

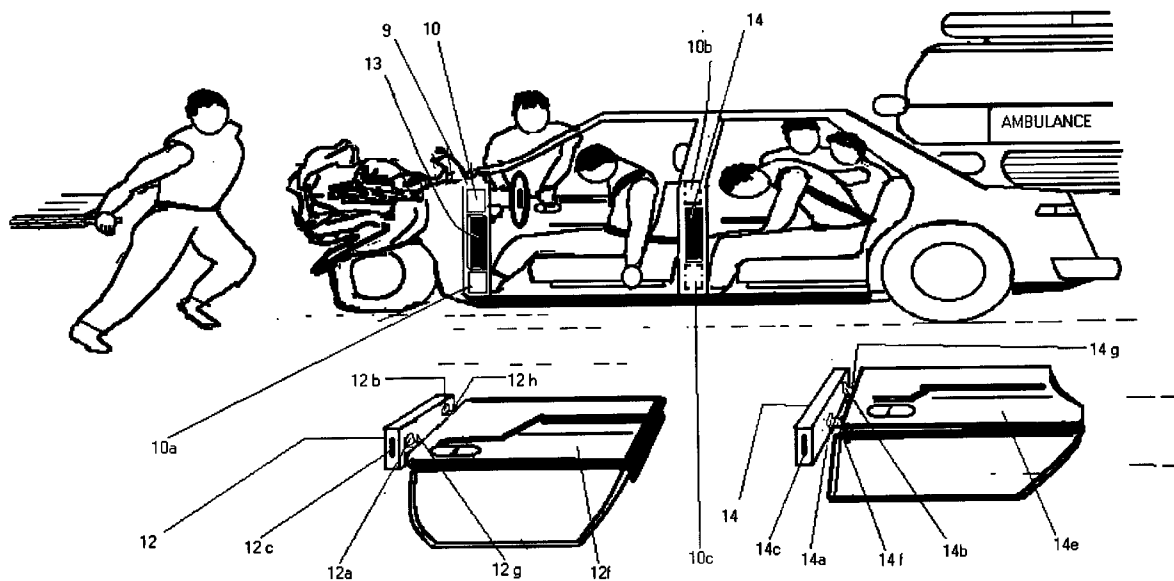


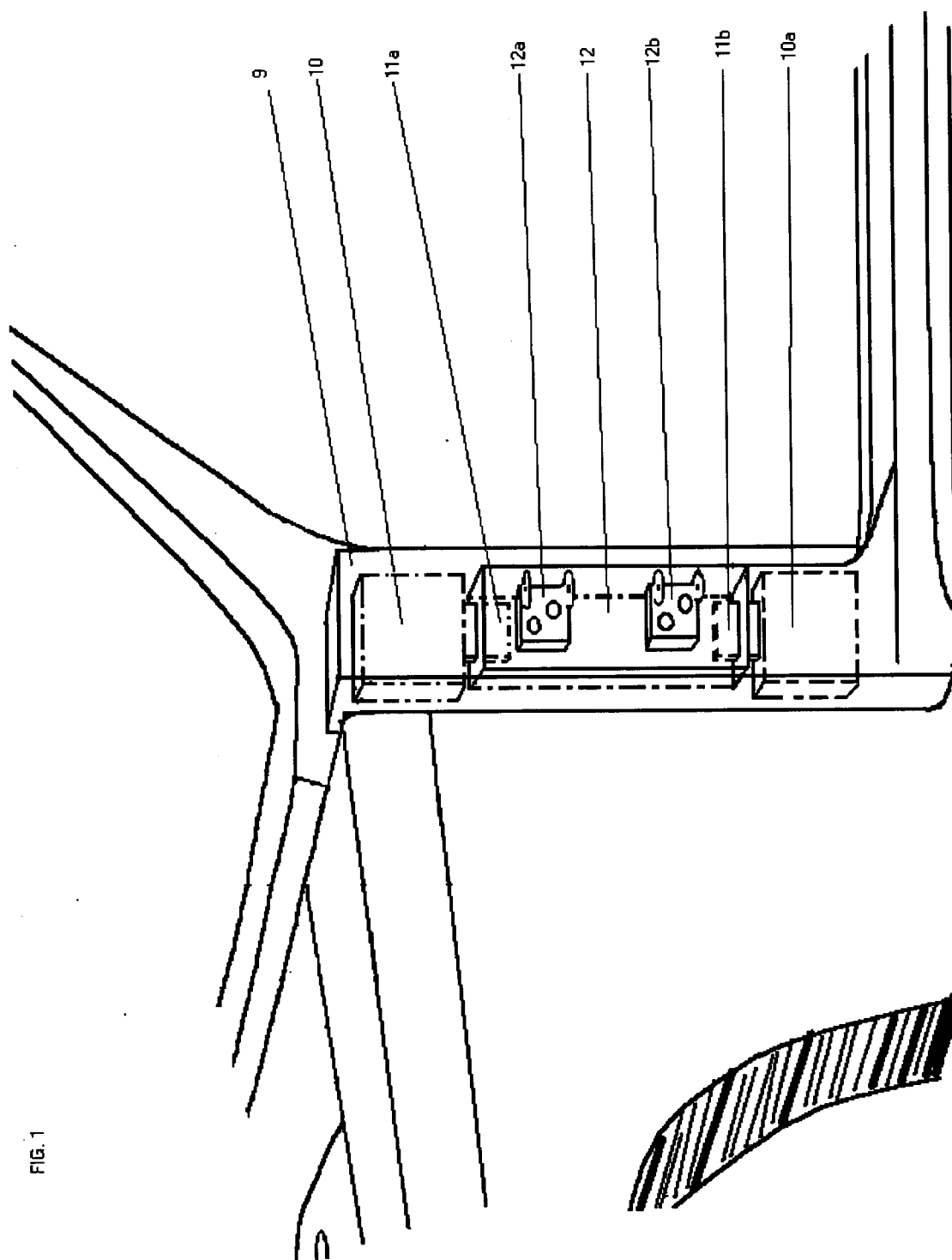
US 20050098371A1

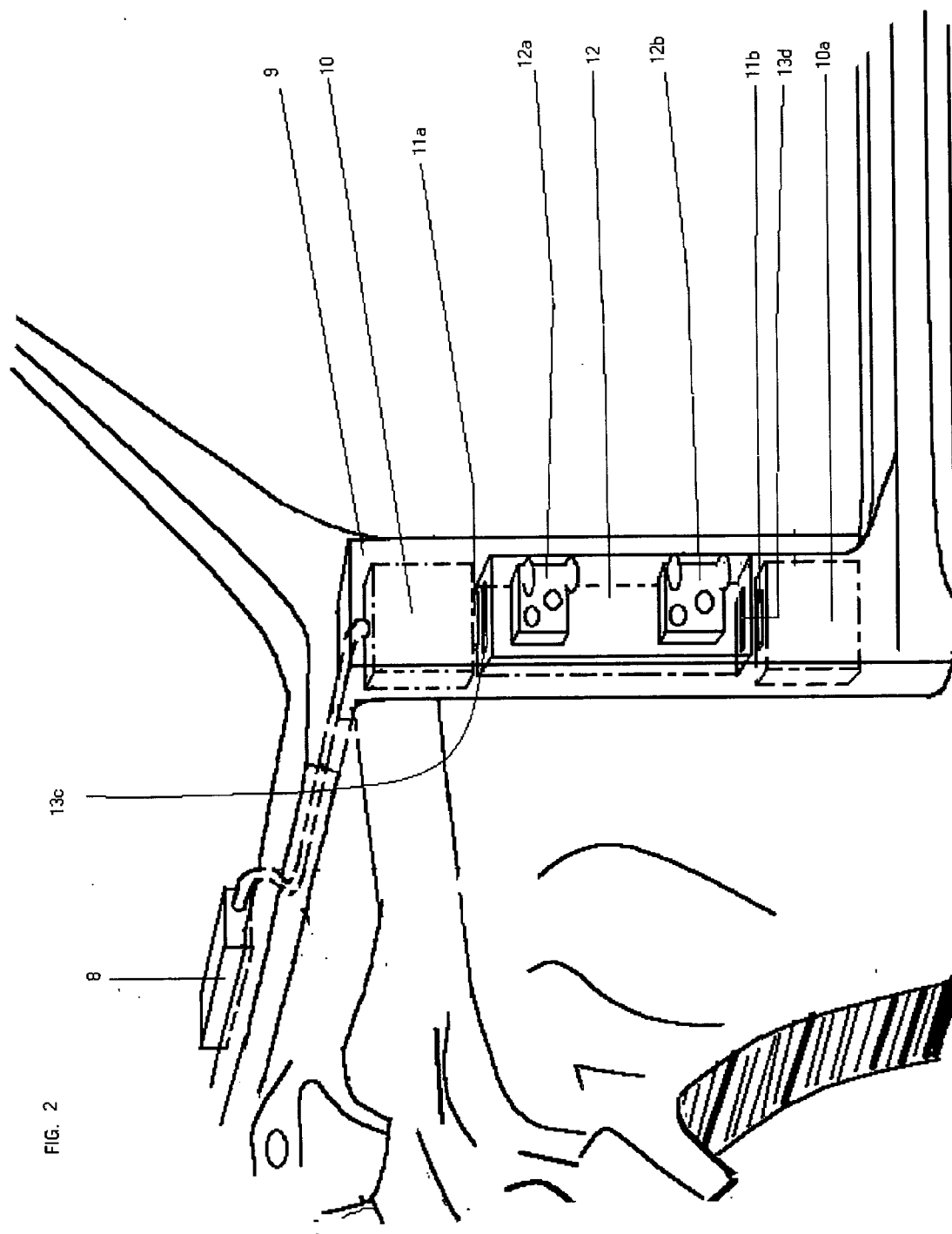
(19) **United States**(12) **Patent Application Publication**  
**Zabtcioğlu**(10) **Pub. No.: US 2005/0098371 A1**(43) **Pub. Date: May 12, 2005**(54) **AUTOMOTIVE POST ACCIDENT  
ANTI-ENTRAPMENT SYSTEM**(76) Inventor: **Fikret Mehmet Zabtcioğlu**, Bellevue,  
WA (US)Correspondence Address:  
