Nov. 21, 1933. J. J. BURKE ET AL 1,936,245

TELEPHONE

Filed July 8, 1931 2 Sheets-Sheet 1

Fig. 3

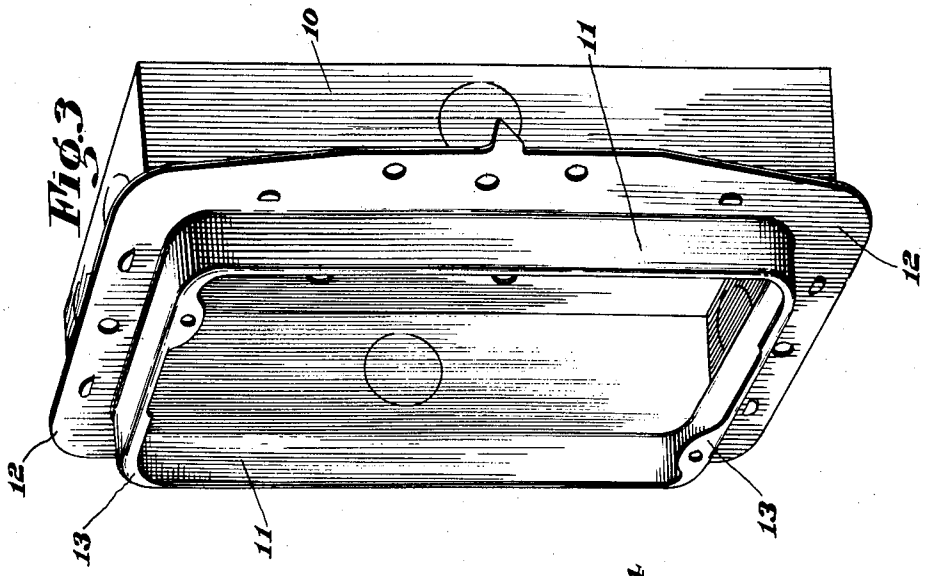


Fig. 2

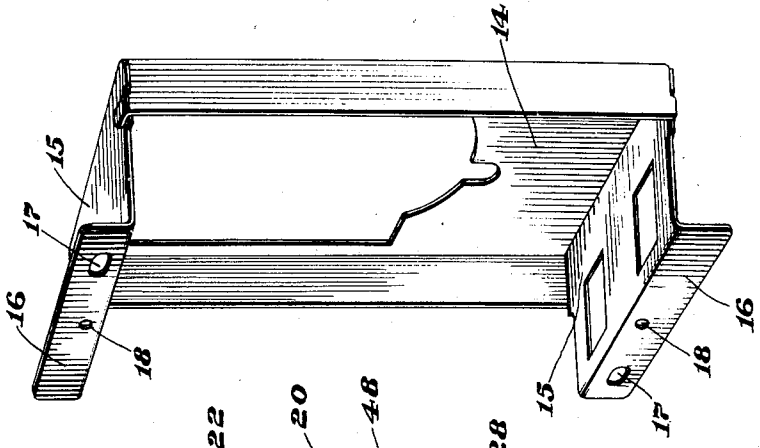
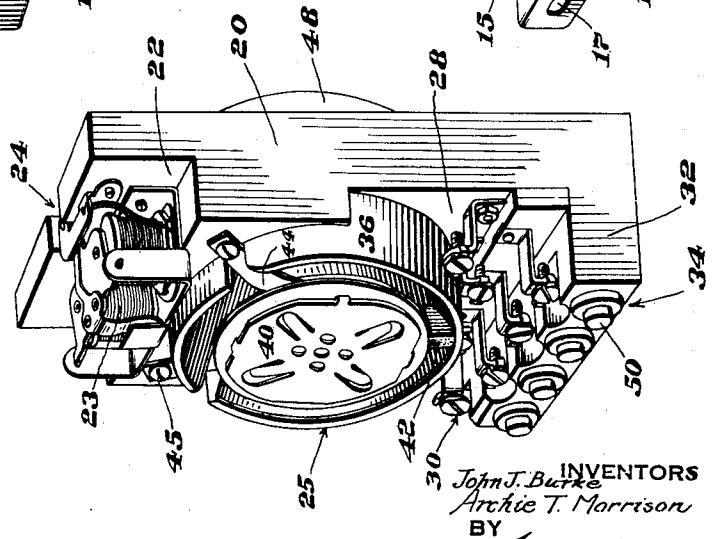


