking ring and can thus be easily removed. In addition, the springset bracket carries two springs facing upwards, which press against two terminal plates fixed in the case at the

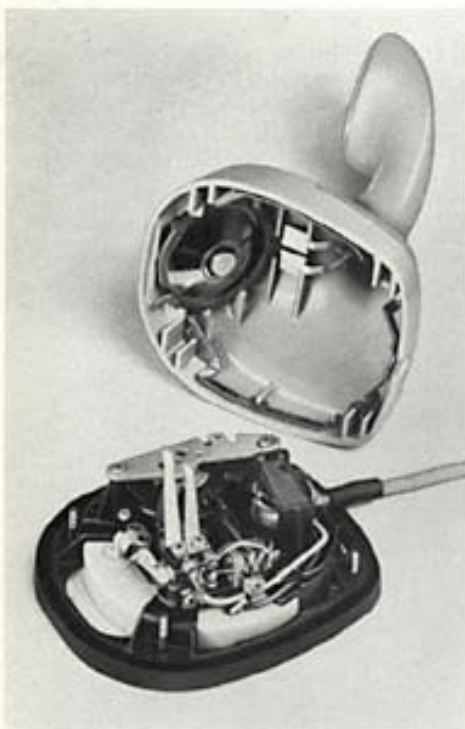


Fig. 9 X 2184
The chassis of the Ericofon is enclosed within the base of the plastic case. The transmitter inset and the terminal plates for connection to the receiver can be seen in the case.

lower end of the neck (see fig. 9). From these terminals, two wires lead up to the receiver inset. The receiver inset has been developed especially for the Ericofon. The receiver and transmitter insets are described in a separate article.

The receiver inset is permanently fixed in the case. It cannot be removed for replacement. Trouble in Ericsson's modern receiver insets is most unusual and, in the rare event of a receiver fault, it is extremely simple to replace the entire case. The permanent mounting of the receiver is attended by important advantages. The inset always lies in the correct position and is protected against tampering; a simpler and more functional design of the case has been possible; and the electrical connections of the receiver could be simply and reliably arranged in the manner described above.

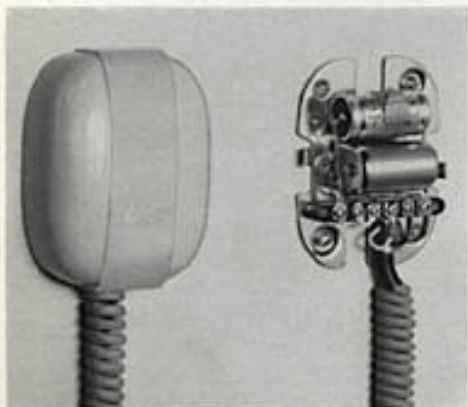
It might have appeared more logical to place the Ericofon receiver on the chassis with a simple acoustic channel up to the ear shell, which would have simplified the case still further and eliminated wiring inside it. This variant was given thorough study, but the idea was rejected. One reason was that placing the receiver in the base would make the telephone too bottom-heavy, and the fine balance which is a feature of the Ericofon, both in speaking and in dialling, would have been lost.

As already stated, one of the initial specifications for the designers was that the new instrument should not weigh more than an ordinary microtelephone. By utilizing every means of reducing the weight of parts, it has been possible to embody all essential components and, in addition, the induction coil—even in some types a capacitor—without exceeding the weight limit. The weight of the Ericofon, including the induction coil, is only 400 grams (14 oz.), which is about 20 per cent less than the weight of the ordinary Ericsson handset. The induction coil is of the entirely new miniature type which is described elsewhere in this issue.

2. The Wall Terminal Box

Apart from the subscriber's line and cord terminals, the wall terminal box also contains the bell set and capacitor. In the model illustrated in fig. 10 the bell set consists of a buzzer. The capacitor is of the metallized paper type.

Fig. 10 X 2185
The wall terminal box and coiled cord (Right) with cover removed



Extension telephone sets have the capacitor placed in the standset instead of in the wall terminal box. They are made with or without buzzer. The buzzer, when present, can be disconnected by means of a switch on the terminal box.

3. The Cord

A great advantage of the Ericofon is that it has only one cord instead of the two cords of the ordinary desk set.

The cord between the standing Ericofon and the wall terminal box is coiled at the wall end, which permits adequate extension during conversation (see fig. 11). The cord will take a much stronger pull than an ordinary handset cord, which has no fixed point at its other end. It thus allows the telephone



Fig. 11 X 8004
The coiled cord allows wide freedom of movement

user great freedom of movement. The remainder of the cord is straight, so as not to catch on the edge of the desk. It enters between the plastic case and the bottom frame and connects directly to terminals on the springset. The cord has only three conductors, a result of the newly developed circuit design of the Ericofon described in a separate article.

Operating Characteristics of the Ericofon

The advantages offered by the Ericofon both to subscribers and telephone companies are manifest.

For subscribers, the main value is the extreme convenience in handling the Ericofon. The placing of the dial in the handset simplifies its use in practically every situation, as proved by several years of trials with a large number of Ericofons. The dial, so to speak, comes straight into the subscriber's hand,



Fig. 12
The caller instinctively holds the dial at the distance best suited to the eye

and without conscious effort he holds it at the distance and angle most convenient to him. Mistakes in dialling have proved to be rare. The very small space occupied by the set also adds to its ease of operation.

In office work, the telephone user normally employs only a limited area of his desk. He can now operate the telephone within this working space and replace it after a call without needing to think particularly of where to put it. Thus telephoning causes a minimum of disturbance in his work, which is of course extremely important for anyone who is constantly on the phone. If he wishes to make another call immediately, he need not replace the set but can simply press the button switch for a moment.

An Ericofon that is to be used by two or more persons can be conveniently picked up and operated from all sides—a useful feature in offices, at shop counters, and in similar locations.

In the home equally great advantages are offered by the convenience in dialling, the small space requirements, and the ease of placing the Ericofon on a table, sideboard or the like. The Ericofon is probably the only telephone having a dial that can be easily operated from the depths of an armchair or in bed, as illustrated in fig. 13. This makes the Ericofon a very desirable extension set. It should also prove ideal for hotel rooms, hospitals, and other public locations, owing to its simple and hygienic design and the ease of cleaning the plastic case. The wide choice of light colours is an additional attraction.

For telephone companies the most valuable feature of the Ericofon, in addition to its good transmission characteristics, is the likelihood of its proving extremely reliable and involving minimum maintenance costs. This is assured by the general simplicity of construction, with the one-piece, easily removed, plastic case containing receiver and transmitter; by the chassis for the remaining components which has a minimum of soldered connections and which, when the case is removed, lies open for inspection and service; by the single cord; and, finally, by Ericsson's high-quality components and parts. The small weight and dimensions of the Ericofon make for simpler and cheaper transport and storage. The wide choice of colours and the ease of changing the case makes it possible to offer this service feature without great expense and without maintaining a large stock of spare parts.



Fig. 13

Even in bed, you can easily use the Ericofon—the telephone with the most accessible dial



Fig. 14

The Ericofon is made in six colours: ivory, light blue, bright red and blue-grey as shown above, and also light grey and light green

A Word about Form

The appearance of the Ericofon may be a surprise to some subscribers. That, however, often happens when an old, well-known utility changes its form in the course of technical evolution. The aim of the Ericofon designers has been to create a highly simplified and efficient form for the commonplace telephone set.

A fully conscious attempt has been made to produce a dynamic design. Out of the sturdy base, the slender neck of the Ericofon rises as though listening and ready for action. In all its simplicity, the Ericofon is an expression of the dynamic power that lies hidden in the spoken word.