

April 23, 1957

I. HELLER

2,790,027

TELEPHONIC UNIT WITH BATTERY-POWERED AUXILIARIES

Filed July 6, 1955

2 Sheets-Sheet 1

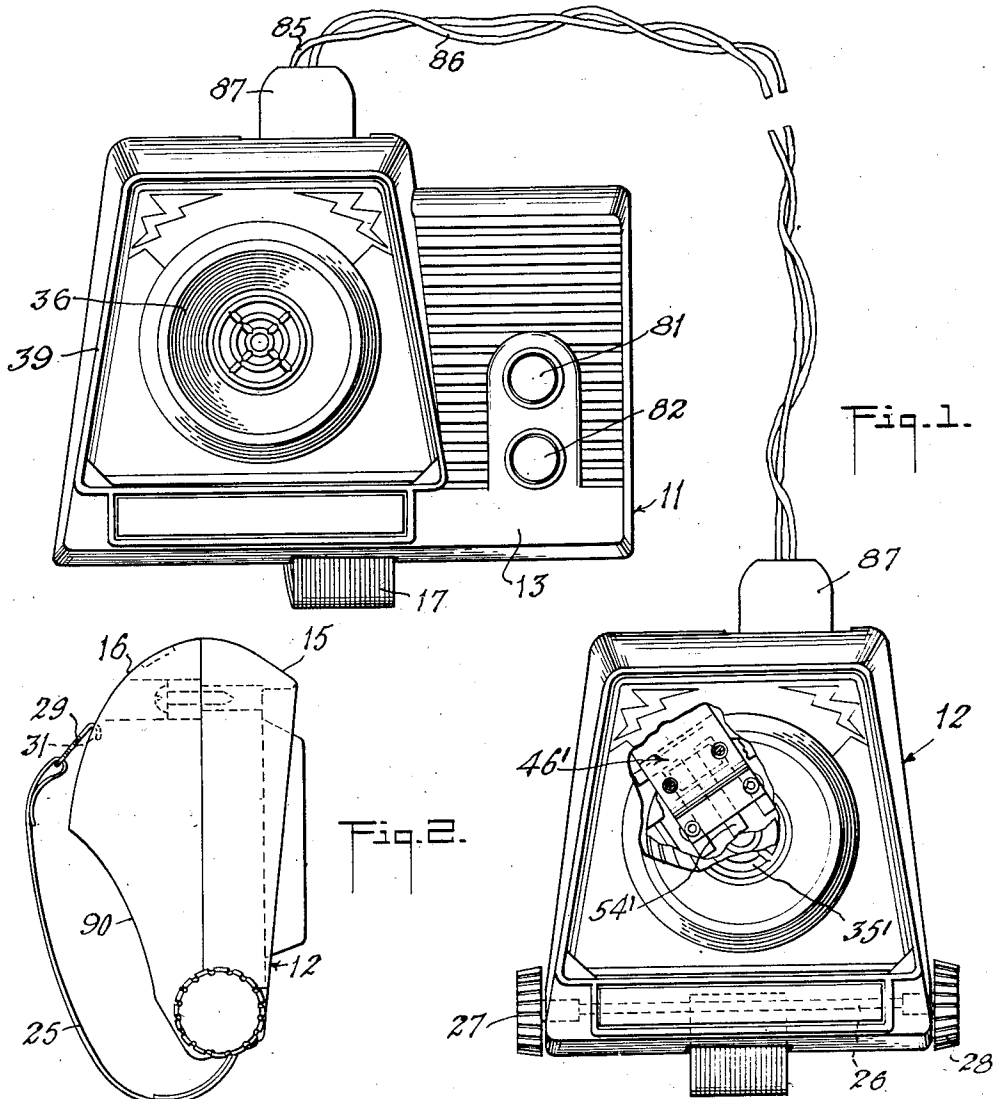


Fig. 1.

