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(54) Interactive toy vehicle adapted to hold a toy character

(57) A wheeled toy adapted to respond interactively to movement comprises sensor means adapted to detect a change in movement selected from speed, direction and angle of orientation, computer processing means adapted to process signals from the sensor means, to calculate the orientation of the toy, and to generate an electronic response, selected from a series of pre-selected responses, appropriate to said orientation or change in movement, communication means adapted to receive said electronic response and to generate a visual or audible response which can be sensed by a user of the toy in order to prompt a change in said orientation or movement.

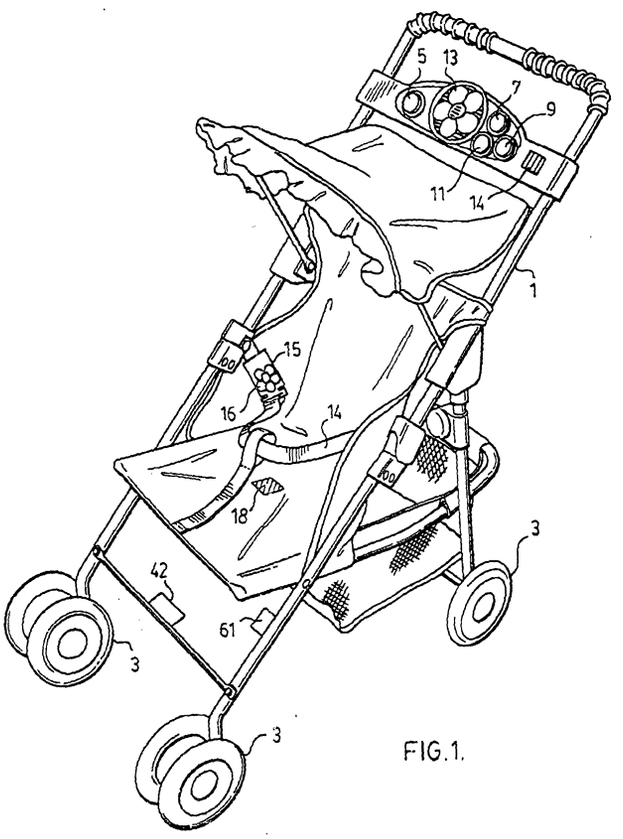

FIG.1.

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Description

Background

[0001] For many years, children have played with wheeled vehicles, such as wagons, toy cars, or strollers, and have placed a doll or toy in the vehicle in order to give the character a "ride". The play activity in such circumstances typically consists of the child creating a situation completely from his or her imagination. Some such toys make noises relating to a particular activity. These noises are typically triggered by a hand-operated switch or some movement of the vehicle.

[0002] Accordingly, it would be an advantage to provide a wheeled vehicle toy which could generate a variety of audible and/or visual signals to correspond with various activities which a child might undertake. It would be a further advantage if a doll or toy character could be placed into the vehicle, and the vehicle would generate such signals in response to, for example, simulated speech by the doll or toy character. It would be a further advantage if the vehicle would respond to its environment, in terms of its direction and speed of motion, rocking motion, or the like.

Summary of the Invention

[0003] Accordingly, in a principal aspect, the invention comprises a wheeled toy adapted to respond interactively to movement, comprising: at least one sensor adapted to detect a change in movement selected from speed, direction and angle of orientation; a computer processing means adapted to process signals from the sensor, to calculate the orientation of the toy. and to generate a signal appropriate to said orientation or change in movement; and communication means adapted to receive said signal and to generate a response which can be sensed by a user of the toy in order to prompt a change in said orientation or movement.

[0004] In further aspects of the invention:

(a) the computer processing means comprises an integrated circuit;

(b) the communication means comprises the combination of an integrated circuit and at least one audio speaker;

(c) a first sensor comprises a lever balancing sensor adapted to detect rotation of the toy about an axis of rotation to measure tilting forwards or backwards, or side to side;

(d) two first sensors comprise lever balancing sensors adapted to detect tilting of the toy respectively in the back and forth and sideways directions with a vertical component;

(e) a second sensor comprises a direction sensor adapted to detect back and forth movement in the horizontal plane;

(f) the second sensor comprises a speed sensor adapted to detect the speed of movement forwards or backwards in the horizontal plane;

(g) the speed sensor comprises a rotating member associated with a wheel or axle adapted to trigger a switch a fixed number of times per rotation, such that the number of switch triggers per unit time provides an indication of the speed of the vehicle;

(h) the rotating member comprises a cam surface adapted to trigger a switch only when rotating in one direction;

(i) a pair of rotating members and switch combinations are adapted to trigger one switch when rotating in one direction and another switch when rotating in the opposite direction, to detect forward and backward motion and the speed thereof;

(j) the vehicle comprises both a pair of lever balancing sensors and a direction and speed sensor;

(k) the processing means are adapted to generate signals appropriate to a plurality of background noises;

(l) the processing means are adapted to generate signals appropriate to a plurality of doll responses;

(m) the vehicle comprises doll or toy carrying means;

(n) the doll or toy carrying means comprises a seat with latching means to secure the doll or toy;

(o) the communication means is adapted to gencratc a sound appropriate to the doll or toy being carried in the vehicle;

(p) the toy further comprises a switch to indicate when the doll or toy is secured in place by the latching means;

(q) the switch to indicate correct positioning of the doll or toy is incorporated into the latching means adapted to secure the doll or toy to the vehicle;

(r) the vehicle further comprises a vibration sensor,

(s) the rotating member comprises a magnet adapted to rotate in relation to at least one reed switch associated with a wheel of the toy;

(t) the rotating member comprises a magnet adapted to rotate in relation to three magnetic field detectors associated with a wheel of the toy, such that the direction of the rotation of the wheel and the speed of rotation of the wheel can be detected and determined.

