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(72) Gilbert, Raymond, CA

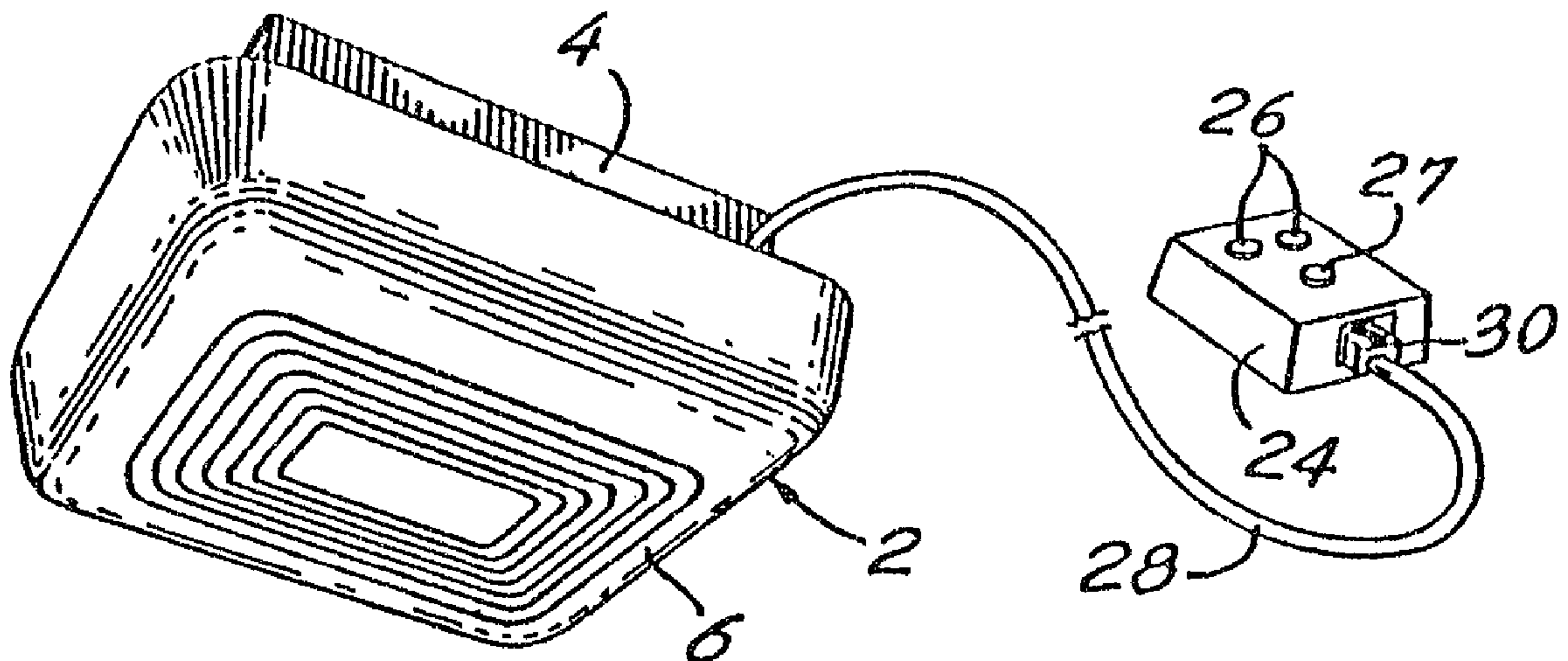
(73) Gilbert, Raymond, CA

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(54) **DETECTEUR DE FUMEE DOTE D'UN SELECTEUR
AUTOMATIQUE**

(54) **SMOKE DETECTOR WITH AUTOMATIC DIALING**



(57) A smoke detector casing of conventional size and adapted to be secured in any room of a residence or the like, contains not only a smoke detector, an audible alarm and their circuit with a 9 volts alkaline battery as a power supply but also a microprocessor and an automatic telephone dialer and a modem together with a telephone jack for connecting the circuit to a telephone line so as to immediately dial and send a smoke detection signal to a central monitoring station. The circuit of the smoke detector is also used for transmitting emergency signals others than fire alarms. The smoke detector casing also encloses a high sensitivity combined microphone and loud speaker to provide for direct bi-directional voice communication between the occupant of the monitored area and the attendant at the central monitoring station. The direction of the voice communication is controlled by the attendant who can thus manage the panic situation.

