

(19) World Intellectual Property Organization
International Bureau



(43) International Publication Date
14 December 2006 (14.12.2006)

PCT

(10) International Publication Number
WO 2006/133085 A2

- (51) International Patent Classification:
A47C 27/14 (2006.01)
- (21) International Application Number:
PCT/US2006/021728
- (22) International Filing Date: 3 June 2006 (03.06.2006)
- (25) Filing Language: English
- (26) Publication Language: English
- (30) Priority Data:
11/145,548 3 June 2005 (03.06.2005) US
- (71) Applicant and
(72) Inventor: KORNAKER, Kathleen, M. [US/US]; 16569
Acacia Drive, Strongsville, OH 44136 (US).

GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KM, KN, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, LY, MA, MD, MG, MK, MN, MW, MX, MZ, NA, NG, NI, NO, NZ, OM, PG, PH, PL, PT, RO, RU, SC, SD, SE, SG, SK, SL, SM, SY, TJ, TM, TN, TR, TT, TZ, UA, UG, US, UZ, VC, VN, YU, ZA, ZM, ZW.

(84) Designated States (unless otherwise indicated, for every kind of regional protection available): ARIPO (BW, GH, GM, KE, LS, MW, MZ, NA, SD, SL, SZ, TZ, UG, ZM, ZW), Eurasian (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European (AT, BE, BG, CH, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GR, HU, IE, IS, IT, LT, LU, LV, MC, NL, PL, PT, RO, SE, SI, SK, TR), OAPI (BF, BJ, CF, CG, CI, CM, GA, GN, GQ, GW, ML, MR, NE, SN, TD, TG).

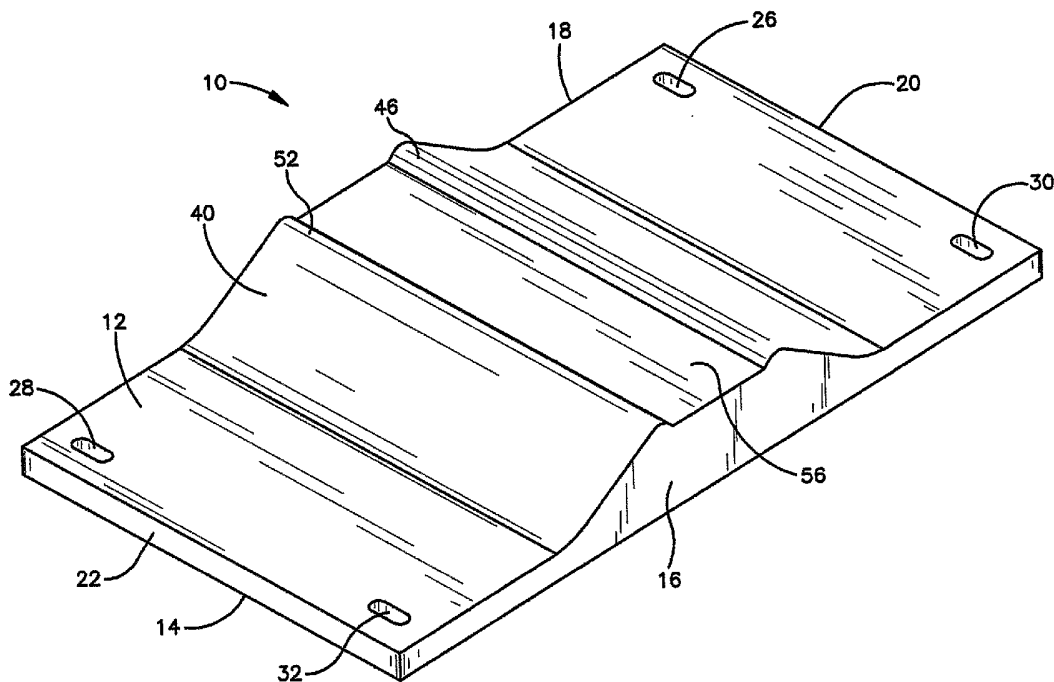
Declaration under Rule 4.17:
— of inventorship (Rule 4.17(iv))

- (74) Agent: COLLINS, Forrest, L.; Post Office Box 41040,
Brecksville, OH 44141-0040 (US).
- (81) Designated States (unless otherwise indicated, for every kind of national protection available): AE, AG, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BW, BY, BZ, CA, CH, CN, CO, CR, CU, CZ, DE, DK, DM, DZ, EC, EE, EG, ES, FI,

Published:
— without international search report and to be republished upon receipt of that report

For two-letter codes and other abbreviations, refer to the "Guidance Notes on Codes and Abbreviations" appearing at the beginning of each regular issue of the PCT Gazette.

(54) Title: CARDIOPULMONORY ASSIST DEVICE



(57) Abstract: The present invention deals with a simple device to aid in cardiac compression to assist in reestablishing normal heart rhythm. The design and size of the device is particularly useful in morbidly obese individuals that require cardiac compressions in order to optimize resuscitation efforts.

WO 2006/133085 A2

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18
19
20
21
22
23
24
25
26
27
28
29
30
31
32
33
34
35
36
37
38
39

14. Field of the Invention.

The present invention deals with individuals in need of cardiopulmonary resuscitation (CPR). The present invention provides an effective method of delivering cardiac compression to individuals in need of such treatment.

15. With the increase in the number of obese people, there is a need to develop and utilize new, bigger and better equipment to care for obese patients. Greater numbers of morbidly obese patients are being treated for high blood pressure, diabetes, sleep apnea, and choose bariatric surgery as a means of weight control. Obese patients are at risk for cardiac arrest whether

1 they are medical or surgical patients. Cardiopulmonary resuscitation is an
2 effective way to provide artificial circulatory and ventilatory support. It is
3 difficult to perform effective chest compressions on a morbidly obese patient
4 due to excess adipose. The present invention, a cardiopulmonary
5 resuscitation assist device is designed to support the spine and upper thorax
6 in order to improve the effectiveness of chest compression in the event of a
7 cardiac arrest in an obese patient.

8 16. Description of the art practices.

9 17. United States Patent 6,709,410 Sherman, et al., March 23, 2004
10 describes a system for performing chest compression for cardiopulmonary
11 resuscitation. The system includes a motor, drive spool and associated
12 couplings which allow for controlling and limiting the movement of the
13 compressing mechanism and includes a control system for controlling the
14 operation and interaction of the various components to provide for optimal
15 automatic operation of the system.

