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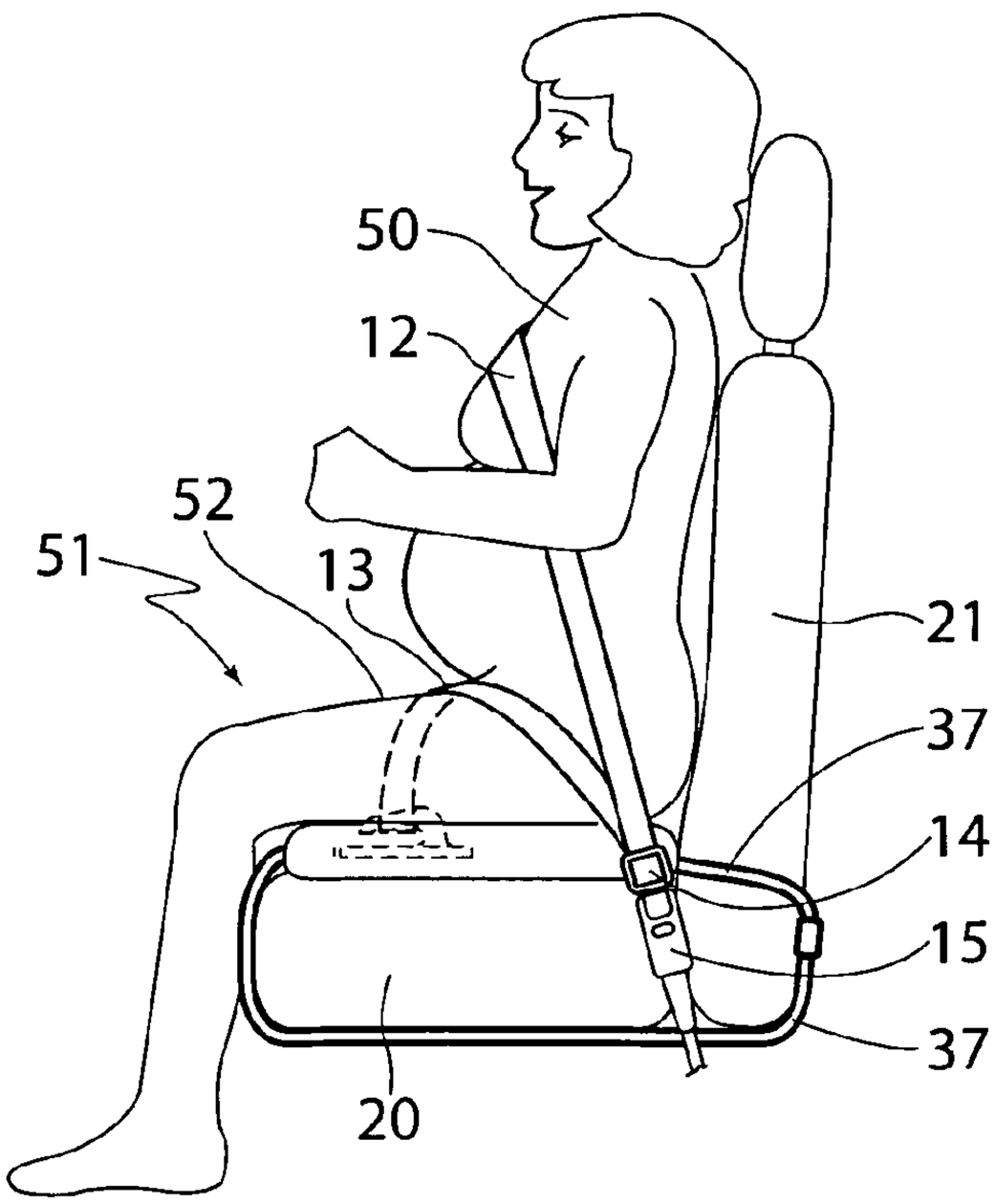
(54) Title: SEATBELT RETENTION DEVICE AND SYSTEM



(57) Abrégé/Abstract:
A seatbelt retention device (30) comprises a base (31) to be located on the upper seat surface (22) of a vehicle seat (20) and a seatbelt catch (32) mounted on the base (31) and adapted to retain the waist section (13) of a seatbelt (10). The seatbelt retention device (30) receives a passenger (50) on the base (31) in use, such that the catch (32) is accessible between the legs (51) of the passenger (50). A vehicle seat assembly may incorporate the seatbelt catch (32) mounted in the seat (20) and projecting through the upper seat surface (22) so as to be accessible between the legs (51) of a passenger (50) seated on the upper seat surface (22).

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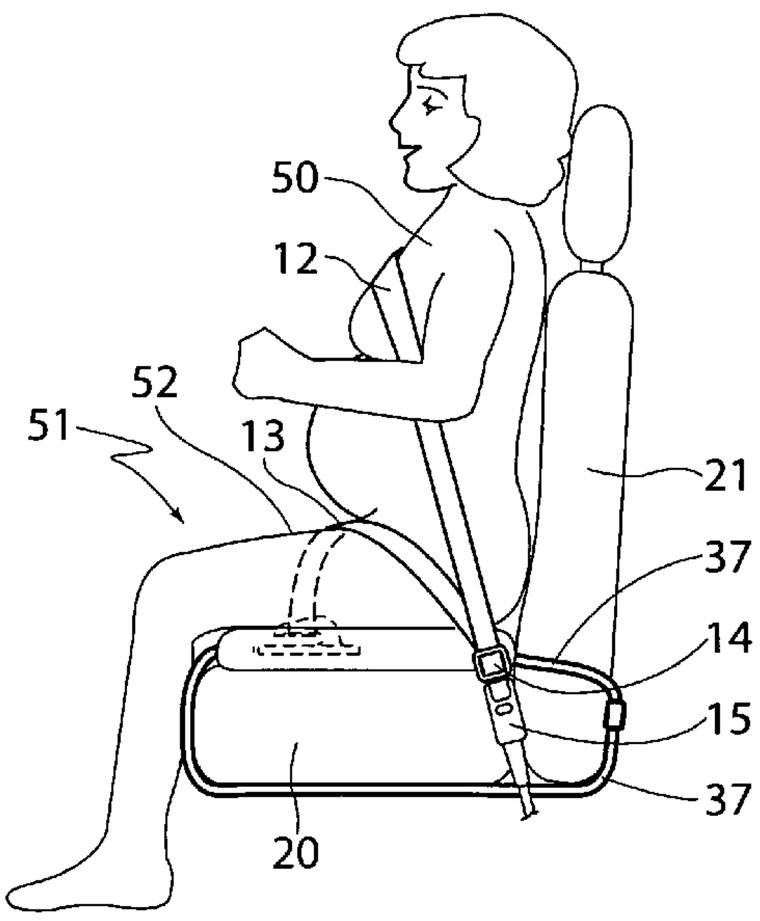

(57) Abstract: A seatbelt retention device (30) comprises a base (31) to be located on the upper seat surface (22) of a vehicle seat (20) and a seatbelt catch (32) mounted on the base (31) and adapted to retain the waist section (13) of a seatbelt (10). The seatbelt retention device (30) receives a passenger (50) on the base (31) in use, such that the catch (32) is accessible between the legs (51) of the passenger (50). A vehicle seat assembly may incorporate the seatbelt catch (32) mounted in the seat (20) and projecting through the upper seat surface (22) so as to be accessible between the legs (51) of a passenger (50) seated on the upper seat surface (22).

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SEATBELT RETENTION DEVICE AND SYSTEM

Technical Field

The present invention relates to a seatbelt retention device, a vehicle seat assembly incorporating a seatbelt retention device and a vehicle seat and seatbelt system.

Background of the Invention

Conventional vehicle seatbelts typically take either of two main forms. The simplest is a lap belt that is secured on either side of the passenger's waist and extends across the waist in use. The most common is a lap-sash belt that similarly has a lower waist section extending across the waist of the passenger as well as an upper torso section extending diagonally across the torso from one side of the waist to the opposite shoulder of the passenger.

In the event of a vehicle accident, the waist section of both the above seatbelt types typically applies a large force across the lower abdomen of a passenger. This can cause serious abdominal injury to the passenger and is particularly dangerous for pregnant women.

Object of the Invention

It is the object of the present invention to substantially overcome or at least ameliorate one or more of the disadvantages of the prior art, or to provide a useful alternative.

Summary of the Invention

Accordingly, in a first aspect, the present invention provides a seatbelt retention device comprising:

a cushion adapted to be located on the upper seat surface of a vehicle seat;

a base embedded in said cushion, said base being in the form of a rigid plate; and

a seatbelt catch adapted to retain the waist section of a seatbelt, said catch comprising a rigid hook and being mounted on said base and projecting through a recessed area of said cushion;

wherein said seatbelt retention device is adapted to receive a passenger on said cushion and said base in use, such that said catch is accessible between the legs of the passenger.

Typically, the seatbelt retention device is configured to locate the waist section of the seatbelt extending across and engaging an upper femoral portion of each leg of the passenger adjacent the hips of the passenger.