Fig. 1



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Fig. 4

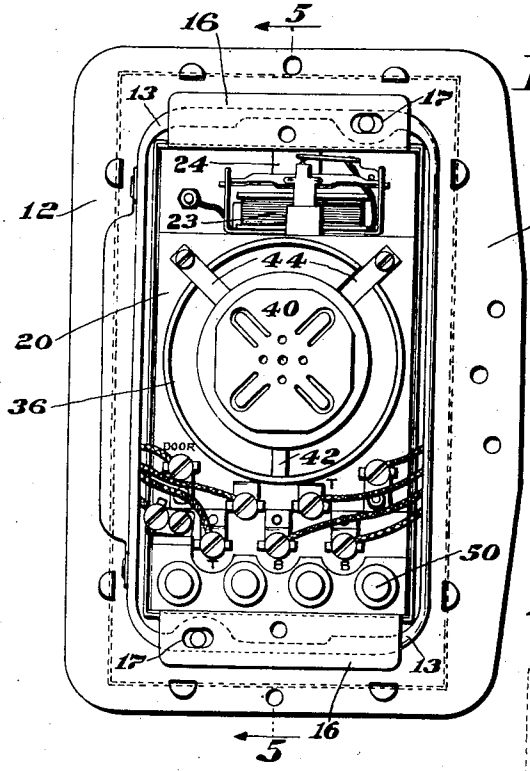


Fig. 5

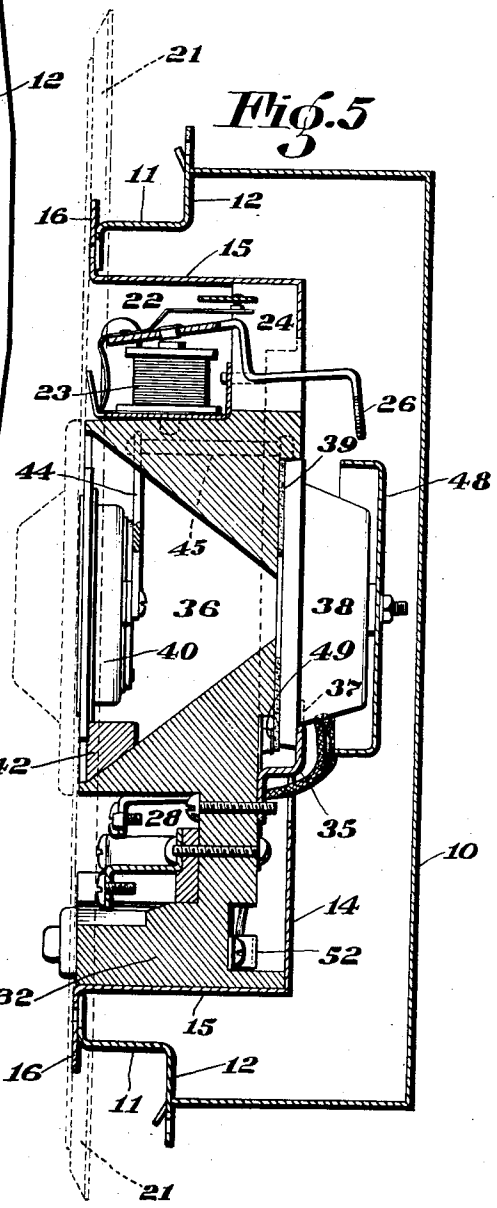
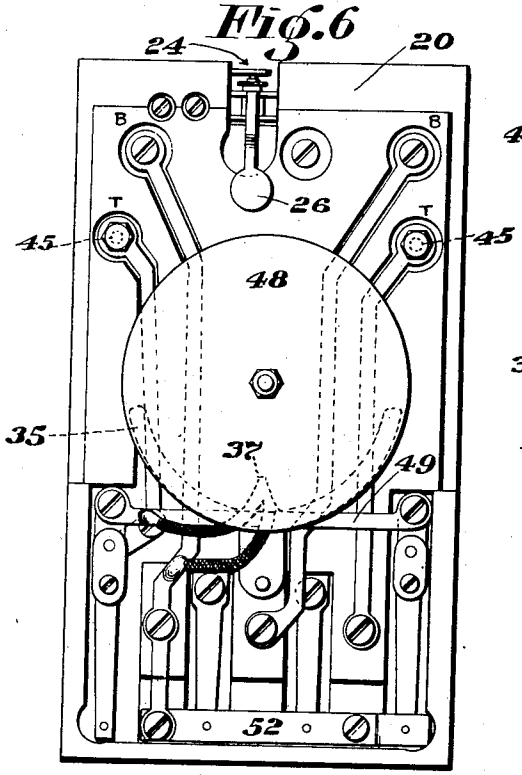