16 18. United States Patent 6,699,259 issued to Fogarty, et al., March 2, 2004
17 suggests a minimally invasive device for performing direct cardiac massage
18 including an inflatable bladder mounted on a rigid inflation tube. The rigid
19 inflation tube is used to push the bladder into the sternocostal space through
20 an incision in the upper abdomen just below the xiphoid process. A tear-away
21 insertion sleeve is provided over the balloon, so that the device may easily be
22 inserted in to the body. The insertion sleeve includes various features that
23 assist in placement of the device and removal of the sleeve. After insertion
24 into the sternocostal space and removal of the insertion sleeve, the bladder is
25 repeatedly inflated and deflated to massage the heart and provide blood flow.

26 19. United States Patent 6,616,620 issued to Sherman, et al., September
27 9, 2003 describes a resuscitation device for automatic compression of a
28 victim's chest using a compression belt, which exerts force evenly over the
29 entire thoracic cavity. The belt is constricted and relaxed through a motorized
30 spool assembly that repeatedly tightens the belt and relaxes the belt to
31 provide repeated and rapid chest compression.

32 20. United States Patent 6,447,465 issued to Sherman, et al., September
33 10, 2002 suggests system for performing chest compression and abdominal

1 compression for cardiopulmonary resuscitation. The system includes a motor
2 and gearbox including a system of clutches and brakes which allow for
3 controlling and limiting the movement of compressing mechanisms operating
4 on the chest and the abdomen of a patient

5 21. United States Patent 6,503,265 issued to Fogarty, et al., January 7,
6 2003 recites a minimally invasive device for performing direct cardiac
7 massage including an inflatable bladder mounted on a rigid inflation tube.
8 The rigid inflation tube is used to push the bladder into the sternocostal space
9 through an incision in the upper abdomen just below the xiphoid process.
10 After insertion into the sternocostal space, the bladder is repeatedly inflated
11 and deflated to massage the heart and provide blood flow.

12 22. United States Patent 6,536,056 issued to Vrzalik, et al., March 25,
13 2003 suggests a bariatric treatment system providing a comprehensive array
14 of therapeutic services for the morbidly obese patient. The treatment system
15 generally comprises a stable bed frame upon which is mounted a low air loss
16 therapeutic mattress system. Integrated hardware and software controls
17 provide such therapies as pulsation, percussion, rotation, cardiac chair and
18 Trendelenburg. Means are disclosed whereby the bariatric patient may safely
19 and comfortably enter and exit the bed with relative ease. The bed is
20 adaptable for transport within a hospital, including such features as a
21 transport mode wherein the bed's lateral axis is minimized and battery backup
22 to maintain necessary therapies during patient transport. A plurality of control
23 means are disclosed for simplification of caregiver workload and ease of
24 patient utilization.

25 23. United States Patent 6,599,258 issued to Bystrom, et al., July 29, 2003
26 sets out a resuscitation device for automatic compression of victim's chest
27 using a compression belt that exerts force evenly over the entire thoracic
28 cavity. The belt is constricted and relaxed through a motorized spool
29 assembly that repeatedly tightens the belt and relaxes the belt to provide
30 repeated and rapid chest compression. An assembly includes various
31 resuscitation devices including chest compression devices, defibrillation
32 devices, and airway management devices, along with communications

1 devices and senses with initiate communications with emergency medical
2 personnel automatically upon use of the device.

3 24. United States Patent 6,699,259 issued to Fogarty, et al., March 2, 2004
4 describes a minimally invasive device for performing direct cardiac massage
5 including an inflatable bladder mounted on a rigid inflation tube. The rigid
6 inflation tube is used to push the bladder into the sternocostal space through
7 an incision in the upper abdomen just below the xiphoid process. A tear-away
8 insertion sleeve is provided over the balloon, so that the device may easily be
9 inserted in to the body. The insertion sleeve includes various features that
10 assist in placement of the device and removal of the sleeve. After insertion
11 into the sternocostal space and removal of the insertion sleeve, the bladder is
12 repeatedly inflated and deflated to massage the heart and provide blood flow.

13 25. United States Published Patent Application 20020156401 to Sherman
14 et al., dated October 24, 2002 suggests a system for performing chest
15 compression for cardiopulmonary resuscitation. The system includes a motor,
16 drive spool and associated couplings that allow for controlling and limiting the
17 movement of the compressing mechanism and includes a control system for
18 controlling the operation and interaction of the various components to provide
19 for optimal automatic operation of the system.

20 26. United States Published Patent Application 20030009115 to Sherman
21 et al., dated January 9, 2003 sets out a system for performing chest
22 compression and abdominal compression for cardiopulmonary resuscitation.
23 The system includes a motor and gearbox including a system of clutches and
24 brakes which allow for controlling and limiting the movement of compressing
25 mechanisms operating on the chest and the abdomen of a patient.

26 27. United States Published Patent Application 20030105481 to Fogarty, et
27 al., and dated June 5, 2003 sets out a minimally invasive device for
28 performing direct cardiac massage including an inflatable bladder mounted on
29 a rigid inflation tube. The rigid inflation tube is used to push the bladder into
30 the sternocostal space through an incision in the upper abdomen just below
31 the xiphoid process. A tear-away insertion sleeve is provided over the
32 balloon, so that the device may easily be inserted in to the body. The
33 insertion sleeve includes various features that assist in placement of the

1 device and removal of the sleeve. After insertion into the sternocostal space
2 and removal of the insertion sleeve, the bladder is repeatedly inflated and
3 deflated to massage the heart and provide blood flow.

4 28. United States Published Patent Application 20030208847 to Vrzalik, et
5 al., dated November 13, 2003 postulates a bariatric treatment system
6 providing a comprehensive array of therapeutic services for the morbidly
7 obese patient is disclosed. The treatment system generally comprises a
8 stable bed frame upon which is mounted a low air loss therapeutic mattress
9 system. Integrated hardware and software controls provide such therapies as
10 pulsation, percussion, rotation, cardiac chair and Trendelenburg. Means are
11 disclosed whereby the bariatric patient may safely and comfortably enter and
12 exit the bed with relative ease. The bed is adaptable for transport within a
13 hospital, including such features as a transport mode wherein the bed's lateral
14 axis is minimized and battery backup to maintain necessary therapies during
15 patient transport. A plurality of control means are disclosed for simplification
16 of caregiver workload and ease of patient utilization.

