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(72) Inventors:
• **Rodano, Andrea**
I-16010, Savignone (GE) (IT)
• **Scardigli, Fabio**
I-16010, Savignone (IT)

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(74) Representative: **Karaghiosoff, Giorgio**
Alessandro
Studio Karaghiosoff e Frizzi S.r.l.
Via F. Baracca 1R 4° piano
17100 Savona (IT)

(71) Applicant: **Oregon Group SRL**
16010 Savignone (IT)

(54) **Equipped bulkhead for fitting medical transport vehicles, particularly ambulances**

(57) Equipped bulkhead for fitting medical transport vehicles, particularly ambulances, installed in order to divide the vehicle in two portions, a front portion indented to house the driver and a further passenger and a rear portion intended to house the patient and helping per-

sonnel characterized in that said wall is divided in three parts i.e. it has two fixed elements (1, 2) and a passage opening (3) between said two vehicle portions that is said opening (3) serves for the communication between the medical area and the driver's cab.

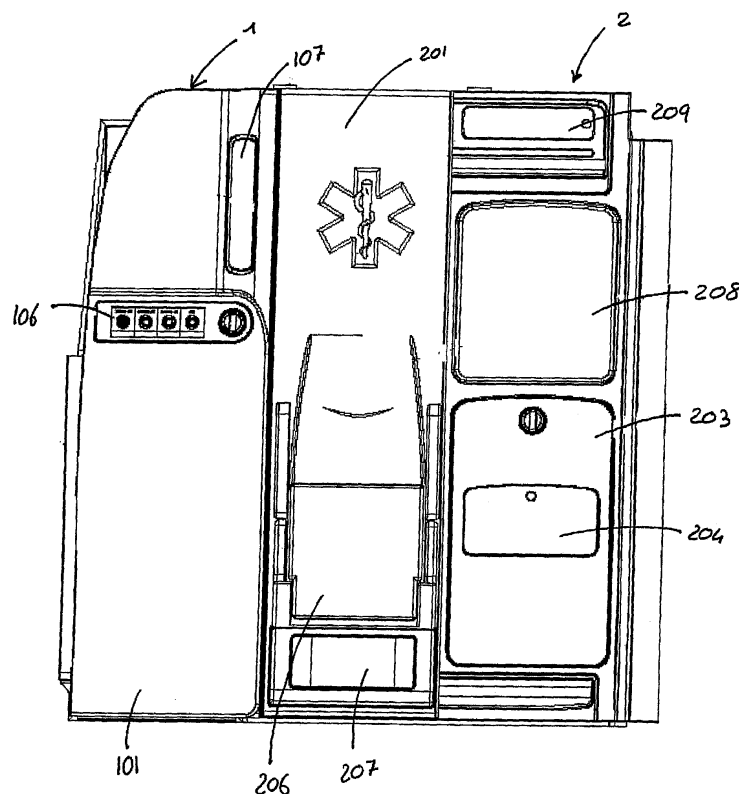


Fig 1

Description

[0001] The present invention relates to an equipped bulkhead for fitting medical transport vehicles, particularly ambulances.

[0002] The medical aid activity falls only under the competence of the National Health Service. The government determines typologic standards and standards related to equipment of emergency vehicles and professional requirements of personnel.

[0003] The territorial emergency service uses medical transport vehicles that are designed and made such to provide the greatest safety and comfort level to patients and to helping personnel.

[0004] The ambulance comprises a compartment for the driver and a compartment for the patient able to house generally two operators and one or more patients on a stretcher or carry chair. The vehicle has to transport equipment and materials necessary to provide an appropriate professional assistance at the intervention place and during the transport.

[0005] In Italy and in Europe the manufacturing of ambulances is regulated by Ministerial Decrees, which in Italy define two types of ambulances depending on the function fulfilled by vehicles

- Type A emergency ambulances equipped for transporting invalid and injured patients and for the first aid service, provided with specific aid equipment,
- type B transport ambulances essentially equipped for transporting invalid or injured patients, in case equipped with simple aid equipment.

[0006] New European regulations provide further types of vehicles to be classified.

[0007] It is clear that said types of vehicles are provided with equipment and instruments such as articles for protecting the patient and articles for monitoring the patient, equipment for moving the patient such as wheeled stretchers, folding and cardiopathic stretchers, in addition to other more specific equipment for treating particular diseases or accidents.

[0008] For all devices transporting and housing the patient and for equipment used for the vital support there are provided suitable housings and fastening methods as well as the reinforcement of ambulance structures in anchorage locations. Moreover in the patient compartment there are provided suitable housings for smaller stuff such as materials subjected to be consumed, such as gloves, cannulas, bandages and instruments for treating wounds, fractures and medical devices for the first treatment of the patient before transporting him in the ambulance.

[0009] It is necessary for supports intended to housing apparatuses and equipment to be well fastened to reinforced anchorage structures in order to withstand a force not lower than 10G and supports have to be suitably placed such to be used at best safety conditions, hidden-

ly, and placed such to reach both the lower and upper half of the patient.

[0010] The aim of the present invention is to provide an equipped bulkhead allowing a high amount of equipment and patient supporting means to be housed within a limited space such that patients affected by different diseases can be suitably treated during the transport inside the ambulance and towards the assistance facilities.

[0011] The invention achieves the above aims by providing an equipped bulkhead according to the preamble of claim 1 and wherein said bulkhead is divided into three portions, i.e. it has two closed elements causing the driver's cab and the medical compartment to be divided such to define an opening for the communication between the driver's cab and the medical compartment.

[0012] According to one embodiment the two closed elements are two lateral fixed elements spaced apart such to create a central passage opening between the two areas of the vehicle.

[0013] Each one of the lateral fixed wall elements has a sliding element that is fastened or mounted thereto and said sliding elements can be alternatively moved one with the other in a position coinciding with the central opening.

[0014] According to a further possible characteristic, at least a lateral fixed element is composed of fixed and sliding parts that can be brought from a position overlapping the lateral element to a laterally staggered position with respect to the element and coinciding with the opening.

[0015] One or both the fixed lateral wall elements have a thickness where at least a compartment for housing structures supporting and helping the patient is obtained.

[0016] The compartment/compartments housing or supporting equipment are placed on different levels such that all space available of the wall can be used.

[0017] The equipped bulkhead allows all equipment to be locked in a safety position when they are not used and at the same time allows equipment to be quickly reached when it is necessary.

[0018] The partition concerning the driver's cab takes place by means of a not movable partition wall divided in three portions. Each portion can contain primary equipment for transporting and treating the patient and secondary medical devices therefore being easily to be reached by the operator.

[0019] The characteristic of said bulkhead is that a certain considerable amount of patient supporting means are safely transported without being an obstacle.

[0020] Therefore the equipped bulkhead allows the rear compartment for the patient to have enough space for housing a scoop stretcher and/or a long spine board, and at the same time it provides further structures and apparatuses for helping and transporting the patient.

[0021] Main characteristics of the bulkhead according to the present invention are the subject matter of dependent claims.

[0022] Further characteristics that can be provided and combined with each other and going beyond claimed

characteristics provide that a lateral compartment housing equipment is obtained in one of the fixed lateral wall elements. Said compartment can be opened since a door provided with hinges along the vertical edge of the lateral element is provided.

[0023] As an alternative the door closing the compartment can slide along guides placed along at least a part of the bulkhead base in contact with the transport vehicle floor or along the floor itself.

[0024] Also the second fixed lateral wall element can be provided with a compartment particularly for housing one or more gas cylinders or the like.

[0025] In this case, at least one of said cylinder can be connected to the central oxygen therapy system by pipes in compliance with regulations and high resistance materials such that oxygen or other gases can be transported till the delivery point arranged on a front panel of the lateral element near the analog reading and controlling systems and hand-operated or electrical controls.

[0026] Again according to a further improvement, with respect to the central opening the first fixed wall element with the compartment for the cardiopathic chair projects towards the medical compartment past the opening, such that the cardiopathic chair projects in the medical compartment while the recess containing cylinders projects in the opposite direction i.e. it projects towards the driver's cab such that the side where the recess can be opened faced towards the medical compartment is aligned with the central opening.

[0027] Again according to a further improvement, the remaining part, preferably the upper part, of the lateral wall element adjacent to the recess containing cylinders comprises compartments for housing and/or means for supporting additional equipment for helping the patient.

[0028] According to one embodiment the central passage opening between the two fixed wall elements has an height equal to or slightly lower than the maximum height of the bulkhead such that an average high man can pass between the driver's cab and the medical area walking in a standing or slightly bent position.