Brief Description of the Drawings

[0005] An illustrative embodiment of the invention is shown in the appended drawings, in which:

Figure 1 is a front perspective view of a stroller;

Figure 2 is a side perspective view of a stroller;

Figure 3 is a partial view of controls for a stroller;

Figure 4 is a rear elevation view of a stroller,

Figure 5 is a cut-away, schematic view of the speed and forward/reverse motion sensor;

Figures 6A, 6B, 6C and 6D are schematic illustrations of lever balancing sensor units;

Figure 7 is a front perspective view of the stroller with a doll or toy character in place.

Detailed Description of the Invention

[0006] Figure 1 illustrates a stroller, although the invention is equally applicable to other wheeled vehicles such as wagons, carts, and the like which can be adapted to carry a toy character. The stroller 1 comprises wheels 3. The wheels may be provided with forward/reverse sensors 24, which will be described more fully below. A strap 14 comprising a latch 15 including a sensor or switch 16 is adapted to secure a toy character to the stroller. The latch sensor or latch switch 16 completes an electrical circuit to signal when the doll or toy character is latched in place. Indeed, the circuit may be created with or without a doll in place, but the user may be prompted to put a toy in place. A pressure sensitive sensor or other suitable sensor 18 may be placed in the seat of the stroller to indicate whether a doll is in place. Such a sensor may be used alternatively to, or in addition to, latch 15 and latch switch or sensor 16.

[0007] The stroller 1 is provided with a self-contained electrical power source, such as storage battery cells 20 located behind battery cover plate 19 as shown in Figure 4. The strollex, may further be provided with multiple sensors to detect vibration, or tilting in back and forth or sideways directions. Typically, lever balancing sensors 42 are useful in this regard, particularly for tilt detection, as more fully described below.

[0008] The stroller 1 is provided with an audio speaker 17 located in the vicinity of a doll or toy character when one is placed in the stroller. The stroller may also be provided with one or more further speakers 13 somewhat distanced from the vicinity of a doll or toy character when one is placed in the stroller.

[0009] When a toy character 18 is strapped or latched into place on the stroller as illustrated in Figure 7, the latch switch 16, which may be located in the closure means 15 or triggered by the placing of the doll in a seat with sensor 18 (see Figure 1), triggers or permits the flow of electrical power from the batteries 20 to the electrical or electronic components. A single microprocessor or integrated circuit, or a combination of microprocessors and integrated circuits 14 appropriately programmed begins to generate signals. Typically, such signals are audible in nature although visual signals can also be generated.

[0010] For example, a segment of human speech recorded on the integrated circuits 41 can be projected at speaker 17 to simulate speech by the toy character. The location of the speaker 17 in the vicinity of the toy character 18 creates this illusion. It is an advantage to be able to use any toy character which can be latched into place in order to give maximum flexibility to the child using the toy. Of course, a particular toy character and vehicle combination could be mandated, if desired.

[0011] The toy then interacts with the child to suggest certain play activities and to react to the activities chosen. For example, by pressing "talk" button 5, under the control of the microprocessor 41, an initial prompt made audible by the speaker 17 in the vicinity of the toy character could constitute a request ostensibly by the character sitting in the stroller to be taken for a walk or to be taken to a specific location, such as the zoo. If the child then puts the stroller in forward motion for a walk, an appropriate forward motion is detected by one or more direction and speed sensors 24 which may be mounted on or in wheel 3. Other sounds can be generated at a secondary speaker 13 to simulate background noises. An initial activity with appropriate background noises may be chosen by the microprocessor either randomly or in a specific order, or the user may select a specific activity by depressing button 7 for shopping, button 9 for the park, or button 11 for the zoo, for example. Thus, the doll will appear to be speaking from a location near its seat while background noises will be generated from a speaker remote from the toy character but still located on the stroller. The toy character thus can appear to make various comments about being, for example, at the zoo while background zoo noises are generated at the remote speaker 13.

[0012] At a certain point, a new set of signals can be generated. For example, the toy character may ostensibly ask to be taken to another location, such as the grocery store or a park. When appropriate forward motion is generated and sensed at sensor 24, appropriate new background noises and toy character phrases can be generated.

[0013] A vibration detector or sensor 61 in the stroller

detects bumps or rough conditions. A signal generated by the vibration detector 61 can prompt a simulated voice response at speaker 17 appropriate to such bumpy conditions. For example, the toy character 18 may act shocked, or request to be taken to smoother terrain. Similar responses can be generated if the stroller is tipped from side to side, driven too fast, or driven in reverse, as more fully described below.

[0014] The stroller may additionally be provided with a microphone 14 to detect speech from the child using the stroller. The detection of such speech patterns can be used to generate a further set of responses at the toy character speaker 17 all under the control of microprocessor 41.

[0015] Thus, the stroller and toy character combination, along with movement imparted by the child using the combination, leads to real time interactivity with the illusion of the toy character speaking to the child and responding to changed circumstances.