17 29. United States Published Patent Application 20040002667 to Sherman,
18 et al., dated January 1, 2004 recites a resuscitation device for automatic
19 compression of a victim's chest using a compression belt which exerts force
20 evenly over the entire thoracic cavity. The belt is constricted and relaxed
21 through a motorized spool assembly that repeatedly tightens the belt and
22 relaxes the belt to provide repeated and rapid chest compression.

23 30. United States Published Patent Application 20040006290 to Sherman,
24 et al., dated January 8, 2004 suggests a resuscitation device for automatic
25 compression of a victim's chest using a compression belt which exerts force
26 evenly over the entire thoracic cavity. The belt is constricted and relaxed
27 through a motorized spool assembly that repeatedly tightens the belt and
28 relaxes the belt to provide repeated and rapid chest compression.

29 31. United States Published Patent Application 20040030271 to Sherman,
30 et al., and dated February 12, 2004 provides a resuscitation device for
31 automatic compression of a victim's chest using a compression belt, which
32 exerts force evenly over the entire thoracic cavity. The belt is constricted and

1 relaxed through a motorized spool assembly that repeatedly tightens the belt
2 and relaxes the belt to provide repeated and rapid chest compression.

3 32. United States Published Patent Application 20040064054 to Clift dated
4 April 1, 2004 recites an apparatus and techniques are provided for precise
5 measuring and monitoring of certain vital signs of patients that have been
6 difficult to measure especially in emergency situations. A sensor may be
7 used for detecting contraction and expansion in the vascular bed of the lining
8 tissue of the external auditory canal during a cardiac cycle to obtain a better
9 indication of certain physiological parameters. Such a signal generally may
10 be superimposed with an additional signal that is primarily due to breathing
11 activity of the patient. Based on various scenarios different sensors may be
12 used to determine the signal due to breathing activity and thus the
13 physiological parameter of interest may be derived. The signal corresponding
14 to the physiological parameter of interest, for example, blood pressure may
15 then be used to monitor the vital signs or control other medical equipment.

16 33. United States Published Patent Application 20040073145 to Bystrom
17 dated April 15, 2004 describes a resuscitation device for automatic
18 compression of victim's chest using a compression belt, which exerts force
19 evenly over the entire thoracic cavity. The belt is constricted and relaxed
20 through a motorized spool assembly that repeatedly tightens the belt and
21 relaxes the belt to provide repeated and rapid chest compression. An
22 assembly includes various resuscitation devices including chest compression
23 devices, defibrillation devices, and airway management devices, along with
24 communications devices and senses with initiate communications with
25 emergency medical personnel automatically upon use of the device.

26 34. United States Published Patent Application 20040167563 to Fogarty,
27 et al., dated August 26, 2004 suggests a minimally invasive device for
28 performing direct cardiac massage including an inflatable bladder mounted on
29 a rigid inflation tube. The rigid inflation tube is used to push the bladder into
30 the sternocostal space through an incision in the upper abdomen just below
31 the xiphoid process. A tear-away insertion sleeve is provided over the
32 balloon, so that the device may easily be inserted in to the body. The
33 insertion sleeve includes various features that assist in placement of the

1 device and removal of the sleeve. After insertion into the sternocostal space
2 and removal of the insertion sleeve, the bladder is repeatedly inflated and
3 deflated to massage the heart and provide blood flow.

4 35. United States Published Patent Application 20040193076 to Sherman,
5 et al., and dated September 30, 2004 describes a system for performing chest
6 compression for cardiopulmonary resuscitation. The system includes a motor,
7 drive spool and associated couplings, which allow for controlling and limiting
8 the movement of the compressing mechanism and includes a control system
9 for controlling the operation and interaction of the various components to
10 provide for optimal automatic operation of the system.

11 36. United States Published Patent Application 20040215112 to
12 Mollenauer et al., dated October 28, 2004 suggests a resuscitation device for
13 automatic compression of victim's chest using a compression belt, which
14 exerts force evenly over the entire thoracic cavity. The belt is constricted and
15 relaxed through a motorized spool assembly that repeatedly tightens the belt
16 and relaxes the belt to provide repeated and rapid chest compression. An
17 assembly includes various resuscitation devices including chest compression
18 devices, defibrillation devices, and airway management devices, along with
19 communications devices and senses with initiate communications with
20 emergency medical personnel automatically upon use of the device

21 37. United States Published Patent Application 20040225238 to Sherman,
22 et al., and dated November 11, 2004 recites a resuscitation device for
23 automatic compression of a victim's chest using a compression belt operably
24 attached to a platform upon which a patient rests. In use, the compression
25 belt is wrapped around the patient and at least one spindle operably attached
26 to the platform.

27 38. The foregoing devices are difficult to employ, often involve invasive
28 procedures, and when cardio-version (electric shock) is utilized must be
29 disconnected to prevent damage to the equipment.

30 39. To the extent that the foregoing patents and references are relevant to
31 the present invention they are herein incorporated by reference.

32

- 1 **40.** **Summary of the Invention**
2 **41.** The present invention describes a cardiopulmonary assist device
3 comprising:
4 a generally rectangular object;
5 said generally rectangular object having a first generally rectangular flat
6 surface;
7 said generally rectangular object having a first side area;
8 said generally rectangular object having a second side area;
9 said generally rectangular object having a first end region;
10 said generally rectangular object having a second end region;
11 said generally rectangular object having a second generally rectangular
12 surface;
13 said generally rectangular object having a second generally rectangular
14 surface having a raised region thereon a centrally located between the first
15 side area and the second side area.
16 **42.** The present invention also describes a cardiopulmonary
17 assist device comprising:
18 a generally rectangular object;
19 said generally rectangular object having a first generally rectangular flat
20 surface;
21 said generally rectangular object having a first side area;
22 said generally rectangular object having a second side area;
23 said generally rectangular object having a first end region;
24 said generally rectangular object having a second end region;
25 said generally rectangular object having a second generally rectangular
26 surface;
27 said generally rectangular object having a second generally rectangular
28 surface having a raised region thereon a centrally located between the first
29 side area and the second side area;
30 provided further that the raised region is generally trapezoidal
31 configuration having a trapezoidal base region, a trapezoidal region
32 upper region, a first trapezoidal side and a second trapezoidal side,
33 and;

1 wherein the generally trapezoidal configuration does not extend to one
2 of the first side area or the second side area.

3 43. Another aspect of the invention is a method of treating a mammalian
4 subject in need of cardiopulmonary resuscitation comprising placing the
5 mammalian subject in a supine position on a cardiopulmonary assist device
6 having a raised region, such that the cardio-region of the mammalian subject
7 is located above the raised region during at least a portion of the time that
8 cardiopulmonary resuscitation is performed on the mammalian subject.

