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## (54) Toy

(57) A toy comprising a transducer to produce an output signal in response to variations in barometric pressure, a filter to filter said output signal to select a component of the output signal relating to air movement at the transducer and response means to cause said toy to create an effect in response to receipt of the filtered output signal.

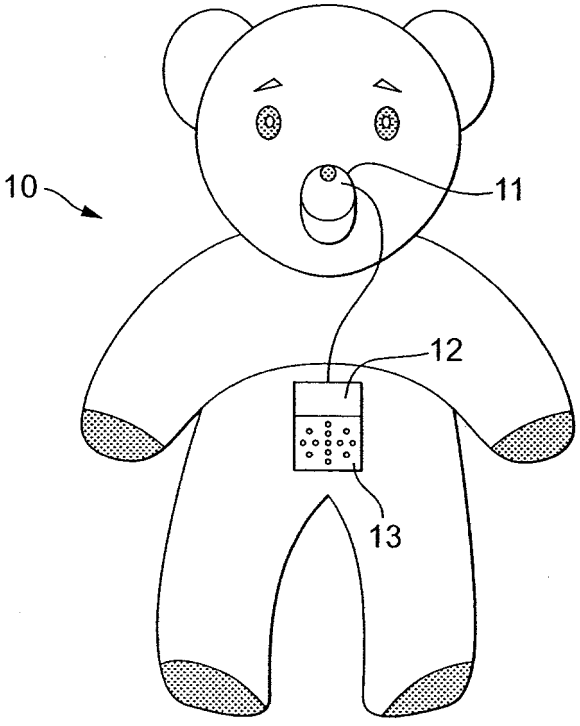


FIG. 1

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## Description

### BACKGROUND TO THE INVENTION

**[0001]** The present invention relates to a toy. By toy we include not only items to be played with by children but also novelty items such as seasonal or gifts of mementos of, for example, a holiday or visit.

### SUMMARY OF THE INVENTION

**[0002]** According to one aspect, the present invention comprises a plush toy comprising a transducer to produce an output signal in response to variations in barometric pressure, a filter to filter said output signal to select a component of the output signal relating to air movement at the transducer and response means to cause said toy to create an effect in response to receipt of the filtered output signal.

**[0003]** As examples, the effect created may be a sound (e.g. a cry or the sound of an explosion), a movement (e.g. of limbs or eyes where the toy is a teddy bear or the like, rotation of a windmill to blow bubbles, apparent breaking up of the toy) or operation of lighting means (e.g. to generate flashes or changes of colour) or other effects.

**[0004]** According to a further aspect, the present invention comprises a toy comprising a transducer to produce an output signal in response to a person blowing at the transducer, and means to cause said toy to create an effect in response to the filtered output signal.

**[0005]** According to a further aspect, the present invention comprises a toy comprising a transducer to produce an output signal in response to movement of air caused, for example, by a person blowing at the transducer, and means to cause said toy to create an effect in response to the filtered output signal.

**[0006]** According to a further aspect, the present invention comprises a toy comprising a transducer to produce an output signal in response to a change of barometric pressure caused, for example, by a person blowing at the transducer, and means to cause said toy to create an effect in response to the filtered output signal.

**[0007]** According to a further aspect, the present invention comprises a toy comprising a transducer to produce an output signal in response to variations in barometric pressure, means to filter said output signal to select a component of the output signal relating to air movement at the transducer (caused for example by blowing at the toy) and means to cause said toy to create an effect in response to the filtered output signal.

**[0008]** Thus for example a toy may be provided which creates an effect when a child breathes or blows on it.

**[0009]** The toy may provide a plush toy such as a teddy bear and the effect created may be a sound effect or a lighting effect or movement of limbs or eyes.

**[0010]** The toy may alternatively comprise a toy with motor driven parts, the motor driven parts being set in operation by the filtered signal. The motor driven parts may comprise a windmill, or means for producing soap bubbles.

**[0011]** The toy may comprise a light device, such as a replica candle, and the light may be caused to go out (or come on) by the filtered output signal.

**[0012]** The toy may comprise a snow globe, that is, a transparent globe with a snow effect within it, and there may be provided a motor means to agitate the snow and the motor means may be controlled by means of the filtered output signal.

**[0013]** The transducer may comprise a piezo electric device or a microphone such as an electret microphone. The means to filter the output signal may comprise means to remove output signals relating to sound. Thus the filter means may comprise a filter to remove all oscillating signals from the transducer greater than a particular frequency, which may be a very low frequency of up to 10Hz or up to 50Hz whereby the toy will only be operated by small changes in barometric pressure caused by a child blowing on the transducer rather than by background sounds.

### BRIEF DESCRIPTION OF THE DRAWINGS

**[0014]** Preferred embodiments to the invention will now be described by way of example only and with reference to the accompanying drawings in which:-

Figure 1 is a front view of a plush toy in the form of a teddy bear.