[0016] The lever balancing sensor unit 43 is more fully described in Figures 6A through 6D. Although any suitable sensor will function for the purposes of the invention, a lever balancing sensor has the advantage of being simple and relatively inexpensive. A pendulum 45 hangs between two contact plates 47, 49 creating no signal when the wheeled vehicle is sitting flat on a plane. When the stroller is rolling up or down a hill, or tipped to the side, however, appropriately mounted sensors detect such orientations. The pendulum 45 remains vertical while the contact plates are tilted along with the vehicle, thus creating a signal when the pendulum touches one or the other of contact plates 47 or 49. By using a sufficient number of such lever balancing sensors, sophisticated rocking or tipping movements can be detected. For example, Figure 6D illustrates an array of two sensors oriented at 90° to detect orientation or tipping from front to back or from side to side.

[0017] Turning to Figure 5, direction and speed sensor 24 comprises a pair of rotating cams 25, 27 and trigger switches 29, 31. The trigger switches are respectively adapted to contact stops 37, 39 in one direction, while the cams are permitted to rotate either clockwise or counterclockwise depending upon the rotation of the wheel to which they are mounted. When a trigger switch is free to rotate, it can ride up its corresponding cam and avoid the pressure which would lead to the switch being closed. On the other hand, when the direction of rotation is reversed, the respective stop prevents the trigger switch from rotating and the cam motion causes the switch to close at least once per rotation of the cam. Thus, by using a pair of such switches, movement in either the forward or backward direction can be detected and recognized. Electrical signals are transported from sensor 24 by wires 33, 35 to the microprocessor 41. Signals from the microprocessor to generate a sound segment a speaker 17 can indicate to the user whether the direction of movement of the stroller is forwards or backwards. Thus, the toy character ostensibly communicates to the user an awareness of the direction of travel. In addition, by counting the number of times each trigger switch is closed in a period of time, the speed of motion of the wheels can be calculated. If the speed becomes too great, an appropriate response can be generated from the microprocessor 41. For example, the toy character 18 may be prompted to appear to ask the child user to slow down, or to speed up if appropriate, or to express delight at going fast.

[0018] Because the various sensors can detect rapid changes in movement, real time responses can be generated. Thus, the illusion is created of the toy character being carried in the wheeled vehicle and reacting as if it were animate. In order to amplify the illusion of animation or life, the volume and timing of voice responses can be varied. In addition, the stroller may be provided with lights or moving parts which can also be made to react to movement or orientation.

[0019] Preferably, the child will remove the toy character 18 from the vehicle when it is finished playing. This will open the trigger switch 16 and should stop the use of battery power when not required. Obviously, keeping the sensors powered will use battery energy. The vehicle can also be provided with buttons to be operated manually by the child in order to generate responses. This will allow responses to be generated at the request of the child. When the stroller is left unattended for a period of time, it can shut down to conserve the batteries by the use of an appropriate timer connected to a power-interruption switch as known in the art. This timer function can be built into integrated circuits contained within the vehicle.

[0020] Although a particular embodiment of the invention has been described, other embodiments will be apparent to those skilled in the art and are included within the scope of this invention.

Claims

1. A wheeled toy adapted to respond interactively to movement, comprising:

(a) sensor means adapted to detect a change in movement selected from speed, direction and angle of orientation;

(b) computer processing means adapted to process signals from the sensor means, to calculate the orientation of the toy, and to generate an electronic response, selected from a series of pre-selected responses, appropriate to said orientation or change in movement;

(c) communication means adapted to receive said electronic response and to generate a visual or audible response which can be sensed by a user of the toy in order to prompt a change

in said orientation or movement.

2. The toy of claim 1, wherein the computer processing means comprises an integrated circuit.

3. The toy of claim 1, wherein the communication means comprises the combination of an integrated circuit and at least one audio speaker.

4. The toy of claim 1, wherein the sensor comprises a lever balancing sensor adapted to detect rotation of the toy about an axis of rotation to measure tilting forwards or backwards, or side to side.

5. The toy of claim 4, wherein two sensors comprise lever balancing sensors adapted to detect tilting of the toy respectively in the back and forth and sideways directions.

6. The toy of claim 1, wherein the sensor means compriscs a direction sensor adapted to sense back and forth movement in the horizontal plane.

7. The toy of claim 1, wherein the sensor means comprises a speed sensor adapted to sense the speed of movement of the toy forwards or backwards in the horizontal plane.

8. The toy of claim 7, wherein the speed sensor comprises a rotating member adapted to trigger a switch a fixed number of times per rotation, such that the number of triggers of the switch per unit of time indicates the speed.

9. The toy of claim 8, wherein the rotating member comprises a cam surface adapted to trigger a switch only when rotating in one direction.

10. The toy of claim 9, comprising a pair of said rotating members and switch combinations adapted to trigger one switch when rotating in one direction, and another switch when rotating in the opposite direction.

11. The toy of claim 1, comprising both a pair of lever balancing sensors and a direction and speed sensor.

12. The toy of claim 1, wherein the processing means are adapted to generate signals appropriate to a plurality of background noises.

13. The toy of claim 1, wherein the processing means are adapted to generate signals appropriate to a plurality of toy character responses.

14. The toy of claim 1, further comprising doll or toy character carrying means.

15. The toy of claim 14, wherein the doll or toy character carrying means comprises a seat.

16. The toy of claim 15, wherein the communication means is adapted to generate a sound appropriate to the doll or toy character being carried in the stroller.