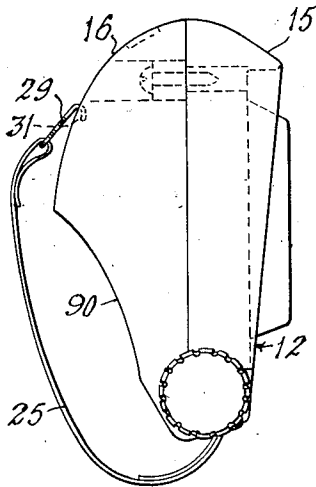


Fig. 2.

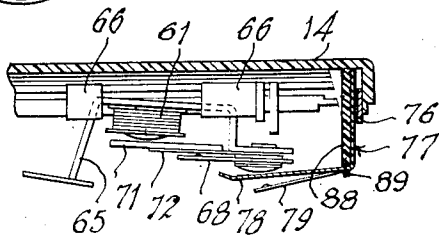


Fig. 3.

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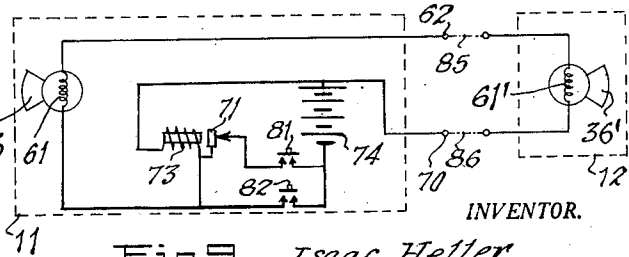
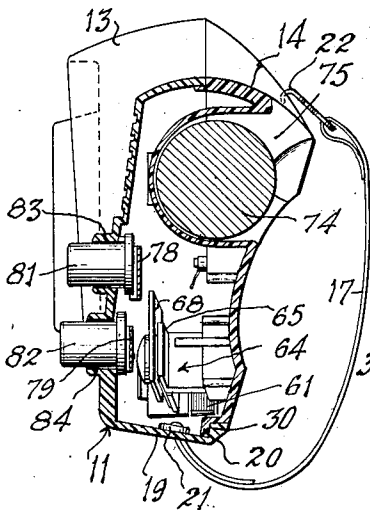
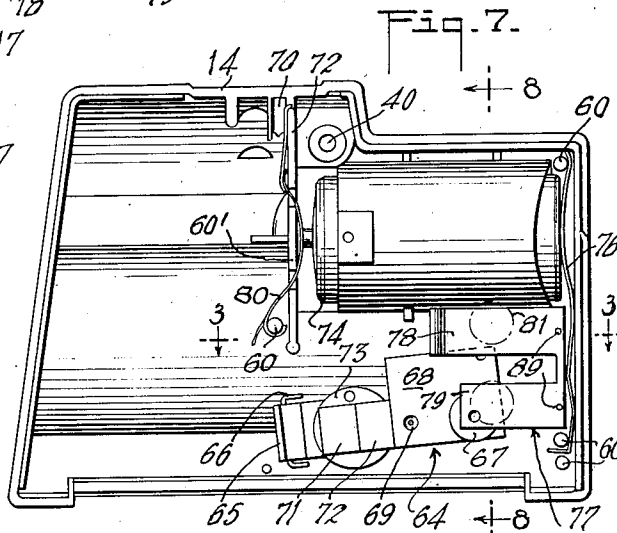
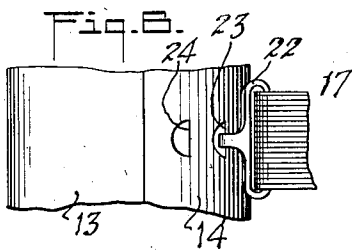
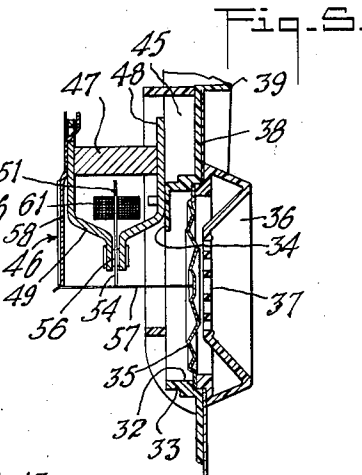
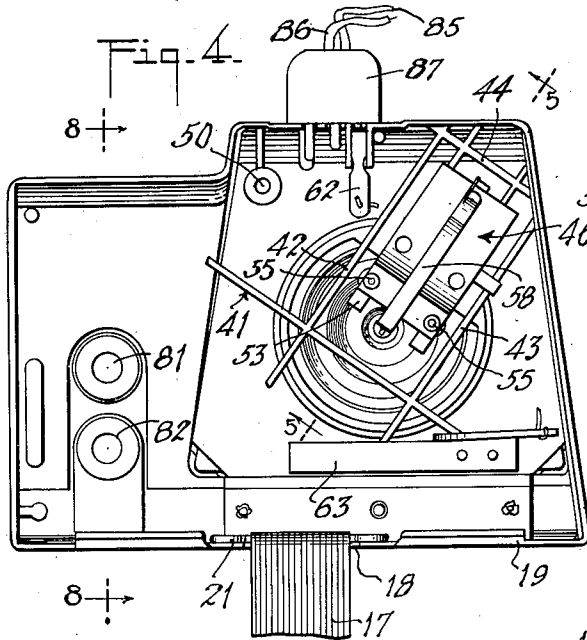