[0029] Said opening can be closed by means of a sliding door that can be provided with an automated closing/opening system that automatically slides in both directions.

[0030] The door in turn can be provided with at least a compartment.

[0031] Particularly the height and the thickness of at least a compartment obtained in the door is such that a scoop stretcher or a long spine board or the like can be hiddenly housed therein.

[0032] According to an improvement said compartment has opened lateral surfaces in order to take out equipment, particularly the scoop stretcher or a long spine board towards the rear area of the vehicle.

[0033] An alternative embodiment provides the central opening to be closed by two or more intersecting sliding doors that are moved from a position overlapping the lateral element and/or also a position overlapping one

with respect to the other to a position coinciding with said central opening.

[0034] According to one embodiment said door or doors slide along guides placed on the supporting base of the bulkhead and/or on the vehicle floor and along the ceiling in a position vertically aligned one to the other.

[0035] Said guides extend for at least a part of the length of bulkhead sides in contact with the floor and the ceiling of the vehicle and particularly said guides extend at the base of the lateral element from sides of the vehicle to the compartment hiddenly housing the cardiopathic chair, the lower guide being in common with the sliding saddle in the compartment of the fixed lateral wall element and with the door closing the central opening associated to the fixed lateral wall element.

[0036] Moreover, guides upon which the door slides are different with respect to and run parallelly to guides of the saddle, at a short distance one with respect to the other along the supporting base of the bulkhead.

[0037] Again according to a further characteristic, guides and/or the corresponding saddle and/or the corresponding door are provided with means for stopping the sliding movement.

[0038] A further variant embodiment provides a tiltable seat or chair placed in a rear-faced travelling position to be fastened to the sliding door.

[0039] According to one embodiment the seat is provided with a high back with a headrest integrated therein which back is fastened to the door or it extends parallelly to the side thereof faced towards the vehicle area housing the patient while it has a structure provided with arms and/or a seat tiltable against the back and/or door and safety belts with automatic roller such not to encumber operators when it is not used.

[0040] Moreover the seat portion is fixed and projects towards the compartment housing the patient and in the space comprised between the plane where the door slides and the front side of the seat there is provided a housing for medical stuff.

[0041] The compartment has a thickness equal to or lower than the thickness provided in the opposite fixed wall element.

[0042] In the case of a folding chair like the one described above that can be hiddenly housed into a compartment of the fixed wall element, the saddle to which the folding chair is fastened has a rear panel that closes at least partially the central opening when said saddle slides outside the appropriate compartment and being parallel to the central opening.

[0043] Generally, the bulkhead is divided in a lower portion wherein more heavy and cumbersome equipment are placed, such as sitting devices and cylinders, and an upper portion where compartments or housings can be obtained for medical devices.

[0044] Particularly above the compartment with cylinders in the thickness of the fixed lateral wall element there are provided one or more compartments for housing equipment, instruments or medical devices, having dif-

ferent thicknesses and equipped with shelves and closing elements.

[0045] Then, above the compartment safely holding the cardiopathic chair there are provided instruments for delivering gases and/or at least a control board for electronic and mechanical devices the emergency vehicle is equipped with.

[0046] According to a further improvement there is provided a further control board obtained in the thickness of the fixed lateral element i.e. on the wall of the lateral element perpendicular to the plane wherein the central opening is provided.

[0047] Again according to an advantageous characteristic, a transversally elongated compartment can be provided in the bulkhead taking up a part of the central opening in contact with the vehicle ceiling and the upper part of the lateral element.

[0048] Such elongated compartment can project towards the driver's cab and it can be reached both from the driver's cab and from the medical area.

[0049] According to an advantageous embodiment, said compartment is at least partially replaced by a rear window provided with panels for the communication between the medical area and the driver's cab.

[0050] Still according to a variant embodiment of the invention, both the fixed wall elements are placed side by side such to create a lateral opening between said adjacent fixed lateral elements and a vehicle side while the fixed lateral wall element bearing the closing door with the tiltable chair is placed adjacent to the lateral opening.

[0051] Moreover, the two fixed wall elements placed side by side are staggered one with respect to the other such that the door-like sliding part associated to a second fixed wall element slides from a position overlapping said second fixed wall element to a laterally staggered position and coinciding with the lateral opening and the saddle-like sliding part for the cardiopathic chair slides from a hidden retained position inside an housing of the first fixed lateral wall element to a position overlapping the second fixed wall element.

[0052] The first fixed wall element with the compartment housing the cardiopathic chair is placed adjacent to the lateral opening.

[0053] Again according to a variant, the passage opening placed both in a central position with respect to the bulkhead and in a lateral position is closed at least partially by a fixed panel having some supporting elements and/or compartments housing medical instruments.

[0054] Said fixed panel has an height equal to the height of the two fixed wall elements such to make an equipped bulkhead not allowing the direct passage between the driver's cab and the rear area.

[0055] According to an advantageous characteristic, said fixed panel has one or more compartments with different thicknesses and/or placed on various levels for introducing diagnostic and therapy apparatuses, that can be reached from vehicle portion housing the patient

and/or from the driver's cab and are provided with closing elements such as sliding doors and shelves obtained in the thickness of said fixed panel.

[0056] Moreover said fixed panel has a rear window provided with laterally sliding doors and placed in the upper portion of said fixed panel for the communication between the front and the rear area of the vehicle.

[0057] Fixed and movable wall elements constituting the equipped bulkhead are suitably shaped and connected in order to avoid dangerous projections or sharp edges.

[0058] These parts are also made of a material highly resistant to chemical agents and atmospheric agents, mildew-proof, microorganism-proof and that can be washed and disinfected.

[0059] The bulkhead can also have a modular structure.

[0060] These and other characteristics and advantages of the present invention will be more clear from the following description of some embodiments shown in annexed drawings wherein:

Fig.1 is a front view of the equipped bulkhead faced towards the medical compartment with a sliding element overlapping the central opening,

Fig.2 is a side view of the bulkhead according to the present invention,

Fig.3 is a front view of the equipped bulkhead faced towards the medical compartment with a further sliding element overlapping the central opening,

Fig.4 is a front view of the equipped bulkhead faced towards the medical compartment with the two fixed lateral elements and the central opening,

Fig. 5 is a front view of the equipped bulkhead faced towards the medical compartment with a sliding element overlapping the central opening wherein section lines B-B and A-A are shown,

Fig.6 is a side view of the bulkhead according to the present invention taken along the section line B-B;

Fig.7 is a side view of the bulkhead according to the present invention taken along the section line A-A.

[0061] The equipped bulkhead is installed between the driver's compartment and the rear compartment of vans, ambulances or the like as to divide the inner compartment of a vehicle in two areas.

[0062] The front area of the vehicle is intended for housing the driver and other medical personnel that do not directly intervene on the patient during the transport, as well as hand-operated or electrically-operated instruments that can be necessary during interventions and that are provided by current regulations. The bulkhead is placed such that in the driver's compartment there is enough space allowing the driver's seat and/or the passenger's seat to make a predetermined antero-posterior travel.

[0063] The rear area of the vehicle, separated from the front area by at least an equipped bulkhead, is intended

for housing the patient and medical personnel that have to look after the patient during the transport.

[0064] The thickness or depth of said bulkhead is such that dimensions of the medical compartment are in compliance with European standards concerning all types of ambulances, that is said dimensions allow compulsory equipment to be transported and allow medical personnel to operate under comfort and safety conditions.

[0065] As shown in figures 1 to 7, the not movable partition bulkhead placed between the driver's compartment and the medical compartment, is divided in three parts that is it has two fixed wall elements 1, 2 which are spaced apart in order to create a central passage opening 3 or, as an alternative, they are placed one near the other in order to create a lateral passage opening 3 for the communication between the medical compartment and the driver's compartment.

[0066] In a preferred embodiment the two fixed lateral wall elements 1, 2 are spaced apart to create a central passage opening 3 for the communication between the medical compartment and the driver's cab which can be at least partially closed by means of a sliding panel or door 201.

[0067] Each one of the fixed lateral wall elements 1, 2 is composed of fixed and sliding parts that can be brought alternately to each other from a position overlapping the lateral wall element 1, 2 or from an hidden position retained inside a housing of said lateral wall element 1, 2 to a position that is laterally staggered with respect to the lateral wall element 1, 2 and coinciding with the central opening 3.