Fig. 6



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UNITED STATES PATENT OFFICE

1,936,245

TELEPHONE

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Application July 8, 1931. Serial No. 549,360

15 Claims. (Cl. 179—100)

This invention relates to telephonic apparatus and more particularly to what may be termed private telephones as distinguished from the public service telephones. Such private telephones are advantageous and in demand for many uses, for example, in apartment houses to connect the several apartments with the lobby, in business and professional offices to connect the various departments, in private homes or estates to connect the different rooms within the house as well as outlying quarters and departments, etc. etc.

A very large use of private telephones is derived from apartment house systems wherein a single transmitting and receiving unit is installed in the lobby, connected by selective call lines to the multiplicity of instruments located in the several apartments. Such instruments may be provided with cord-connected receivers or, in accordance with more modern practice, they may include a combined unit adapted to act as both receiver and transmitter permitting omission of the clumsy receiver with its hook and cord and providing a flush loud speaker or concealed speaker, cordless telephone. The hookless and cordless type of telephone is more desirable in apartments because the wall unit may be covered with a decorative face plate of such attractive and ornamental appearance as not to disfigure the wall and thus call particular attention to the installation.

The object of the invention is to improve telephones of the kind just described having the advantages, among others, of compactness permitting the use of a relatively small face plate, and ease of installation. For simplicity of illustration and description there is disclosed herein a hookless and cordless combined transmitter and loud speaker unit but those skilled in the art will recognize from the following description that certain features of the invention have a broader aspect and are useful in telephones of other types. The features through which the objects of the invention are attained include a unitary block of insulating material, on which all operating instrumentalities are compactly mounted, adapted to be fitted within an apparatus box for convenient handling which, in turn, seats within a wall outlet box permitting the assembly to be concealed by a relatively small face plate. The insulating block is completely front-connected and its holder is so proportioned with respect to the wall box that it may be suspended therein between the projecting line wires and all connections then made to terminals in plain view. In the construction of the insulating block, herein shown for use in a hookless and cordless telephone system, compactness is obtained by an aligned relation of the transmitter and receiver and preferably also of a call bell when used, with a front rabbet or recess for enclosing the electro-magnetic vibrator, a front recess for the line and other wire terminals, and a row of sockets to receive the press-to-talk key and one or more call buttons which are accessible through holes formed in the face plate. Then the key and buttons are the only parts of the apparatus projecting through the face plate and a true flush telephone is achieved.

To the accomplishment of these objects, and such others as may be explained or described hereinafter, the invention comprises the features and combinations of parts specifically disclosed by the following description and then particularly pointed out in their true scope by the appended claims.

An understanding of the invention will be aided by reference to the accompanying drawings showing a flush loud speaker or concealed speaker, cordless telephone for installation in the wall of an apartment or a similar environment, embodying the novel features of the invention, in which:

Figures 1, 2 and 3 on sheet one show the three interfitting parts comprising the block, its box and the wall outlet box, all in an exploded or detached relation;

Figure 1 being a view, in perspective, showing the front face of the insulating block which mounts the combined receiving and transmitting apparatus,

Fig. 2 being a view, in perspective, of the apparatus box or protective shell by which the block may be seated in the wall box, and

Fig. 3 being a view, in perspective, looking into the wall box;

Fig. 4 is a view, in front elevation, of the assembly of the parts shown in Figs. 1, 2 and 3;

Fig. 5 is a view, in full-size central vertical section, on the line 5—5 of Fig. 4, showing also a cover plate in dotted lines; and

Fig. 6 is a view, in full-size elevation, of the rear face of the insulating block shown in Figs. 1 and 4.