SMOKE DETECTOR WITH AUTOMATIC DIALING**ABSTRACT OF THE DISCLOSURE**

A smoke detector casing of conventional size and adapted to be secured in any room of a residence or the like, contains not only a smoke detector, an audible alarm and their circuit with a 9 volts alkaline battery as a power supply but also a microprocessor and an automatic telephone dialer and a modem together with a telephone jack for connecting the circuit to a telephone line so as to immediately dial and send a smoke detection signal to a central monitoring station. The circuit of the smoke detector is also used for transmitting emergency signals others than fire alarms. The smoke detector casing also encloses a high sensitivity combined microphone and loud speaker to provide for direct bi-directional voice communication between the occupant of the monitored area and the attendant at the central monitoring station. The direction of the voice communication is controlled by the attendant who can thus manage the panic situation.

FIELD OF THE INVENTION

The invention relates to an apparatus for detecting fire and other emergency conditions and transmitting a corresponding emergency signal to a remote central monitoring station.

BACKGROUND OF THE INVENTION

Various emergency reporting or alarm systems exist for installation in houses and other buildings, which link up the alarm system to a central monitoring station which in turn, can take steps for notifying the police or the fire department or a medical organization. Known such systems are quite costly and they often require a special dedicated telephone line.

Generally speaking such a known alarm system comprises a central unit and a series of detectors such as infra-red sensors which mainly serve to detect a non-desired presence. These known systems must be armed when the house occupant leaves the premises and must be disarmed when the occupant comes back to the house. This requirement is constraining with the result that the occupant often abandons or forgets the arming and disarming procedure.

Also the house occupant, in an emergency and therefore stressful situation, must use a conventional telephone apparatus to communicate with the attendant at the central monitoring station. Both the attendant and the occupant may dial at the same time and the communication becomes impossible. Frequently, the attendant, in an intrusion situation, is under directives not to call the occupant. In such a situation, the occupant must call the attendant and frequently he does not have the required central telephone number at hand, so much so that he is in a stressful situation. Delays therefore occur which are highly harmful in an emergency situation.

OBJECTS OF THE INVENTION

The general object of the invention is to provide a conventional casing for a smoke detector which encloses not only a smoke detecting circuit but also is circuited for automatic telephonic communication with his central monitoring station, and yet is powered in an autonomous manner by a standard dry cell battery as used in conventional smoke detectors.

Another object of the present invention is to provide an emergency system of the character described having means for sending another type of emergency alarm or signal, than a fire or smoke signal.

Another object of the present invention is to provide a device of the character described provided with means for establishing bi-directional voice communication between the occupant of the monitored area and the attendant at the central monitoring station.

Another object of the present invention is that all the communications are transmitted over a conventional public utility phone line.

SUMMARY OF THE INVENTION

The alarm system of the invention comprises a small portable casing adapted to be secured to a ceiling, a wall or the like, in a room to be monitored, said casing enclosing its own power supply, a smoke sensing device and its attendant electronic circuit together with a microprocessor and automatic telephone dialer and a modem with telephonic cord connectors. The circuit is capable of using the public utility phone lines to automatically dial upon a smoke detection, so as to communicate with a computer at said monitoring station.

Preferably, the casing includes a discriminating circuit to permit signals indicating other types of emergency situations than a fire or smoke situation to be sent to the central monitoring station.

Preferably, the device further includes a high sensitivity microphone and a loud speaker together with a corresponding bidirectional voice communication circuit whereby through the same telephone line, voice communication can be established between the attendant at the central monitoring station and the occupant of the monitored area. The latter does not have to use the conventional telephone apparatus, the casing then being used as a free-hand telephone apparatus.

Preferably, this voice communication circuit enables the attendant at the monitoring station to control the directions of the voice communication in order to better manage a panic situation at the monitored area.

BRIEF DESCRIPTION OF THE INVENTION

Figure 1 is a perspective view of the smoke detector in accordance with the invention together with a control pad connected thereto.

Figure 2 is a bottom plan view of the casing of figure 1 and with portions of the bottom cut away to show certain parts located within the casing.

Figure 3 is a vertical section of the casing.

Figure 4 is a cross-section taken along line 4-4 of figure 3.