[0068] Therefore the bulkhead is like a cabinet with one passage opening 3 and two fixed lateral portions 1, 2 and a possible upper portion at the opening 3, where one or more compartments can be obtained in order to house a wide range of instruments, which are carefully arranged such that the doctor and medical personnel are able to effectively and quickly use them in compliance with technical and administrative standards concerning ambulances.

[0069] With a particular reference to figures 1 and 3 in the lower part in contact with the vehicle floor of one of the two lateral elements 1, 2 there is provided a lateral compartment 101 hidden housing a folding carry chair 102 for cardiopathic patients, which chair is hidden housed into the compartment 101 because it is made compact by folding it on itself and by sliding it transversally to the longitudinal axis of the vehicle and/or parallelly to said lateral wall element 1, 2.

[0070] The sliding part of the lateral element 1 is composed of a sliding saddle element 103, housed into the compartment 101, upon which the wheels, particularly rear wheels, of the cardiopathic chair 102 rest, and if it is not used it remains closed in the folded condition inside the compartment 101 of the bulkhead, in a safety rear-facing travelling position.

[0071] In a preferred embodiment the folding cardiopathic chair 102 is placed into the compartment 101 upon

a saddle 103 sliding on guides 104 placed at the base of the bulkhead and oriented transversally to the longitudinal axis of the vehicle and/or parallelly to the fixed lateral wall element 1, 2. Said sliding saddle 103 is the base containing wheels and it is provided with a rear panel 105 to which the folding cardiopathic chair 102 can be fastened in safety conditions by means of quick release belts or the like, both with the chair folded inside the compartment 101 and with said chair 102 outside the compartment 101. The rear panel 105 of the sliding saddle 103 has such dimensions, i.e. height and width, that it can be housed inside the compartment 101.

[0072] The thickness of the lateral element 1 where the compartment 101 is provided is such that the folded chair 102 and the sliding saddle 103 with the rear panel 105 upon which said chair 102 is placed can be housed in it. Particularly the chair can be folded from an idle position with the chair folded against said panel 105 to an opened position with the chair deployed in an opposite direction with respect to said panel 105 and, when the chair is folded against said panel, it has a thickness lower than the port of an aperture for introducing it inside the compartment 101 said aperture being provided at the side of said compartment 101 faced towards the opposite fixed lateral element 2 and delimiting the central opening 3.

[0073] As shown in figures 3 and 6 the compartment 101 is not provided with a sliding or openable door but it is like a parallelepiped cabinet obtained in the thickness of the fixed lateral element 1 with at least one of the long sides opened in order to allow the saddle 103 upon which the cardiopathic chair 102 rests to be slid outside the compartment 101. When the saddle 103 and the cardiopathic chair 102 are outside the compartment 101 that is when the sliding part of the lateral element 1 is taken out from the compartment 101 and overlaps the central opening 3, said chair 102 is in its folded condition but the user can reach it.

[0074] Particularly in the preferred embodiment the lateral fixed element 1 projects past the opening 3 towards the medical compartment such that when the sliding part, that is the saddle 103 with the chair 102, is outside the compartment 101 it overlaps the opening area 3, thus obstructing the passage obtained between the two fixed lateral elements 1, 2.

[0075] A further embodiment not shown in figures provides the compartment 101 obtained in the lateral element 1, as an alternative or in combination with the previous embodiment providing a compartment with the lateral side opened, to be openable on the side faced towards the medical compartment by the provision of a closing door or panel movably fastened at least along an edge of said compartment 101 by means of mechanical coupling means such as hinges or the like.

[0076] Considering that the compartment 101 housing the cardiopathic chair 102 is obtained in a lateral element 1 of the bulkhead, it is possible to provide hinge means for coupling the door closing the compartment 101 to the

bulkhead to be provided at or along the peripheral edge of the element 1 having the greatest length that is along the vertical edge of the bulkhead such to allow the compartment 101 to be opened and the cardiopathic chair 102 to be reached by rotating the door by 90° with respect to the vertical edge of the bulkhead.

[0077] As an alternative it is possible to provide the door closing the compartment 101 to slide along guides arranged for at least a part of the base of the bulkhead element 1 in contact with the floor of the transport vehicle or on the floor itself. Particularly such guides 104 will have such a length allowing the compartment 101 to be completely opened and consequently the length of such guides 104 for sliding the door will be at least twice the length of the door base and they will be comprised between lateral walls of the vehicle and the central opening 3 of the bulkhead.

[0078] The height of the compartment or cabinet 101 described above can be such that a typical cardiopathic chair 102 can be housed and consequently the upper part of the lateral element free from the compartment 101 remains free and can be equipped according to requirements, for example can have recesses, compartments, peaks that can be closed or can be opened and/or provided with means retaining parts of equipment or the like.

[0079] Such as shown in figures the second lateral closed element 2 has a further compartment 203 that can be used for housing cylinders 202.

[0080] Said compartment 203 is made like a recess in the lower part of the lateral element 2 such that one or more cylinders 202 can rest on the bulkhead floor.

[0081] Inside said compartment 203 there are provided locking means for locking cylinders 202 when they are subjected to a specific acceleration.

[0082] At least one of said cylinder 202 is connected to the oxygen therapy central system by pipes and systems in compliance with standards and high resistance materials such that oxygen or other gases can be transported till the delivery point placed on a front panel 106 of a lateral element 1, particularly the lateral element 1 provided with the compartment 101 housing the cardiopathic chair 102, near the control and reading analog systems and manual and/or electronic controls 107.

[0083] In a preferred embodiment the first lateral element 1 having the compartment 101 housing the cardiopathic chair 102 and the second lateral element 2 with the recess 203 housing cylinders 202 are not aligned with the third element 3 having the opening area 3 but are staggered one with respect to the other. Particularly the element 1 with the compartment housing the cardiopathic chair 102 projects towards the medical compartment past the central opening 3, such that the cardiopathic chair 102 projects into the medical compartment while the recess 203 with cylinders 202 projects in the opposite direction that is it projects towards the driver's cab such that the opening side of the recess 203 faced towards the medical compartment is aligned with the central opening 3.

[0084] The interior of the recess 203 on the side faced towards the medical compartment is protected by one at least partially movable door having such dimensions that the opening of the recess 203, being free by removing said door, allows cylinders 202 to be replaced or substituted.

[0085] The door closing the recess 203 may have a safety closure system such that only authorized people can access the compartment containing cylinders 202.

[0086] It is possible to provide on said door a slot 204 allowing valves of the cylinders 202 or parts thereof to be reached without removing the door of the recess 203.

[0087] It is possible to provide said slot 204 to be closed by sliding doors, panels or the like for safety reasons.

[0088] As for the cabinet 101 housing the cardiopathic chair 102, the lateral element 2 above the recess 203 for cylinders 202 provides the space necessary to house further equipment or instruments ambulances are equipped with.

[0089] The two elements 1,2 placed side by side or spaced apart one with respect to the other make a passage or communication opening 3 between the medical compartment and the driver's cab.

[0090] As shown in figure 4 the passage opening 3 has such dimensions to allow an average height man to pass between the driver's cab and the medical compartment walking upright or slightly bent. It is possible to provide said opening to have any dimensions depending on requirements of the staff operating on the transport vehicle.

[0091] In a preferred embodiment said opening 3 is in a central position inside the medical compartment and it is closed by at least a sliding door 201 that is the movable part associated to the lateral element 2 bearing the compartment 203 with cylinders 202. Said door 201 is mounted in an overlapping position so as to slide in a direction transversal to the longitudinal axis of the vehicle and/or parallelly to said lateral wall element 2 and it can be moved from a lateral position and being overlapped to the lateral wall element 2 wherein the central opening 3 is opened to a position coinciding with said central opening 3 thus said central opening 3 is closed.

[0092] Said door 201 can be equipped with an automated closing/opening system such to have a door automatically sliding in both directions and it closes over the lateral wall of the cabinet 101 for the cardiopathic chair 102.

[0093] In a preferred embodiment the movable part associated to the lateral element 2 is like a door having such a thickness to allow one or more compartments for housing medical equipment to be provided inside said thickness.

[0094] As shown in figures 2 and 7 the sliding door 201 has a single compartment taking all the thickness of the door 201 and extending all along its length in order to allow a scoop stretcher or a long spine board to be housed i.e. patient transport devices having a specific length and that have to be easily reached by medical and paramedical personnel in order to quickly and easily take it out

from the compartment obtained in the bulkhead towards the rear area of the vehicle. In order to allow equipment to be quickly taken out, such as shown in figures 2 and 7, it is possible to reach the compartment 208 obtained in the door from the long open lateral sides of the door 201, and they are in case equipped with means for preventing equipment inside it to be casually moved.