17. The toy of claim 17, wherein the toy further comprises a status switch to indicate when the doll or toy is in place.

18. The toy of claim 18, wherein the status switch is incorporated into securing means adapted to secure the doll or toy to the stroller.

19. The toy of claim 1, further comprising a vibration sensor.

20. The toy of claim 8, wherein the rotating member comprises a magnet adapted to rotate in relation to at least one reed switch with a wheel of the toy.

21. The toy of claim 8, wherein the rotating member comprises a magnet adapted to rotate in relation to three magnetic field detectors associated with a wheel of the toy, such that the direction of the rotation of the wheel and the speed of rotation of the wheel can be detected and determined.

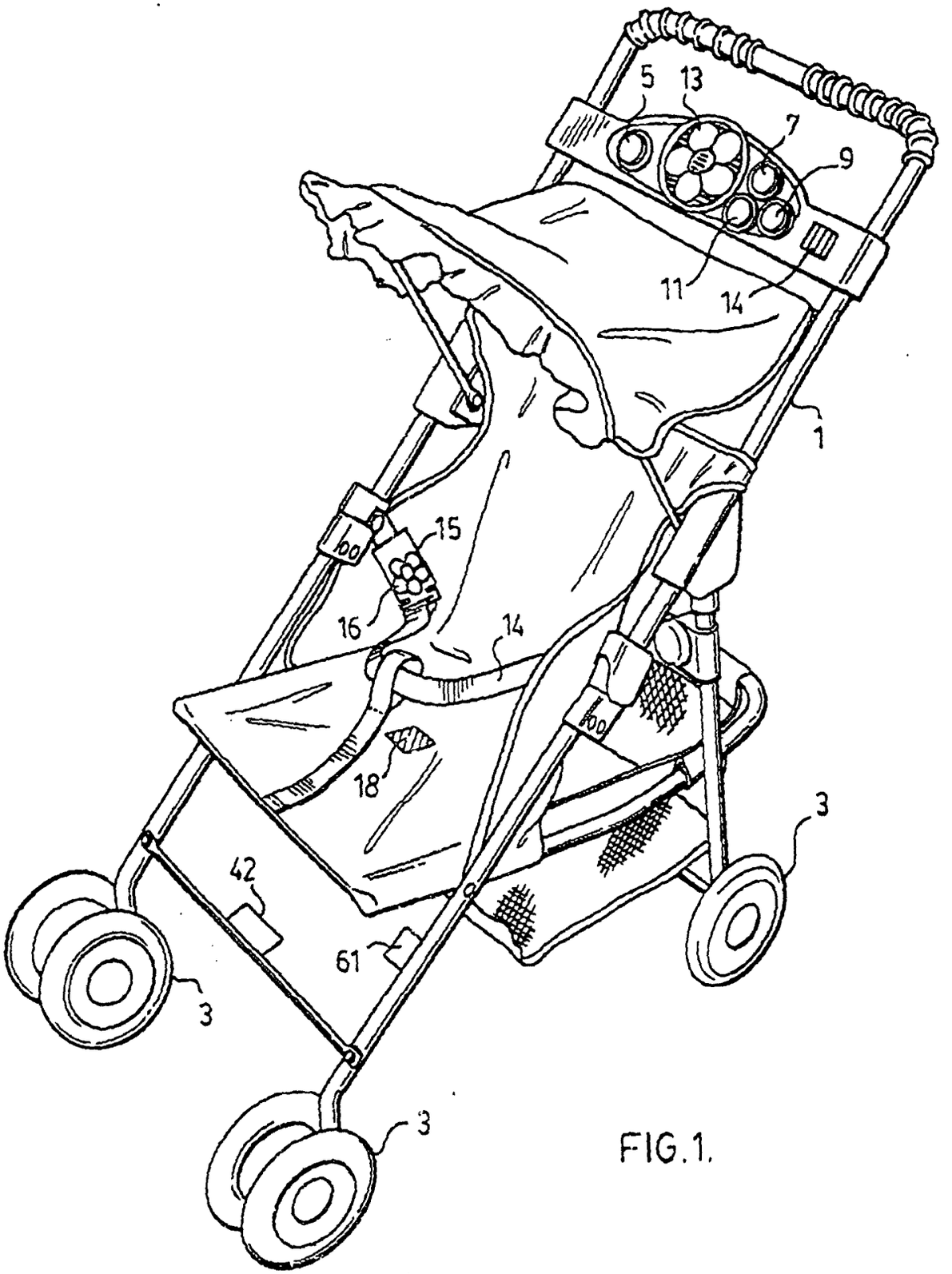


FIG.1.