Figure 2 is a front view of a windmill toy,

Figure 3 is of a snow globe toy,

Figure 4 is a side view of a toy for producing soap bubbles, and

Figure 5 is a circuit diagram,

Figure 6 is a perspective view of a toy which includes a plurality of targets in the form of transducers,

Figure 7 is an apparatus for providing a directed blast of air, and

Figure 8 is a circuit diagram for use with the apparatus of Figure 6

### DESCRIPTION OF THE PREFERRED EMBODIMENTS

**[0015]** The first embodiment of the invention is shown in Figure 1 which is a front view of a plush toy in the form of a teddy bear. The teddy bear 10 includes, preferably beneath the plush outer surface in the face region, a transducer 11 in the form of a microphone. The micro-

phone 11 is connected to a first control circuit 12 which is in turn connected to a second control circuit 13 which may be for example a sound or light controller.

**[0016]** As will be understood, a child may blow at the teddy bear's face, and the flow of air or change in barometric pressure will be detected by the microphone 11. The first (trigger) control circuit 12 will cause an output signal to be passed to the second control circuit 13 which, if it is a sound controller, will provide a relevant sound.

**[0017]** Thus when the child blows at the teddy bear, the teddy bear may speak or sing or make some other noise.

**[0018]** If the sound controller 13 is replaced by, for example, a controller for the lights such as LED's, the teddy bear light up or flash.

**[0019]** If the teddy bear includes motor driven limbs, then the sound controller 13 may be replaced by a motor controller which causes the limbs to move in response to a child blowing at the teddy bear.

**[0020]** Thus a particularly attractive toy is provided in the form of a teddy bear in which a child may blow a kiss at the teddy bear, the change in barometric pressure being detected by the microphone 11 and causing the teddy bear to react by means of sound or light or movement, or a combination.

**[0021]** The electrical circuit for controlling the teddy bear 10 shown in Figure 1 is illustrated in Figure 5.

**[0022]** The connections between the various components in the circuit will not be described that is clear from the circuit diagram itself.

**[0023]** The sensing device/ transducer 11 is a low cost electret microphone insert (MIC1). A bias resistor R1 provides the power that is required for this type of two terminal electret microphone. Transistor TR1 and resistors R2, R3 and R4 form a first stage preamplifier 14 which consists of a single stage preamplifier (common-emitter amp with feedback biasing via R3). An unusual filtering configuration of capacitors C1 and C2 and the first stage preamplifier 14 enables this front end to be generally insensitive to and to filter out audio frequencies, but to be sensitive to local changes in barometric pressure or air flow which occurs when a puff or blast of air passes over the transducer 11.

**[0024]** An output signal from the preamplifier 14 is fed to a second gain stage 16 comprising transistor TR2, resistors R5, R6, R7, R8 and variable resistor VR1 via a high pass filter 17 formed by C3 and R5. The gain of the second stage 16 is preset by means of resistor VR1, which controls the change of barometric pressure (either the value or rate of change), i.e. the level of 'puff', required to trigger. This can be adjusted by quite a large scale.

**[0025]** A DC output signal from the second stage 16 is passed to a diode pump 18 comprising diode D1, capacitor C4 and bleed resistor R9 which then passes an output signal to an input of a the trigger stage 19 formed by transistor TR3, resistors R10, R11 and light emitting diode LED1. The LED provides an indicating or flashing light in the bear.

**[0026]** The trigger stage 19 passes a trigger signal to the input of a controller IC1 (or microcontroller) which in turn operates loudspeaker 20 and hence outputs sound (and/or lighting effects and/or motor control in the case of a motorised bear). Transistor TR4 forms an electronic switch, so that the sound controller (or microcontroller) can shut down the circuitry and reduce quiescent current to a minimum.

**[0027]** In the circuit of Figure 5 typical values of the components are as follows:-

| | |
|---|---|
| TR1 | = MPSA13 (NPN Darlington transistor) |
| TR2 | = BC337 (NPN transistor) |
| TR3 | = BC548 (NPN transistor) |
| D1 | = IN4148 (signal diode) |
| IC1 | = W523Axxx (sound controller) |
| R1 | = 1kΩ |
| R2, R7 | = 22KΩ |
| R3, R4, R9 | = 1MΩ |
| R5 | = 12KΩ |
| R6 | = 47KΩ |
| R8, R10 | = 10KΩ |
| R11 | = 1KΩ |
| R12 | = 2KΩ |
| VR1 | = 100KΩ (preset) |
| C1, C2, C3 | = 1uF electrolytic |

**[0028]** Corresponding circuits 12 and 13 can be provided in other toys. Figure 2 shows a windmill comprising a handle 26 mounting circuits 12 and 13, an outer frame 27, a windmill 28, and a motor 25 provided behind the windmill 27 which can be powered by a battery within the handle 26. There is provided a transducer in the form of a microphone 21. The motor may rotate the windmill in response to a child blowing on the transducer. The control circuits 12 and 13 in this case may control a sound effect and in addition may control suitable lighting effects provided by lights 24 which may be in the form of LED's.