Fig. 8.

Fig. 9. *Isaac Heller,*  
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1

2,790,027

**TELEPHONIC UNIT WITH BATTERY-POWERED AUXILIARIES**

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7 Claims. (Cl. 179—1)

This invention relates to magnetic sound-powered telephonic units combined with a buzzer and/or a sounder powered by a single dry cell, particularly for use as toys, although not limited thereto.

The telephonic unit embodying the present invention is an improvement over that described and claimed in my Patent No. 2,536,179, dated January 2, 1951, in that it not only involves an improvement over the telephonic combined transmitters and receivers, but also incorporates therewith a buzzer and/or a telegraphic sounder. The telephonic units are of the self-energizing type, and except as specifically described may correspond with and be sound powered like those of my patent, and in the circuit with a pair thereof is one or more battery-powered buzzers and/or sounders. A pair of such units or phones are operatively connected together by two wires to form a complete telephonic system. The improved unit is especially adapted for use in so-called "Walkie-Talkie" communication systems.

An object of my invention is to provide telephonic units of the kind disclosed with improved means for securing an armature in position of maximum responsiveness to the driving action of the coil carried thereby and with respect to associated pole pieces.

Another object of my invention is to provide telephonic units of the character mentioned, inclosed in plastic cases adapted to be strapped to and carried by the user's wrist, in order to simulate the well-known "Dick Tracy wrist radio."

A further object of my invention is to provide telephonic units carried in small plastic cases, at least one of the units of each pair also carrying a small dry cell and a combination buzzer-sounder, with buttons for alternatively operating either the buzzer or the sounder.

A still further object of my invention is to provide such plastic cases as interfitting halves which inclose the buzzer, sounder and battery and/or the combination transmitter-receiver microphone, with interior means facilitating connection of the parts to the respective portions of the housing or case.

These and other objects and advantages will become apparent from the following detailed description when taken with the accompanying drawings. It will be understood that the drawings are for purposes of illustration and do not define the scope or limits of the invention, reference being had for the latter purpose to the appended claims.

In the drawings, wherein like reference characters denote like parts in the several views:

Figure 1 is a front elevational view, with a part broken away, of the combination of two telephonic units embodying my invention, one of which also includes a combination buzzer-sounder and energizing dry cell.