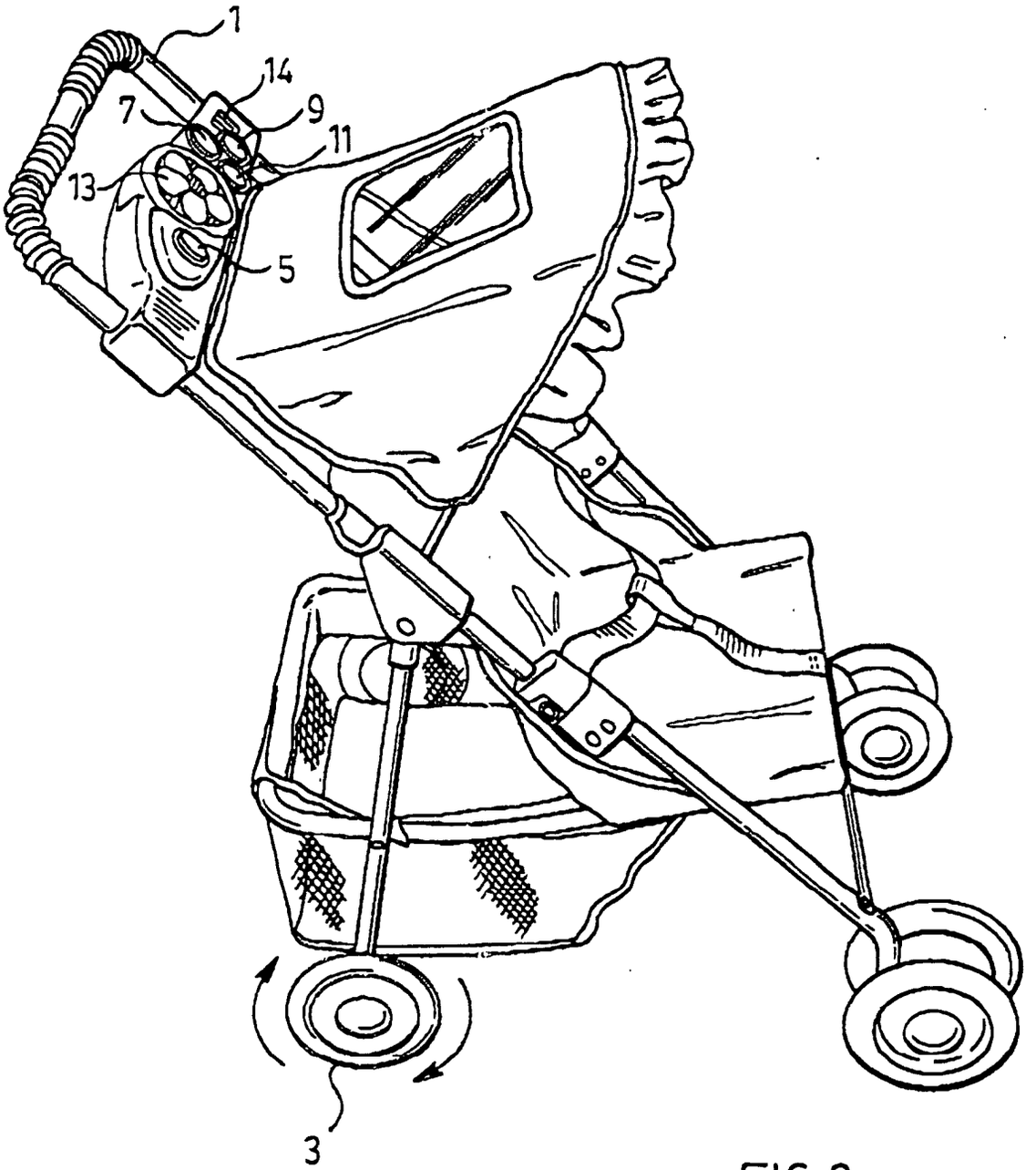
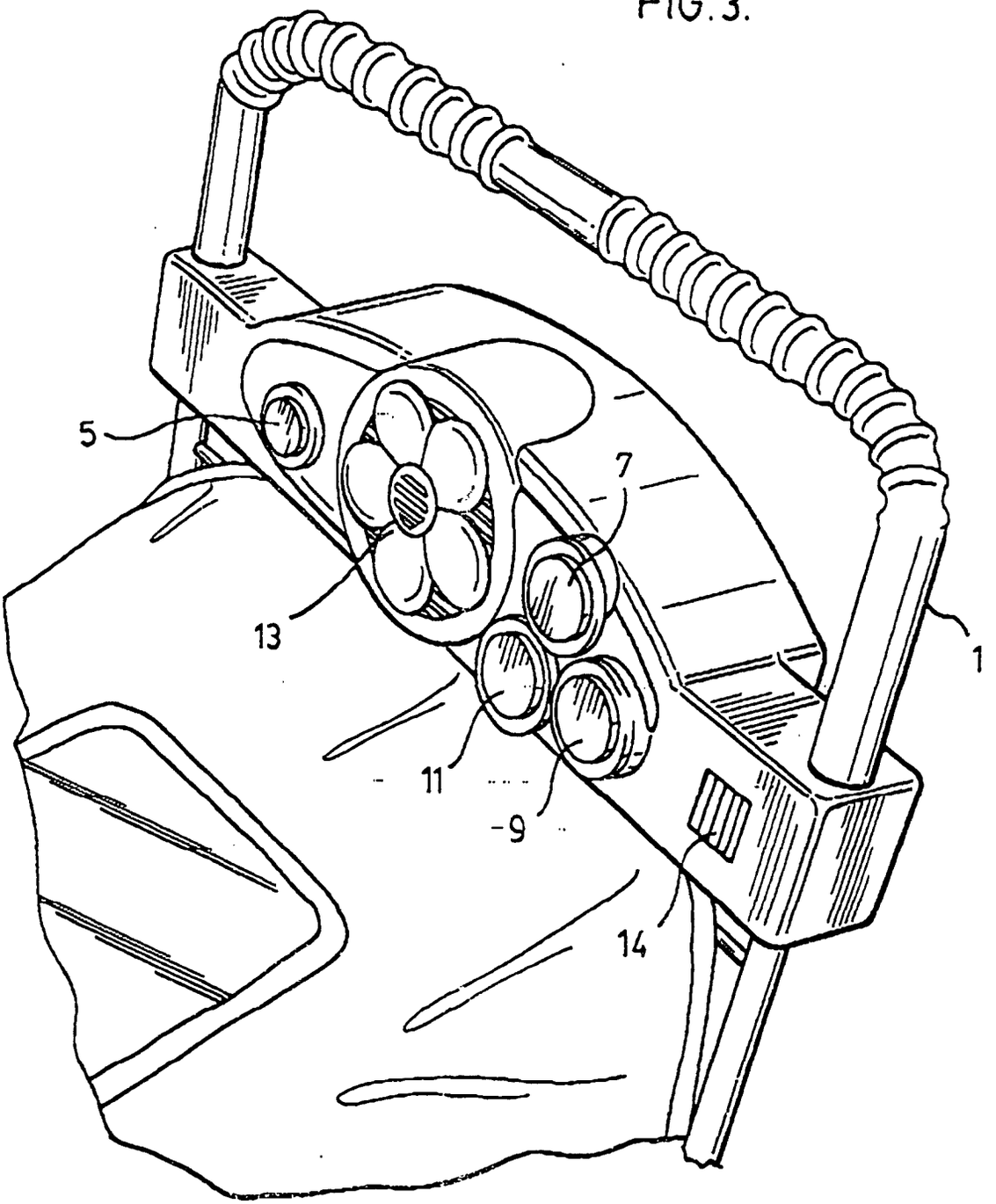