**[0029]** A further preferred arrangement of the invention is shown in Figure 3 and comprises a snow globe. This is a conventional globe comprising a hollow generally transparent globe 30 in which there are provided small particles which give the appearance of the snow. Generally speaking in the base of the globe 30 there is mounted a model (not shown), for example a model of a building or a forest scene, or something similar.

**[0030]** The globe 30 is mounted on a base 31 within which is mounted a motor 32 and a fan 33. There is provided a transducer 34 comprising a microphone as already described, a circuit 35, and a controller 36. In use, a child or a person blows on the transducer, and utilising the circuit shown in Figure 5, the motor is energised and rotates the fan which blows the snow like particles upwardly to give the impression of a snowstorm within the globe.

**[0031]** A further preferred embodiment of the invention comprises a toy 40 shown in Figure 4 for producing soap

bubbles in response to a child blowing on the transducer, comprising a handle 46 in which is mounted a battery and the circuit as shown in Figure 5 a circuit 42, and a controller 43 and the loudspeaker 20 to provide a sound in response to a child blowing on the transducer. The handle mounts a frame 47 on which is mounted a motor 45 with a fan 48 attached, and mounted to the front of the frame 47 is a further frame 49 for mounting soap-engaging portions 50. A transducer 41 is provided on the frame 47.

**[0032]** In use, therefore, the frame 49 is inserted into a suitable soap solution and the soap tends to adhere to the portions 50.

**[0033]** Blowing on the transducer 41 operates the circuit of Figure 5 as already described which operates the electric motor 45 to rotate the fan 46 and thereby blow soap bubbles off the portions 50.

**[0034]** We have therefore described a circuit which can be used to provide a variety of pleasing effects in different types of toy. It will be noted that surprisingly the transducer 11 can operate even when buried under plush in a plush toy such as a teddy bear and so has no visible protrusion in that circumstance. The circuit can be made very sensitive so that even very small children can produce enough puff to activate the toy.

**[0035]** It has been found that sufficient change in barometric pressure may be provided when a door to a room is opened which can operate the toy or similar device.

**[0036]** Referring to Figures 6-8, there is shown in diagrammatic form in Figure 6 a toy which includes a plurality of targets 61A, 61B, 61C. Any number may be provided. Each target comprises a transducer 62 of the same type as transducer 11 already described. The targets 61A, 61B, 61C are spaced apart from one another.

**[0037]** The toy 60 includes three component parts 63A, 63B, 63C, each of the component parts 63A-C being connected to the remainder of the toy 60 by means of a respective releasable coupling 64A, 64B, 64C (see Figure 8).

**[0038]** There may also be provided light means and/or a sound generator 67.

**[0039]** Within the toy 60 there is provided the electrical circuit 80 as shown in Figure 8.

**[0040]** Electrical circuit 80 comprises three circuits 81A, 81B, 81C which each are connected to respective transducers 62A, 62B, and 62C. In each circuit 81A-C there may be provided components corresponding to preamplifier 14, high pass filter 17, second gain stage 16, and diode pump 18. The output of the respective diode pumps 18 are shown at 83A, 83B, 83C. A signal from these outputs 83A-C (or an earlier stage) are passed to respective ports IPA, IPB, and IPC of a microprocessor 82. The microprocessor 82 has, for example, four output ports, OPA, OPB, OPC and OPD which are connected respectively to actuators 84A, 84B, 84C, and 84D. The actuators 84A-C are connected respectively to the releasable couplings 64A-C (or light unit 66A, 66B, 66C). The actuator OPD is connected to the sound generator 67.

**[0041]** Figure 7 shows a hand held apparatus 86 for producing a directed flow of air. The apparatus is referred to as an "airzooka" and is hand operated by manually pulling a spring loaded diaphragm and then releasing the diaphragm which provides a blast of air. It may be used to direct a blast of air at a targeted one or other of the targets 61A, 61B, 61C. Where the toy is a pirate ship as shown in Figure 6 an "airzooka" type apparatus may be built into a cannon shaped toy 87.

**[0042]** When the relevant transducer 62A, 62B or 62C detects the change in barometric pressure, caused by the blast of air, as described with reference to the earlier embodiments, it provides an output signal on the relevant output 83A-83C to the microprocessor 82 which provides an output on the relevant output OPA, OPB or OPC. This causes the relevant actuator 84A, 84B or 84C to release the relevant releasable couplings 64A, 64B, 64C to cause the relevant component of the toy to fall or otherwise move. At the same time, a signal on the output OPD to the sound generator causes the noise to be produced.