[0095] In the thickness of the door 201 it is possible to provide several compartments that can be reached both from the front driver's compartment, and from the rear area where the patient is housed, by means of apertures placed on surfaces of the door 201. Said apertures are provided, if necessary, with closing devices.

[0096] In the preferred embodiment shown in figures, the door 201 is like a pocket that can be translated from a position overlapping the wall element 2 to a position overlapping the opening 3 such that it acts both like an element closing said opening 3 and as an element housing equipment for moving the patient such as stretchers or the like, and as an element supporting equipment for sitting the patient and/or medical staff such as the tiltable chair 206 or the like.

[0097] According to a further embodiment it is possible to provide the central opening 3 to be closed by two or more sliding intersecting doors that are moved from a position overlapping the lateral element 2 and/or also being overlapped one with the other to a position coinciding with said central opening 3.

[0098] When it is necessary to close or clear the opening 3 such that staff can pass through the passage opening 3, the door 201 can slide along guides 205 placed along the supporting base of the bulkhead and/or on the vehicle floor and along the ceiling such guides being vertically aligned one with respect to the other. Thus, depending on requirements, medical staff can move in the most suitable areas, that is in the driver's cab or in the medical compartment.

[0099] Said guides 205 travel for at least a part of the extension of bulkhead sides in contact with the floor and ceiling of the vehicle, particularly to allow said door 201 to be overlapped on the central or lateral opening 3, said guides 205 travel along the base of the lateral element 2 from sides of the vehicle to the compartment 101 hidden housing the cardiopathic chair 102.

[0100] In a preferred embodiment guides 205 upon which the door 201 slides are separated from guides 104 upon which the saddle 103 slides and they travel parallelly to guides 104 of the saddle 103, at a short distance one with respect to the other along the supporting base of the bulkhead.

[0101] In a further embodiment it is possible to provide the lower guide to be in common with the sliding saddle in the compartment 101 of the fixed lateral wall element 1 and with the door 201 closing the central opening 3 associated to the fixed lateral wall element 2.

[0102] Guides 104, 205 the saddle 103 and/or the door 201 are provided with means for stopping them from sliding such that the user can place the saddle 103 or the

door 201 in the desired position.

[0103] As it is clear in figures 6 and 7, compartments for the cardiopathic chair 102 and for cylinders 202 are both placed near the sides of the equipped bulkhead. Particularly the lateral element 2 with the compartment for cylinders 203 is backwardly positioned towards the driver's compartment, and the associated sliding element that is the door 201 closing the opening 3 slides parallelly to the open side of the compartment with cylinders 203 and it overlaps alternatively the central opening and to the aperture of compartment 203 of cylinders 202, thus going in the opposite side with respect to the lateral compartment 101 with the chair 102, making the passage opening 3 free but obstructing the aperture of the compartment 203 with cylinders 202, such as shown in figure 4.

[0104] As shown in the figure the height of the door 201 is equal to the height of the equipped bulkhead and it completely closes the central opening 3.

[0105] The width of the door 201 is such that the passage 3 is closed and according to a preferred embodiment it has such a length to allow the back of a tiltable chair or seat 206 placed in a rear-facing travelling position preferably in line with the primary stretcher to be rested and/or attached to it. The seat 206 is provided with a high back with an headrest integrated therein which back is attached to the door 201 or it extends parallelly to the side thereof faced towards the vehicle area housing the patient, while it has a structure provided with arms and/or a tiltable seat and a safety belt with automatic roller such not to encumber operators when it is not used.

[0106] In order to allow the seat 206 to be comfortably used, it is attached to the door 201 at a certain distance from the vehicle floor. Such arrangement makes it possible to obtain an housing 207 for medical stuff, such as shown in figure 5, projecting towards the medical compartment in the space comprised between the sitting plane and the floor. As shown in figure 2 said compartment 207 has a thickness equal to or lower than the thickness of the compartment 101 with the chair 102, such to be aligned with the lateral compartment 101 and not to project in the medical area past said compartment 101.

[0107] Therefore the bulkhead is equipped with two sitting devices 206, 102 borne by sliding supporting means 201, 103 each one associated to a lateral element 1, 2 which supporting means can slide from a position overlapping the corresponding fixed lateral element 1, 2 to a position coinciding with the central opening 3 of the bulkhead.

[0108] Particularly the bulkhead is equipped with a cardiopathic chair 102 that can be folded inside a preformed compartment 101 in the bulkhead and supported by a sliding saddle 103. The cardiopathic chair 102 can remain attached to the rear panel 105 of the saddle 103 or can be carried outside the ambulance by means of wheels. Moreover there is provided a tiltable chair or seat 206 attached to the door 201 closing the central opening 3 and so it is in a rear-facing travelling position inside the

medical compartment.

[0109] Said sitting devices 206, 102 can be used contemporaneously since are borne or attached to sliding supporting means 201, 103 on guides 104, 205 made of steel or the like.

[0110] Such as shown in figure 1 and 5 it is possible to put the two chairs 206, 102 side by side such that only one chair can be seen and used inside the vehicle: the cardiopathic chair 102 can be left in the safety position that is inside the compartment 101 while the automated door 201, by sliding outwardly with respect to the lateral element 2 and by being arranged parallelly to the opening 3, closes the passageway 3 between the driver's cab and the medical compartment such that the tiltable chair 206 remains in the centre of the bulkhead aligned with the primary stretcher.

[0111] The bulkhead, subject matter of the present invention, as shown in figure 3 allows the two chairs 102, 206 to be put side by side by sliding the saddle 103 bearing the cardiopathic chair 102 outside the suitable compartment 101 and by sliding the door 201 bearing the tiltable chair 206 towards the opposite side of the bulkhead therefore towards the vehicle side. Thus the saddle 103 with the chair 102 is in front of the central passage opening 3 and closes it at least partially by the provision of the rear panel 105 of the saddle 103 while the door 201 with the tiltable chair 206 covers the side, that is the fixed lateral element 2, where the compartment for cylinders 203 is provided, being arranged parallel in front of the opening side of said compartment 203. In such position both chairs 102, 206, particularly the cardiopathic chair 102 can be used by medical staff and/or by the patient.

[0112] The equipped bulkhead can be therefore divided in a lower area wherein more cumbersome and heavy equipment are placed, such as sitting devices 206, 102 and cylinders 202, and an upper area wherein compartments or housings can be obtained for medical devices, that is instruments allowing the doctor and medical staff to timely and efficaciously intervene on the patient.

[0113] As it is clear from figures 1 and 5, above the compartment for cylinders 203 obtained in the thickness of the fixed lateral element 2, there is a space where further compartments can be obtained for housing equipment, instruments or medical devices. The space available in the lateral element is equal about to an half of the height of the bulkhead, since, in the shown embodiment, the compartment with cylinders 203 takes up the lower half of the fixed lateral element.

[0114] The space free from the compartment for cylinders 203 on the lateral element 2 can be provided with one or more compartments, having even different thicknesses for inserting diagnostic and therapy devices, provided with closing elements such as sliding panels and shelves obtained in the thickness of the fixed element for storing drugs, bottles and medical nursing stuff.

[0115] On the fixed element 1 on the opposite side of the vehicle such as shown in figure 5 above the compart-

ment 101 safely holding the cardiopathic chair 102 there are provided instruments for delivering gases 106 and at least a control board 107 for electrical and mechanical devices the emergency vehicle is equipped with.

[0116] The fact that air intakes and/or oxygen intakes 106 are placed on the lateral portion opposite to the wall where cylinders 202 are placed allows air to be used also when the sliding door 201 is moved in front of the opening of the compartment containing cylinders 203 and seats are placed side by side.

[0117] Figures 6 and 7 show the position of the control board 107 for functions of the medical compartment with respect to sitting devices associated to the equipped wall.

[0118] The fixed lateral portion 1 comprising the compartment 101 for the cardiopathic chair 102 is partially taken up by control instrument.

[0119] The control board 107 is placed both on the side of the bulkhead faced towards the medical compartment and as an alternative or in combination it is provided with a further control board 108 obtained in the thickness of the fixed lateral element 1 that is on the wall of the lateral element 1 perpendicular to the plane where the opening 3 is provided. Such additional control board 8 is placed near at least a sitting device, particularly the folding chair 206, when the sliding door element 201 overlaps the central opening 3, or the cardiopathic chair 102 when the sliding supporting saddle 103 and the associated wall 105 overlap the opening. Thus the control board 107, 108 and air intakes 106 can be reached under any configurations of equipment inside the ambulance.