Figure 5 is a schematic diagram of the electronic circuit contained in the casing of figures 1 to 4 and,

Figure 6 is a schematic view showing the alarm system of the invention connected to a central monitoring station which is in turn connected to a public utility security service station.

DETAILED DESCRIPTION OF THE INVENTION

The alarm system of the invention comprises a casing 2 of the size of a conventional smoke detector casing such as found in residential homes and adapted to be secured to the ceiling or a wall of the room to be monitored. Casing

2 comprises a box 4 to which is hinged a cover 6 by means of releasable hinges 8. The casing is secured to the ceiling by means of screws or the like inserted through holes in the tubular ears 10. The cover is maintained in closed position by a snap lock 12. Two female telephone jacks are mounted within the box 4 and opens at the side of the box 4, namely an eight-pin telephone jack 14 to be connected to a telephone line and a six-pin telephone jack 16 serving as an input for accessories. The box 4 also carries a push-button 18 which serves as a cancel/test button. The box 4 and cover 6 houses electronic circuits at two levels, namely the bottom level 20 and the top level 22.

As one type of input accessory, a remote control pad 24 is provided, having two top push-buttons 26 which serve, when simultaneously depressed, to manually sound an alarm and a single button 27 which serves to cancel the alarm.

The pad 24 is connected to the input jack 16 through a conventional telephone cord 28 having at its ends two male plugs 30. The remote control pad 24 can be positioned in any easily accessible location within the room being monitored.

The electric and electronic components contained in the casing 2 are shown in figure 5, as schematic blocks : a power supply 32 is provided which includes means to releasably receive a standard 9 volt alkaline battery such as found in conventional smoke detectors and which also includes the electronic circuit for furnishing different voltages as necessary to the various other electronic components.

A processing unit or micro-processor 34 is provided which controls all the operations and gives the necessary instructions.

A mute/test 36 is provided which is operated by the cancel/test button 18 or by the remote cancel button 27 on the remote control pad 24. If the apparatus is not in an alarm state when cancel/test button 18 is activated, then

block 36 will effect a verification of the functioning of the apparatus. If the apparatus is in an alarm state when button 18 is depressed, then the alarm is cancelled. This occurs also when button 27 is depressed on the remote control pad 24. A smoke alarm block 38 is provided which contains a smoke detector preferably
5 a double high ionization chamber and an audible alarm and attending electronic circuit.

An interface block 40 is provided which serves to detect a change of status of the different inputs : for instance this interface block, will detect whether the smoke detector is in a detecting state or whether the two push-
10 buttons 26 have been depressed simultaneously to sound an alarm, or if the button 27 is depressed to cancel the alarm. This interface block 40 can be also provided with electronic circuits not only to discriminate between a smoke-sensing signal for the smoke detector and between an emergency alarm from the control pad 24 but also to discriminate for instance the signals of intrusion detectors which would be
15 connected to the input jack 16. A specific signal is therefore sent to the processing unit 34 accordingly.

A telephonic interface 42 is also present which comprises an automatic dialer and modem. A communication block 44 serves to coordinate the transmission of informations between box 2 and a central control station through the telephonic
20 lines.

Finally, casing 2 also preferably contains a high sensitivity microphone and a loud speaker, which may be combined as one unit, together with the attendant electronic circuits as denoted by bi-directional voice circuit 46. Line 43 connected to telephone interface block 42 indicates that the latter is connected to
25 the female telephone jack 14 while line 41 connected to the interface block 40

indicates that the latter is connected to jack 18 and to remote control pad 24, namely for connection to various types of input accessories.

Referring to Figure 6, casing together with control pad 24 are shown located in a room 48 to be monitored. A telephone cord 50 is connected to the eight-pin jack 14 and together with a conventional telephone apparatus 52 is connected to the utility telephone line 54 which feeds the signal coming from the casing 2 to a computer 56 in a central monitoring station 58. The information is sent over lines 54 via the modem of telephonic interface 42, so as to obtain better sending accuracy of the transmitted signal. The signal, when received at computer 56, activates the audible alarm 60 to warn the attendant at the monitoring station. Upon a signal having been received by the computer 56, an order is sent to pull out from the hard disk of said computer, a customer file corresponding to the occupant of the room 48. The customer file may contain the following information : name and address of room occupant, information on the same such as whether he is an elderly or a sick person, key person to call in the case of emergency with phone number and any other useful information. The monitoring station attendant then sends relevant information to the computer 62 of the public security service station 64, the attendant of which sends the appropriate instructions in accordance with the type of emergency situation either to the police department, the fire department or the appropriate medical organization which sends the appropriate help as indicated by the police car 66, the fire fighting truck 68 and the ambulance 70.