In a preferred form, said base comprises two opposing side regions extending laterally from a central region on which said catch is mounted, said seatbelt retention device being adapted to receive the passenger with each said side region of said base located directly below a respective leg of the passenger and said central region located below and between the legs of the passenger.

Preferably, said catch and said base are each formed from high tensile steel.

The catch and said base are typically integrally formed.

In a second aspect, the present invention provides a vehicle seat and seatbelt system comprising:

a vehicle seat having an upper seat surface for seating a passenger;

the seatbelt retention device defined above, said cushion being located on said upper seat surface; and

a seatbelt associated with said vehicle seat, said seatbelt having a waist section adapted to extend across the waist of a passenger received on said cushion and said base in use, said seatbelt catch being adapted to retain said waist section of said seatbelt.

In a third aspect, the present invention provides a method of arranging a vehicle seatbelt over a passenger, said method comprising:

locating the seatbelt retention device defined above on the upper surface of a vehicle seat;

receiving the passenger on said cushion and said base such that said catch is accessible between the legs of the passenger;

engaging a waist section of the seatbelt on said catch; and

fastening the seatbelt.

Typically, the seatbelt extends across and engages an upper femoral portion of each leg of the passenger.

In a fourth aspect, the present invention provides a vehicle seat assembly comprising:

a vehicle seat having an upper seat surface for seating a passenger;

a base embedded in said seat, said base being in the form of a rigid plate;

a seatbelt catch adapted to retain the waist section of a seatbelt, said catch comprising a rigid hook and being mounted on said base and projecting through said

upper seat surface so as to be accessible, in use, between the legs of a passenger seated on said upper seat surface.

Typically said catch is located so as to locate the waist section of the seatbelt, in use, extending across and engaging an upper femoral portion of each leg of the passenger adjacent the hips of the passenger.

In a preferred form, said base comprises two opposing side regions extending laterally from a central region on which said catch is mounted, said seatbelt assembly being adapted to receive the passenger with each said side region of said base located directly below a respective leg of the passenger and said central region located below and between the legs of the passenger.

Preferably, said catch is formed from high tensile steel.

The catch and said base are typically integrally formed.

In one form, said catch is retractable.

In one form, said seat is a child booster seat.

In an alternate form, said seat is a fixed regular vehicle seat permanently secured to a vehicle.

In a fifth aspect, the present invention provides a vehicle seat and seatbelt system comprising:

the vehicle seat assembly defined above; and

a seatbelt associated with the said vehicle seat, said seatbelt having a waist section able to extend across the waist of a passenger seated on said upper seat surface in use, said catch being adapted to retain said waist section of said seatbelt.

In a sixth aspect, the present invention provides a method of arranging a vehicle seatbelt over a passenger, said method comprising:

seating the passenger on upper seat surface of said seat of said vehicle seat assembly defined above, such that said catch is accessible between the legs of the passenger;

engaging a waist section of the seatbelt on said catch; and

fastening the seatbelt.

Typically, the seatbelt extends across and engages an upper femoral portion of each leg of the passenger.

In one form, said catch is retractable and said method further comprises the step of deploying said catch before engaging the waist section of the seatbelt on said catch.

In a seventh aspect, the present invention provides a seatbelt retention device comprising:

a base adapted to be located on the upper seat surface of a vehicle seat, said base being in the form of a rigid plate and comprising two opposing side regions extending laterally from a central region; and

a seatbelt catch adapted to retain the waist section of a seatbelt, said catch comprising a rigid hook and being mounted on said central region and; and

wherein said seatbelt retention device is adapted to receive a passenger on said base in use with each said side region of said base located directly below a respective leg of the passenger and said central region located below and between the legs of the passenger such that said catch is accessible between the legs of the passenger.

Typically, said seatbelt retention device is configured to locate the waist section of the seatbelt extending across and engaging an upper femoral portion of each leg of the passenger adjacent the hips of the passenger.

Preferably, said catch and said base are each formed from high tensile steel.

The catch and said base are typically integrally formed.

In an eighth aspect, the present invention provides a vehicle seat and seatbelt system comprising:

a vehicle seat having an upper seat surface for seating a passenger;

the seatbelt retention device defined above located on said upper seat surface; and

a seatbelt associated with said vehicle seat, said seatbelt having a waist section adapted to extend across the waist of a passenger seated on said base in use, said seatbelt catch being adapted to retain said waist section of said seatbelt.

In a ninth aspect the present invention provides a method of arranging a vehicle seatbelt over a passenger, said method comprising:

locating the seatbelt retention device defined above on the upper surface of a vehicle seat;

receiving the passenger on said seatbelt retention device such that said catch is accessible between the legs of the passenger;

engaging a waist section of the seatbelt on said catch; and

fastening the seatbelt.

Brief Description of the Drawings

Preferred embodiments of the invention will now be described, by way of example only, with reference to the accompanying drawings wherein:

Figure 1 is a side elevation, partially cross-sectioned view of a vehicle seat and seatbelt system;

Figure 2 is a plan view of the system of Figure 1;

Figure 3 is a front elevation view of the system of Figure 1 in use;

Figure 4 is a side elevation view of the system of Figure 1 in use;

Figure 5 is a plan view of the seatbelt retention device of the system of Figure 1;

Figure 6 is a cross-sectional view of the seatbelt retention device of Figure 5 taken through section 6-6;

Figure 7 is a perspective view of the base and catch of the seatbelt retention device of Figure 5;

Figure 8 is a plan view of the catch and base of Figure 7;

Figure 9 is a front elevation view of the catch and base of Figure 7;

Figure 10 is a side elevation view of the catch and base of Figure 7;

Figure 11 is a perspective view a vehicle seat assembly comprising a child booster seat;

Figure 12 is a perspective view of a vehicle seat assembly comprising a child booster seat base;

Figure 13 is a partially cross-sectioned side elevation view of a vehicle seat assembly comprising a regular vehicle seat; and

Figure 14 is a partially cross-sectioned side elevation view of a vehicle seat assembly incorporating a retractable catch.

Detailed Description of the Preferred Embodiments

Referring to Figures 1 to 4 of the accompanying drawings, a vehicle seat and system includes a seatbelt 10, a conventional vehicle seat 20, and a seatbelt retention device 30. The vehicle seat 20 depicted is a standard motor vehicle seat, having a backrest 21 mounted at the rear of the seat 20. The seatbelt 10 is a standard lap-sash vehicle seatbelt that has a lower end thereof fixed to an anchor 11 adjacent the seat 20. The opposing end of the seatbelt 10 is mounted on the B pillar of the vehicle, using a retraction mechanism in the usual manner. The seatbelt 10 is divided between an upper torso section 12 and a lower waist section 13 by a seatbelt tongue 14 that is slidingly received on the seatbelt 10 and which engages a seatbelt buckle 15 mounted on the opposing side of the vehicle seat 20.

The seatbelt retention device 30, depicted in greater detail in Figures 5 and 6, is a removeable unit adapted to be mounted on the upper seat surface 22 of the vehicle seat 20. The seatbelt retention device 30 comprises a base 31 and a seatbelt catch 32 mounted on the base 31. The seatbelt retention device 30 depicted further comprises a cushion 33 that substantially covers the upper surface of the seat 20. The base 31 is embedded within the cushion 33. The base 31 is here in the form of a plate and comprises two opposing side regions 34 and a central region 35 on which the catch 32, here in the form of a hook, is mounted. The seatbelt retention device 30 is adapted to receive a passenger 50 seated on the cushion 33 and base 31 such that the catch 32 is accessible between the legs 51 of the passenger 50. Specifically, the upper femoral region 52 of each leg 51 is located on a respective side region 34 of the base 31, thereby firmly retaining the base 31 (and accordingly the catch 32) in place during use.

The catch 32 protrudes through the cushion 33 in a recessed area 36 of the cushion 33 such that the catch 31 only projects slightly above the upper surface of the cushion 33, typically about 10mm.

To assist in maintaining the location of the seatbelt retention device 30 on the seat 20 as a passenger enters or alights the vehicle, a system of straps 37 may be secured to the cushion 33 to pass around the backrest 21 and underneath the seat 20, with the straps being mutually attached behind the backrest 21.

To fasten the seatbelt 10, the seatbelt 10 is passed across the passenger 50 and the waist section of the seatbelt 10 is engaged on the catch 31. The waist section 13 of the seatbelt 10 is thus kept away from the abdomen of the passenger 50. Locating the catch 31 between the legs 51 of the passenger 50, projecting above the upper seat surface 22 of the seat 20, ensures the waist section 13 of the seatbelt extends across the upper femoral portion 52 of each leg 51 adjacent the hip rather than towards the knees of the passenger.

Further detail of the base 31 and catch 32 of the seatbelt retention device 30 is depicted in Figures 7 to 10. The catch 32 and base 31 are here integrally formed of high tensile steel. The catch 32 projects forward, and is formed of a vertically extending post 41 projecting from the upper surface of the base 31, a forwardly projecting arm 38 extending from the post 41, and a downwardly projecting lip 39 at the leading end of the arm 38. As can be seen, each of these elements of the catch 32 is rounded so as to minimize the possibility of catching the passenger's clothing on the catch 32 and preventing any possible damage to the passenger 50 himself/herself. The waist section 13 of the seatbelt 10 is retained by the catch 32 in the recess 40 defined between the lip 39 and post 37 of the catch 32 against the underside of the arm 38. Tension on the seatbelt 10 will retain the seatbelt within the recess 40, with the lip 39 inhibiting the seatbelt 10 from slipping off the end of the catch 32.