[0120] Each region of the equipped bulkhead is made as to provide the patient with the greatest care. Such as shown in figures 1 and 4 the upper part of the bulkhead, particularly the part above the passage opening 3 and the upper part of the lateral element 2 where the compartment containing cylinders 203 is provided, is taken up by at least a transversally elongated compartment 209 obtained in the thickness of the wall.

[0121] In a preferred embodiment said compartment 209 projects towards the driver's cab. It is possible to provide said compartment 209 to be reached both from the driver's cab and from the medical compartment. A further embodiment provides said compartment 209 to be at least partially replaced by a rear window provided with doors in order to have a communication between the medical compartment with the driver's cab even when sliding elements associated to each lateral element 1, 2 are placed such to close the central opening 3.

[0122] A further embodiment of the bulkhead not shown in figures provides the two fixed elements 1 and 2 to be placed side by side such that the opening 3 allowing the passage between the front area of the driver and the rear area housing the patient is created between said adjacent fixed lateral elements 1, 2 and a side of the vehicle. Particularly, the two elements 1, 2 are placed side by side such that the element 2 bearing the closing door 201 with the tiltable chair 206 is placed adjacent to the lateral opening 3.

[0123] In this embodiment the two fixed elements 1, 2 placed side by side will be staggered one with respect to the other such that the door-like sliding part 201 associated to the fixed element 2 can slide from a position overlapping the fixed wall element 2 to a laterally staggered position coinciding with the lateral opening 3 while, as an alternative or in combination, the saddle-like sliding part 103 for the cardiopathic chair 102 can slide from a hidden position holding it inside a housing of the lateral element 1 to a position overlapped to the adjacent fixed wall element 2.

[0124] As an alternative it is possible to provide the two elements 1, 2 to be placed staggered one with respect to the other and side by side such that the opening is delimited by the vehicle side and by the element 1 with the compartment housing the cardiopathic chair 102. In this case the lateral opening 3 is closed at least partially by the rear panel 105 of the saddle 103 when the latter slides outside the specific compartment towards the lateral opening 3 in a direction transversal to the longitudinal axis of the vehicle and/or parallel to said wall element 1.

[0125] It is possible to provide a further embodiment wherein the passage opening 3 both placed in a central position with respect to the bulkhead and in a lateral position is closed at least partially by a fixed panel having supporting elements and/or compartments for housing medical equipment.

[0126] In such embodiment the equipped bulkhead is therefore divided in three fixed parts, with at least one part being configured to support or house equipment necessary to take care of the patient.

[0127] Said fixed panel, according to a preferred embodiment, has an height equal to the height of the two elements 1, 2 such that they form an equipped bulkhead preventing the direct passage between the driver's cab and the rear area.

[0128] As described for fixed elements 1, 2 said fixed panel is provided with at least a compartment for safely housing equipment the medical vehicle is equipped with. Particularly there are provided various compartments even with different thicknesses for introducing diagnostic and therapy devices, that can be reached from the patient area and/or from the driver's cab of the vehicle and are provided with closing elements such as sliding doors and shelves obtained in the thickness of said fixed panel. Compartments or elements for fastening equipment are placed on different levels such to use all the available space on the wall. This last embodiment allows the medical vehicle to have more spaces for storing medical stuff since in this further embodiment the third portion of the bulkhead, that in previously shown and described embodiments is taken up by the opening 3, is taken up by an element allowing further equipment to be housed.

[0129] In the embodiment described above that is in the equipped bulkhead free from the direct passage between the driver's cab and the rear area, the communication between the rear and front areas of the medical vehicle is possible by means of a rear window provided

with laterally sliding doors placed in the upper region of the fixed panel.

[0130] Elements composing the equipped bulkhead are suitably shaped and connected in order to avoid dangerous projections or sharp edges and they are made of a material showing a high resistance to chemical and atmospheric agents, and mildew-proof and microorganism proof, that can be washed and disinfected.

[0131] The bulkhead can have minimum basic equipment and at the same time can be arranged for the integration of equipment also after having purchased it. It is possible to integrate and remove damaged parts since the bulkhead has a modular structure and elements with different equipment can be made and combined according to requirements. The modular structure moreover allows equipment to be replaced due to wear or because of different standards to be met or because of particular requirements.

[0132] Obviously the invention is not limited to embodiments described and shown hereinbefore, but it can be widely varied, without departing from the informing principle described above and claimed below.

Claims

1. Equipped bulkhead for fitting medical transport vehicles, particularly ambulances, installed in order to divide the vehicle in two portions, a front portion intended to house the driver and a further passenger and a rear portion intended to house the patient and helping personnel **characterized in that** said wall is divided in three parts i.e. it has two fixed elements (1, 2) and a passage opening (3) between said two vehicle portions that is said opening (3) serves for the communication between the medical area and the driver's cab.
2. Equipped bulkhead according to claim 1, **characterized in that** the two fixed elements (1, 2) are two lateral elements spaced apart in order to create a central opening (3) for the passage between said two vehicle portions, said opening (3) can be at least partially closed by a sliding panel or door (201).
3. Equipped bulkhead according to claim 2, **characterized in that** at least one of the fixed lateral wall elements (1, 2) or each one of the fixed lateral wall elements (1, 2) is composed of fixed parts and sliding parts that can be brought alternately to each other from a position overlapping the lateral wall element (1, 2) or from an hidden position retained inside an housing of said lateral wall element (1,2) to a position that is laterally staggered with respect to the lateral wall element (1, 2) and coinciding with the central opening (3).
4. Equipped bulkhead according to one or more of the

preceding claims, **characterized in that** at least a compartment housing a bearing structure for medical equipment is obtained in the thickness of at least one of the two fixed lateral wall elements (1, 2).

5. Equipped bulkhead according to one or more of the preceding claims, **characterized in that** in the lower portion in contact with the vehicle floor of one of the two fixed lateral wall elements (1, 2) there is provided a lateral compartment (101) for hiddenly housing a carry chair (102) for cardiopathic patients by sliding it in a direction transversal to the longitudinal axis of the vehicle and/or parallel to said lateral wall element (1, 2), which chair is foldably fastened to a sliding saddle structure and in a rear-facing travelling position.
6. Equipped bulkhead according to claim 5, **characterized in that** the sliding part of the lateral element (1) is composed of a sliding saddle element (103), housed inside the compartment (101), upon which wheels of the cardiopathic chair (102) rest and which saddle (103) slides on guides (104) placed at the bulkhead base and being oriented in a direction transversal to the longitudinal axis of the vehicle and/or parallel to the fixed lateral wall element (1, 2) said sliding saddle (103) being provided with a rear panel (105) to which the cardiopathic chair (102) is safely attached by quick release belts or the like, and said rear panel (105) of the sliding saddle (103) has such dimensions, i.e. height and width, that it can be housed inside the compartment (101), while the chair can be folded from an idle position wherein it is folded against said panel (105) to an opening position wherein it is deployed in a direction opposite to said panel (105), and when it is folded against said panel, the chair has a thickness lower than the port of an aperture for introducing it inside the compartment (101) said aperture being provided at the side of said compartment (101) faced towards the opposite fixed lateral element (2) and delimiting the central opening (3).
7. Equipped bulkhead according to one or more of the preceding claims **characterized in that** the housing compartment (101) projects towards the vehicle portion housing the patient such that when the saddle (103) with the chair (102) is taken out from the compartment (101) it overlaps the central opening (3), at least partially closing it.
8. Equipped bulkhead according to one or more of the preceding claims **characterized in that** the compartment (101) obtained in the lateral element (1) can be opened on the side faced towards the medical compartment by the provision of a closing door or panel movably or slidably fastened at least along an edge of said compartment (101) by means of me-

chanical coupling means such as hinges, guides or the like.