Signals sent from casing 2 should have an override command mode that will interrupt and cancel a possible telephone conversation using the telephone 52.

Whenever the system does not include an oral communication facility within the box 2 as provided by the bi-directional voice circuit 46, the room occupant will use the conventional telephone 52 to communicate with the attendant at central monitoring station 58. If the bi-directional voice circuit and microphone
5 loud speaker unit is present in box 2, then the occupant can communicate directly with the attendant at the central monitoring station 58 without using telephone 52.

Voice circuit 46 includes circuitry which enables the attendant at the monitoring station to control the direction of the voice communication. The attendant decides whether to listen only or to speak only. He can thus better
10 manage a panic situation at the monitored area.

1. An emergency signalling system comprising a casing adapted to be fixed to the ceiling or wall of a room to be monitored and a separate, hand held, control pad having a pair of buttons disposed side by side and a third button, said casing enclosing a power supply circuit including connector means to connect said circuit to a direct current battery and means to furnish different voltages, and a main circuit including a smoke detector, an audible alarm, a mute-test, a micro-processor, an interface block having discriminating means to discriminate between a smoke-sensing signal and an emergency signal, an automatic telephone dialer, a modem, a first connector means to connect said circuit to a utility telephone line and a second connector means to connect said circuit to said pad buttons, said circuit generating a smoke indicating signal when said smoke detector detects presence of smoke in said room or an emergency signal when said pair of buttons are simultaneously depressed by an occupant of said room, whereby said smoke indicating signal or an emergency signal is automatically dialed and transmitted to a central monitoring station through said utility telephone line, said third button when solely depressed by said occupant activating said mute-test to cancel said generated emergency signal or, when no emergency signal is being generated, to effect a verification of the functioning of said circuit.

2. An emergency signalling system as defined in claim 1, wherein said circuit in said casing further includes a bi-directional voice circuit including a high sensitivity microphone and a loud speaker enabling said casing and its circuit to be used by said occupant as a hands-off telephone apparatus for oral communication with the attendant at the central monitoring station.

3. An emergency signalling system as defined in claim 2, wherein said bi-directional voice circuit includes electronic circuit means enabling sole control of the direction of the voice communication by the attendant at said central monitoring station.