In the embodiment of the invention illustrated in the drawings, Fig. 3 shows a metal wall outlet box of suitable size and shape for receiving the compactly formed insulating block and its shell of Figs. 1 and 2. The wall box comprises a body 10 and a rim 11 having an outturned flange 12, removably connected to the body, and an irregular inturned marginal flange 13 at its front

opening. The usual knockouts for the line wires are provided in the body metal. The apparatus box, Fig. 2 is a skeletonized metal frame comprising a partially cut-out floor 14 having low sides and end walls 15 each having an outturned flange 16 at its front face. The length of this box or shell is such that, when rested in the wall box, its flanges 16 overlie the flange 13 and the two parts may be secured together by screws set through aligned holes in the two flanges. The width of the block-holder, as shown by Fig. 4, is somewhat less than the width of the opening presented by the rim 11 of the wall box. Because of this, after the line and bell wires have been lead into the box and then drawn through to stand at each side thereof the block shell containing the insulating block 20 may, because of its lesser width, readily be seated within the wall box between said projecting wires. It will be observed that the screw holes 17 of the shell are of oval shape. Should the workman seat the wall box slightly off the desired perpendicular the elongated holes 17 permit the shell and block 20 to be shifted angularly relative to the wall box to rectify its position and make positive a true vertical position on the wall of the cover plate 21 (dotted lines Fig. 5) which is secured in place by screws threaded into screw holes 18 centrally of the shell flanges 16.

The insulating block 20 and apparatus carried thereby will now be described with reference to Figs. 1, 4, 5 and 6. The block 20 may be molded of any suitable insulating material and is dimensioned to fit snugly within the apparatus box. Its face, at the top, is rabbeted to form a recess 22 (see also Fig. 5) in which the electro-magnetic vibrator 23 is mounted. Any suitable electro-magnetic vibrator which can be fitted within the recess 22 may be used. The greatest thickness or depth of the block 20 is at its central part. Here there is provided a single voice unit for transmitting and receiving designated generally 25 in Fig. 1. Below the voice unit 25 the block is again thinned or front recessed at 28 (see also Fig. 5) and here are supported two rows of terminals designated generally 30 in Fig. 1. Below the recess 28, and forming the lower end wall of the block 20, is another portion 32 of full thickness containing a row of sockets which receive a bank of operating keys or push buttons designated generally 34 in Fig. 1.

The construction and arrangement of the voice unit 25 is a highly important feature of our invention. This unit comprises a combined transmitter and receiver in a single element the compactness of which, it is believed, has never before been attained. The block 20 is molded to form a sound amplifier in the form of a horn 36 (Figs. 1 and 5), at the rear or smaller end of which, within a circular centering recess, is mounted a receiver 38, a felt pad 39 being interposed between the receiver and the rear face of the block. A semi-circular bracket 35 (Figs. 5 and 6) partly embraces and clamps the receiver firmly in position. The clamp 35 is the sole means for securing the receiver in position over the rear end of the amplifying horn and is provided with a central prong 37 entering a hole in the wall of the receiver to prevent angular displacement thereof. Centrally within the mouth of the horn there is mounted a transmitter unit 40 the diaphragm of which is of less diameter than the diameter of the horn mouth leaving an annular space between said unit and the rim of the horn (see Fig. 1). The transmitter, or microphone, is of a special construction in order to promote and provide clear transmission of speech when so close to the receiver but this forms no part of the present invention. It will be seen from Fig. 5, which is full size, that the distance from the transmitter to the receiver diaphragms is less than two inches and yet reception is clear and distinct and entirely free from squealing. The transmitter unit 40 has a three point suspension. A small block 42 of insulating material serves to maintain its lower portion in the proper plane and a plurality of arms 44, serving for the electrical connection, extend from its rear center upwardly through slots in the rim of the horn where the arm-ends are fastened through the block by screws 45 (see dotted lines Fig. 5) providing connection to the circuit at the rear face of the block.