9. Equipped bulkhead according to one or more of the preceding claims **characterized in that** the lateral element (1) for a part of its height has a compartment (101) for hiddenly housing the saddle and the cardiopathic chair (102) or other devices while, for the remaining part of the height, said lateral wall element (1) has housings for equipment used to help the patient.
10. Equipped bulkhead according to one or more of the preceding claims, **characterized in that** the second fixed lateral wall element (2) has a compartment (203) for housing aid stuff, particularly cylinders (202), said compartment (203) being made like a recess in the lower part of the lateral element (2) such that one or more cylinders (202) can rest on the vehicle floor and/or on the bulkhead floor; and inside said compartment (203) there being provided means for locking cylinders (202) when they are subjected to an acceleration.
11. Equipped bulkhead according to one or more of the preceding claims, **characterized in that** the interior of the recess (203) on the side faced towards the medical compartment is protected by one at least partially movable door, which door has a safety closing system and the door of the recess (203) has a slot (204) for reaching only valves of the cylinder (202) or parts thereof without removing the door of the recess (203) and which slot (204) is closed by a sliding panel, doors or the like.
12. Equipped bulkhead according to one or more of the preceding claims **characterized in that** the central opening (3) is in a central position inside the medical compartment and it is closed by at least a sliding door (201) mounted in an overlapping position so as to slide in a direction transversal to the longitudinal axis of the vehicle and/or parallel to said lateral wall element (2) and it can be moved from a lateral position and being overlapped to the lateral wall element (2) wherein the central opening (3) is opened to a position coinciding with said central opening (3) thus said central opening (3) is closed.
13. Equipped bulkhead according to one or more of the preceding claims **characterized in that** at least a compartment for housing medical equipment is obtained in the thickness of said door (201).
14. Equipped bulkhead according to one or more of the preceding claims **characterized in that** one or more compartments obtained in the thickness of the sliding door (201) can be reached both from the driver's cab and from the rear part of the vehicle.

15. Equipped bulkhead according to one or more of the preceding claims **characterized in that** the door (201) closing the central opening (3) slides parallelly to the open side of the compartment (203) containing cylinders and alternately it overlaps the central opening and the opening of the compartment (203) of cylinders (202). 5

16. Equipped bulkhead according to one or more of the preceding claims **characterized in that** a tiltable chair or seat (206) in a rear-facing travelling position is attached to the door (201) or at least two sitting devices (206, 102) are provided carried by sliding supports (201, 103) each one associated to a lateral element (1, 2) which supports slide alternately from a position overlapping the corresponding fixed lateral element (1, 2) to a position coinciding with the central opening (3) of the bulkhead. 10
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17. Equipped bulkhead according to one or more of the preceding claims **characterized in that** the two fixed wall elements (1, 2) are placed side by side such to create a lateral opening (3) between said adjacent fixed lateral elements (1, 2) and a vehicle side and the element (2) bearing the closing door (201) with the tiltable chair (206) is placed adjacent to the lateral opening (3). 20
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18. Equipped bulkhead according to one or more of the preceding claims **characterized in that** the two fixed wall elements (1, 2) placed side by side are staggered one with respect to the other such that the door-like sliding part (201) associated to the fixed element (2) slides from a position overlapping said fixed wall element (2) to a laterally staggered position and coinciding with the lateral opening (3) and the saddle-like sliding part (103) for the cardiopathic chair slides from a hidden retained position inside an housing of the lateral element (1) to a position overlapping the adjacent fixed wall element (2). 30
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19. Equipped bulkhead according to one or more of the preceding claims **characterized in that** the passage opening (3) placed both in a central position with respect to the bulkhead and in a lateral position is closed at least partially by a fixed panel having some supporting elements and/or compartments housing medical instruments. 45