FIG. 2.

FIG.3.



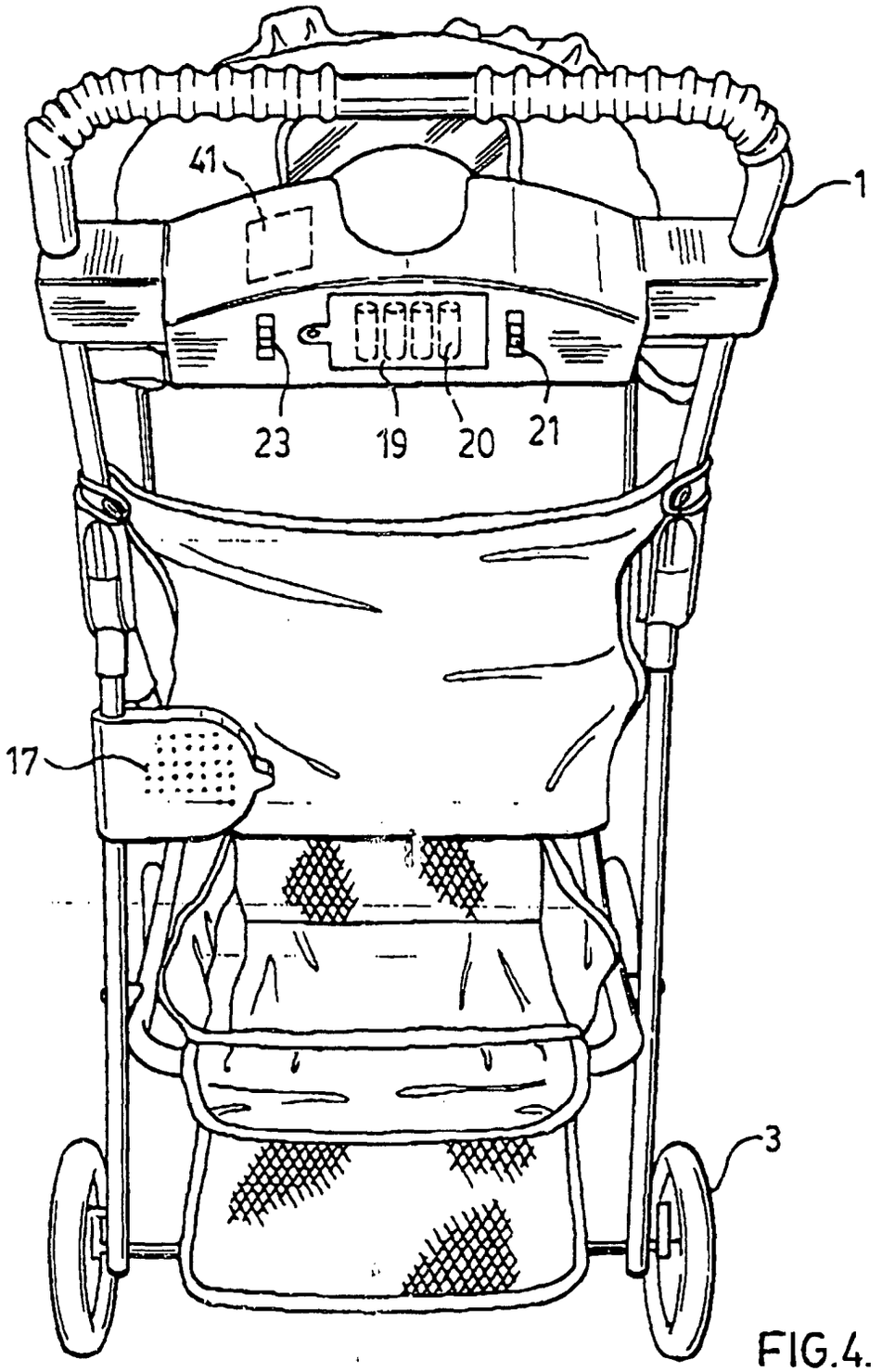


FIG.4.