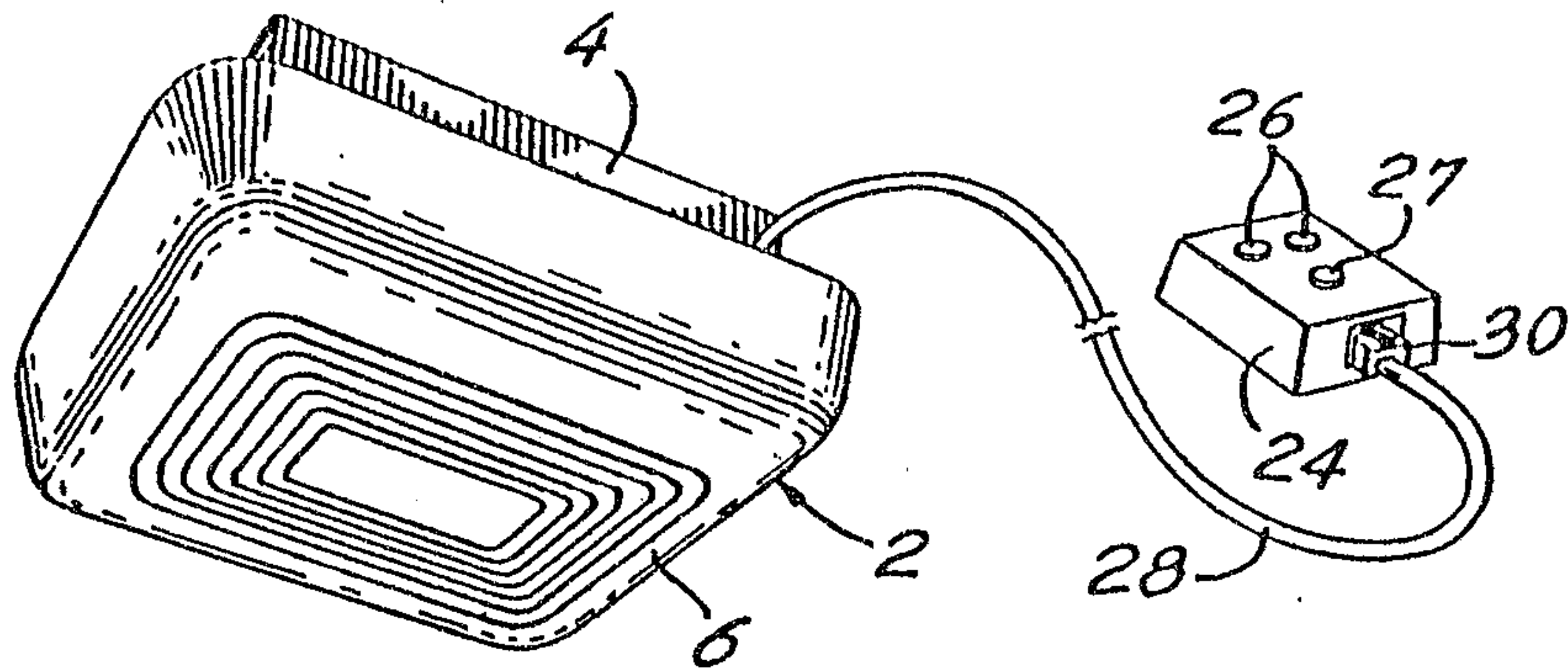


Fig. 1