**FIKRET M. ZABTCIOĞLU**  
**APTS. #8**  
**CLIFF TERRACE**  
**198 106TH AVE. SE**  
**BELLEVUE, WA 98004 (US)**(21) Appl. No.: **10/703,611**(22) Filed: **Nov. 7, 2003****Publication Classification**(51) **Int. Cl.<sup>7</sup> ..... B60D 1/28**(52) **U.S. Cl. .... 180/271**(57) **ABSTRACT**

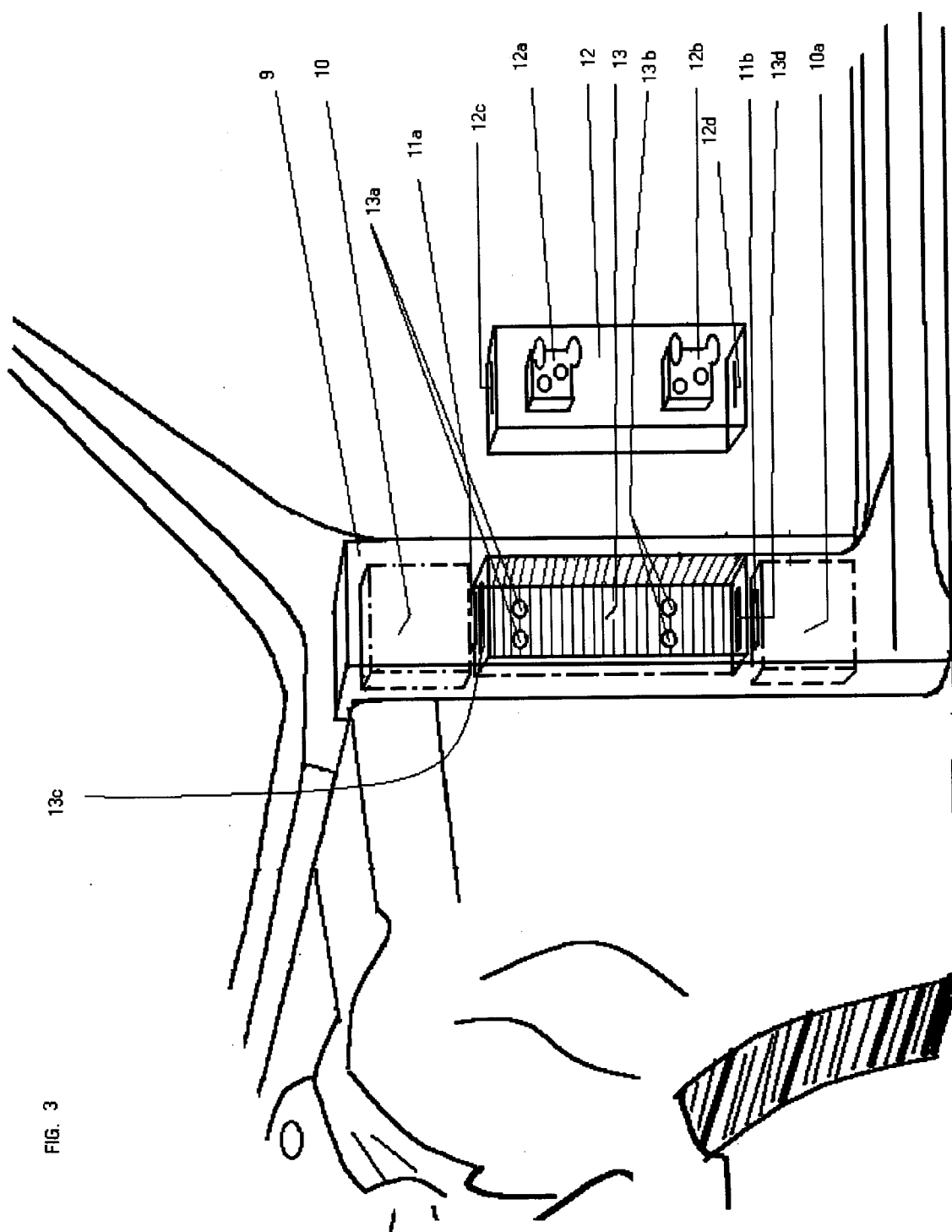
The present invention is a system to provide an immediate and visible escape route out of a damaged automobile and to