9

1
2
3
4
5
6
7
8
9
10
11
12
13
14
15
16
17
18

44. Brief Description of the Drawings

45. The features of the present invention will become apparent to one skilled in the art to which the present invention relates upon consideration of the following description of the invention with reference to the accompanying drawings, wherein:

46. Fig. 1 is a perspective view according to the present invention;

47. Fig. 2 is a plan view according to the present invention;

48. Fig. 3 is an end view according to the present invention;

49. Fig. 4 is a first side view according to the present invention;

50. Fig. 5 is a prior art device;

51. Fig. 6 is a schematic view according to the present invention

52. Fig. 7 is a perspective view of an alternative embodiment similar to Fig. 1 of the present invention;

53. Fig. 8 is a plan view of an alternative embodiment similar to Fig. 2 of the present invention; and,

54. Fig. 9 an alternative embodiment similar to Fig. 4 of the present invention.

1 55. Detailed Description of the Invention

2 56. As best seen in Fig. 1 is a cardiopulmonary resuscitation assist device
3 10. The cardiopulmonary resuscitation assist device 10 has a
4 cardiopulmonary resuscitation assist device upper surface 12. The
5 cardiopulmonary resuscitation assist device 10 also has a cardiopulmonary
6 resuscitation assist device lower surface 14. A cardiopulmonary resuscitation
7 assist device lower end 16 is located between the cardiopulmonary
8 resuscitation assist device upper surface 12 and the cardiopulmonary
9 resuscitation assist device lower surface 14.

10 57. A cardiopulmonary resuscitation assist device upper end 18 is located
11 in between the cardiopulmonary resuscitation assist device upper surface 12
12 and the cardiopulmonary resuscitation assist device lower surface 14. The
13 cardio-pulmonary resuscitation assist device 10 has a cardiopulmonary
14 resuscitation assist device first side 20. The cardiopulmonary resuscitation
15 assist device 10 also has a cardiopulmonary resuscitation assist device
16 second side 22.

17 58. The cardiopulmonary resuscitation assist device 10 is generally
18 rectangular. The cardiopulmonary resuscitation assist device 10 is
19 symmetrical on the cardiopulmonary resuscitation assist device upper surface
20 12. The cardiopulmonary resuscitation assist device 10 is also symmetrical
21 on the cardiopulmonary resuscitation assist device lower surface 14.

22 59. The cardiopulmonary resuscitation assist device 10 may be
23 conveniently formed from one or more materials. As a practical matter it is
24 preferred that the cardiopulmonary resuscitation assist device 10 be formed
25 from a single material such as a plastic. Such formation of the
26 cardiopulmonary resuscitation assist device 10 may be accomplished by
27 injection molding. The cardiopulmonary resuscitation assist device 10 is
28 generally formed such that it is a non-resilient. Conveniently, the cardio-
29 pulmonary resuscitation assist device 10 is electrically non-conductive.

30 60. The cardiopulmonary resuscitation assist device 10 has a cardio-
31 pulmonary resuscitation assist device first handgrip 26 along the
32 cardiopulmonary resuscitation assist device first side 20. The
33 cardiopulmonary resuscitation assist device 10 has a cardiopulmonary

1 resuscitation assist device second handgrip 28 along the cardiopulmonary
2 resuscitation assist device second side 22. The cardiopulmonary
3 resuscitation assist device 10 has a cardiopulmonary resuscitation assist
4 device third handgrip 30 located along the cardiopulmonary resuscitation
5 assist device first side 20. The cardiopulmonary resuscitation assist device
6 10 has a cardiopulmonary resuscitation assist device fourth handgrip 32
7 located along the cardiopulmonary resuscitation assist device second side 22.
8 The various handgrips extend through the cardiopulmonary resuscitation
9 assist device upper surface 12 to the cardiopulmonary resuscitation assist
10 device lower surface 14.

11 61. The various handgrips are of a sufficient size to permit movement of
12 the cardiopulmonary resuscitation assist device 10 beneath an obese patient
13 as later described. The handgrips are intended as a matter of convenience
14 and are not required for the cardiopulmonary resuscitation assist device 10 to
15 function.

16 62. Extending from the cardiopulmonary resuscitation assist device upper
17 surface 12 of the cardiopulmonary resuscitation assist device 10 is a cardio-
18 pulmonary resuscitation assist device raised region 40. The cardiopulmonary
19 resuscitation assist device raised region 40 has a cardiopulmonary
20 resuscitation assist device raised region first ridge 46. The cardiopulmonary
21 resuscitation assist device raised region 40 also has a cardiopulmonary
22 resuscitation assist device raised region second ridge 52. Located between
23 the cardiopulmonary resuscitation assist device raised region first ridge 46
24 and the cardiopulmonary resuscitation assist device raised region second
25 ridge 52 is a cardiopulmonary resuscitation assist device trough 56.

26 63. As best seen in Fig. 2, the cardiopulmonary resuscitation assist device
27 raised region 40 is devised such that when an obese patient may be placed
28 on the cardiopulmonary resuscitation assist device 10. The cardiopulmonary
29 resuscitation assist device trough 56 is thus of a sufficient width to
30 accommodate the obese patient. A space of several inches exists for the
31 cardiopulmonary resuscitation assist device trough 56 between the
32 cardiopulmonary resuscitation assist device raised region first ridge 46 and
33 cardiopulmonary resuscitation assist device raised region second ridge 52.

1 The distance between cardiopulmonary resuscitation assist device raised
2 region first ridge 46 and cardiopulmonary resuscitation assist device raised
3 region second ridge 52 is such that the scapulae of a patient placed on the
4 cardiopulmonary resuscitation assist device raised region 40 are located
5 outward of the respective cardiopulmonary resuscitation assist device raised
6 region ridges 46 and 52.

7 64. The cardiopulmonary resuscitation assist device raised region first
8 ridge 46 and the cardiopulmonary resuscitation assist device raised region
9 second ridge 52 are generally rounded to avoid injury to an obese patient
10 positioned on the cardiopulmonary resuscitation assist device 10. The size of
11 the cardiopulmonary resuscitation assist device 10 is conveniently 28 inches
12 by 16 inches. The height of the cardiopulmonary resuscitation assist device
13 raised region first ridge 46 from the cardiopulmonary resuscitation assist
14 device lower surface 14 is about 1.5 to about 6 times the distance from the
15 cardiopulmonary resuscitation assist device lower surface 14 to the
16 cardiopulmonary resuscitation assist device trough 56.