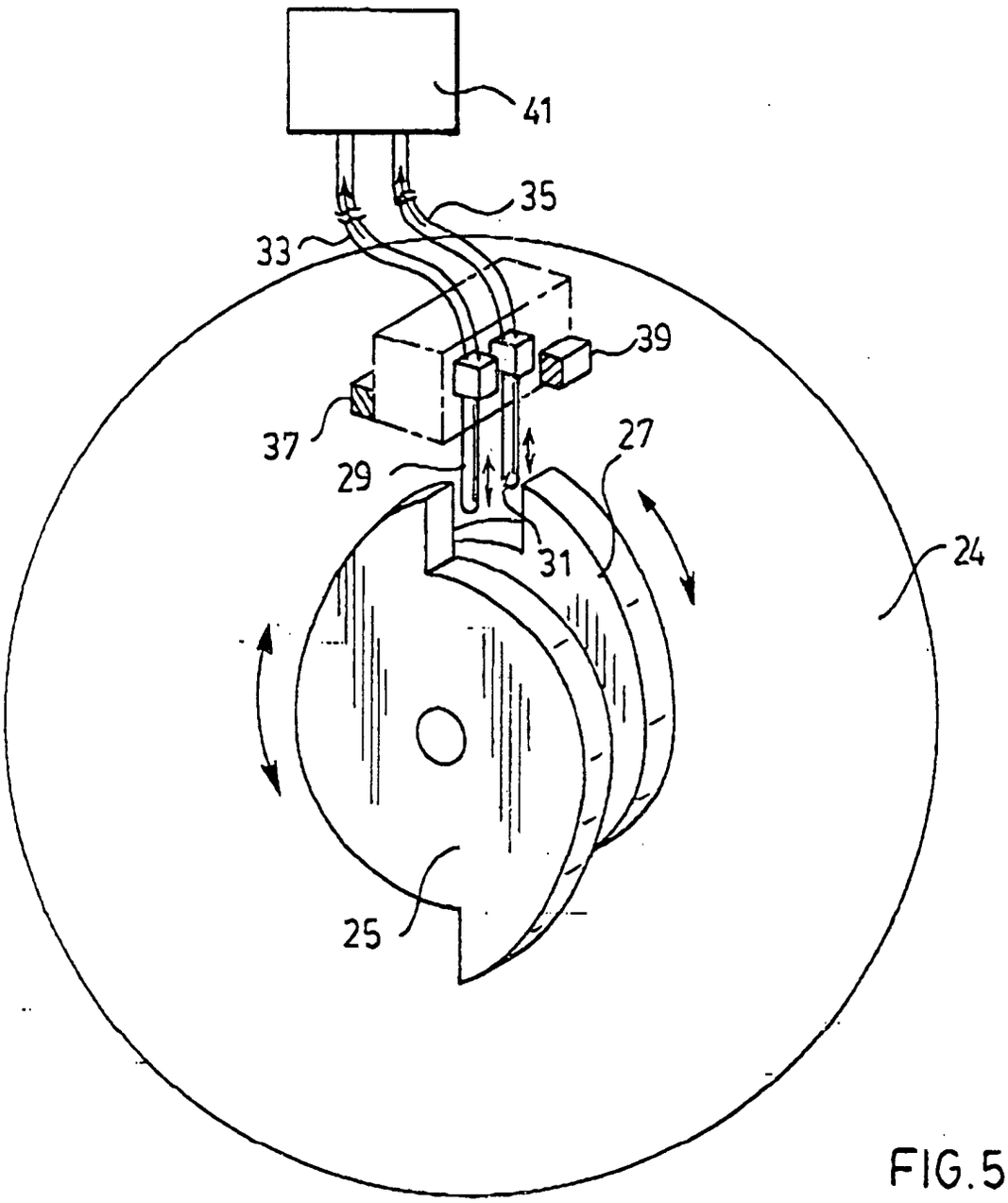


FIG.5.

FIG 6A.

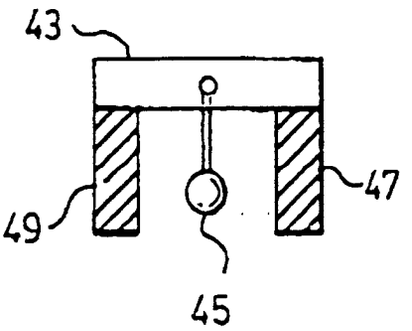
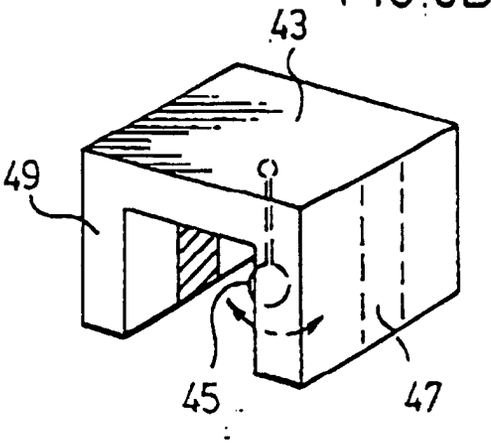


FIG.6B.