**[0043]** Thus, for example, if the toy 80 is a pirate ship as shown in Figure 6, the targets are spaced along the side of the pirate ship, and the releasable couplings holding on different parts of the ship, for example a mast and a bow cannon and the stem wheel, then by firing the airzooka at the relevant target, the relevant part of the pirate ship will fall off.

**[0044]** At the same time the sound generator can produce an explosive noise, and if there is provided a light generator, and then a flash of light can be produced.

**[0045]** Similar arrangements may be provided with other types of toy which include a plurality of spaced transducers which may be selected by movement of air causing a variation of barometric pressure..

## Claims

1. A toy comprising a transducer (11,21, 34, 41, 61A, 61B, 61C) to produce an output signal in response to variations in barometric pressure, a filter (17) to filter said output signal to select a component of the output signal relating to air movement at the transducer and response means (13, 20, 25, 24, 33, 48, 50, 63A-C, 64A-C) to cause said toy to create an effect in response to receipt of the filtered output signal.

2. A toy as claimed in claim 1 in which the transducer is selected from the group comprising a piezo electric device, a microphone, an electret microphone.

3. A toy as claimed in claims 1 or 2 in which the filter comprises a filter to remove output signals relating to sound.

4. A toy as claimed in claim 3 in which the filter means

comprises a filter to remove all oscillating signals from the transducer greater than a particular frequency.

**5.** A toy as claimed in claim 4 in which the particular frequency is selected from up to 10Hz and up to 50Hz.

**6.** A toy as claimed in any of claims 1 to 5 comprising a plush toy.

**7.** A toy as claimed in claim 6 comprising a teddy bear (10).

**8.** A toy as claimed in claim 6 or 7 in which the plush toy includes limbs, the toy comprising means to move one or more said limbs in response to receipt of the filtered output signal.

**9.** A toy as claimed in any of claims 6 to 8 in which the plush toy includes eyes, the toy comprising means to move one or more said eyes in response to receipt of the filtered output signal

**10.** A toy as claimed in any of claims 6 to 9 in which the plush toy includes sound producing apparatus, the sound producing apparatus being adapted to produce a sound effect in response to receipt of the filtered output signal

**11.** A toy as claimed in any of claims 1 to 5 in which the toy includes at least one motor driven part, the movement of the motor driven part being controlled by receipt of the filtered output signal.

**12.** A toy as claimed in claim 11 in which the motor driven part comprises a windmill.

**13.** A toy as claimed in claim 11 in which the motor driven part comprise means for producing soap bubbles.

**14.** A toy as claimed in claim 12 or 13 further including a light device and including means to vary the light produced by the light device in response to receipt of the filtered output signal.

**15.** A toy as claimed in any of claims 1 to 5 comprising a snow globe, including a motor means to agitate the snow, the motor means being controlled by means of the filtered output signal.

**16.** A toy as claimed in any of claims 1 to 5 in which the transducer is visible and forms a target, and there is also provided a manually operable air flow producing means which may be manually positioned to direct the air flow at the transducer.

**17.** A toy as claimed in claim 16 in which the effect created is one or more of a sound effect or a lighting effect or a movement.