17 65. As best seen in Fig. 5 is a prior art board 90. The prior art board 90
18 has a flat surface 92. The prior art board 90 may simply be a piece of
19 plywood in a rectangular shape.

20 66. A patient 100 is shown positioned on the prior art board 90. The
21 patient 100 has a patient spinal column 110. The patient also has a scapula
22 114 and a scapula 116. The patient 100 has a heart 120.

23 67. Cardiac and respiratory arrest is a risk for obese patients. When a
24 patient undergoes cardiac arrest cardiopulmonary resuscitation is performed.
25 The cardiopulmonary resuscitation involves as one aspect the compression of
26 the heart region to provide blood flow through the body of cardiac arrest
27 patient. The morbidly obese present great difficulty in receiving cardiac
28 compression. The difficulty arises because the morbidly obese have an
29 excess of adipose tissue that deflects and absorbs the force delivered by the
30 person performing the cardiac compression.

31 68. As best seen in Fig. 5 the patient 100 will receive a force A 1 applied
32 manually to provide the cardiac compression portion of cardiopulmonary
33 resuscitation. The force A 1 is applied directly over the patient heart 120 of

1 the patient 100. As the prior art board 90 has a flat surface 92 there is
2 nothing to stop the force A 1 from the urging toward the force lines B 1 and C
3 1. That is, the large amounts of adipose tissue in the patient permit deflection
4 and absorption of the force A 1 such that heart is not effectively compressed.
5 69. Accordingly, the patient 100 loses most of the force A 1 applied to the
6 patient heart 120 of the patient 100. The same situation occurs when any flat
7 surface is utilized to perform cardiopulmonary resuscitation.

8 70. As seen in Fig. 6 a patient 100 has the cardiopulmonary resuscitation
9 assist device 10 positioned such that the patient's heart 120 is between the
10 cardiopulmonary resuscitation assist device raised region second ridge 52
11 and the cardiopulmonary resuscitation assist device trough 56. When the
12 force A is applied to the cardiac region of the patient 100 positioned on the
13 cardiopulmonary resuscitation assist device 10 the deflection of the force A in
14 the direction of B and C is considerably less as the adipose tissue is less
15 inclined to move freely.

16 71. The effect of the present invention is to permit the force to be applied
17 effectively to the patient's heart 120 without undue deflection or absorption of
18 the force by the adipose tissue of the patient 100.

19 72. As seen in Figs. 7 through 9 is an alternative embodiment of the
20 present invention. A cardiopulmonary resuscitation assist device extension
21 200 is present on the cardiopulmonary resuscitation assist device 10. The
22 cardiopulmonary resuscitation assist device extension 200 may be molded
23 integrally with the remainder of the cardiopulmonary resuscitation assist
24 device 10. The cardiopulmonary resuscitation assist device extension 200
25 may also be fixed to the cardiopulmonary resuscitation assist device 10 by
26 screws, swage fitted, or by adhesive (not shown).

27 73. The cardiopulmonary resuscitation assist device extension 200 has a
28 cardiopulmonary resuscitation assist device extension beveled edge 206 and
29 a cardiopulmonary resuscitation assist device extension rounded edge 218.
30 The cardiopulmonary resuscitation assist device extension 200 reduces the
31 potential of hyperextension of the head and neck region when used with a
32 patient 100.

1 74. From the above description of the invention, those skilled in the art will
2 perceive improvements, changes and modifications. Such improvements,
3 changes and modifications within the skill of the art are intended to be covered
4 by the appended claims.
5

1 75. What is claimed is:

2 Claim 1. A cardiopulmonary assist device comprising:
3 a generally rectangular object;
4 said generally rectangular object having a first generally rectangular flat
5 surface;
6 said generally rectangular object having a first side area;
7 said generally rectangular object having a second side area;
8 said generally rectangular object having a first end region;
9 said generally rectangular object having a second end region;
10 said generally rectangular object having a second generally rectangular
11 surface;
12 said generally rectangular object having a second generally rectangular
13 surface having a raised region thereon a centrally located between the first
14 side area and the second side area.

15
16 Claim 2. The cardiopulmonary assist device according to claim 1,
17 wherein the raised region is generally trapezoidal configuration having
18 a trapezoidal base region, a trapezoidal region upper region, a first
19 trapezoidal side and a second trapezoidal side.

20
21 Claim 3. The cardiopulmonary assist device according to claim 1,
22 wherein the generally trapezoidal configuration does not extend to one
23 of the first side area or the second side area.

24
25 Claim 4. The cardiopulmonary assist device according to claim 1,
26 wherein the raised region is from about 1.5 to 6 times the width of the
27 first end region or the second end region.

28
29 Claim 5. The cardiopulmonary assist device according to claim 2,
30 wherein the trapezoidal upper region has a first peak area, a second
31 peak area, and a trough located between the first peak area and the
32 second peak area.

33

- 1 **Claim 6.** **The cardiopulmonary assist device according to claim 1, which**
2 **is a single formed structure.**
3
- 4 **Claim 7.** **The cardiopulmonary assist device according to claim 1, which**
5 **is generally non-flexible.**
6
- 7 **Claim 8.** **The cardiopulmonary assist device according to claim 1, having**
8 **one or more openings, for when in use, to permit a hand grasping**
9 **action in at least one opening.**
10
- 11 **Claim 9.** **A cardiopulmonary assist device comprising:**
12 **a generally rectangular object;**
13 **said generally rectangular object having a first generally rectangular flat**
14 **surface;**
15 **said generally rectangular object having a first side area;**
16 **said generally rectangular object having a second side area;**
17 **said generally rectangular object having a first end region;**
18 **said generally rectangular object having a second end region;**
19 **said generally rectangular object having a second generally rectangular**
20 **surface;**
21 **said generally rectangular object having a second generally rectangular**
22 **surface having a raised region thereon a centrally located between the first**
23 **side area and the second side area;**
24 **provided further that the raised region is generally trapezoidal**
25 **configuration having a trapezoidal base region, a trapezoidal region upper**
26 **region, a first trapezoidal side and a second trapezoidal side, and;**
27 **wherein the generally trapezoidal configuration does not extend to one of the**
28 **first side area or the second side area.**
29
- 30 **Claim 10.** **The cardiopulmonary assist device according to claim 9,**
31 **wherein the raised region is from about 1.5 to 6 times the width of the**
32 **first end region or the second end region.**
33