In the event of a vehicle collision, the restraining force applied to the passenger 50 by the waist section 13 of the seatbelt 10 will be applied across the legs 51 of the passenger 50, and particularly the upper femoral portion 52 of the legs 51 adjacent the hips, rather than across the lower abdomen. This reduces the likelihood of serious internal injury to the passenger 50. Further, if the passenger 50 is pregnant, this reduces the likelihood of serious injury to the foetus. Specifically, locating the waist section 13 of the seatbelt 10 across the upper femoral portion 52 of each leg 51 adjacent the hip will also greatly reduce the likelihood of injury to the legs as compared, for example, to

positioning the waist section 13 close to the knees of the passenger, whereby forces applied to the lower portion of the passenger's femur might break the femur.

Figure 11 depicts a vehicle seat assembly comprising a modified form of seatbelt retention device 130 mounted in a child/booster seat 120 (otherwise known simply as a child seat or booster seat) that is configured to be located on the upper seat surface of a standard vehicle seat to restrain a child. The base 31 of the seatbelt retention device 130 is mounted within the cushioned seat base section 121 of the child seat 120 and the catch 32 projects above the upper seat surface 122 of the seat base section 121. The catch 32 may alternatively be mounted directly to the structure of the seat base section 121, rather than having a separate plate mounted within the seat base section 121.

Figure 12 depicts a similar arrangement with the seatbelt retention device 130 mounted in a child booster seat base 220 in a similar manner as described above in relation to Figure 11.

Similarly, as depicted in Figure 13, the seatbelt retention device 130 may be integrally formed within a fixed regular vehicle seat 20 that is permanently secured to a vehicle, again with the base 31 mounted within the seat 20 and the catch 32 projecting through the upper seat surface 22 of the seat 20. Again, rather than mounting the catch 32 on a plate located within the seat 20, the catch may be mounted to the structural frame of the seat 20.

Referring to Figure 14, the catch 32 may be retractable, such that it may be deployed when required and retracted when not in use.

The seatbelt retention device and seatbelt system may be utilized with seats for any form of vehicle, including motor vehicles, maritime vehicles (such as boats) and airborne vehicle (such as aeroplanes and helicopters).

Though the present invention can be described with reference to specific embodiments, it would be appreciated by those skilled in the art the invention may be embodied in any of various forms.

CLAIMS:

1. A seatbelt retention device comprising:

a cushion adapted to be located on the upper seat surface of a vehicle seat;

a base embedded in said cushion, said base being in the form of a rigid plate; and further comprising two opposing side regions extending laterally from a central region on which said catch is mounted; and

a seatbelt catch adapted to retain the waist section of a seatbelt, said catch comprising a rigid hook and being mounted on said base and projecting through a recessed area of said cushion;

wherein said seatbelt retention device is adapted to receive a passenger with each said side region of said base located directly below a respective leg of the passenger and said central region located below and between the legs of the passenger, such that said catch is accessible between the legs of the passenger.

2. The seatbelt retention device of claim 1, wherein said seatbelt retention device is configured to locate the waist section of the seatbelt extending across and engaging an upper femoral portion of each leg of the passenger adjacent the hips of the passenger.

3. The seatbelt retention device of claim 1, wherein said catch and said base are each formed from high tensile steel.

4. The seatbelt retention device of claim 3, wherein said catch and said base are integrally formed.

5. A vehicle seat and seatbelt system comprising:

a vehicle seat having an upper seat surface for seating a passenger;

the seatbelt retention device of claim 1, said cushion being located on said upper seat surface; and

a seatbelt associated with said vehicle seat, said seatbelt having a waist section adapted to extend across the waist of a passenger received on said cushion and said base in use, said seatbelt catch being adapted to retain said waist section of said seatbelt.

6. A method of arranging a vehicle seatbelt over a passenger, said method comprising:

locating the seatbelt retention device of claim 1 on the upper surface of a vehicle seat;

receiving the passenger on said cushion and said base such that said catch is accessible between the legs of the passenger;

engaging a waist section of the seatbelt on said catch; and

fastening the seatbelt.

7. The method of claim 6, wherein the seatbelt extends across and engages an upper femoral portion of each leg of the passenger.

8. A vehicle seat assembly comprising:

a vehicle seat having an upper seat surface for seating a passenger;

a base embedded in said seat, said base being in the form of a rigid plate and comprising two opposing side regions extending laterally from a central region on which said catch is mounted;

a seatbelt catch adapted to retain the waist section of a seatbelt, said catch comprising a rigid hook and being mounted on said base and projecting through said upper seat surface so as to be accessible, in use, between the legs of a passenger seated on said upper seat surface;

wherein said seat is adapted to receive the passenger with each said side region of said base located directly below a respective leg of the passenger and said central region located below and between the legs of the passenger.

9. The seat assembly of claim 8, wherein said catch is located so as to locate the waist section of the seatbelt, in use, extending across and engaging an upper femoral portion of each leg of the passenger adjacent the hips of the passenger.

10. The seat assembly of claim 8, wherein said catch is formed from high tensile steel.

11. The seat assembly of claim 8, wherein said catch and said base are integrally formed.

12. The seat assembly of claim 8, wherein said catch is retractable.

13. The seat assembly of claim 8, wherein said seat is a child booster seat.

14. The seat assembly of claim 8, wherein said seat is a fixed regular vehicle seat permanently secured to a vehicle.

15. A vehicle seat and seatbelt system comprising:

the vehicle seat assembly of claim 8; and

a seatbelt associated with the said vehicle seat, said seatbelt having a waist section able to extend across the waist of a passenger seated on said upper seat surface in use, said catch being adapted to retain said waist section of said seatbelt.

16. A method of arranging a vehicle seatbelt over a passenger, said method comprising:

seating the passenger on said upper seat surface of said seat of said vehicle seat assembly of claim 8, such that said catch is accessible between the legs of the passenger;

engaging a waist section of the seatbelt on said catch; and

fastening the seatbelt.

17. The method of claim 16, wherein the seatbelt extends across and engages an upper femoral portion of each leg of the passenger.

18. The method of claim 17, wherein said catch is retractable and said method further comprises the step of deploying said catch before engaging the waist section of the seatbelt on said catch.