Figure 2 is a side elevational view of the lower of the illustrated telephonic units, or that which does not include the buzzer-sounder arrangement.

Figure 3 is a fragmentary sectional view on the line III—III of Figure 7, in the direction of the arrows.

2

Figure 4 is a view of the interior of the front portion of the plastic case, the outside of which is shown in the upper part of Figure 1, the parts carried thereby being also illustrated.

Figure 5 is a fragmentary sectional view on the line V—V of Figure 4, in the direction of the arrows.

Figure 6 is a fragmentary plan of the unit shown in Figure 8.

Figure 7 is a view corresponding to Figure 4, but showing the interior of the other section of the carrying case and the parts mounted therein.

Figure 8 is a transverse sectional view on the line VIII—VIII of Figure 4, but showing both parts of the case assembled with one another and the interior elements.

Figure 9 is a wiring diagram.

The particular improvement of the present invention is shown as comprising two telephonic units or devices, one—the larger—being contained in a case or housing and generally designated 11, and the other—the smaller—having a case or housing and generally designated 12. These cases are desirably molded out of plastic and each formed as two interfitted parts. The parts of the case for the unit 11 are respectively designated 13 as the front and 14 as the rear, while those of the case for the unit 12 are respectively designated as 15 for the front and 16 for the rear. The parts of each case, after fitting together so that the bottom flange portion 20 of the part 14, as an example and as seen in Figure 8, underlies a shoulder 30 on the flange 19 of its complementary part 13, with the side flanges of the parts interfitting like the top flanges, are connected together by means such as a screw passing through aperture 40 in part 14 and threadably received in aperture 50 in part 13. Both cases are adapted to be secured to the wrist of the user, so as to simulate a "wrist radio" made famous by the Dick Tracy comic series, the part of the case to engage the wrist being formed outwardly concave for comfort.

The case for the unit 11 is held to the wrist by means of an elastic tape 17, one end of which passes through a slot in the case portion 13 and is held against the inner side of the flange 19 of the case by means of a pin 21, the other end of said tape carrying a hook 22 alternatively hooking over one of the shoulders 23 or 24, formed by correspondingly aperturing the case portion 14. The other case for the unit 12 is similarly held by an elastic tape 25, one end of which is secured to a rod 26 mounted in the case portion 15, the ends of which may have ornamental knurled knobs 27 and 28 thereon, and the other end of which carries a hook 29 engaging a shoulder 31 on the case portion 16, formed in a manner similar to the shoulders 23 and 24 of the case portion 14. The case portion 16 has a concave outer surface 90 for comfortably fitting the wrist, like that of the part 14.

The case portion 13 has a relatively large aperture 32 defined by an inwardly projecting flange 33, a portion of which flange is extended to provide a shelf 34. Closing said aperture is a flexible, desirably corrugated diaphragm 35, which may be formed of spring brass or the like. Protecting the diaphragm is a combination generally frustoconical mouth and ear piece 36 which fits over the outer surface of the case portion 13 and covers the diaphragm except for apertures 37 in a central grid portion thereof. The combination frustoconical piece 36 may also serve for holding in place a decorative plate 38 inside of the exterior embossment 39 which frames a large portion of the outer surface of the case member 13.

Bridging the aperture 32 is an interior grid of integral reinforcing members, generally designated 41, two of which, designated 42, being extended toward the upper right-hand corner, as viewed in Figure 4, and joined by connecting reinforcements 44. These reinforcements

form between them a pocket adapted to receive plastic adhesive material 45 securing thereto the magnetic portions of the combined telephonic transmitter-receiver, generally designated 46. These magnetic portions include a single, generally rectangular bar 47 of permanent magnetic material, such as aluminum, nickel, steel alloy known to the trade as "Al-Ni-Co" steel. Associated with this magnet is a pair of pole pieces 48 and 49, formed of magnetic material such as steel or other ferrous metal. These pole pieces 48 and 49 are arranged with straight ends secured to the ends of the magnet 47 therebetween in any desired manner, and with portions adjacent the diaphragm 35 offset toward one another leaving a small clearance therebetween.