A further improvement, gaining compactness and a reduction in size of the wall box required to be covered by the face plate, resides in the location of the bell or gong 48 when a louder signal than buzzing is desired. The bell is mounted on the back of the receiver 38 and concentrically thereto, it being of somewhat greater diameter as shown best by Fig. 5. A bell clapper 26 may extend rearwardly from the magnet armature through a rear slot 24 in the block. Thus we produce an exceedingly compact unit embodying transmitter, receiver and gong all in alignment and conveniently centrally of the block 20. The gong shell 48 may be removed at will if the more subdued buzz is preferred but either provides an electro-magnetic vibrating signal.

The electrical connections through the block to the bell and line wires entering the wall box may be formed in various ways and their detail is not important to the invention claimed herein. Those skilled in the art of telephony will recognize the various leads and circuits from the illustration. It will be sufficient for us to say that conveniently straps may be laid in channels molded in the back of the block 20. In Fig. 6 the two inner straps designated B lead respectively from the bell to the two right-hand terminals of the lower row in Fig. 4. The two outer straps designated T in Fig. 6 lead respectively from the transmitter to the left hand terminal of the lower row and to the terminal in the upper row in Fig. 4 just above the two bell terminals. The receiver, as shown in Fig. 6, is in circuit with the bell and, by connection to the horizontal strap 49, with the transmitter and with all the line connections. The first three of the bank of press buttons 34, from left to right in Fig. 4, may be used to open the lobby door of the apartment building, and as call buttons to other stations. The press button 50 at the right is the "press-to-talk" key which, in this concealed speaker cordless telephone substitutes for the automatic circuit closing obtained when a receiver is removed from its hook. A battery bar 52 (Fig. 6) in a horizontal channel at the rear of the keys serves as a universal connector for all the keys except the press-to-talk key.

A very material advantage resides in the ease of installation. As heretofore described when the apparatus box or shell is slipped into place between the projecting line wires the electrical connections are made with ease and rapidity because all terminals are at the front of the block. The unit may be defined as completely front-connected. The electrician needs to handle two members only, the wall box and the apparatus box which contains

the complete, factory-assembled insulating block. The only manipulation required to complete the various circuits is to connect the several line wires to their respective terminals which are all in plain sight and easily accessible, the work of but a moment. The face plate is secured and the job is completed. The improved assembly is equally advantageous in repair work for, on removal of the face plate, all of the electrical connections are at once exposed to view.

The nature and scope of the invention having been indicated and its preferred embodiment having been specifically described, what is claimed as new, is:—

1. Apparatus for telephones of the concealed speaker hookless and cordless type comprising a unitary block of insulating material having a sound amplifying aperture, a front electro-magnetic vibrator receiving recess, a front wire terminals receiving recess, and sockets for a series of call buttons and a press-to-talk key, said recesses being dimensioned to shelter the parts to be received therein to present a front planate face on the block suitable to take a flush cover.

2. Apparatus as specified in claim 1 having, in combination, an apparatus box dimensioned snugly to receive the block of insulating material, and a wall outlet box considerably deeper than the apparatus box having a front opening dimensioned to receive the apparatus box within said opening, said apparatus box and wall box having opposed portions to permit suspension of the apparatus box within the outlet box.

3. A supporting structure for a suite telephone comprising a wall outlet box having a front opening, an apparatus box of less depth than the wall box having a body portion dimensioned to be received within said front opening and provided with partial side walls and upper and lower outturned flanges at its front face, and said outlet box having marginal means for suspending said apparatus box within it, the line wire space beneath the apparatus box being in communication with the apparatus box by reason of its partial side walls.

4. Front connected apparatus for concealed receiver suite telephones comprising a wall outlet box having a front opening, a block of insulating material carrying a transmitter, receiver, electromagnetic vibrator and complete connections at its rear face for a suite telephone system said connections leading to a series of terminals at the front face of the block, and an apparatus box for said block narrower than the front opening of said wall box and supported in said front opening between line wires led into the wall box and projecting forwardly between the wall and apparatus boxes facilitating front connection thereof to said terminals after the apparatus box has been seated within the wall box.