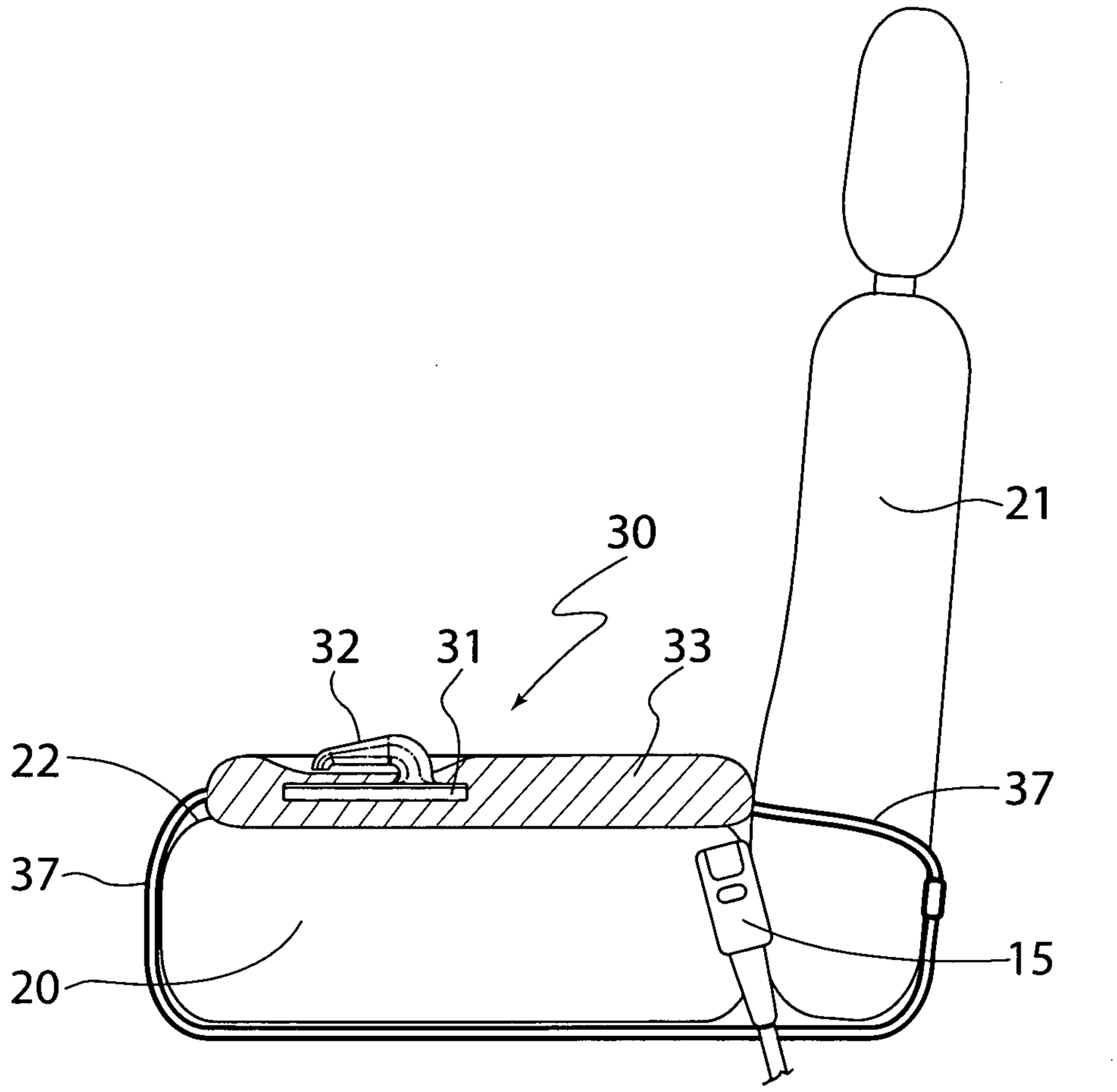

FIG. 1

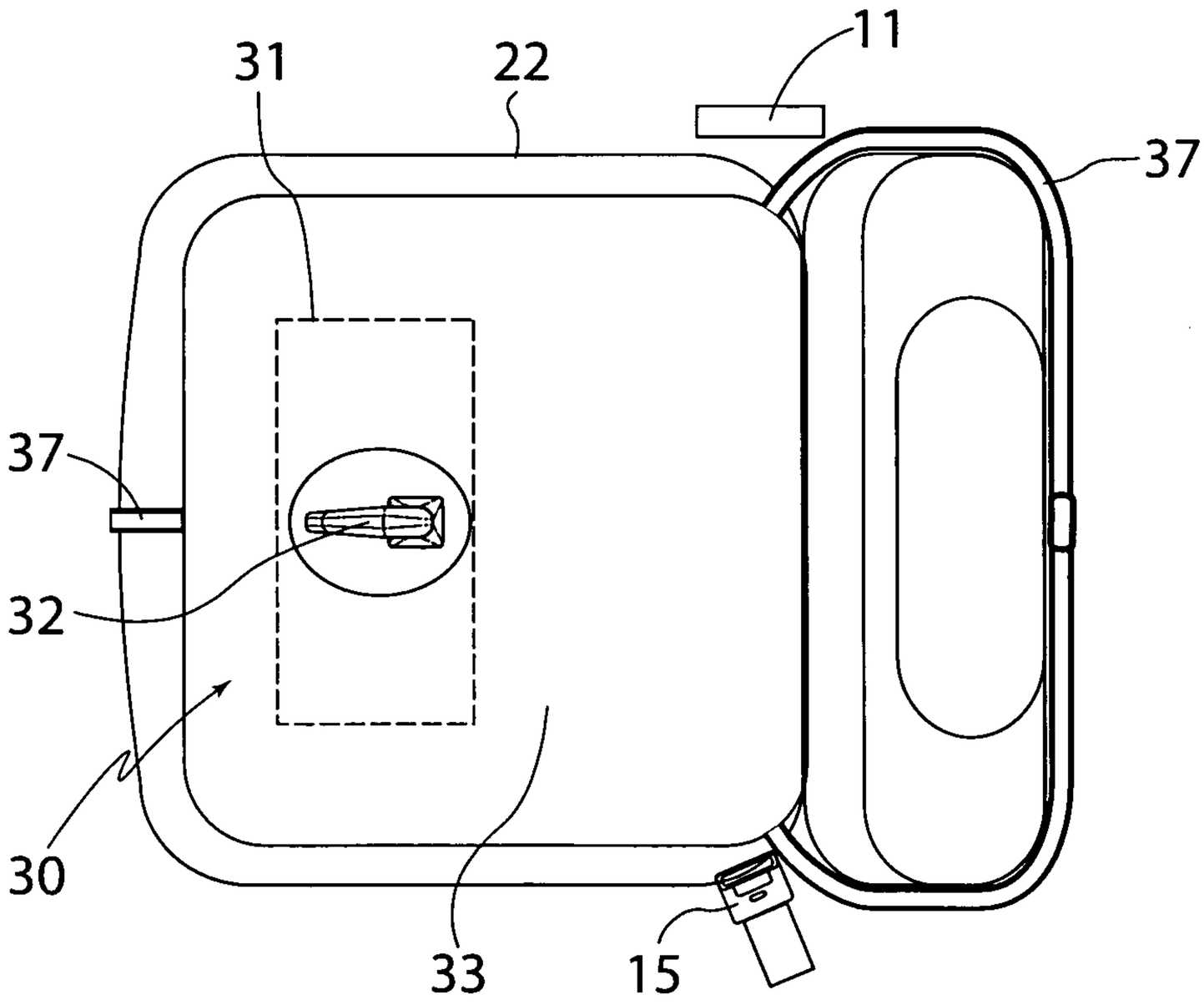

FIG. 2

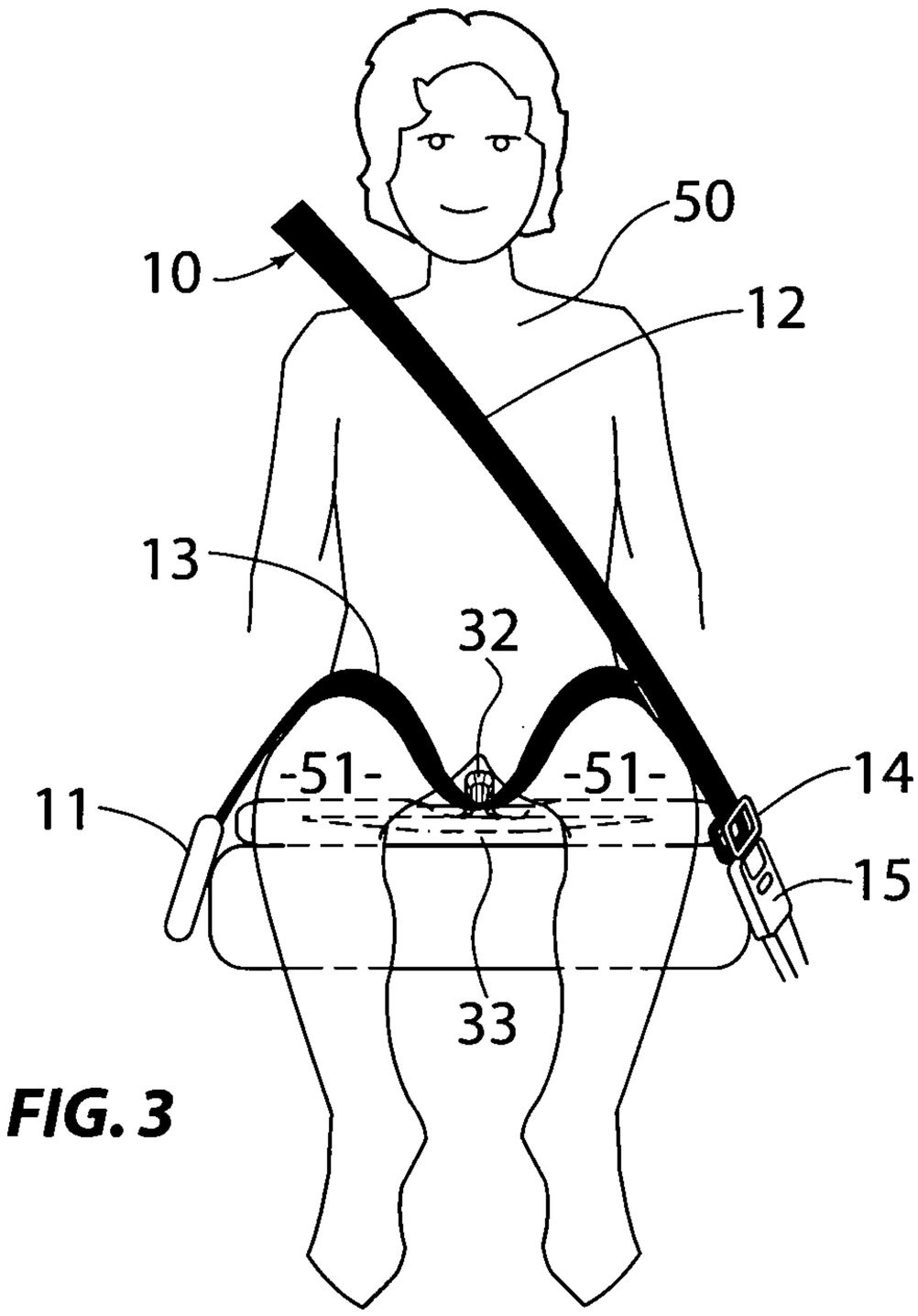

FIG. 3