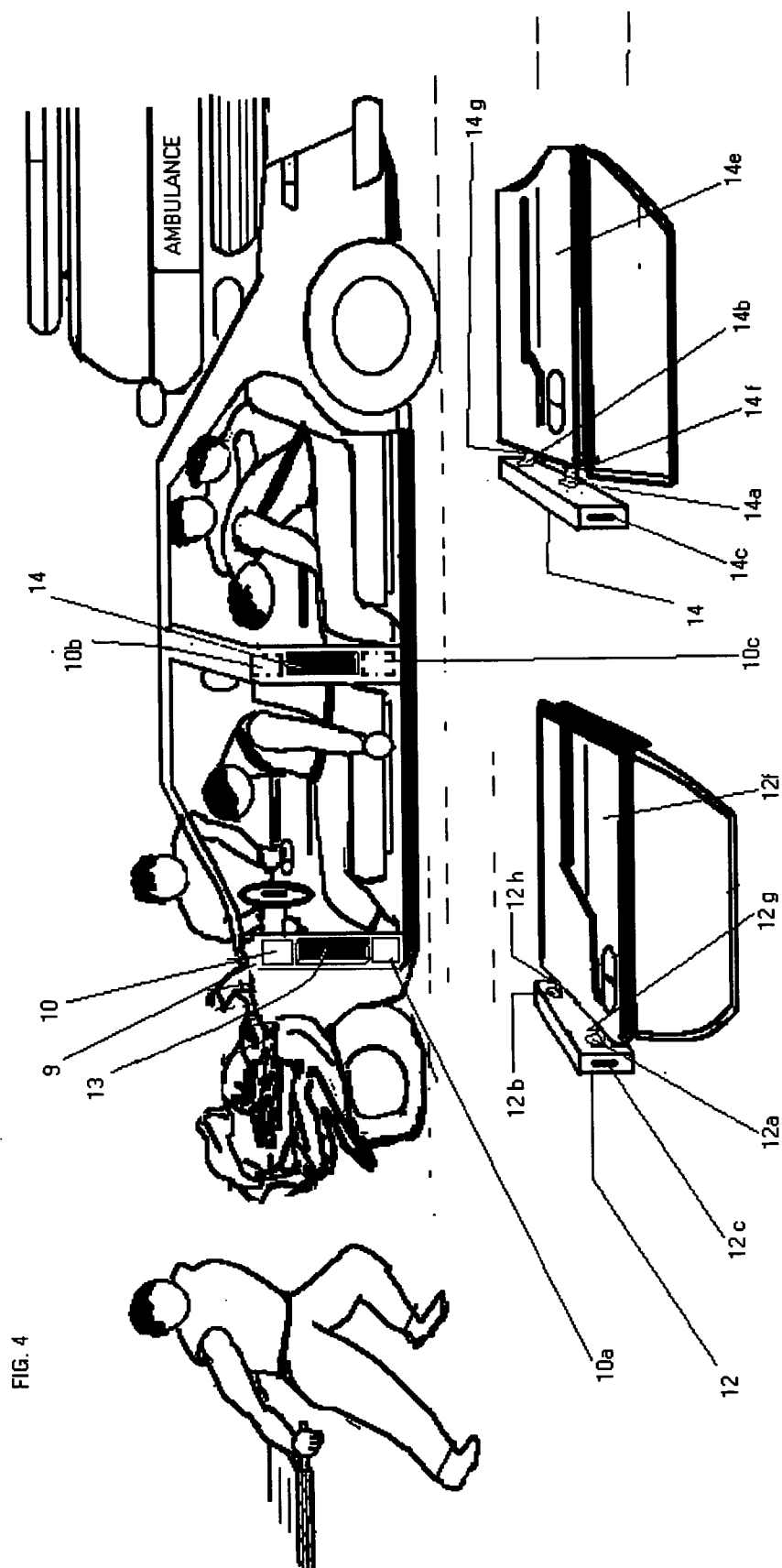
provide easy access to occupants by medical and rescue personnel. In serious damage accidents, doors get jammed and cannot be opened by the medical and rescue personnel. Whereas, no time has to be wasted in reaching the injured passengers for medical attention. This system makes it sure that in serious accidents, the doors will become detachable, even if the doors are jammed and even if the doors are damaged. System functions with a sensor signaling an accident, in less than a second, system unlocks rectangular prism small blocks onto which door hinges are fixed. The unlocking components are above and below the rectangular prism components, and all components are within the front lower pillar of the car—for the front doors—and are within side pillars for the back doors. In an accident rectangular prism components—that act as parts of the car body—when not unlocked, are unlocked and therefore the hinges being fixed on these rectangular prism components, make the doors detachable as same hinges are also connected to the doors. An accident rescue system within the car with a sensor, unlocking and rectangular prism components, that is activated in less than a second, that makes all the doors to become easily detachable together with the hinges, even if these doors are jammed or damaged, are features presented as what are new in the art.