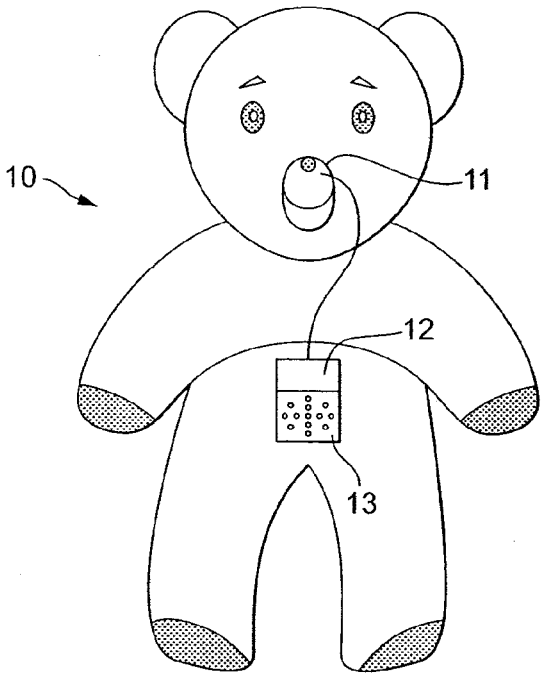



FIG. 1

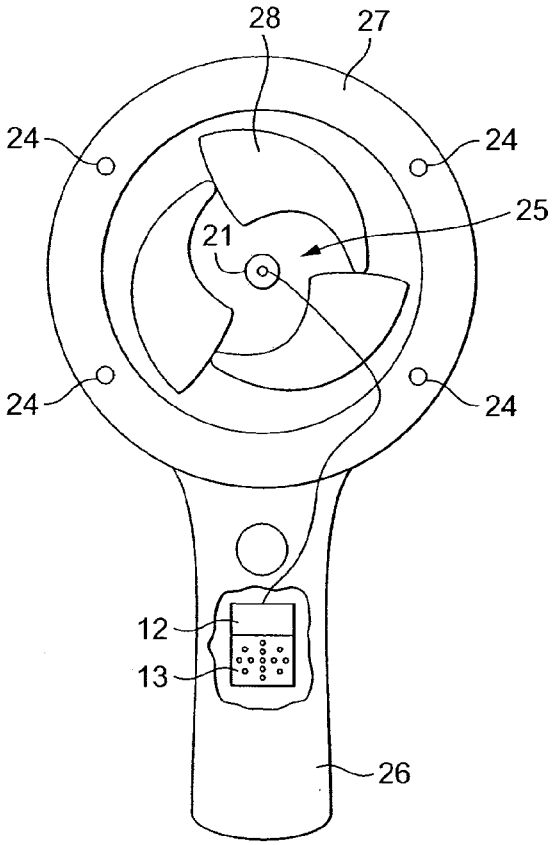



FIG. 2

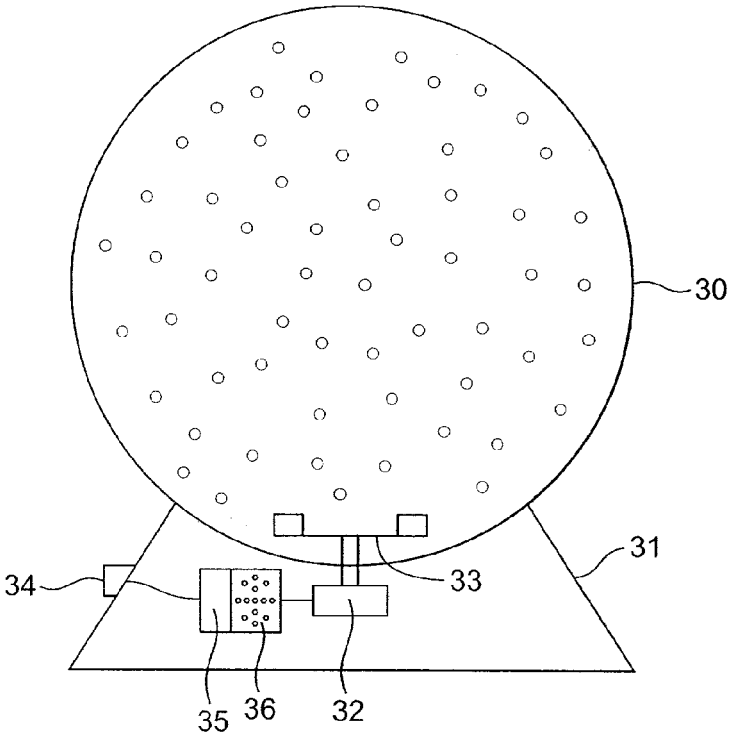



FIG. 3

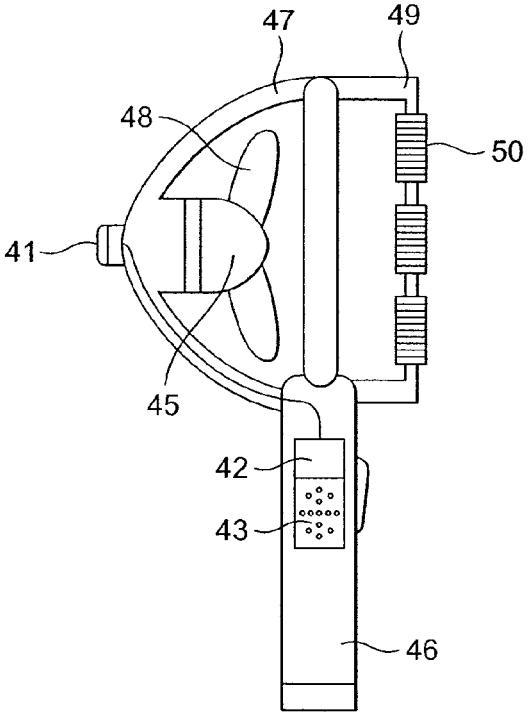