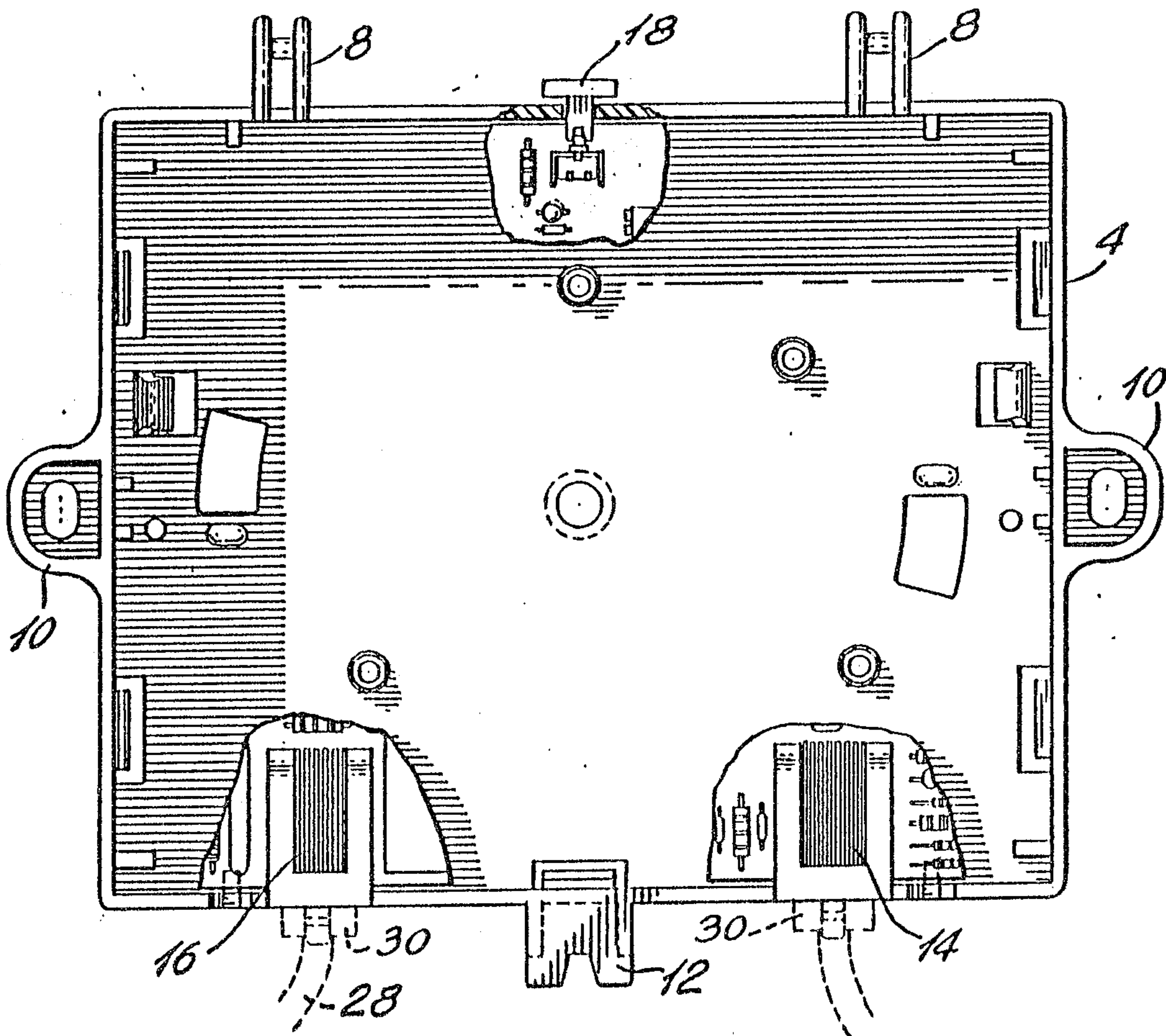


Fig. 2

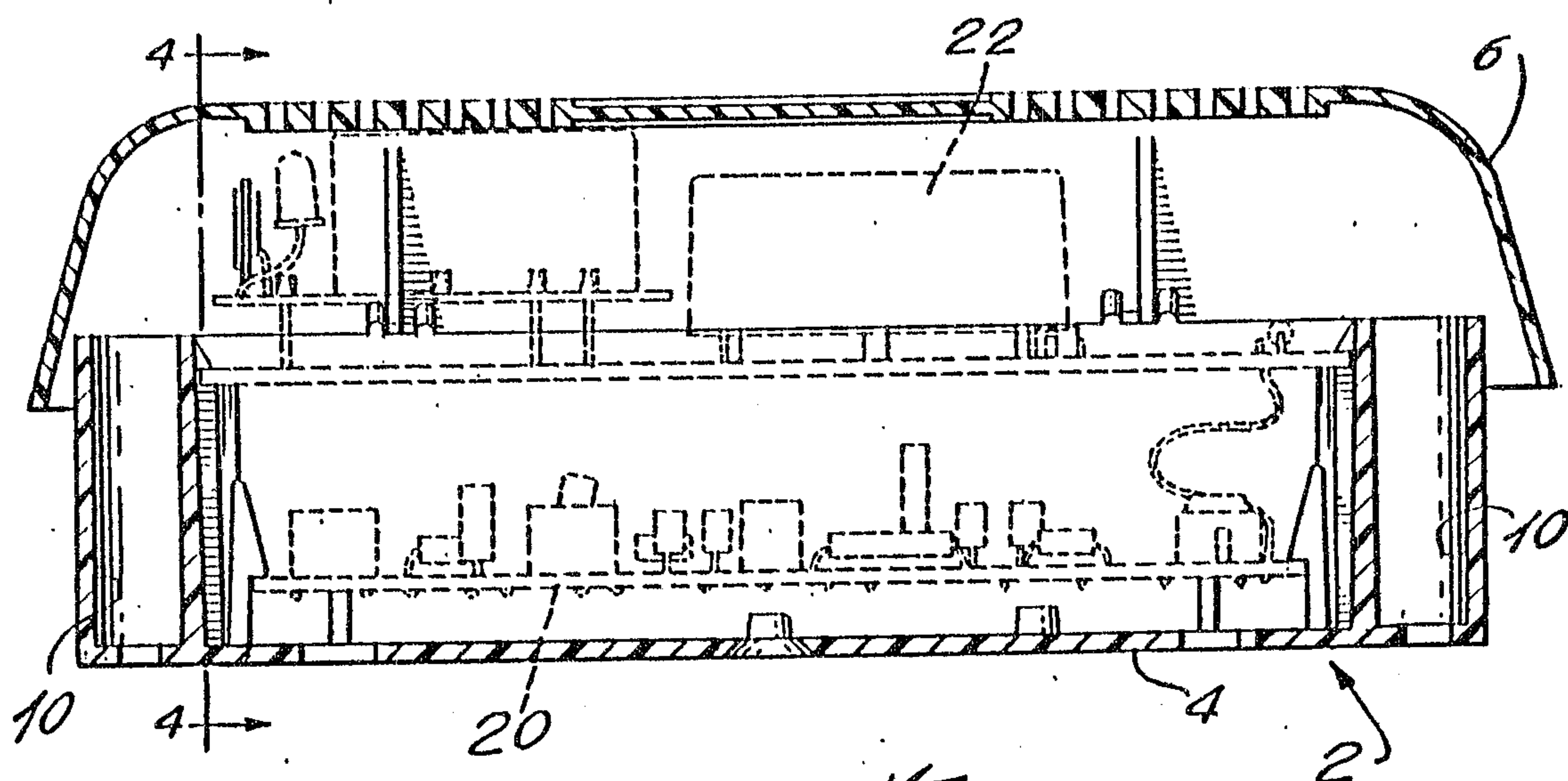