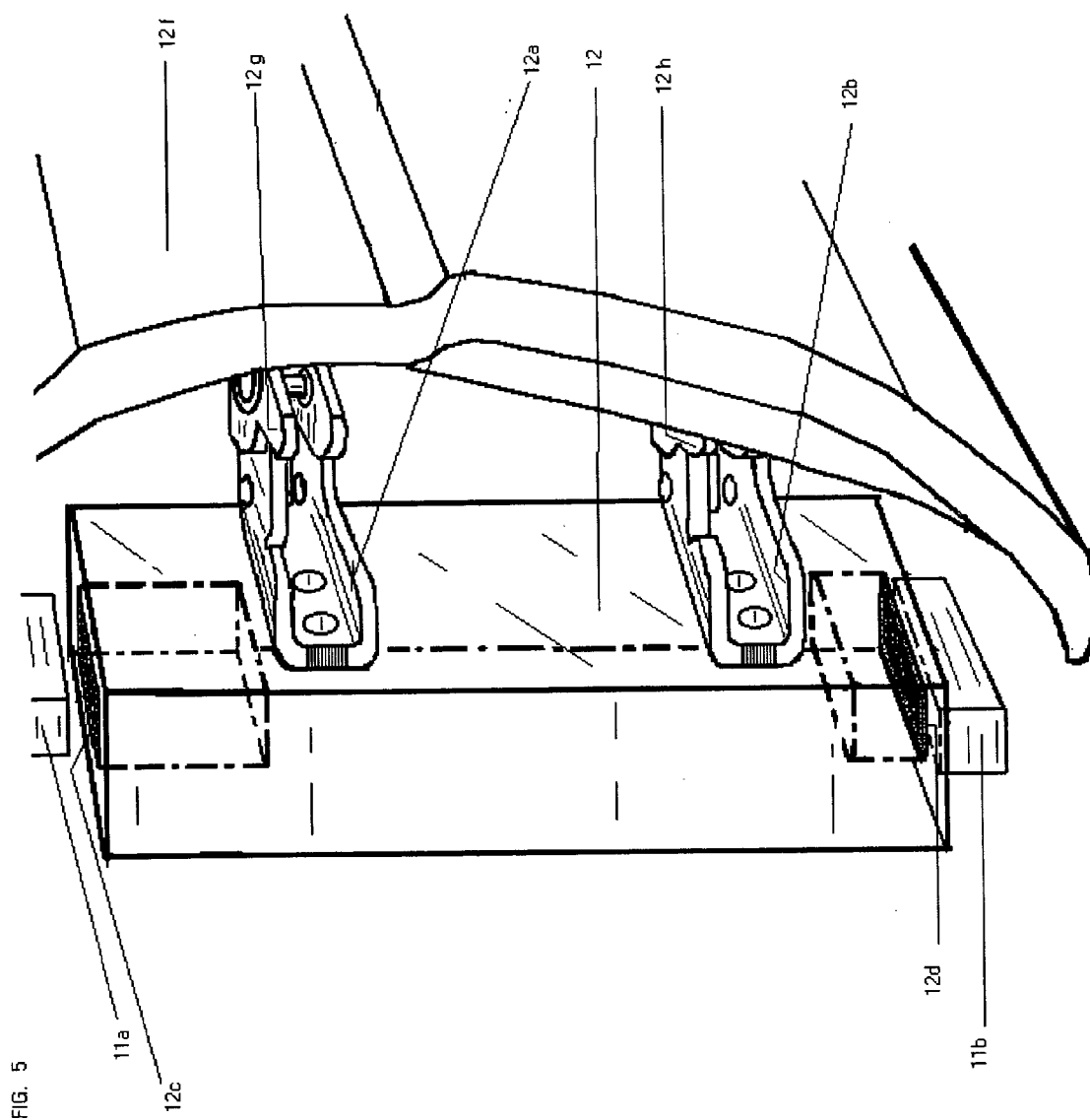












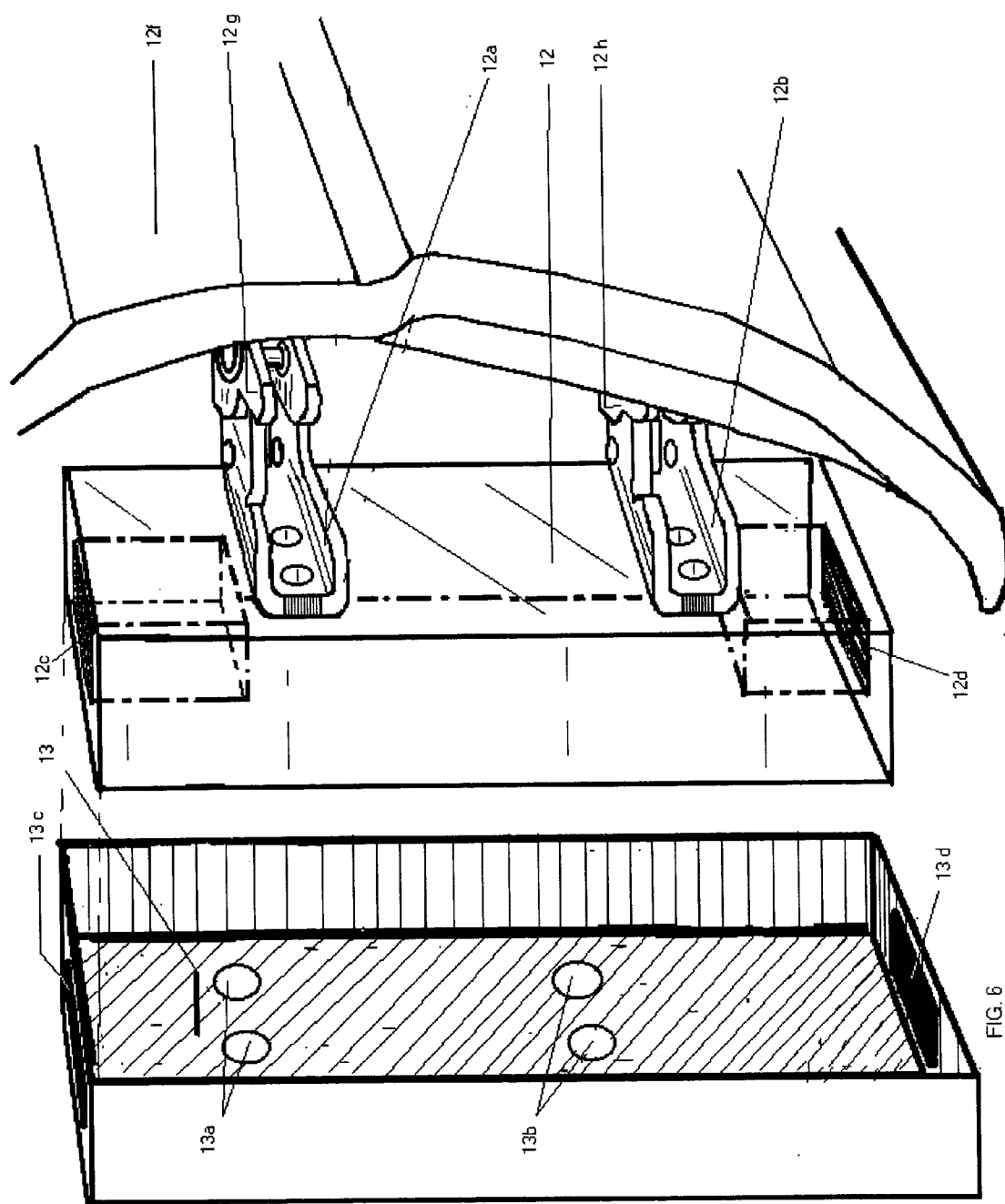