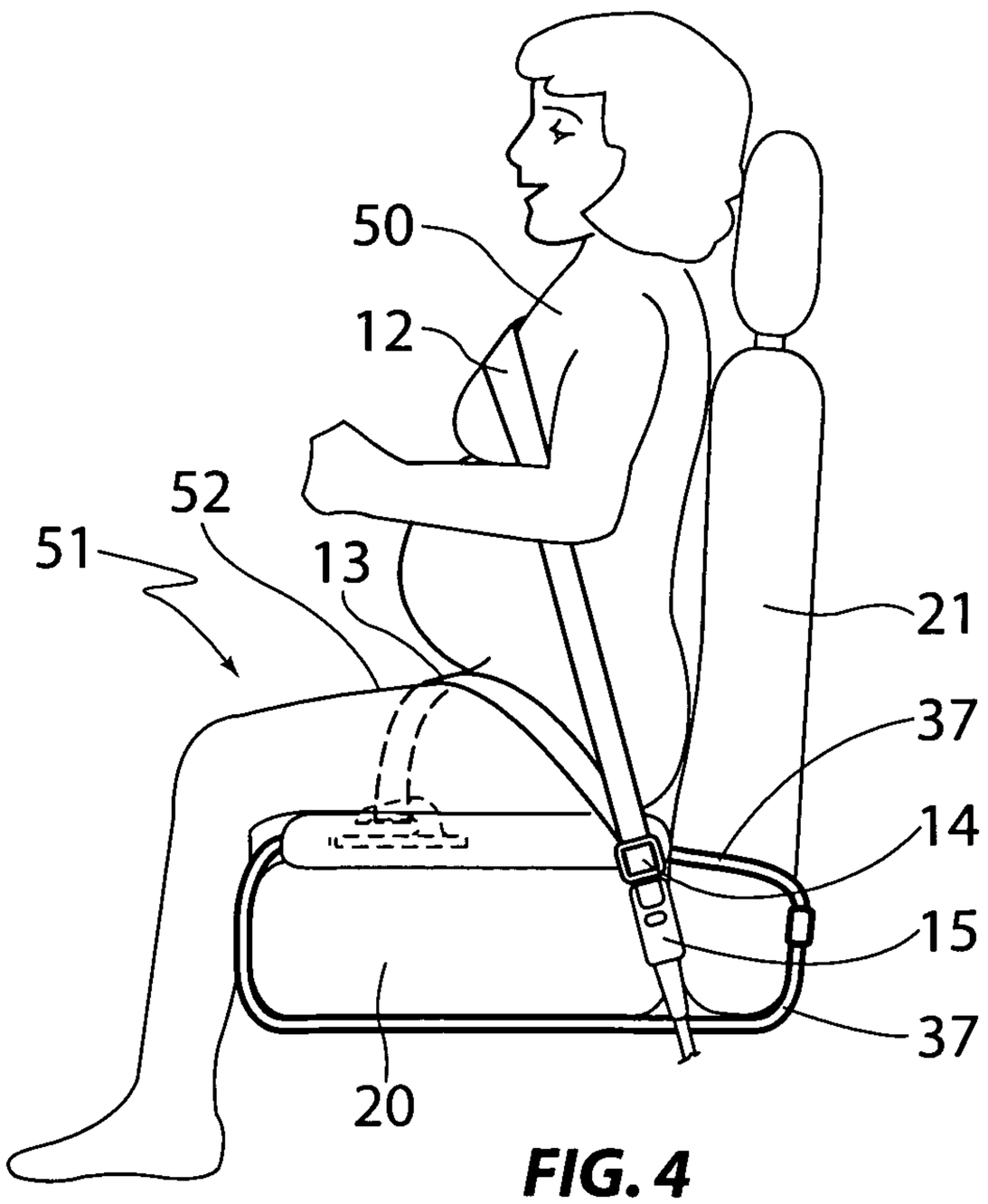

FIG. 4

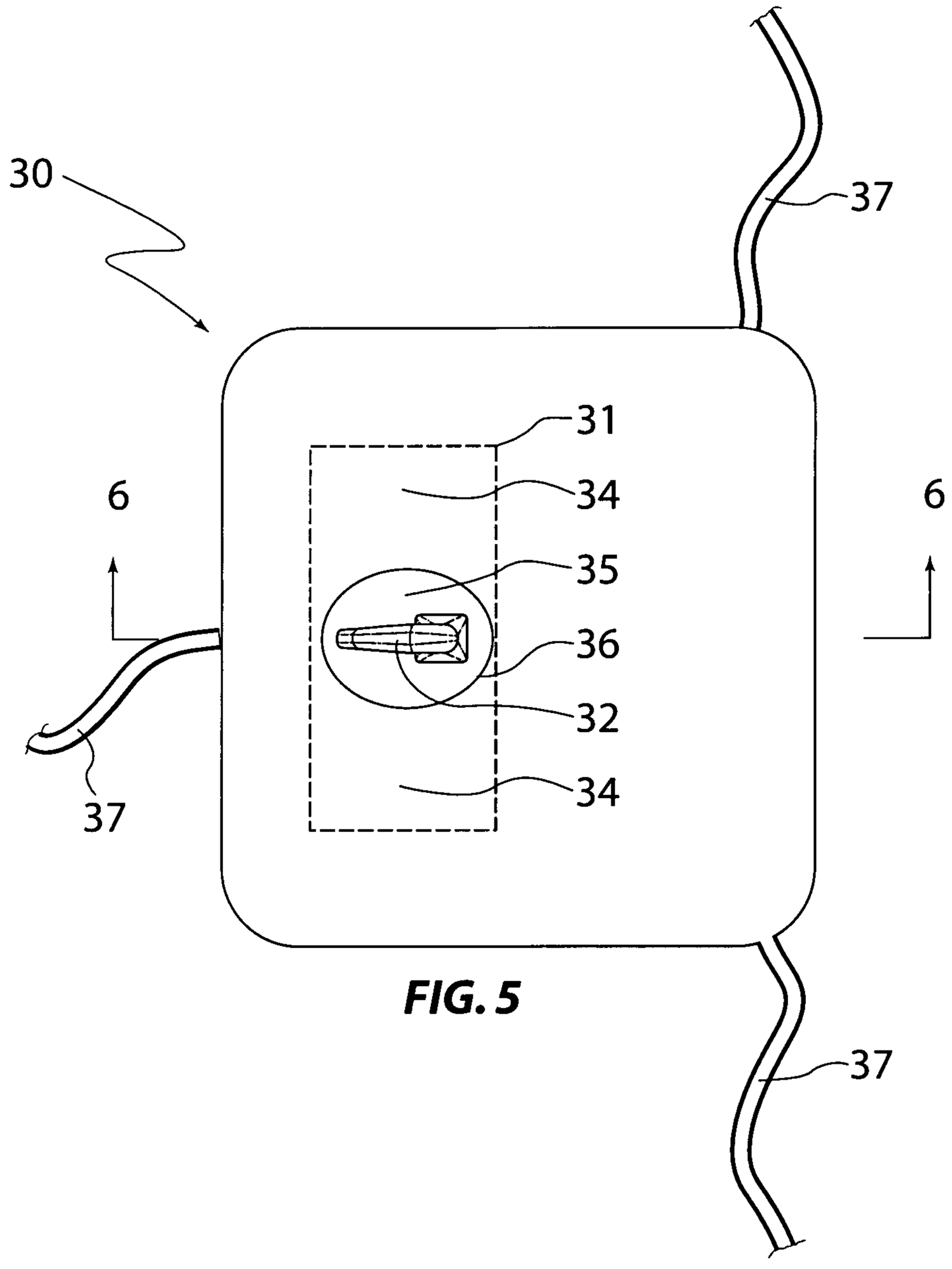

FIG. 5

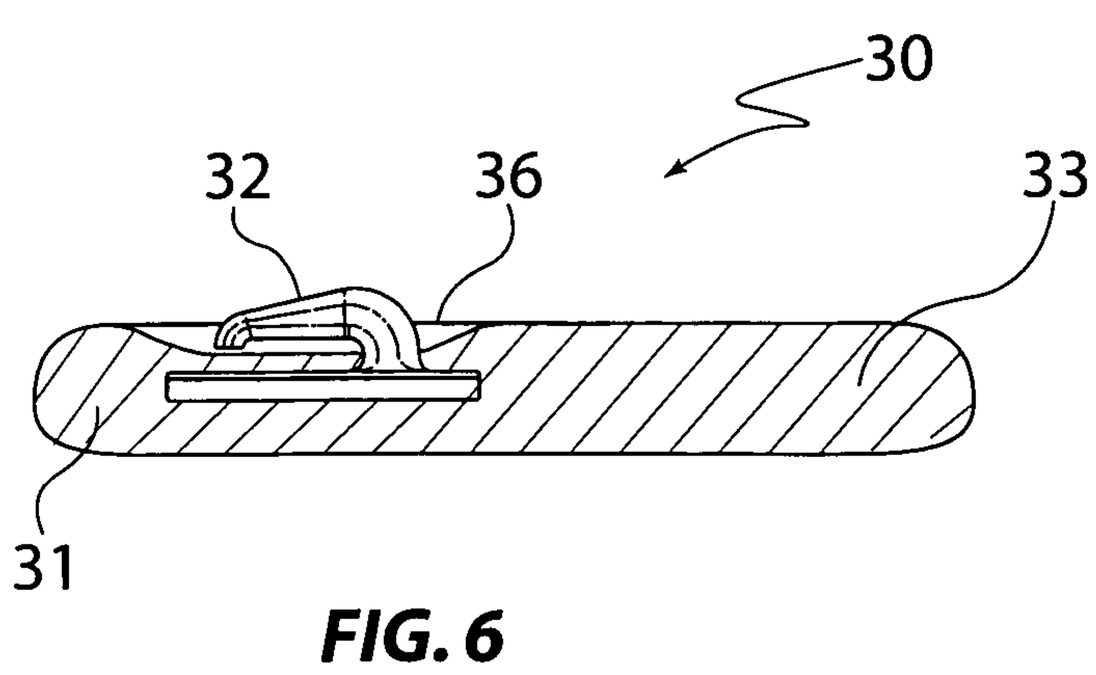