Fig. 3

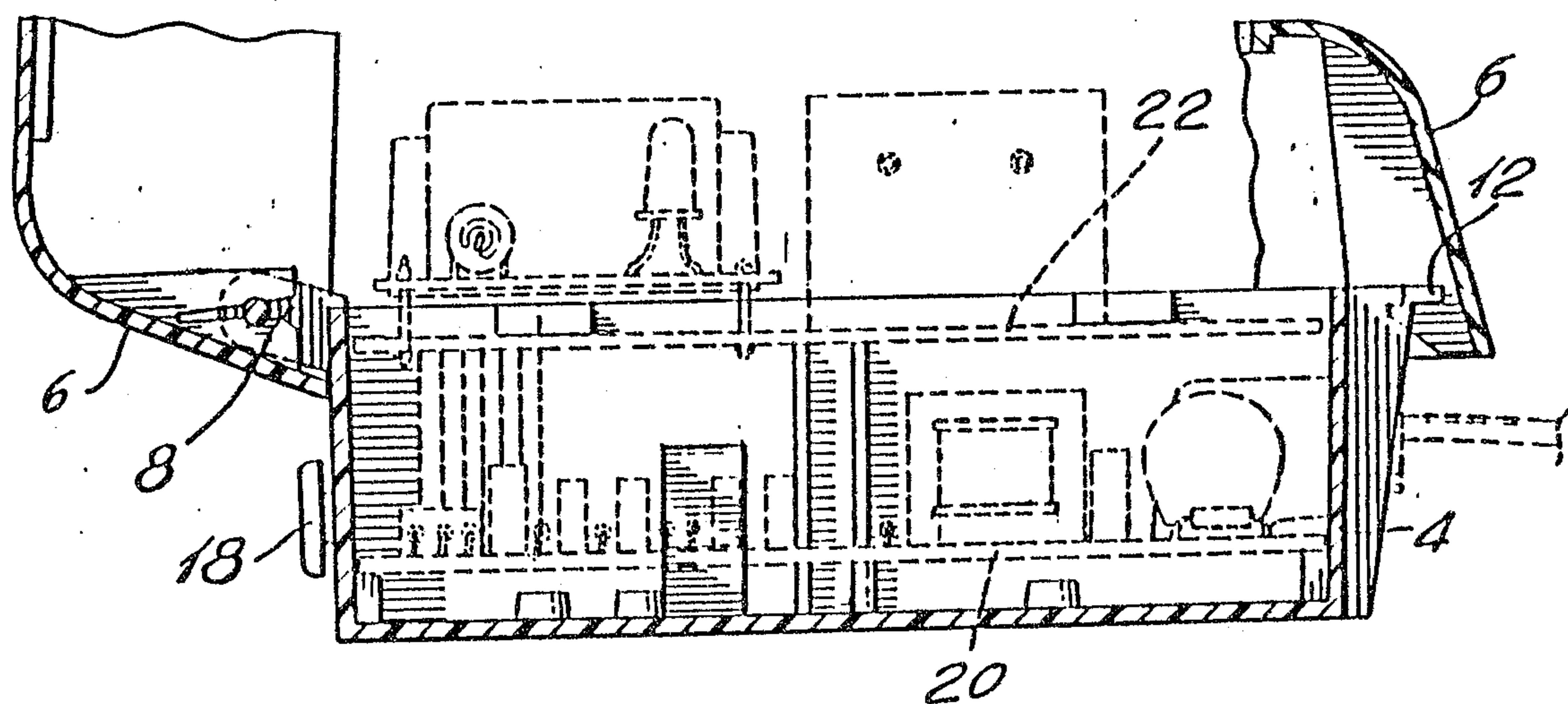