FIG. 7

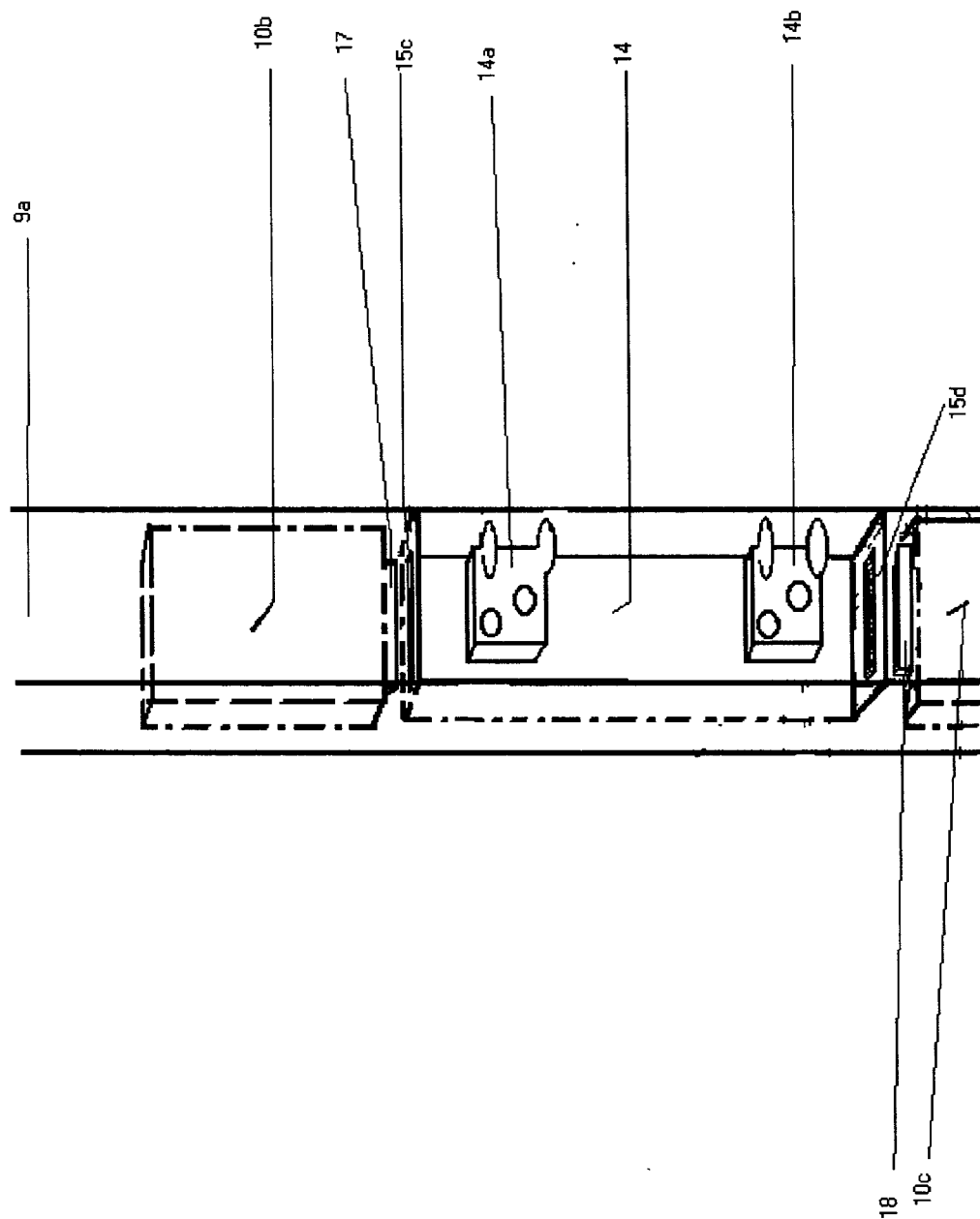
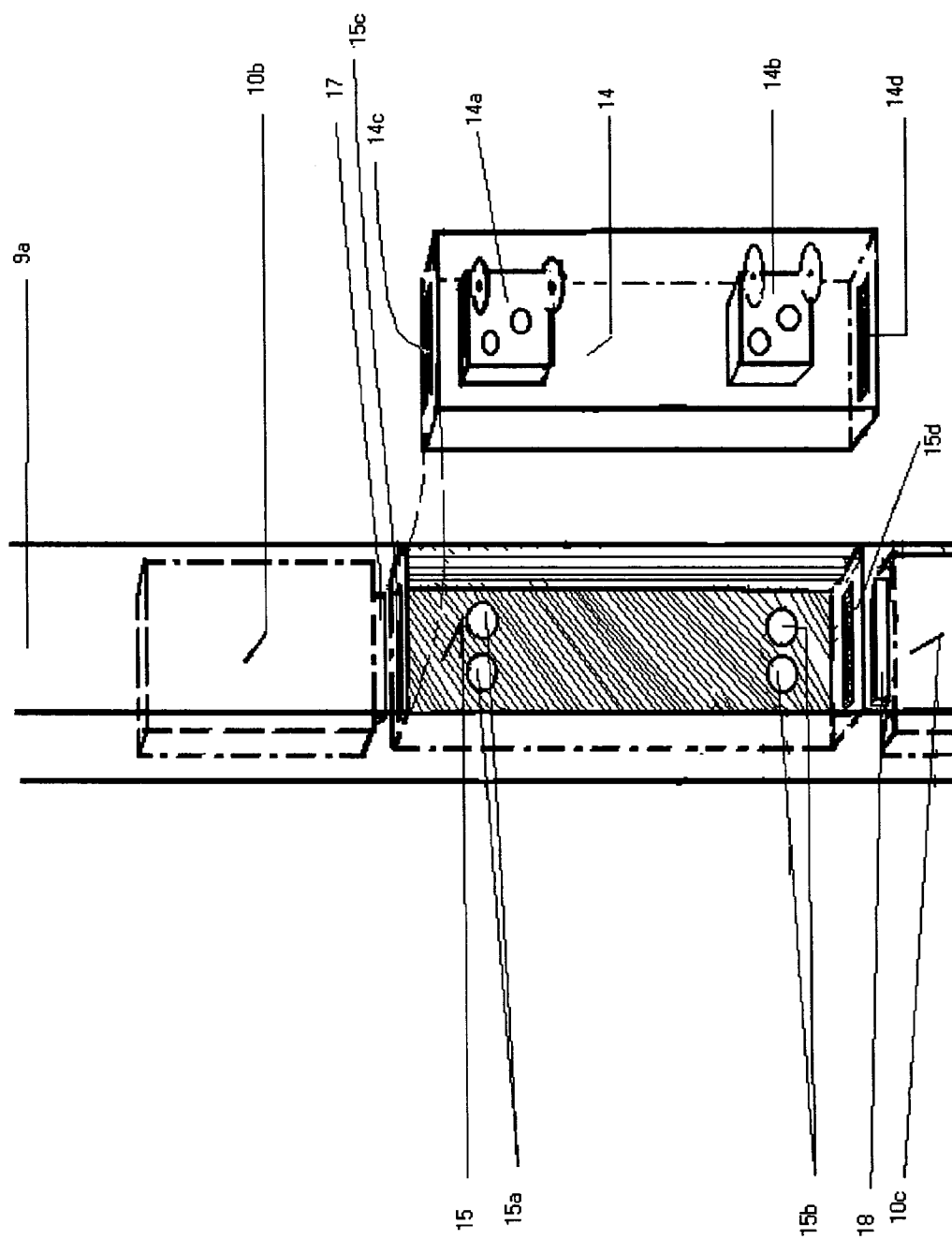