- 1 **Claim 11.** The cardiopulmonary assist device according to claim 9,
2 wherein the trapezoidal upper region has a first peak area, a second
3 peak area, and a trough located between the first peak area and the
4 second peak area.
- 5
- 6 **Claim 12.** The cardiopulmonary assist device according to claim 9, which
7 is a single formed structure.
- 8
- 9 **Claim 13.** The cardiopulmonary assist device according to claim 9, which
10 is generally non-flexible.
- 11
- 12 **Claim 14.** The cardiopulmonary assist device according to claim 9, having
13 one or more openings, for when in use, to permit a hand grasping action in at
14 least one opening.
- 15
- 16 **Claim 15.** A method of treating a mammalian subject in need of
17 cardiopulmonary resuscitation comprising placing the mammalian subject in a
18 supine position on a cardiopulmonary assist device according to claim 1, such
19 that the cardio-region of the mammalian subject is located above the raised
20 region during at least a portion of the time that cardiopulmonary resuscitation
21 is performed on the mammalian subject.
- 22
- 23 **Claim 16.** A method of treating a mammalian subject in need of
24 cardiopulmonary resuscitation comprising placing the mammalian subject in a
25 supine position on a cardiopulmonary assist device according to claim 9, such
26 that the cardio-region of the mammalian subject is located above the raised
27 region during at least a portion of the time that cardiopulmonary resuscitation
28 is performed on the mammalian subject.
- 29
- 30 **Claim 17.** The method according to claim 16, wherein the respective
31 scapula of the mammalian subject are located outward of the respective first
32 peak area, and the second peak area.
- 33

1 **Claim 18.** The cardiopulmonary assist device according to claim 1, having
2 at least one cardiopulmonary resuscitation assist device extension extending
3 downward from at least one lengthwise end of said cardiopulmonary
4 resuscitation assist device raised region toward said first generally rectangular
5 flat surface.

6
7 **Claim 19.** The cardiopulmonary assist device according to claim 9, having
8 at least one cardiopulmonary resuscitation assist device extension extending
9 downward from at least one lengthwise end of said cardiopulmonary
10 resuscitation assist device raised region toward said first generally rectangular
11 flat surface.