FIG. 6

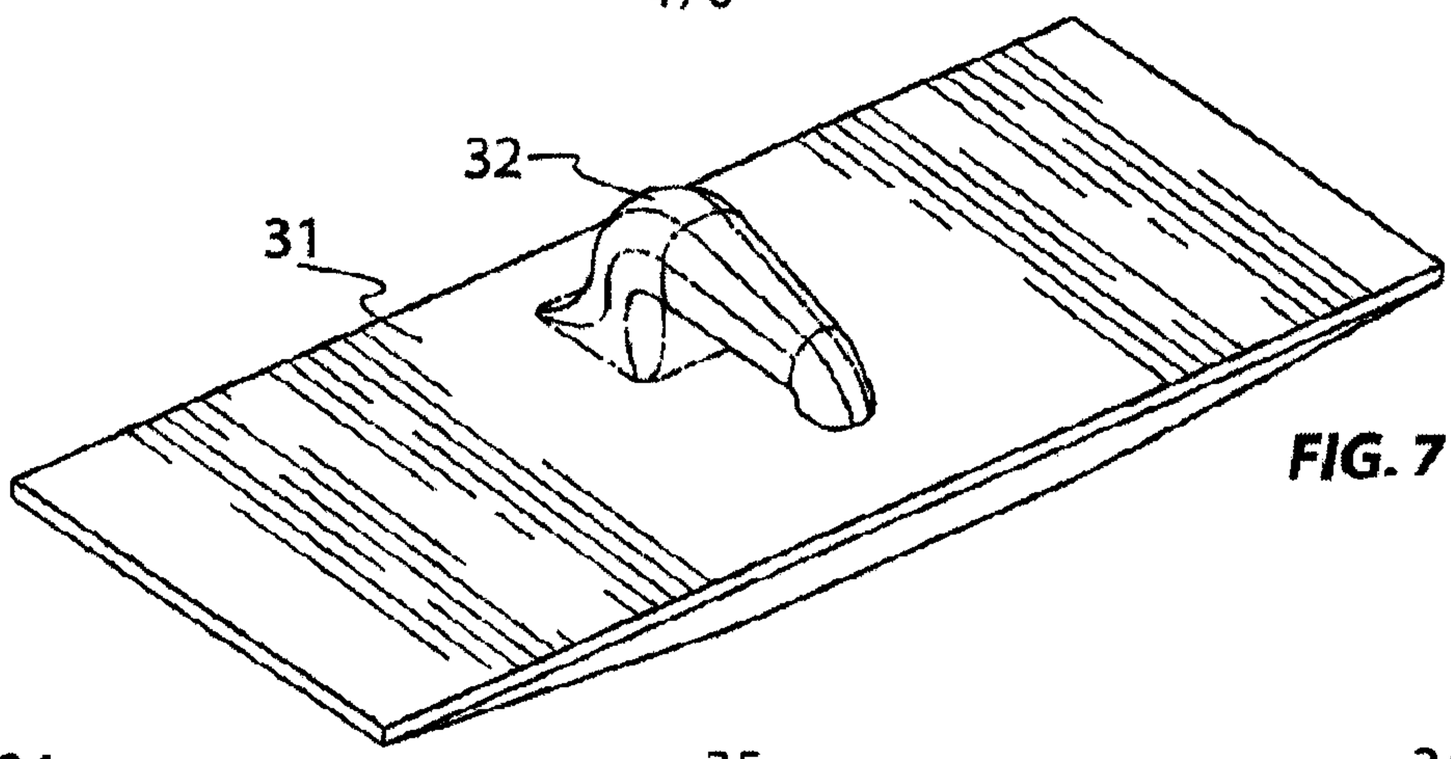

FIG. 7

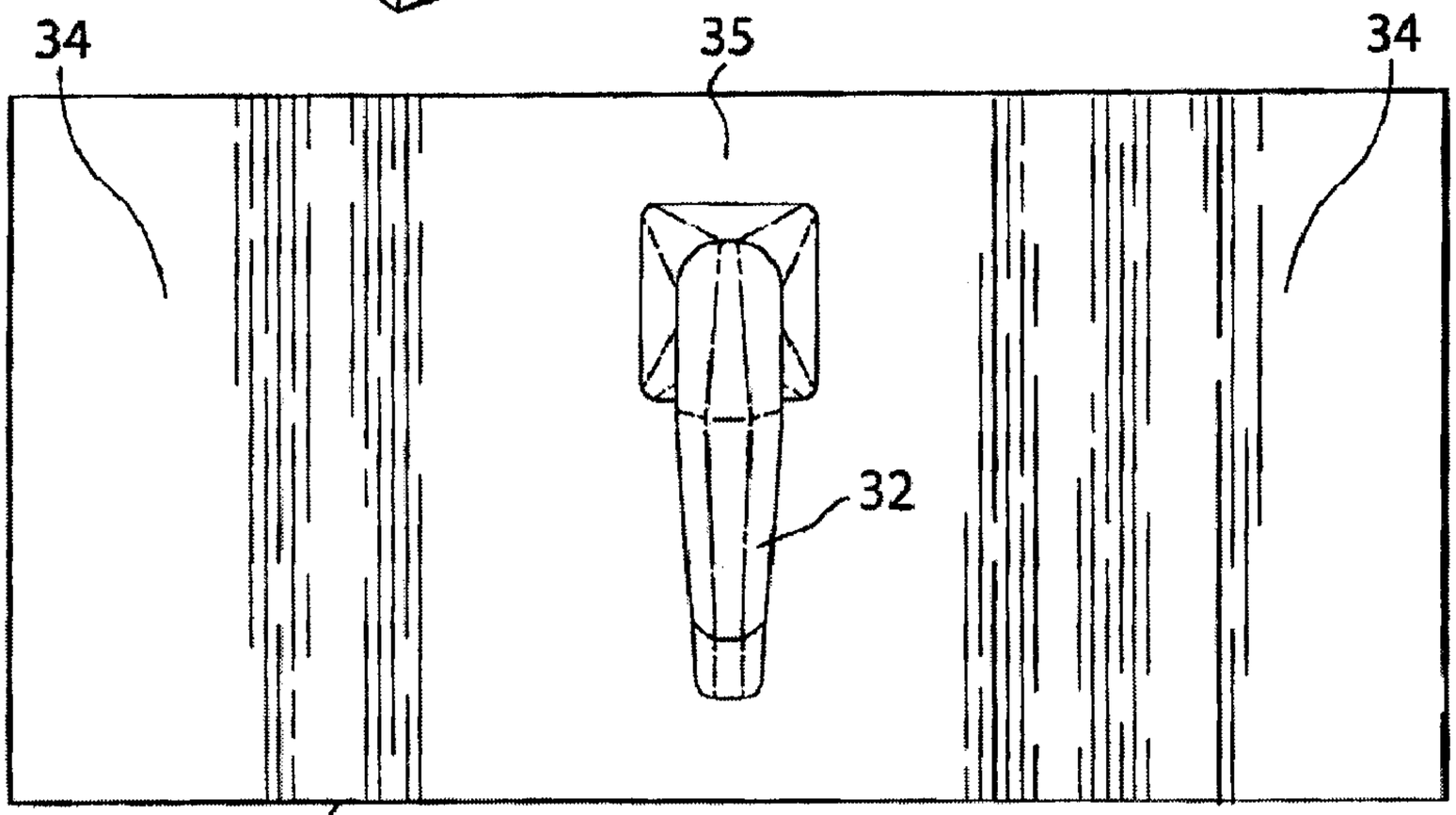

FIG. 8

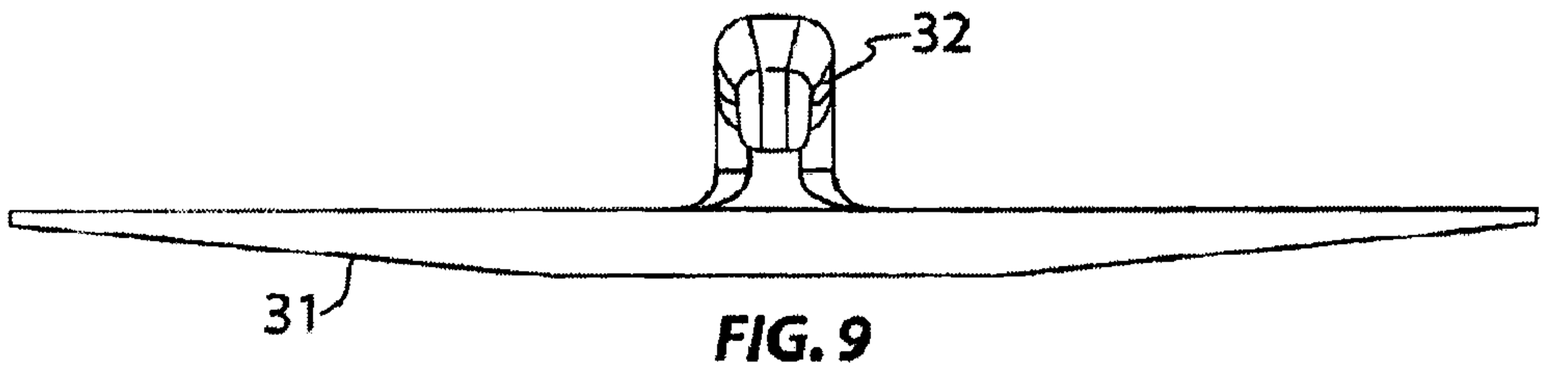