FIG. 8



## AUTOMOTIVE POST ACCIDENT ANTI-ENTRAPMENT SYSTEM

### CROSS REFERENCES TO RELATED APPLICATIONS

[0001] Although a search indicated that there are no directly related prior art to the present invention, the following inventions are related in terms of the general field: From U.S. Pat. No. 6,588,532 entitled; Rescue Assist Safety System, Adams et al, date of patent: Jul. 8, 2003 and from U.S. Pat. No. 5,894,906 entitled; Accident Responsive Safety Release for A Motor Vehicle's Rear Door Child Lock Device, Weber, date of patent: Apr. 20, 1999 and from U.S. Pat. No. 6,224,131 entitled; Reactive Seat System, Sham-mout, date of patent: May 1, 2001 and from U.S. Pat. No. 6,612,639 entitled; Side Door Structure for Vehicle, Ishikawa, date of patent: Sep. 2, 2003 and from U.S. Pat. No. 6,447,052 entitled; Body Structure for Vehicle, Saeki, date of patent: Sep. 10, 2002 and from U.S. Pat. No. 6,438,794 Releasable Automotive Door Stop, Ng et al, date of patent: Aug. 27, 2002 and from U.S. Pat. No. 4,027,432 entitled; Door Arrangement for A Vehicle, Klebba, date of patent: Jun. 7, 1977 and from U.S. Pat. No. 4,074,915 entitled, Safety Door Latch Mechanism, Saffer, date of patent: Feb. 21, 1978 and from U.S. Pat. No. 6,609,754 entitled; Easy Ejector Seat With Skeletal Crash Safety Beam, Rajasingham, date of patent: Aug. 26, 2003 and from U.S. Pat. No. 4,769,951 entitled; Door Made Of Plastic Material For Motor Vehicles, Kaaden, date of patent: Sep. 13, 1988 and from U.S. Pat. No. 5,787,550 entitled; Vehicle Door On-Door Off Mounting Arrangement, Bender, date of patent: Aug. 4, 1998 and from U.S. Pat. No. 5,444,894 entitled; Vehicle Door Hinge With Integrated Check, Heiler, date of patent: Aug. 29, 1995 and from U.S. Pat. No. 6,175,991 entitled; Articulated Door Hinge For An Automotive Vehicle, Driesman et al, date of patent: Jan. 23, 2001 and from U.S. Pat. No. 5,570,498 entitled; Lift-Off Door Hinge, Hipkiss et al, date of patent: Nov. 5, 1996 and from U.S. Pat. No. 5,590,441 entitled; Lift-Off Door Hinge, Spencer, date of patent: Jan. 7, 1997 and from U.S. Pat. No. 4,766,643 entitled; Vehicle Door Hinge Having Vetically Seperable Pivotal Connections, Salazar, date of patent: Aug. 30, 1988 and from U.S. Pat. No. 6,591,451 entitled; Automotive Door Hinge With Removeable Component Adapted for Structural Reassembly, Gruber et al, date of patent: Jul. 15, 2003.

### STATEMENT REGARDING FEDERALLY SPONSORED RESEARCH OR DEVELOPMENT

[0002] Not applicable.

### REFERENCE TO MICROFICHE APPENDIX

[0003] Not applicable.

### BACKGROUND OF THE INVENTION

[0004] 1. Field of the Invention

[0005] This present invention generally relates to vehicle safety systems. More particularly, the invention relates to emergency vehicle exit systems with a sensory system that activates it, that is, to a system within the car that makes it much easier to rescue passengers after a high speed structural damage accident results in entrapment and unconscious and injured passengers.

[0006] Every year there are about 42,000 crash deaths. Half of the victims die without even being transported to a medical treatment facility! There are 250,000 life threatening injuries, 500,000 hospitalizations, 2,000,000 disabled by injuries and 4,000,000 emergency department visits occur. In America alone excluding Europe and other countries—nearly 17 million crashes that involve 27 million vehicles occur yearly. Crash injuries result in about \$100 billion in economic costs. And \$350 billion in costs that also include value for pain and suffering.

[0007] The life threatening injuries that result from serious crashes in the US each year are: 70,000 Brain injuries, 4,400 Neck and Spinal Cord injuries, 80,000 Chest and abdominal injuries that include Heart, Lungs, Spleen, Liver and Kidneys. 18,000 Hip and Pelvic Injuries, 35,000 Leg, Ankle and Foot injuries.

[0008] The above statistics do not include a much greater number of less serious injuries, which however add to economic losses indirectly in the form of work day losses, nor do these statistics include pedestrians, motorcyclist and large truck occupants. As above statistics make it clear, the magnitude of the problem indicates a need to reduce these numbers to much smaller figures by having better rescue means. Furthermore, many motor vehicles have been equipped with power windows and power door locks. Therefore, now additional safety hazards exist. In case of an accident in which the vehicle's electrical power system has become dysfunctional, the vehicle operator—even if conscious, is unable to open the doors or lower the windows. Furthermore, structural damage to the door frames or to the door posts make it impossible to open the doors from inside and many times impossible to open the doors even from outside after high speed collisions—structural damage accidents. If vehicle operator and passengers are not conscious, then there is no one to open the doors. This makes the access to the injured very difficult for the rescue personnel and often requires heavy duty forced entry devices for spreading or cutting of the damaged car parts that constitute the obstacles.

[0009] These safety hazards that occur after accidents, have created a need for an emergency vehicle exit apparatus to automatically enable the car doors to be detached from being trapped in the deformed automobile body, from the car, for easy rescue operations. Otherwise, due to structural damage, due to damage to the door frames or to the door posts, it becomes impossible to open the doors after an accident and it is a major obstacle against the rescue operations, where no time has to be wasted in removing vehicular obstacles to reach the injured individuals.

[0010] An apparatus for disengaging the doors together with the hinges from the main car body generally comprises of hinge sections that are housed into the main body where stationary part of hinges are connected and an electromechanic unlocking system that unlocks these sections. These sections are rectangular prisms, like thin prisms that get into their corresponding housings in the main body of the car and are held by the single prong that lock the prism into its place from above and below. Additional strengthened plastic fasteners are used to secure and to keep the prisms fixed at normal conditions when the automobile is not subject to a serious accident. Such plastic fasteners plus the upper and

lower steel prongs keep the rectangular prisms which in turn have the door hinges fixed upon them, in their respective places.

[0011] The activation of unlocking is made possible by an impact sensor that activates the electromechanic unlock system in the case of high speed accidents.

#### [0012] 2. Description of the Prior Art

[0013] Former automotive door hinge mechanisms do not offer an emergency hinge fast detachment means to enable easy post accident rescue operations. Many of the innovative hinge mechanisms are mostly for easy detachment and re-attachment of the doors from the stationary body hinge part, as for example, for assembly and painting operations at factory or at repair and painting shops. Others are detent mechanisms that enable the door to remain open at certain angles. Some enable extra space between the door and the edges. Others add more flexibility in opening angles. Only one has automatic door lock unlocking.

[0014] When an accident occurs and as structural damage occurs, structural damage often propagates damage to the door frames or to the door posts and makes it impossible to open the doors from inside or from outside. This creates a dangerous condition and makes rescue efforts to last a long time and therefore endangers the lives of the injured and entrapped passengers within.