Associated with these offset portions of the pole pieces 48 and 49 is an armature 51, desirably formed as a stamping of sheet magnetic material having a base portion 52, two end legs 53, and a projecting central leg 54. All of these legs may be of uniform length and width, and spaced distances corresponding with their width, as viewed in Figure 4. The end legs 53 extend between and are secured to the offset end positions of the pole pieces by eyelets 55 passing through openings in the legs and said offset end positions at the corners of the latter. Legs 53 are magnetically insulated from the pole pieces by thin washers of non-magnetic material, such as brass, disposed on both sides thereof to provide an air gap 56 between the center portions of the pole pieces. This construction allows the center leg 54 to vibrate as a reed in the gap.

For transmitting vibrations between the center leg 54 and the diaphragm 35, there is provided a driving wire or pin 57 extending between the center of the diaphragm and a tensioning member or strut 58 secured to and protruding from the inner surface of the inner pole piece 49, as shown most clearly in Figure 5. The outer or free end of the center leg 54 is secured to an intermediate portion of the connector wire or rod 57, as indicated at 59. The center leg 54 of the armature carries an energizing and energizable coil 61 lying within the inclosure formed between the pole pieces and the magnet. The armature stamping 51 on the center leg of which this coil is mounted is preferably made of magnetic material which is low in residual magnetism and relatively thin. A suitable material for such an armature is an alloy formed of approximately 50% nickel and 50% iron.

This coil 61 is of the self-supporting type and telescoped over the central armature leg 54. The ends of the coil wire are respectively connected to a socket 62 and a conductive resilient strap 63, which may be formed of spring brass or the like.

The presence of an oscillating current in the coil 61 when vibrating under the influence of sound waves impinging against the diaphragm 35 sets up corresponding electrical effects in the other armature 54' (Figure 1) which interact with the field between its pole pieces to cause that armature to rock back and forth and drive its diaphragm 35' in mechanical oscillations which correspond substantially to the current input and reproduce the original sound.

The combination buzzer-sounder arrangement, generally designated 64, comprises a base member 65, formed of magnetizable material such as iron or steel, generally U-shaped in elevation, with a flange extending outwardly from its right hand end, as viewed in Figures 3 and 7. The lower element of the U is secured to the other case section or half 14, as by means of plastic adhesive received in a partial inclosure formed by integral plastic ribs 66 extending from the inner surface of said section. The right-hand flange of the base member 65 is secured, as by means of a rivet 67, to a preferably almost square metal plate 68 carrying a small rivet 69 to serve as a contact for the armature or sounder lever 71. The latter is secured for oscillation to the base 65, desirably by means of a thin spring plate 72, as by being spot-welded thereto.

Underlying the free end of the armature 71 is an electromagnet 73, comprising a magnetizable core encircled by a coil, upstanding from the base 65, in magnetic circuit therewith, and with one end of its winding electrically connected thereto. Upon energization of the magnet 73, the sounder arm 71 is drawn thereto to provide either a click or a buzz, depending on whether there is an interrupted or continuous circuit thereto. The rivet 67 is insulated from the plate 68 and directly connected to the base 65 so that the circuit therethrough to the electromagnet is independent, insofar as the make-and-break contacts are concerned, of the circuit through the plate 68, for reasons which will later be explained.