FIG. 9

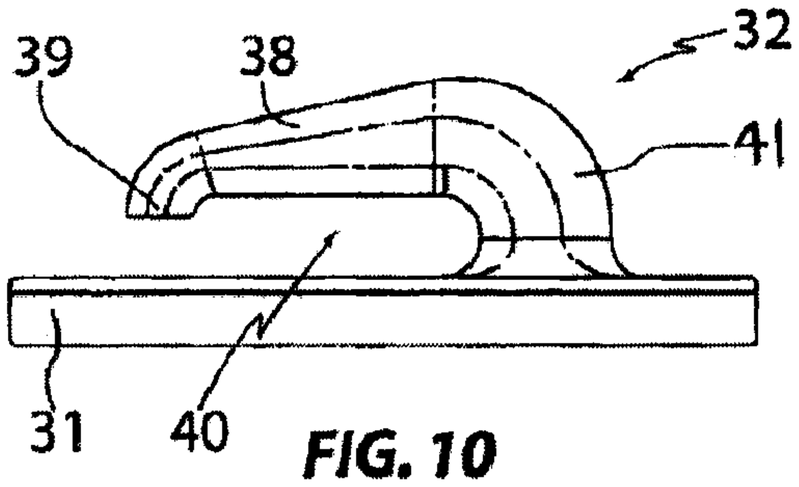

FIG. 10

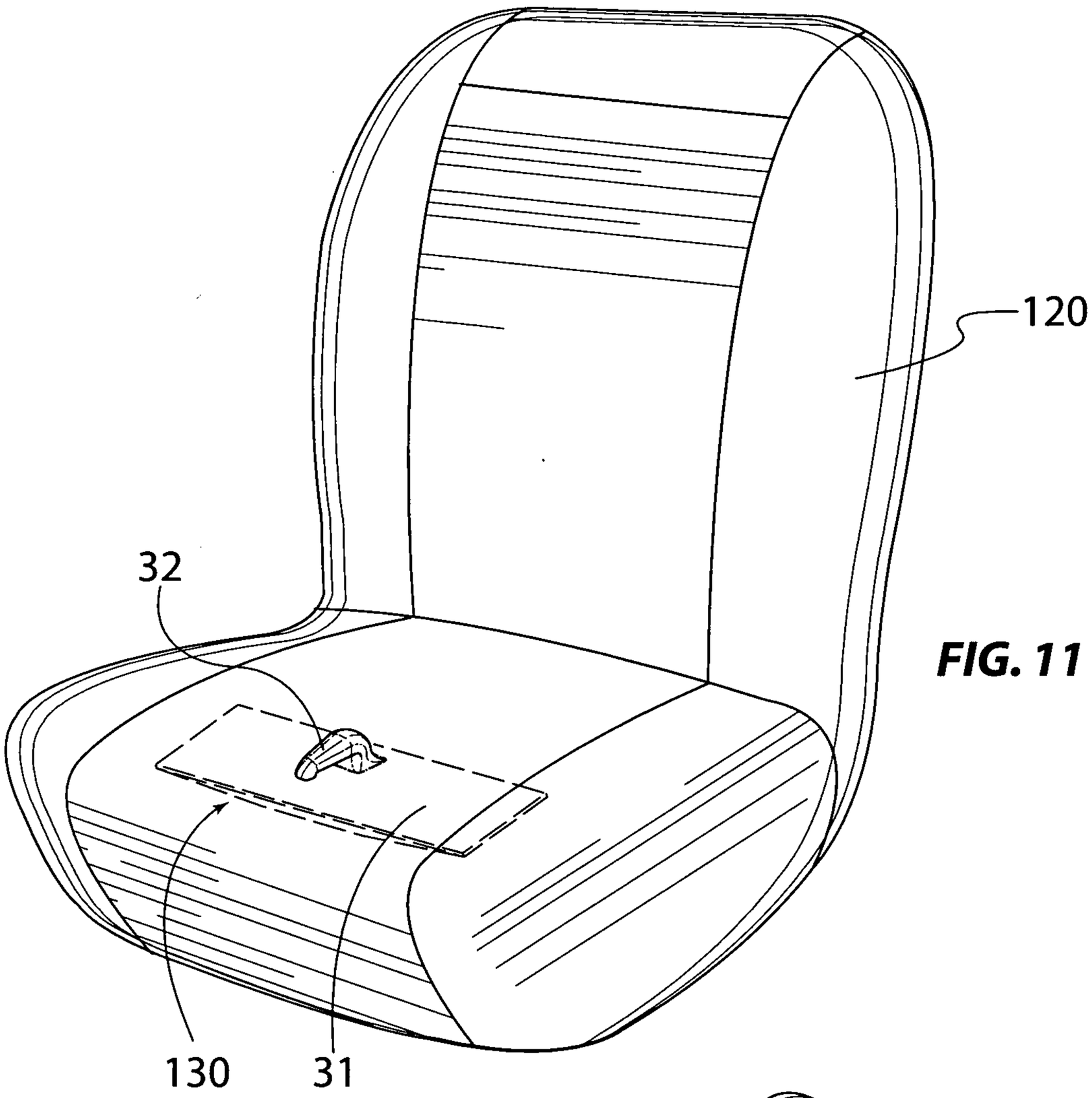

FIG. 11

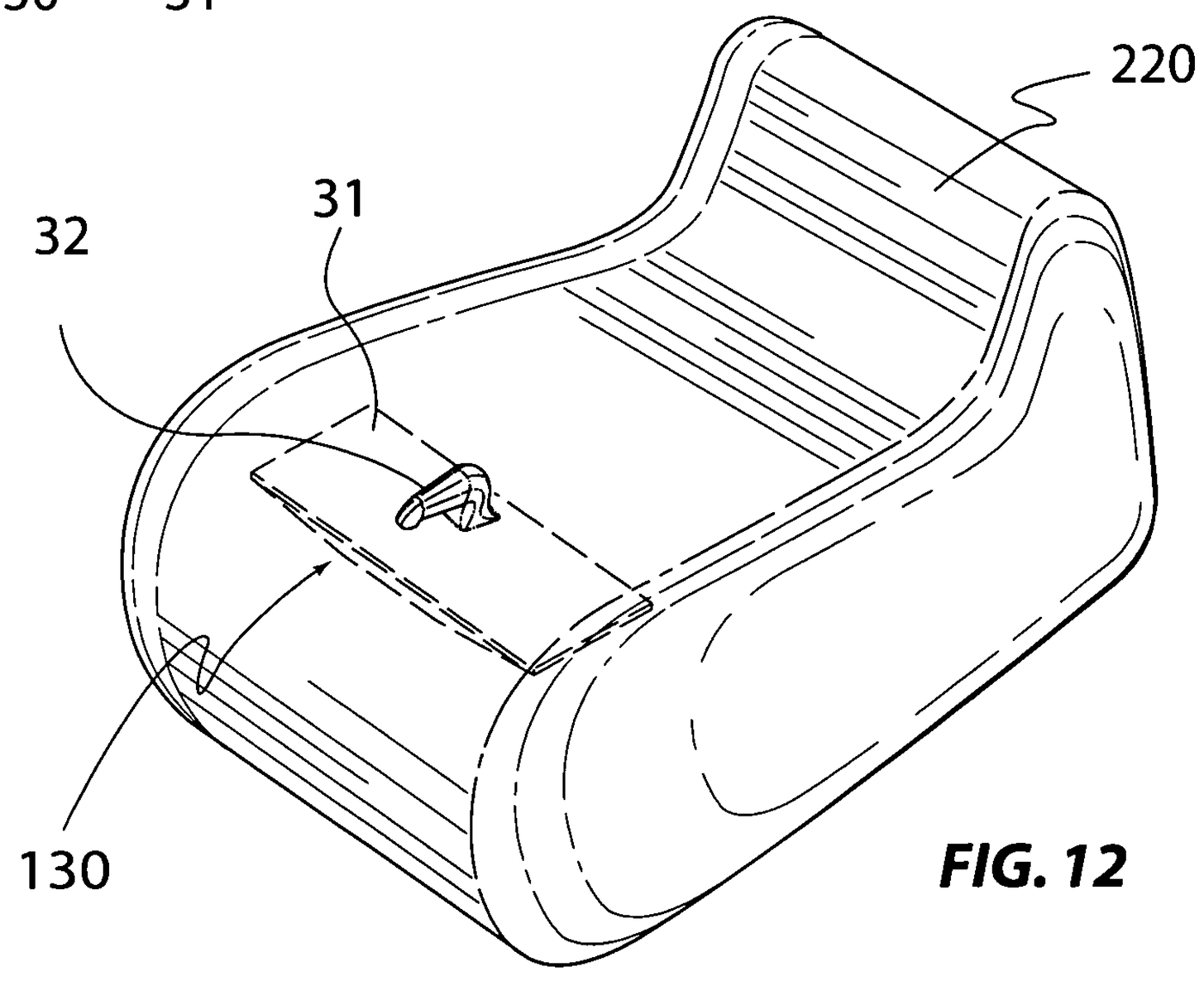