[0015] Former automotive hinge and door systems do not have an easy, fast and reactive detachment mechanism that can secure a swift separation of doors after an accident occurs. A search in this field indicated that there is no prior art directly germane to the present invention.

#### SUMMARY OF THE INVENTION

[0016] Post accident anti entrapment system according to the present invention, is a system to provide an immediate and visible escape route out of a damaged automobile and to provide easy access to occupants by medical and rescue personnel. This system can be installed in new vehicles at factory and can also retrofit older vehicles with some automechanics work by licensed automechanics.

[0017] In view of the disadvantages of the prior art types of rescue equipment and methods, that are mostly devices applied externally as forced entry devices, heavy duty hydraulic forced entry devices, the present invention provides a new apparatus that is within the automobile, for easy post accident rescue of vehicle operator and passengers, who may get entrapped within the vehicle, especially due to heavy structural damage and the inability to open the doors that are jammed.

[0018] The purpose of the present invention, which will be described in greater detail subsequently, is to provide a new mechanism for automobile accidents apparatus and method which has many novel features that result in a new system for automobile accidents which is not anticipated, rendered obvious, suggested, or even implied by any of the prior art rescue devices, either alone or in any combination thereof.

[0019] The present invention generally comprises of electromechanical locks, with locking parts, in the form steel arms with single prongs and these lock into—get into a rectangular prism components that stand vertically, like a

thin brick, onto which the door hinge stationary sides are fixed on the external surfaces, for both left and right doors.

[0020] These locks keep the rectangular prism components onto which door stationary hinge sides are fixed, in their respective places, as if these are permanent parts of the main body of the vehicle, when the vehicle is not involved in a serious accident. In an accident however, the sensory system activates the short electromechanic arms, which swiftly moves out of the rectangular prism components, onto which the stationary hinge parts are fixed.

[0021] Hence, both left and right side doors can be set free and be detached from the body of the car from the hinge connections side—together with the hinges on them—whether the door hinges are damaged as a result of the accident and therefore cause additional difficulty in opening the doors, or not. These rectangular prism components, as uniform blocks can be easily removed out from their housings from the body of the car immediately after unlocking occurs. By analogy, this is similar to removing a brick from its place, from among adjacent bricks above and below and the brick has a nail on its external surface that holds another object. Hence, by moving the brick, the object that is attached to it is also removed.

[0022] The electromechanic devices for the unlocking of the front doors are located within the front lower pillars and side pillars of the right and left front and back doors. The arms of each electromechanic device, one from top, one from bottom side, lock the rectangular prisms. These are generally in the locked position and the prongs stay within the rectangular prism components—when the vehicle is not involved in a serious accident. Furthermore, to keep the rectangular prism components from becoming loose at non-accident, normal operation times, plastic fasteners are used that connect the rectangular prisms firm on the vehicle body. These fasteners plus the steel locks are sufficient to handle the normal operational vibrations associated that originate from normal operation of the vehicle. If a serious accident occurs, these plastic fasteners can be broken easily and since the unlocking system is already activated, the only component holding the rectangular prism components remain these plastic fasteners.

[0023] Before explaining the embodiments of the invention in detail, it is to be understood that the invention is not limited in its application to the details of construction and to the arrangements of the components set forth in the following description or depicted in the drawings. The invention is capable of other embodiments and of being practiced and applied in various ways. Also, it is to be understood that the wording and terminology employed herein are for the purpose of description and should not be regarded as limiting.

[0024] Therefore, those skilled in the art will appreciate that the idea, upon which the disclosure is based, may be utilized for the design of other systems and methods to apply for several purposes of the present invention. Therefore, it is important that the claims be considered as including such equivalent meanings as long as these do not depart from the main subject of the present invention.

[0025] It is therefore the primary object of the present invention to provide a new automotive device for quickly freeing vehicle occupants trapped in a vehicle, which is a result of a serious accident with heavy structural deformation.

[0026] This device and the associated method mentioned heretofore have novel features that result in a new device and method for automobile accidents, which is not anticipated, rendered obvious, suggested, or even implied by any of the prior art rescue devices, either alone or in any combination thereof.

[0027] It is another object of the present invention to provide a new rescue device and associated method for automobile accidents which may be easily and efficiently manufactured and marketed.

[0028] It is another object of the present invention to provide a new rescue device and associated method for automobile accidents which is of a durable and reliable construction.

[0029] It is another object of the present invention to provide a new rescue device and associated method for automobile accidents which is subject of a low cost OEM production and application on OEM cars, with regard to materials, technological methodology and labor, and accordingly is then susceptible of low prices of sale to the consuming public, thereby making said device for automobile accidents economically available to the buying public, or to OEM automobile companies.

[0030] It is another object of the present invention to provide a new rescue device and associated method for automobile accidents that may be economically adjusted to some older model cars and can with some mechanical adjustments retrofit previous models.

#### BRIEF DESCRIPTION OF THE DRAWINGS

[0031] FIG. 1. Shows in perspective view, the two electromechanic locks, that are within the front lower pillar and that are at locked non-accident position, of which the locking function is to lock the rectangular prism component, which in turn has the front door stationary part, upper and lower hinges fixed on it. Said electromechanic locks are capable to unlock the rectangular prism at once, onto which upper and lower stationary part of the front door hinges are fixed.

[0032] FIG. 2. Shows in perspective view, the electromechanic locks being unlocked, as the automobile gets into an accident and the locks that used to be within the rectangular prism structure, are swiftly moved to the unlocked position.

[0033] FIG. 3. Shows in perspective view, how the rectangular prism component onto which the front doors stationary part, upper and lower hinges are fixed, are removable after these are unlocked. As a result the door is set free to be removed away from the vehicle after the accident.

[0034] FIG. 4. Shows in perspective side view, how the doors can be removed easily after the accident by the rescue personnel.

[0035] FIG. 5. Is an enlarged perspective view of the rectangular prism that can be removed and the hinges that are fixed on this rectangular prism and therefore how the door can be removed out of the body of the car. Locking arms in the unlocked position also depicted.

[0036] FIG. 6. Is enlarged perspective view of the rectangular prism and the hinges that are fixed on these prisms. Also depicting the housing out of which the rectangular prism is detached.

[0037] FIG. 7. Is a perspective view and depicts the electromechanic device and the rectangular prisms that hold the upper and lower hinges for the back doors within the side pillars.

[0038] FIG. 8. Is a perspective view and depicts how the rectangular prism component on which the hinges are fixed, can get detached from its housing that is within the side pillars.

#### DETAILED DESCRIPTION OF THE INVENTION

[0039] With reference to FIG. 1, the electromechanic locks 10 and 10a, are within front lower pillars 9, and are at locked non-accident position, of which the lock arms 11a and 11b keep the rectangular prism block 12 locked, onto which the front doors upper stationary hinge part 12a and lower stationary hinge 12b are fixed on the external surface. Said electromechanic locks 10 and 10a are capable to unlock the rectangular prism 12 at once and concurrently, onto which upper stationary hinge 12a and lower stationary part 12b of the front door hinges are fixed. With regards to the parameters of swiftness, the present invention activation, that is the unlocking mechanism can be compared to the fastest air bag system. That means it would unlock within few milliseconds. In less than  $\frac{1}{10}$  of a second, inclusive sensing the accident and completion of activation of unlocking.