12

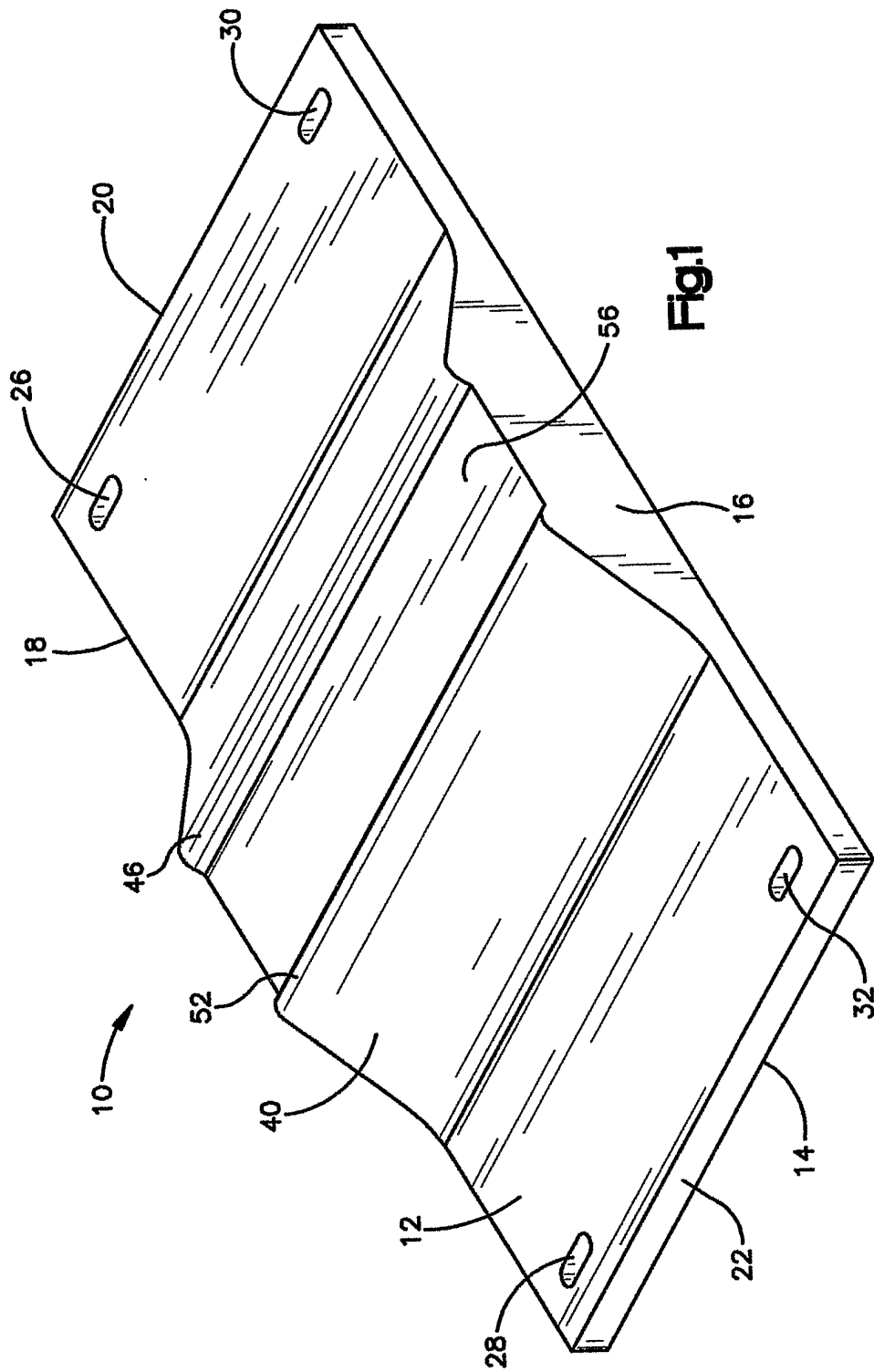
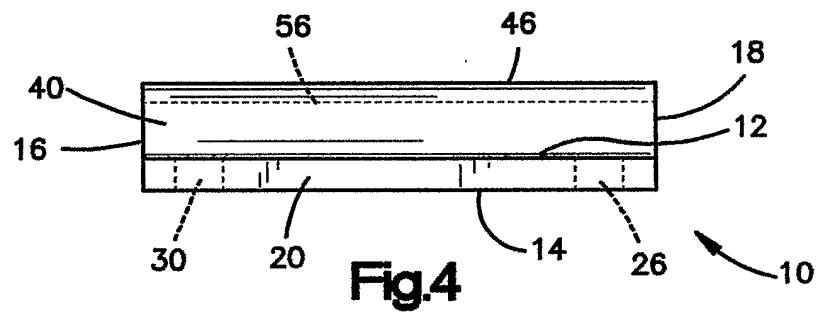
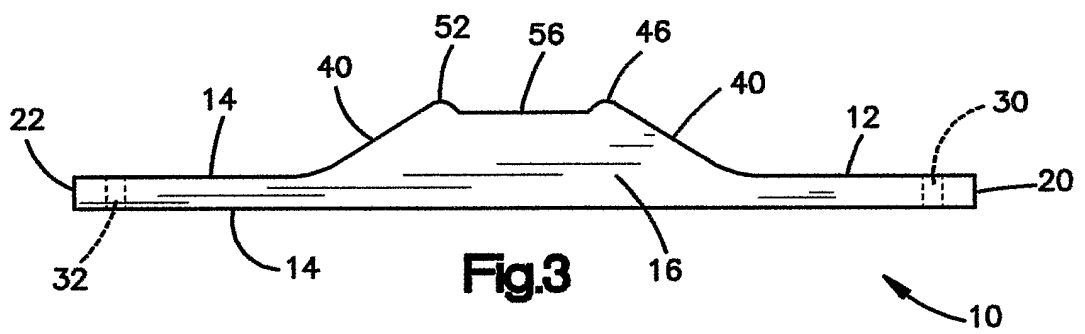
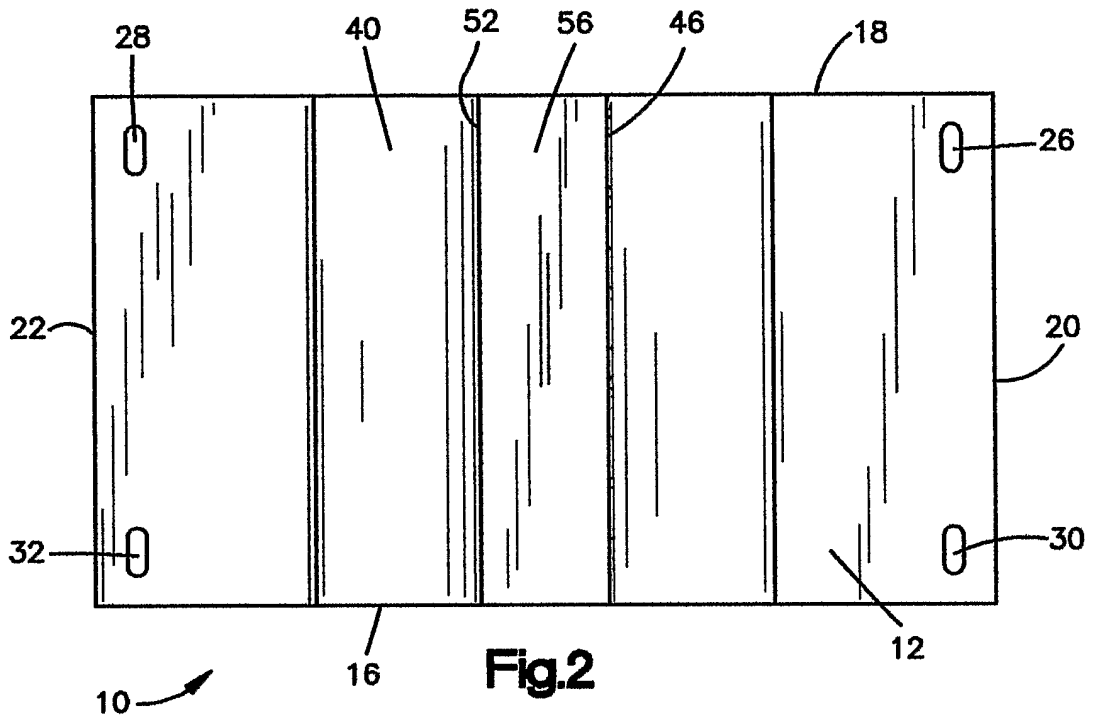