5. Concealed speaker hookless and cordless telephone apparatus comprising a unitary block of insulating material having a cone-shaped amplifying horn and supporting a receiver, transmitter, electromagnetic vibrator, bank of call buttons including a press-to-talk key and electrical connections therefrom at the back of the block and leading through the block to a series of terminals all exposed at the front of the block and adapted selectively to call other stations and to connect the same in circuit.

6. Flush concealed receiver telephone apparatus comprising a block of insulating material having an aperture for amplifying sound, a receiver unit mounted at the back of the block having a diaphragm covering one end of said aperture, and a transmitter unit mounted within the forward end of the aperture having a diaphragm dimensioned to only partly close said end, the diaphragms of said receiver and transmitter being substantially in parallel planes and spaced by the substantial thickness of the block.

7. The invention as specified in claim 6 in which the receiver mounting comprises a clamp which engages the receiver unit externally and is secured to the insulating block.

8. The invention as specified in claim 6 in which the receiver unit is provided with a hole in its peripheral wall and its mounting comprises a semi-circular clamp secured to the insulating block and having a prong to enter said hole.

9. The invention as specified in claim 6 in which the transmitter mounting comprises a plurality of supporting arms extending outward from the transmitter to points outside the rim of said aperture, said supporting arms constituting the electrical connections to the transmitter.

10. A concealed speaker hookless and cordless flush suite telephone comprising a block of insulating material having an aperture extending through its front and back faces for amplifying sound, a transmitter unit suspended within the aperture at its forward end, a receiver mounted at the back face of the block over the rear end of the aperture, and an electro-magnetic vibrator seated in a front recess of said block.

11. Flush loud speaker telephone apparatus comprising a wall box, a block of insulating material seated in said box with its front face substantially flush with the box front and having a cone-shaped aperture flaring from back to front of the block, a transmitter unit suspended therewithin at its larger end, a receiver closing its smaller end, and a gong supported by the receiver, the transmitter, receiver and gong all being located axially of the aperture and within the front face of said wall box.

12. A block of insulating material for a concealed speaker hookless and cordless telephone molded to provide a walled sound amplifying aperture opening through the front and back faces of the block, a front recess at one side of said aperture wall, a front recess at the other side of said aperture wall, a row of sockets through the block adjacent to said last named front recess, and having a circular recess at its rear face surrounding the opening of said sound amplifying aperture at the back of the block.

13. A combined transmitting and receiving assembly for hookless and cordless telephones comprising a block of insulating material having a cone-shaped sound amplifying aperture therethrough larger at front end than rear end, a transmitter and a receiver at the front and rear ends respectively of said aperture, electrical connections leading from the transmitter through the block to its rear face, and electrical connections confined to the rear face of the block leading from the receiver in circuit with the transmitter.

14. In an intercommunicating hookless and cordless telephone comprising telephone circuit mechanism, a unitary block serving as the support for the intercommunicating devices, said block having a cone-shaped sound amplifying aperture opening through its front and rear faces, a transmitter unit suspended by metallic supports centrally of said aperture at its forward open end to leave an annular space between said

unit and the wall of the aperture, a receiver mountd on the rear face of the block over the rear open end of said aperture, an electro-magnetic vibrator and a series of circuit terminals for said telephone circuit supported by said block and exposed only at the front face of said block, and means exposed at the front face of the block for connecting the transmitter through its supports into the telephone circuit.

15. In an intercommunicating hookless and cordless telephone comprising telephone circuit mechanism and push button circuit mechanism, a unitary block serving as a common support for the intercommunicating devices and the push buttons, said block having a sound amplifying aperture therethrough, axially aligned transmitter and receiver units at its front and rear openings respectively and call buttons including a press-to-talk key projecting from the forward face of the block, and the front face of said block having open recesses for receiving an electro-magnetic vibrator and a series of terminals for said telephone and push button circuits, said recesses being of sufficient depth to maintain the parts within them below the plane of the front face of the block permitting securement of a flush cover plate over said aperture and said recesses and through which said buttons project.

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