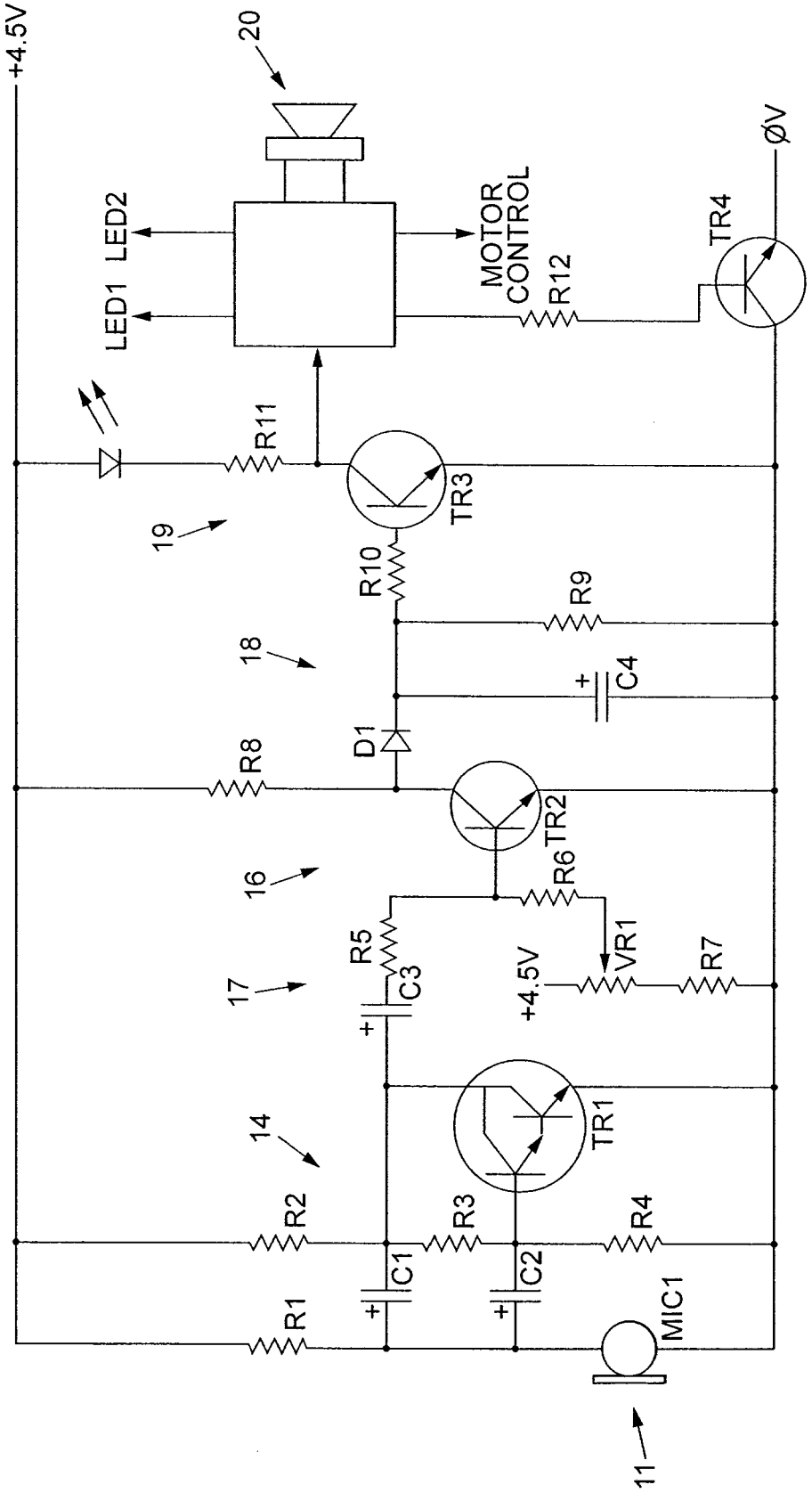



FIG. 4


+4.5V
20
LED1
LED2
MOTOR CONTROL
R12
TR4
øV
R11
TR3
19
R10
R9
18
C4
D1
R8
TR2
16
R6
R5
C3
17
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VR1
R7
TR1
14
R2
R3
R4
C1
C2
R1
MIC1
11