Fig.1



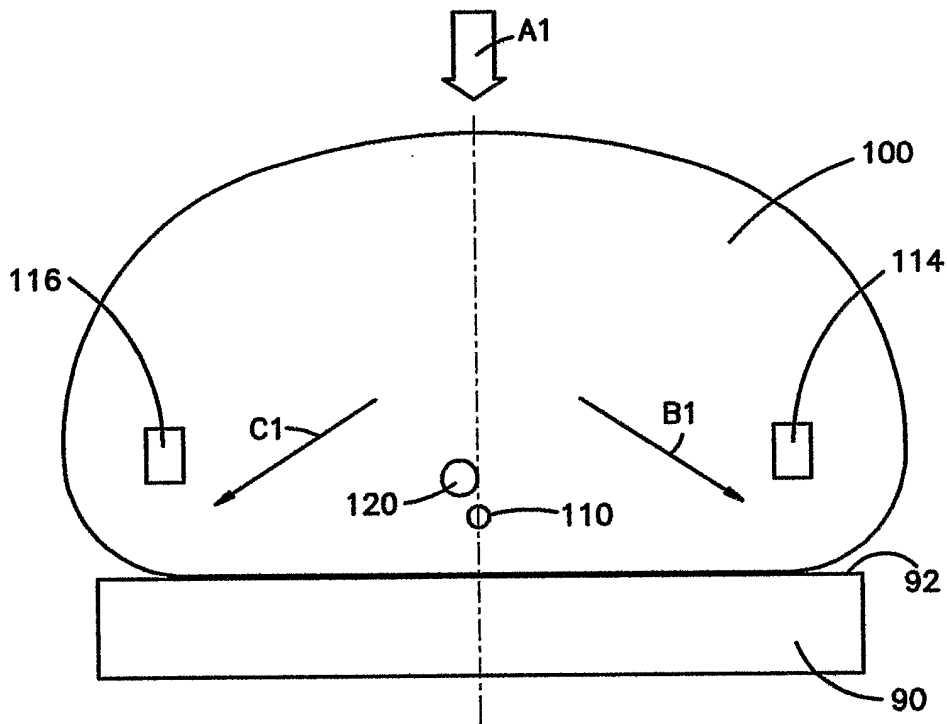


Fig.5
PRIOR ART

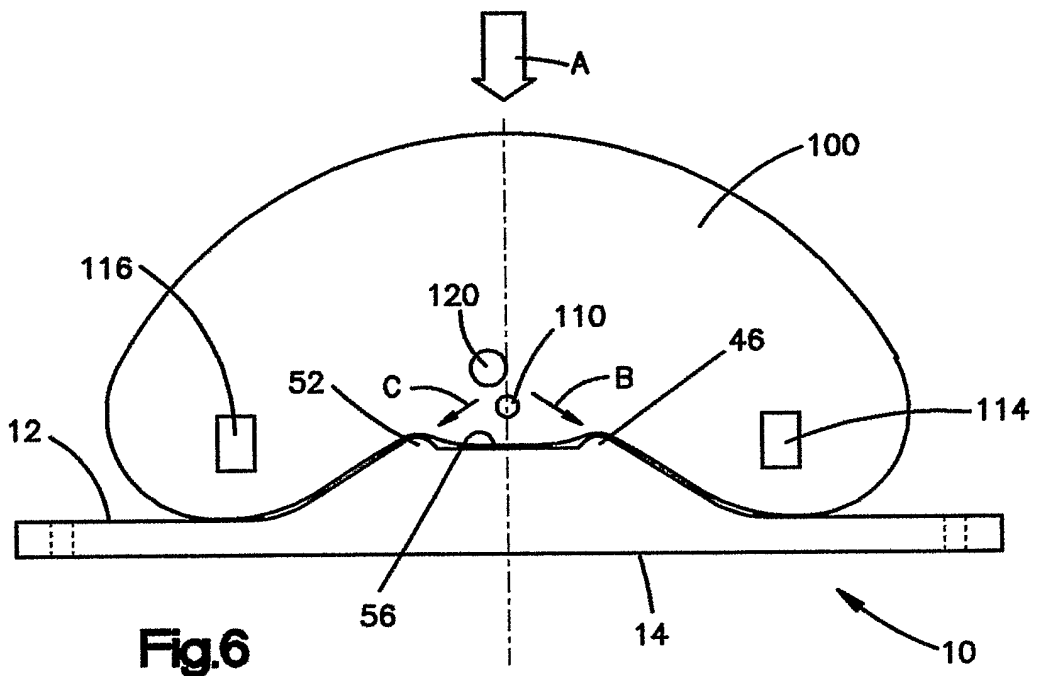


Fig.6

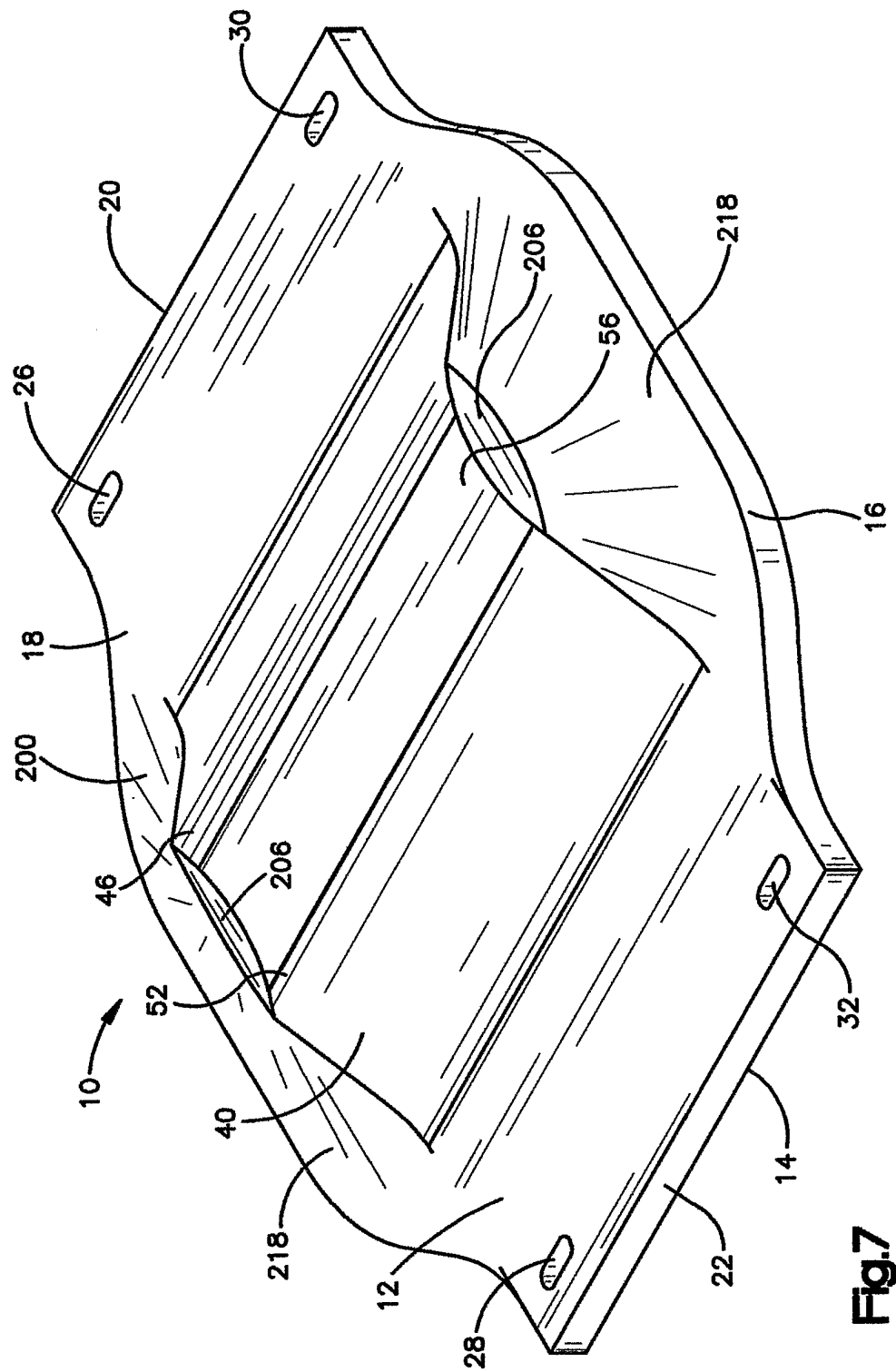


Fig.7