20. Equipped bulkhead according to one or more of the preceding claims **characterized in that** said fixed panel has one or more compartments with different thicknesses and/or placed on various levels for introducing diagnostic and therapy apparatuses, that can be reached from vehicle portion housing the patient and/or from the driver's cab and are provided with closing elements such as sliding doors and shelves obtained in the thickness of said fixed panel. 50
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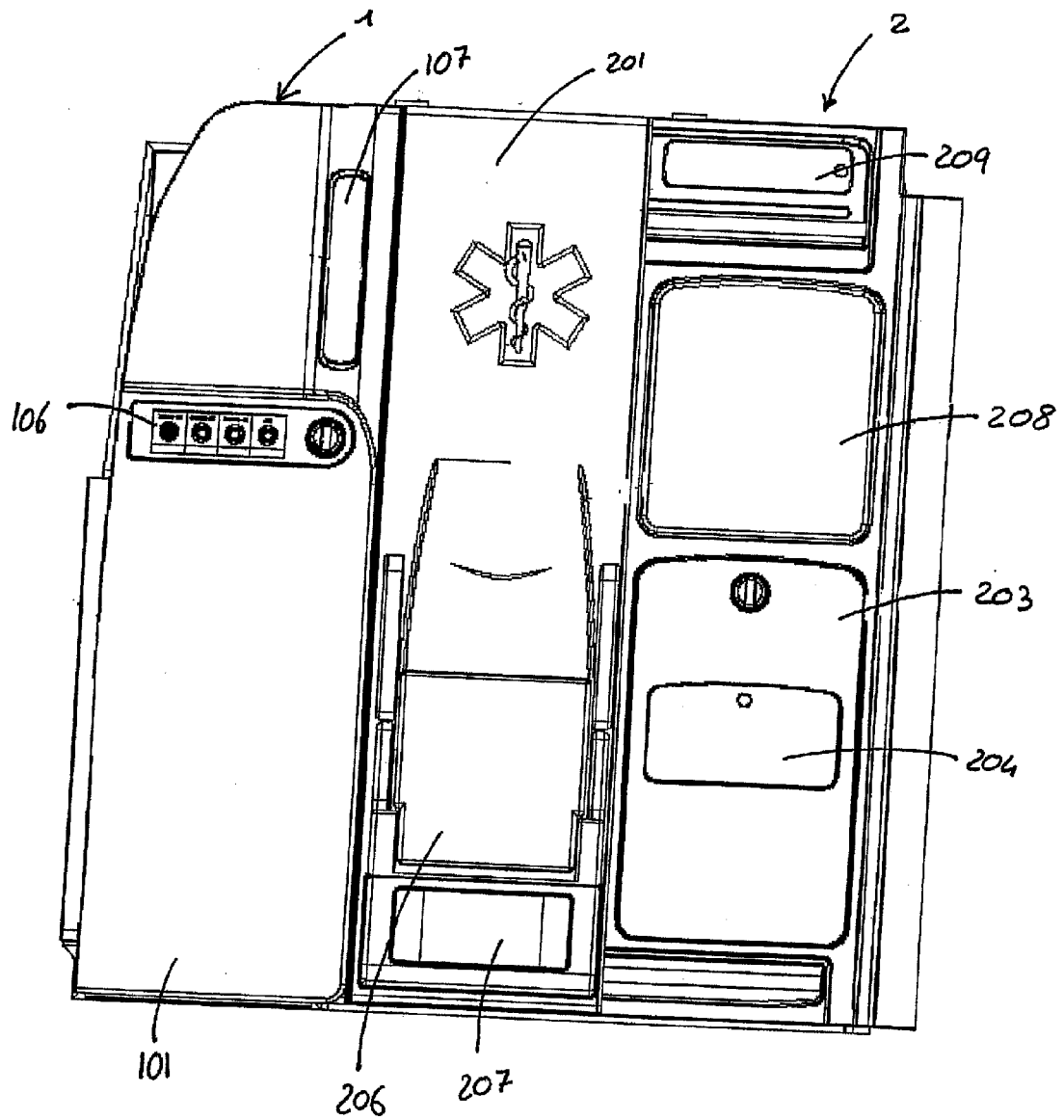
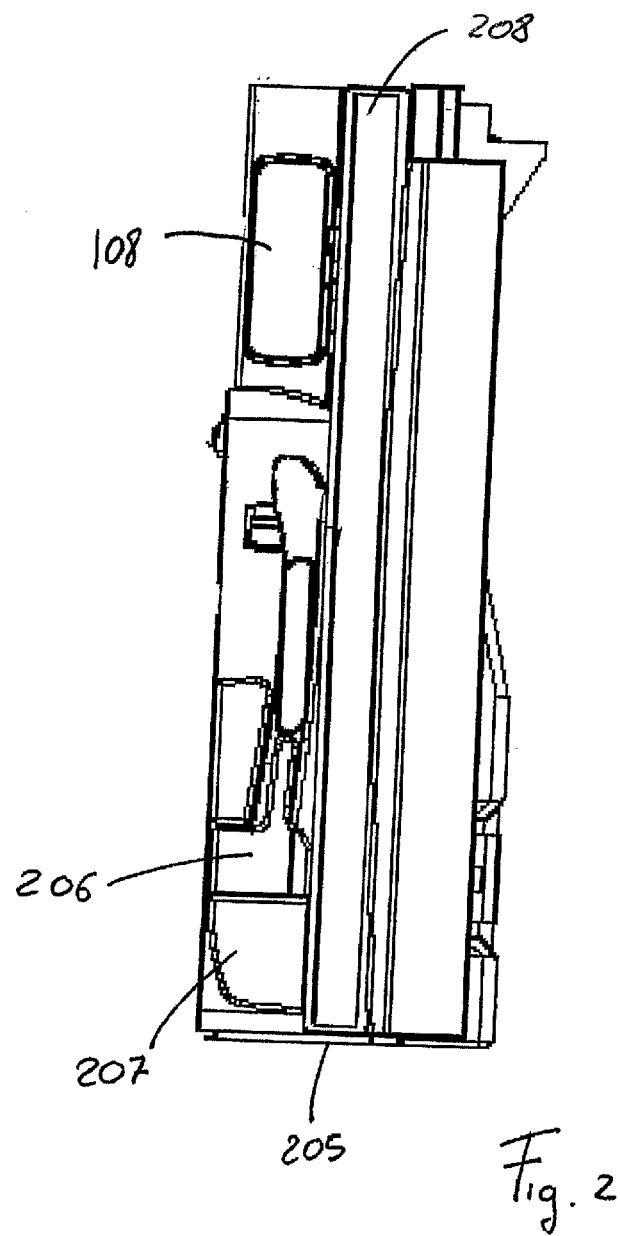
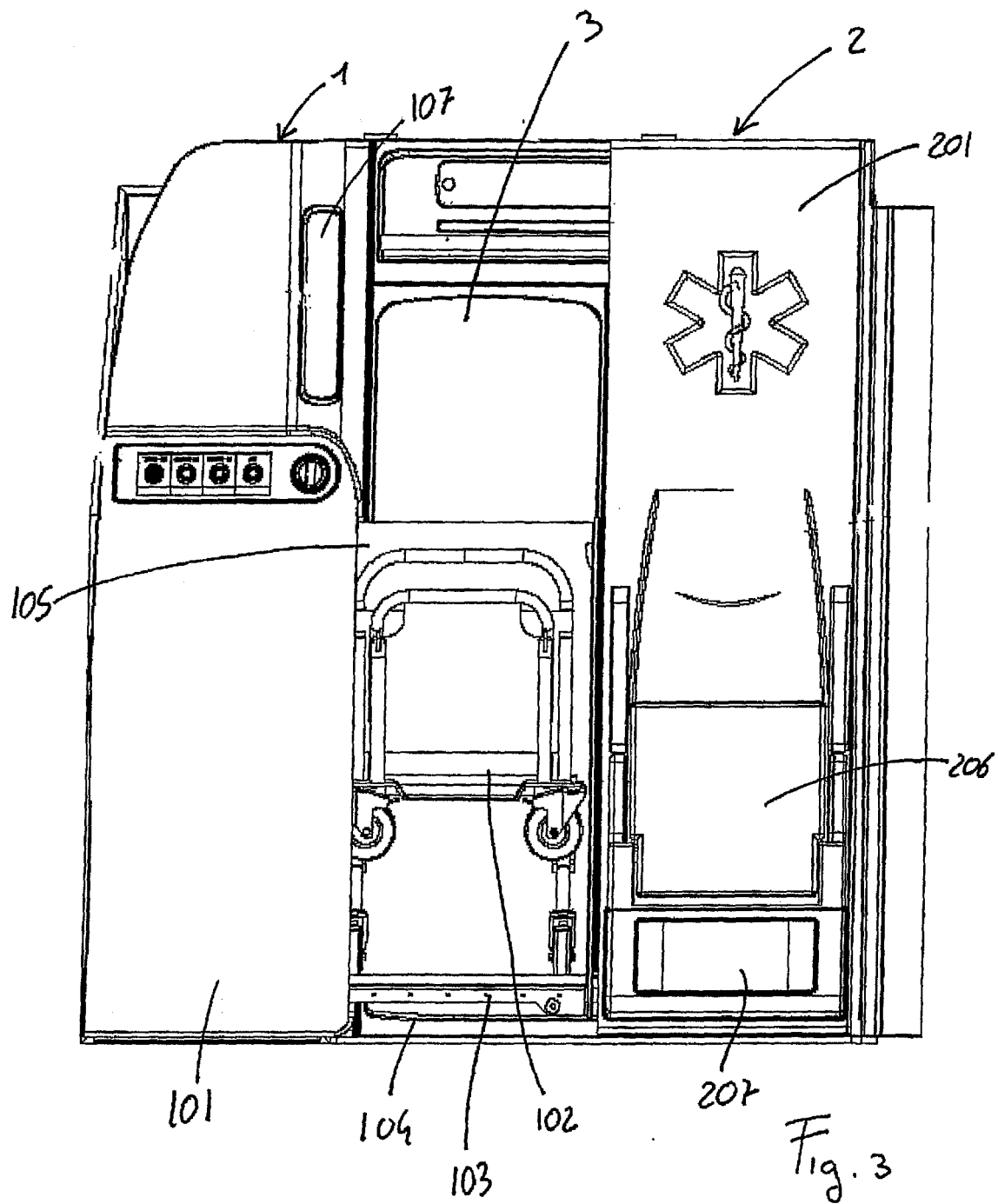
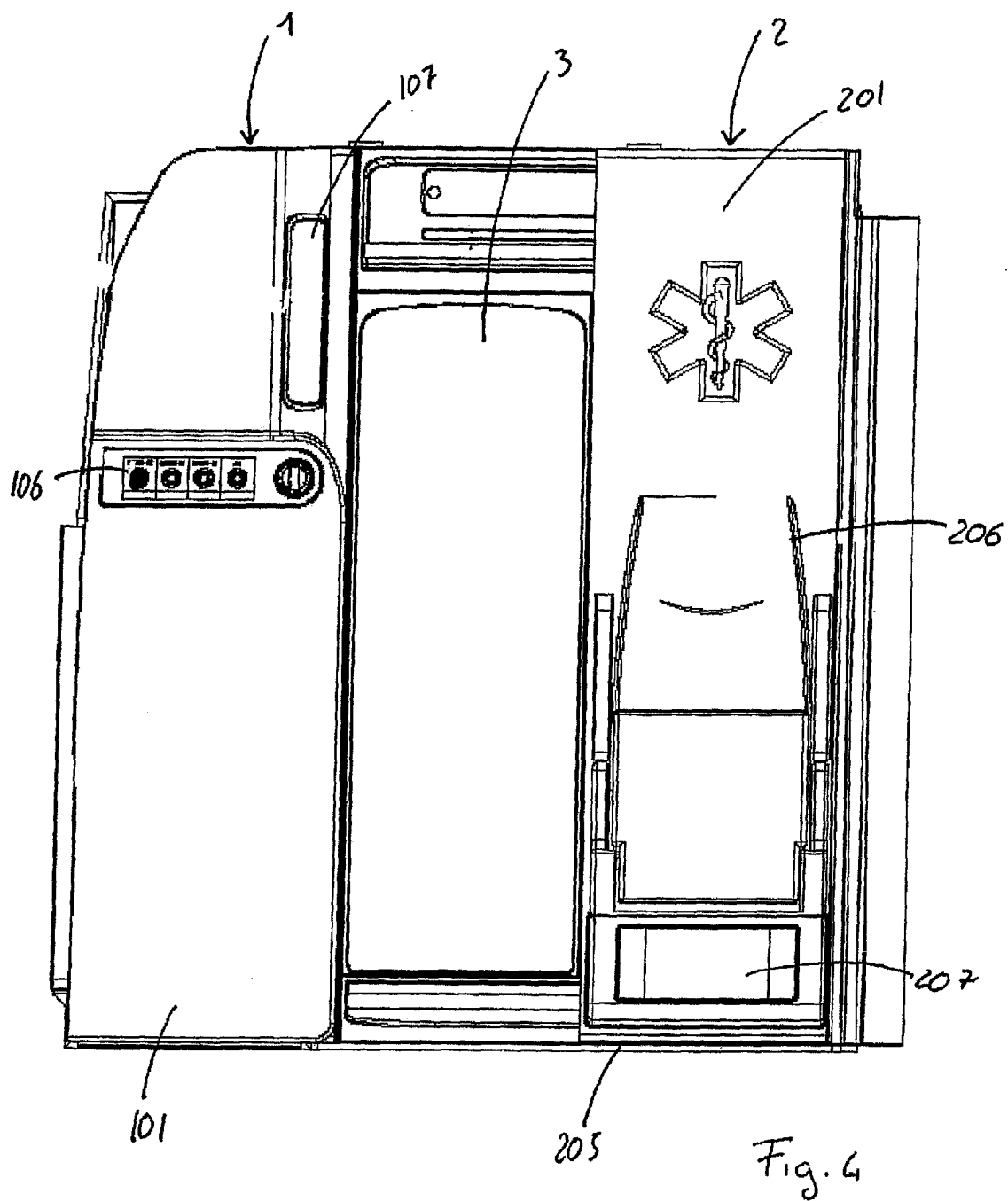