Fig. 4

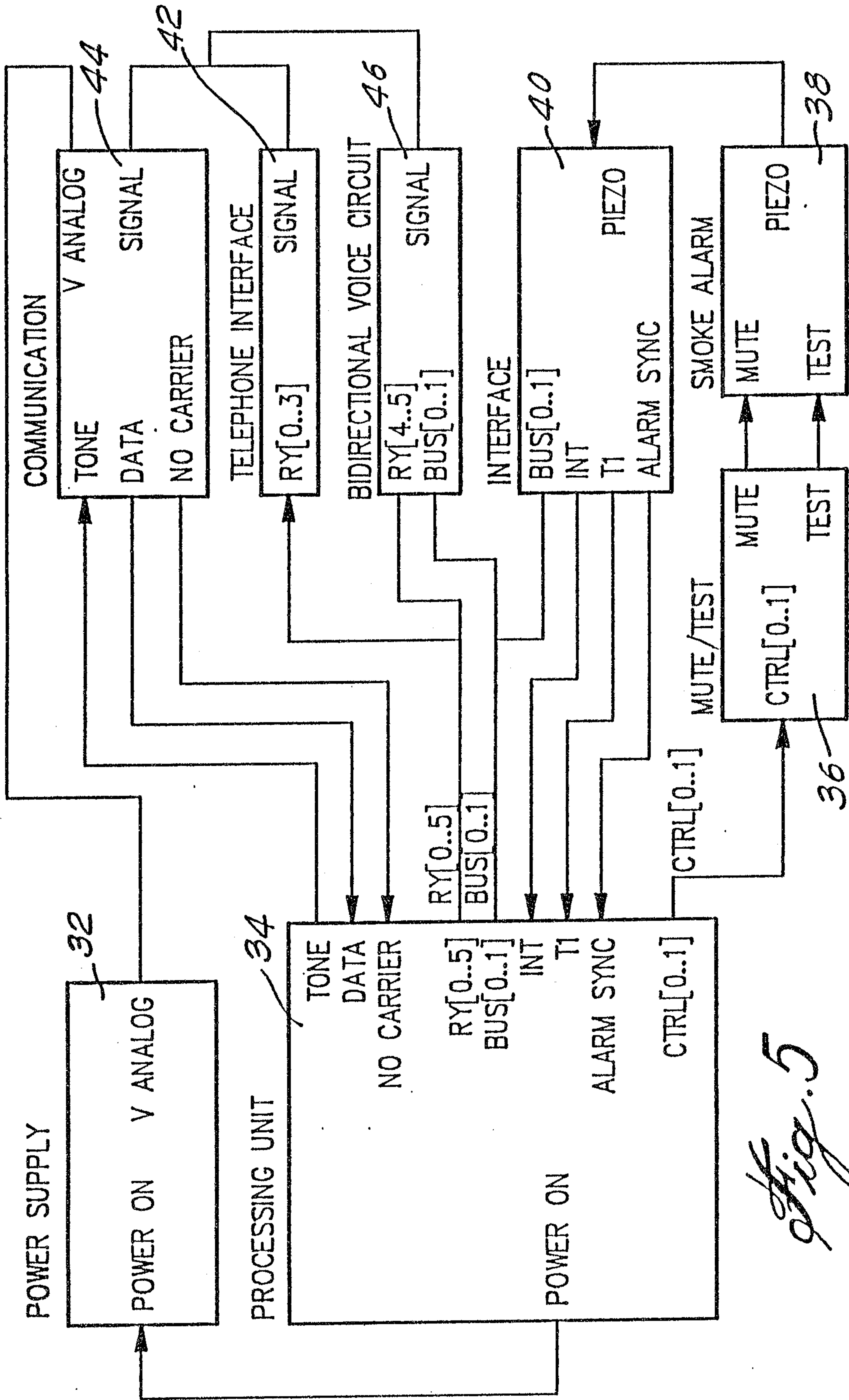


Fig. 5

Fig. 6