FIG. 5

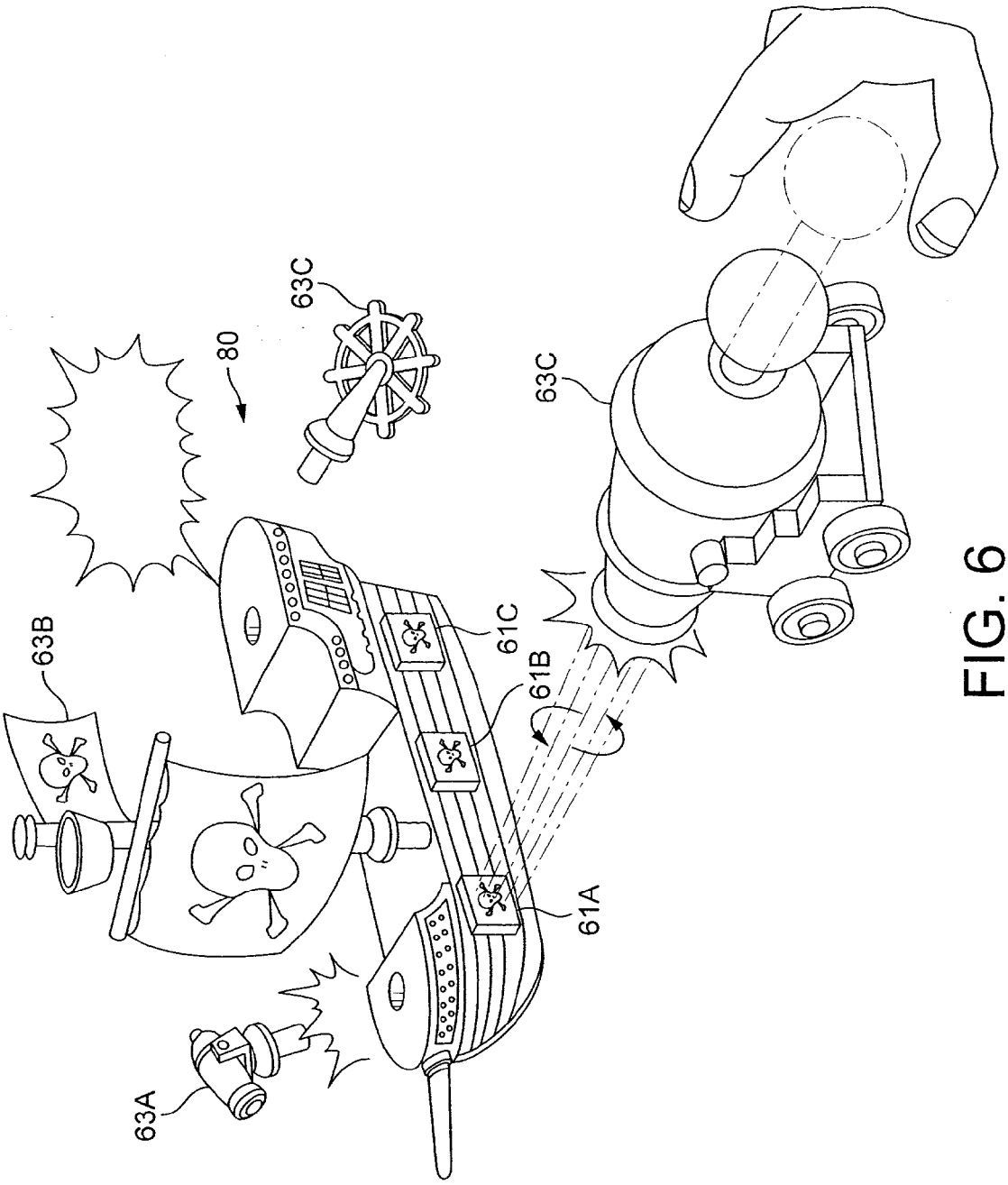



FIG. 6

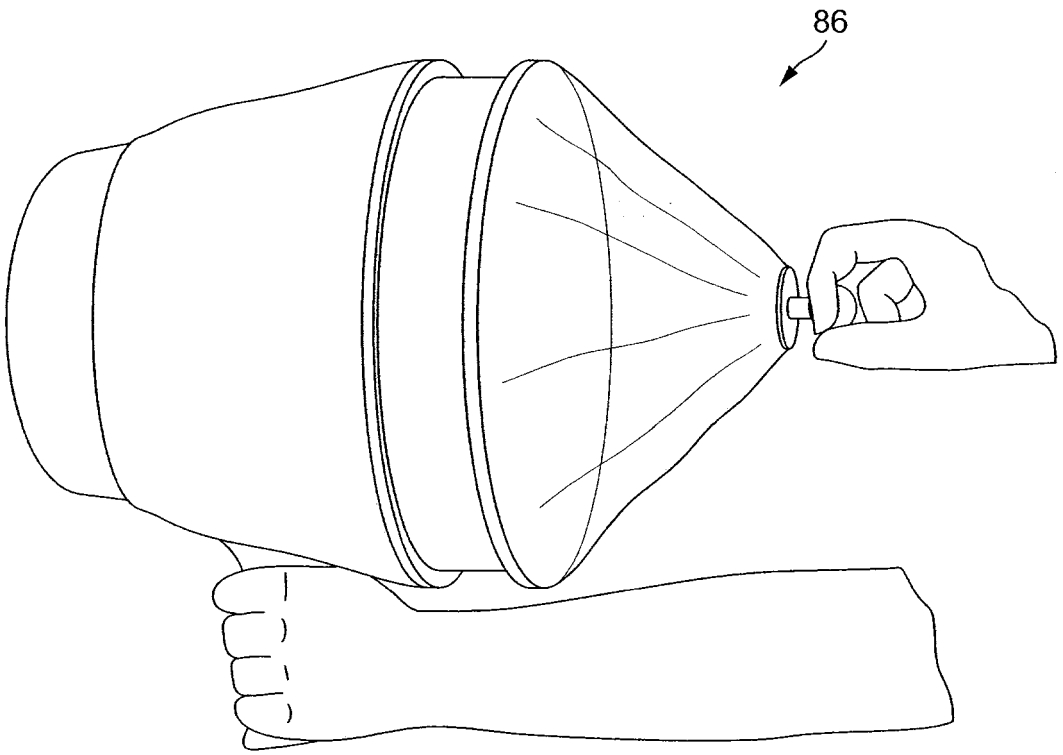
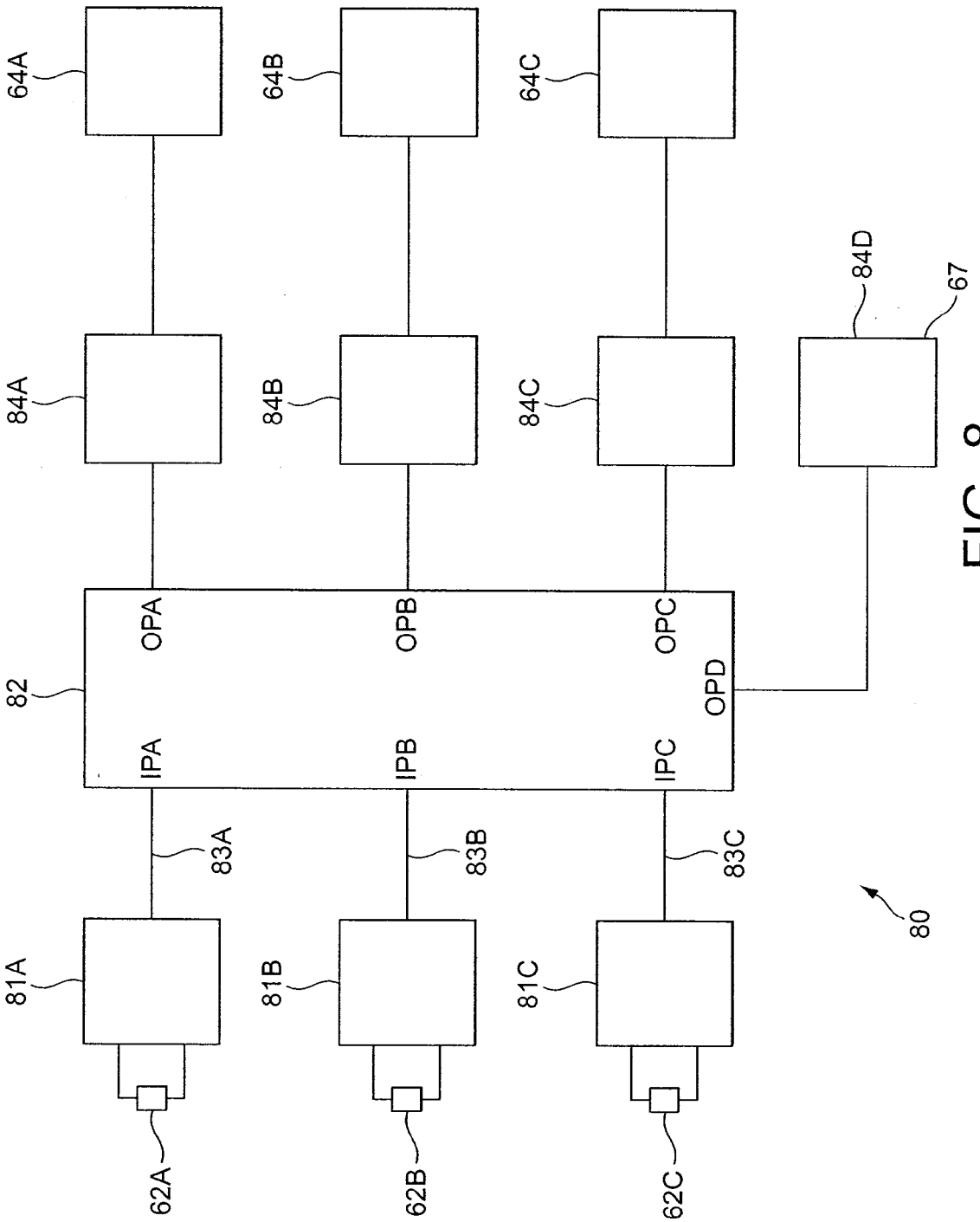



FIG. 7


64A
64B
64C
84D
67
84A
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OPA
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81A
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FIG. 8

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# EUROPEAN SEARCH REPORT

Application Number
EP 07 10 3408

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The present search report has been drawn up for all claims

| Place of search | Date of completion of the search | Examiner |
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