Fig 1







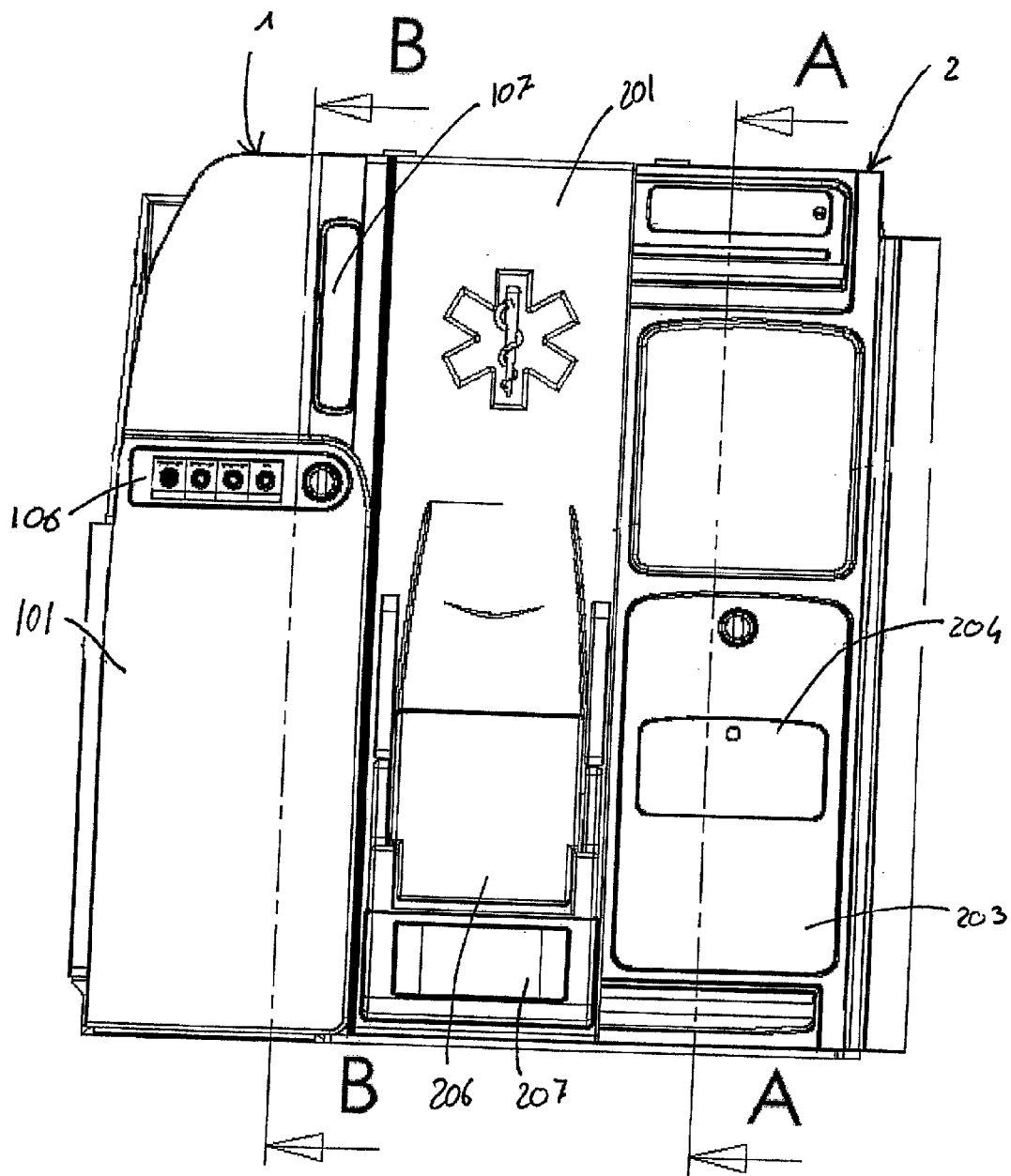
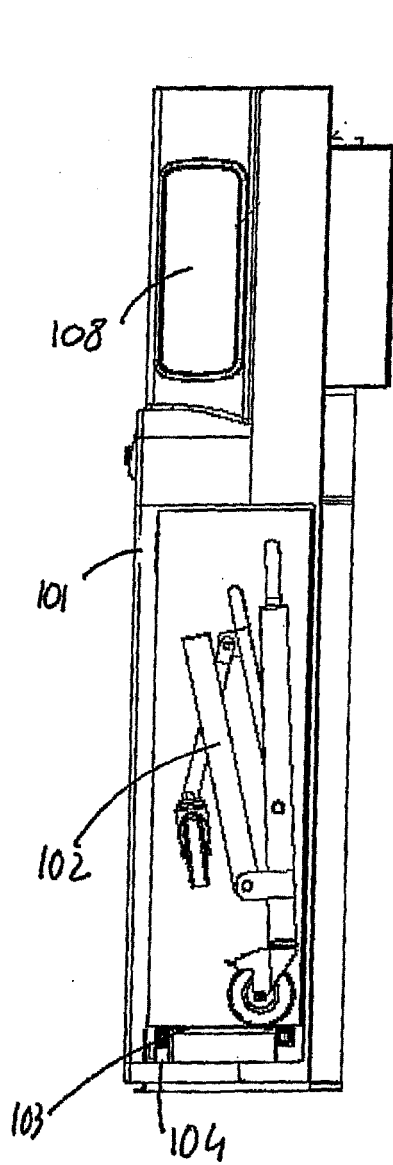
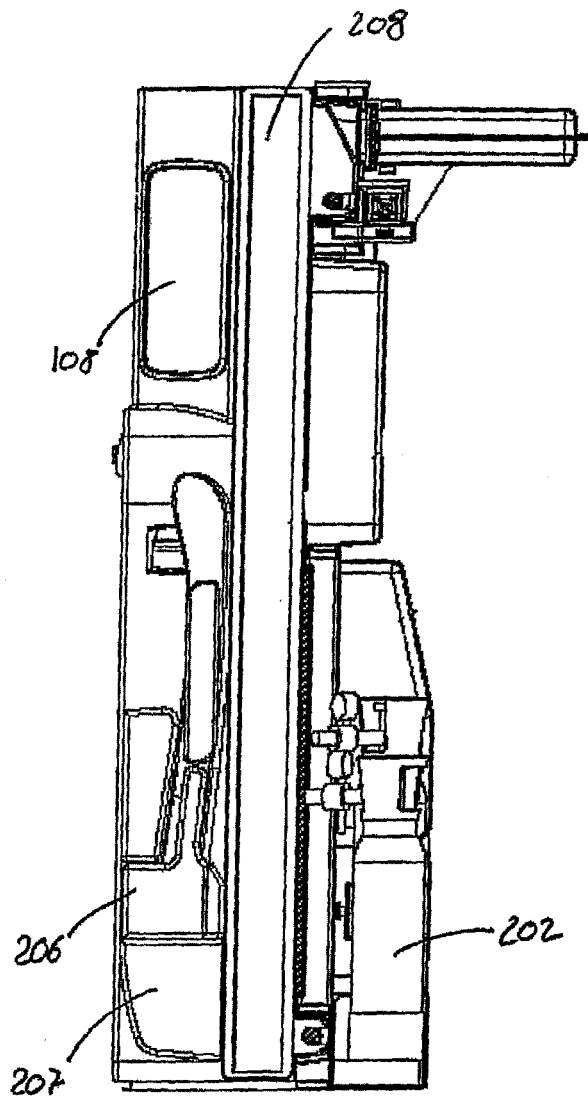


Fig. 5



PARTIAL SECTION B-B
SCALE 1 : 20

Fig. 6



SECTION A-A
SCALE 1 : 20

Fig. 7



EUROPEAN SEARCH REPORT

Application Number
EP 08 16 1389

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Place of search The Hague		Date of completion of the search 24 November 2008	Examiner Bielsa, David
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document			

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