A small dry cell 74 for energizing the buzzer-sounder combination is inserted from the outside of the base portion 14 into an outwardly opening pocket 75. It is spring-gripped in place between a resilient contact element 76, which may be formed of spring brass and which also serves to connect the negative pole of the cell to a conductive member 77, and a resilient contact element 80 which may also be formed of spring brass and which connects the positive pole of the cell in the circuit between the socket 70 and the electromagnet 73. These contacts 76 and 80 are held in place by inwardly projecting plastic formations, such as posts 60 and flanges 69', integral with the housing part 14. The member 77 has one end connected to an interior integral flange 88 on the housing portion 14 as by studs 89 therefrom extending through corresponding apertures thereof and bifurcations 78 and 79 which respectively extend over the plate 68 and the rivet 67, so that a connection between the base or negative pole of the cell, and either the plate 68 for operating the buzzer, or the rivet 67 for operating the sounder, may be effected upon pressing one or the other of the bifurcations.

Buttons 81 and 82 for respectively depressing the bifurcations 78 and 79 are received in corresponding apertures 83 and 84 in the case portion 13, so that when the case portions 13 and 14 are assembled about the inclosed parts, the bifurcations 78 and 79 may be selectively depressed to give either a buzz or a telegraphic indication. Connections from the outside of the case to the connecting wires 85 and 86 are made by means of the corresponding prongs on a plug 87 with the sockets 62 and 70.

The circuit may be traced as follows: From the socket 62 current passes through the coil 61, from which it connects with the spring plate 63, passing from there to the engaged left-hand end portion of the base 65, as viewed in Figure 7. From the base 65 current passes through the electromagnet 73 to the positive pole of the battery 74 and the socket 70. The current connection with the negative pole of the battery is alternatively made through bifurcation 78 to plate 68 which, being insulated from the base 65, causes a buzz as the armature or sounder lever 71, upon being drawn to the electromagnet, immediately breaks the circuit for a repetition of the operation. The pulsating voltage thus developed is impressed on the two phones in series. As the phones may have a coil resistance of 12 ohms and the coil 73 may have a resistance of only one ohm, the total circuit resistance is not greatly increased. On the other hand, the engagement of the bifurcation 77 with the rivet 69 completes a continuous circuit between the electromagnet 73 and the battery 74 so that the armature 71 is held engaged with the electromagnet core until said bifurcation is released.

Referring now to the wiring diagram of Figure 9, it will be seen that there is when in use a continuous wire connection between the coil 61 of the device 11 and the coil 61' of the device 12. Although there is here shown one device 11 and one device 12, connected by wires 85 and 86, yet it will be understood that if desired, the device 12 may be replaced by another device 11, so that buzzing and telegraphic action may be initiated from either end of the line, but not simultaneously. As shown in Figure 9, however, only the person carrying device 11 can transmit

the buzz or telegraphic communication to the person carrying the device 12, although he can receive telephonic communication from that person, and the person carrying the device 12 can both transmit and receive telephonic communication.

In the wiring diagram, it will be seen that telephonic communication only is transmitted by speaking into one of the combination mouth and ear pieces, such as 36 (or 36'), and have the other party listening in the other combination mouth and ear piece 36' (or 36). If it is desired to initiate the conversation by a buzz, then the party carrying the device 11, may depress the button 81, whereupon the buzzer is energized by means of the battery 74 in circuit therewith. If he wants to telegraph, he depresses the button 82 which draws the armature 71 against the electromagnet 73 with a clicking sound, the circuit being continuous until the button is released. This makes it possible to transmit a buzz and telegraphic communication one way, with a device 11 and a device 12, or both ways if two devices 11 are connected together. It will be understood that the device 12 is identical with the device 11, insofar as the interior mechanism is concerned, except that it lacks the battery 74, the electromagnet 73, the armature 71 and the push buttons 81 and 82, and is smaller.

From the foregoing, it will be understood that I have improved on the device of my prior patent before identified, not only in the construction of the sound-powered telephonic units, the carrying cases therefor and the connections therebetween, but I have also made the further improvement in adapting them for being carried by the wrist and allowing for communication by buzzing or by telegraphy.

Having now described my invention in detail in accordance with the patent statutes, those skilled in the art will have no difficulty in making changes and modifications in the individual parts or their relative assembly in order to meet specific requirements or conditions. Such changes and modifications may be made without departing from the scope and spirit of the invention, as set forth in the following claims.