[0040] With reference to FIG. 2, when the electromechanic devices 10 and 10a are activated by the accident sensor 8, in less than a second 11a and 11b are unlocked, and the rectangular prism component 12 is set free from locking arms 11a and 11b. As locking arms 11a and 11b are out of the rectangular prism 12, out of lock holes 13c and 13d, the rectangular prism 12 can be detached with a lever easily from the housing 13 that is within the front pillars 9, by the rescue personnel, whether the front door 12f is jammed at its frame or not.

[0041] With reference to FIG. 3, as the electromechanic lock arms 11a and 11b are removed out of the rectangular prism 12 and the rectangular prism component 12 is set free from locking arms 11a and 11b, this rectangular prism 12 is removed easily out from its housing 13 in the front lower pillars 9 of the car, for the purpose to take the front door 12f out. The holes, out of which locks 11a and 11b become unlocked are 13c and 13d respectively. Since the rectangular prism 12 has the door hinges 12a and 12b fixed on them, front door 12f can be removed out easily with minor effort that can break the plastic fasteners 13a and 13b, these plastic fasteners are made by Emhart, which is a known company in automotive fastener market. An exact type of fastener for purpose of the invention can be produced by this company or by another fastener producer. Thus, even if door 12f is jammed at the frame or there is heavy damage to the door as well, the door can still be detached. When vehicle is not involved in a serious accident, the rectangular prism components 12 and 14 are held stable by plastic fasteners 13a, 13b for prism component 12 and by plastic fasteners 15a and 15b for prism component 14, along with the lock arms 11a, 11b and 17 and 18. The plastic fasteners 13a and 13b are within the prism housing 13, where the inner surface of the housing 13 faces the front lower pillars 9 of the car. Likewise, the plastic fasteners 17 and 18 are within the

prism housing 14, where the inner surface of the housing 14 faces the middle pillars 9a of the car.

[0042] With reference to FIG. 4, after a serious accident with an unconscious vehicle operator and passengers, the car body 9, has heavy structural damage, but since the electromechanic devices 10, 10a, 10b and 10c have already unlocked the rectangular prism components 12 and 14 in less than a second before the accident occurred, the front doors 12f and back doors 14e become removeable and can be removed out easily by rescue personnel after an accident, for quick freeing of the unconscious vehicle operator and passengers, even if the doors 12f and 14e are jammed otherwise at their frames and can not be opened.

[0043] With reference to FIG. 5, the electromechanic device 10 and 10a, can remove the lock arms 11a and 11b, out of 12c and 12d, which under normal non-accident conditions remain within lock holes 12c and 12d, before an accident and generally are in the non-accident locked mode. As the accident occurs, lock arms 11a and 11b are immediately moved out of lock holes 12c and 12d. Since the hinge 12a and 12b are fixed on the rectangular prism 12, in turn the door 12f can also be set free and becomes removeable and can easily be detached out of the car, as it is connected through the stationary hinge parts 12a and 12b and through door hinge part 12g and door hinge part 12h.

[0044] With reference to FIG. 6, the rectangular prism 12, can be seen as it is removed out of its housing. In FIG. 6, the housing 13 is depicted just behind the rectangular prism 12, out of which rectangular prism 12 has been detached. The housing 13 have intermediary openings 13c and 13d, that enable locks 11a and 11b to pass through the wall of housing 13 and get into the lock holes 12a and 12b.

[0045] With reference to FIG. 7, the back doors are also made easily removeable after an accident by applying the same system of electromechanic unlocking. Upper side electromechanic lock 10b and lower side lock 10c and their lock arms 17 and 18, are placed within the middle pillars 9a of the automobile, lock arms 17 and 18 keep the rectangular prism 14 in its housing 15, in the locked position when the vehicle is not involved in an accident. On the external surface of prism 14 are the upper back door hinge 14a and lower door hinge 14b fixed. In a serious accident, the lock arms 17 and 18 are moved out in less than a second and the rectangular prism 14 is only held by the plastic fasteners 15a and 15b, which can easily be broken by the rescue personnel by pulling the door out at the hinge side. Same system is applied on both right and left back door sides.

[0046] With reference to FIG. 8, within the side pillars 9a are the housing 15, within which the rectangular prism block 14 is located. Rectangular prism 14 gets unlocked by electromechanic unlocking arms 17 and 18 when an accident occurs. Since the back door upper stationary hinge 14a is fixed on rectangular prism 14, and in turn the back door is connected to the hinge 14a through the door hinge part 14f, the door becomes easily removeable from the body of the car. The same applies to lower hinge 14b that is fixed onto the lower side of the rectangular prism component 14 through door side hinge part 14g.

[0047] Otherwise, these locking arms 17 and 18 remain within the rectangular prism block—component 14, as long as the vehicle is not involved in a serious accident.

I claim:

1. A new electromechanic unlocking device and associated components for automobile accidents for quickly freeing individuals trapped in a vehicle as a result of an accident comprising in combination:

An electromechanic device member comprised of locking arms that get into the rectangular prism components, which in turn hold the door hinges on which one surface of said rectangular prisms are the door hinges fixed, therefore also automobile doors are connected, said rectangular prisms are located within housings in the automobile pillars—within the front lower pillars and the side pillars of the car—and an electronic sensor activates the electromechanic unlocking device swiftly in the case of a serious accident, to enable easy detachment of the doors away from the damaged automobile body right after the accident,

2. The electromechanic device for automobile accidents as set forth in claim 1 wherein the unlocking arms have a generally rectangular shaped configuration with a single prong that each get into prism from above and below and are made of steel,

3. The electromechanic device for automobile accidents as set forth in claim 1 wherein the unlocked object is a rectangular prism shaped structure, on which the external surface the door hinge is fixed, and is made of metal,

4. The rectangular prism component of claim 3 wherein the rectangular prism has two female entry spaces, above and below it, into which the rectangular shaped locking parts get in, like an electrical plug that gets into a socket,

5. The rectangular prism components of claim 3 wherein the rectangular prism components are moveable after these are unlocked, which in turn results in the removal of the door hinges away from the car body, which means the doors can be detached from the car even if doors are jammed at door frames, posts or even if there is damage to the doors in an accident,

6. The rectangular prism components of claim 3 wherein the rectangular prism components are held in position fixed when the vehicle is not involved in a serious accident by plastic strengthened no-hole fasteners that fix the rectangular prism components onto the car body, in addition to the rectangular shaped locking components that also function as fasteners, if not unlocked,

7. The rectangular prism components of claim 3 wherein the rectangular prisms are used as a means to move the door hinges with their block base on which the hinges are fixed, said rectangular components and said same electromechanic unlocking mechanism are also applied for the back doors, where said electromechanic devices and rectangular prism components—upper and lower parts—are within the two side pillars that support the ceiling of the car.

\* \* \* \* \*