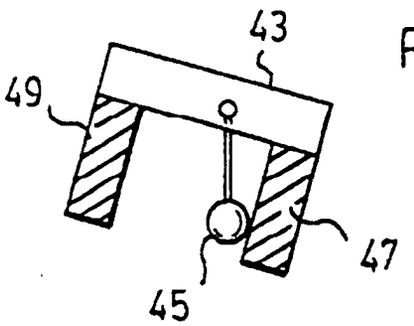
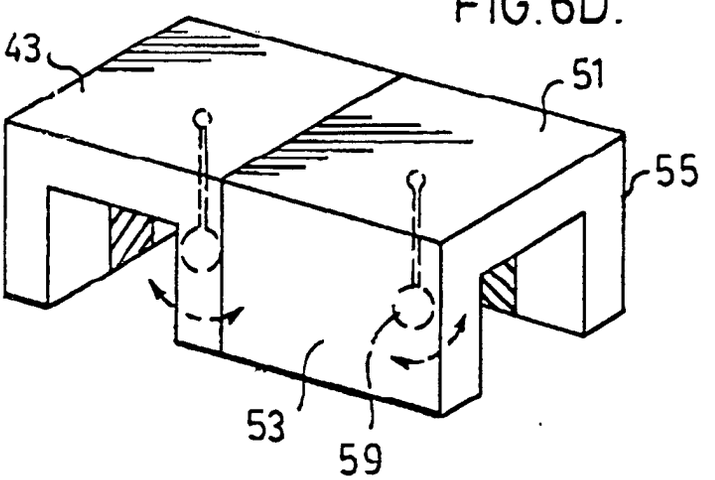


FIG.6C.

FIG.6D.



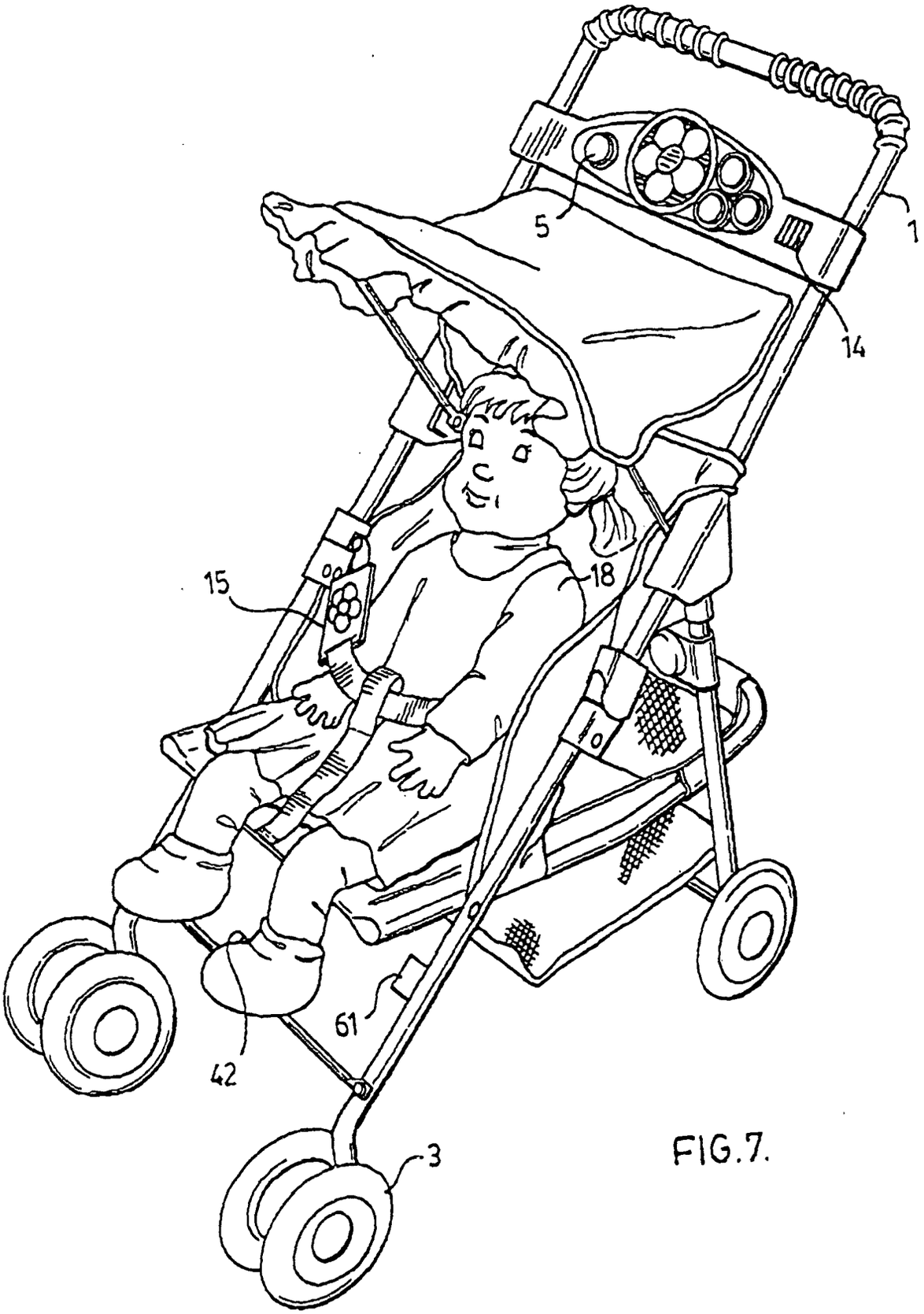


FIG.7.