FIG. 12

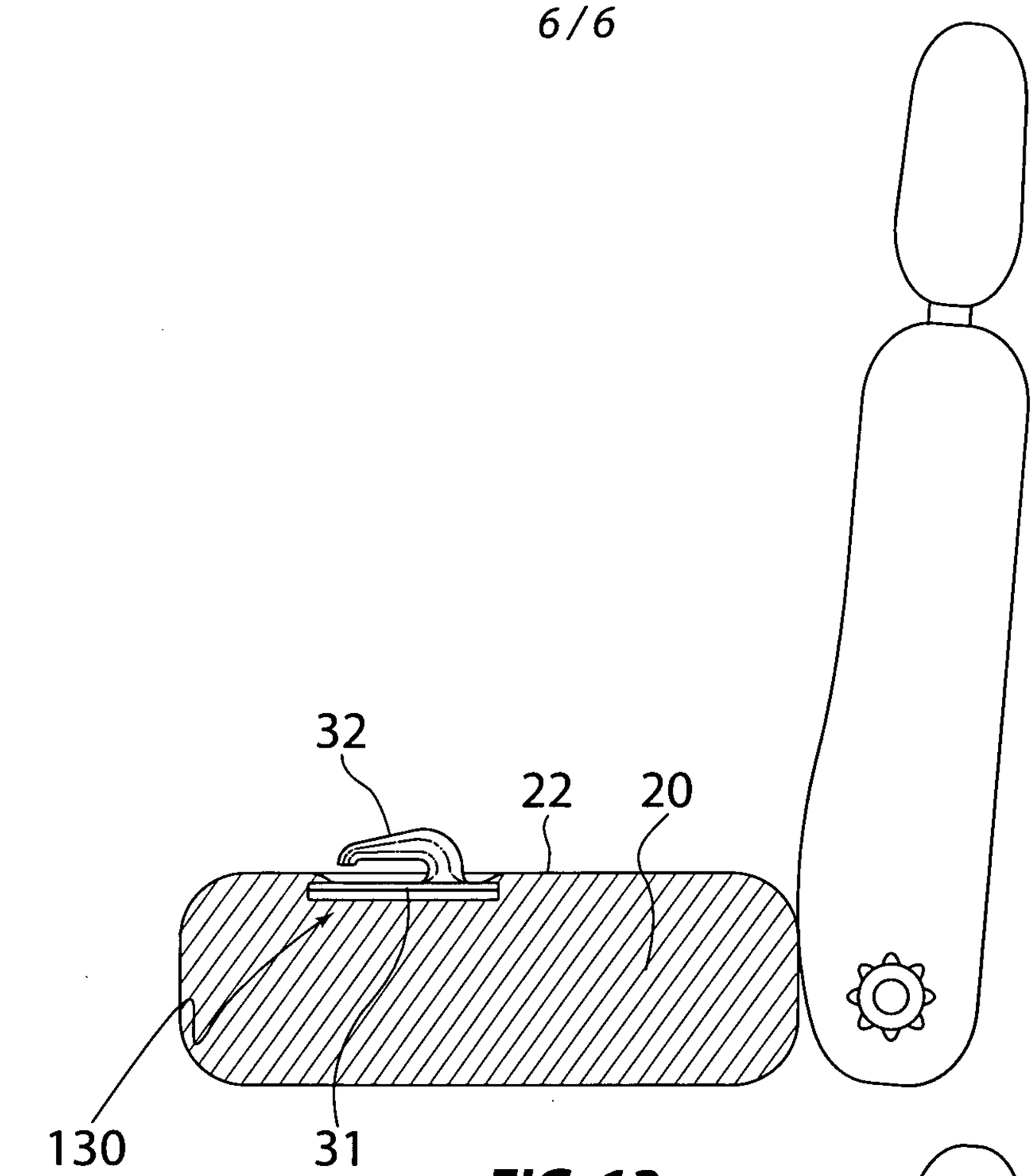

FIG. 13

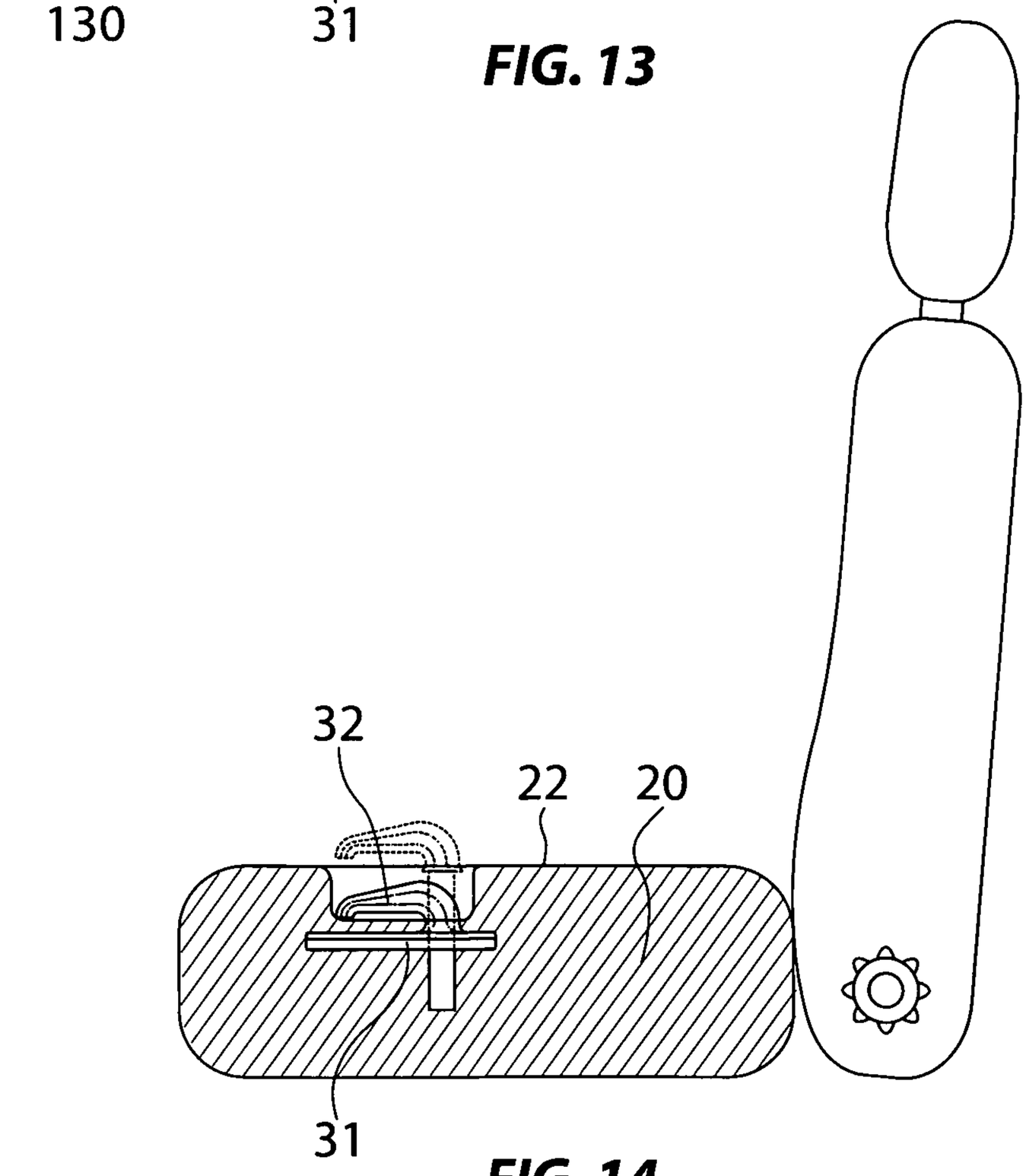

FIG. 14

50
12
52
51
13
21
37
14
15
37
20