Having thus described the invention, what I claim is:

1. In a telephonic unit, a permanent magnet, outer and inner pole pieces between which said magnet is mounted, said pole pieces comprising plates of magnetizable material each having one end portion offset toward the corresponding end portion of the other plate in spaced opposed relationship thereto and forming an air gap between said offset portions, a housing formed as two parts interfitting to inclose the interior mechanism of said unit, one of said parts having a relatively large, generally circular opening, a diaphragm closing said opening, means mounting the assembled pole pieces and magnet near the edge of, with the offset portions of said pole pieces overlying, said opening, an armature having a portion poised in said air gap, nonmagnetic means fastening together said offset end portions in spaced relationship, with said armature clamped therebetween so as to leave a portion free to vibrate in and extended beyond said gap, a coil mounted on said armature, a tensioning device secured to the inner surface of the inner pole piece, extending over the opening and terminating at a point over the center of said diaphragm, a driving connection between the center of said diaphragm and the free end of said tensioning device, and means connecting the free end of said extended armature portion to said connection.

2. In a telephonic unit, a permanent magnet, outer and inner pole pieces between which said magnet is mounted, said pole pieces comprising plates of magnetizable mate-

rial each having one end portion offset toward the corresponding end portion of the other plate in spaced opposed relationship thereto and forming an air gap between said offset portions, a molded plastic housing formed as two parts interfitting to inclose the interior mechanism of said unit, one of said parts having a relatively large, generally circular opening, a flexible diaphragm closing said opening, means mounting the outer of said pole pieces near the edge of, with the offset portions of said pole pieces overlying, said opening, and the other pole piece extending inwardly therefrom, an armature having a portion poised in said air gap, nonmagnetic clamping means fastening together said offset end portions in spaced relationship, with said armature clamped therebetween but leaving an armature portion free to vibrate in and extending beyond said gap, a field coil mounted on the free portion of said armature, a tensioning device secured to the inner surface of the inner pole piece, extending to a point over the opening and terminating in line with its center, a driving connection between the center of said diaphragm and the free end of said tensioning device, and means connecting the free end of said extended armature portion to an intermediate portion of said connection.

3. In combination with a pair of sound-powered telephonic units including operating coils enclosed in housings, a combination buzzer-sounder comprising an electromagnet with a core and a coil, an armature oscillatable to and from said core and from and to a circuit contact, wires connecting the coils of said telephonic units in series with said buzzer-sounder coil, and a dry cell and circuit-interrupting means including said armature and circuit contact connected in said series circuit in parallel with said buzzer-sounder coil, whereby buzzing or telegraphic communication may be transmitted over said wires alternatively to telephonic communication, each housing being formed of plastic in two parts which interfit to enclose the interior mechanism, one of said parts being inwardly pocketed to receive the dry cell.

4. The invention as defined in claim 1, in which the housing is formed of molded plastic with integral reinforcements bridging the generally circular opening inside of the diaphragm, some of said reinforcements being continued as inwardly extending ribs defining a pocket receiving plastic adhesive for holding the pole pieces and magnet in place.

5. The invention as defined in claim 3, in which the inwardly-pocketed part is formed with inwardly-extending integral projections, and spring contacts for said cell held by said projections and serving to resiliently hold said cell in place by gripping opposite poles thereof.

6. The invention as defined in claim 3, in which the buzzer-sounder device includes a generally U-shaped piece with a flange extending from one end and to which the armature is connected, and plastic adhesive means securing the bottom portion of said piece to the interior portion of said housing.

7. The invention as defined in claim 3, in which the circuit-interrupting means comprises a spring metal contact device, one end of which is rigidly secured to the interior of the housing and the other end of which is bifurcated, and buttons mounted in said housing and respectively engaging said bifurcations to alternatively operate the buzzer and the sounder.

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