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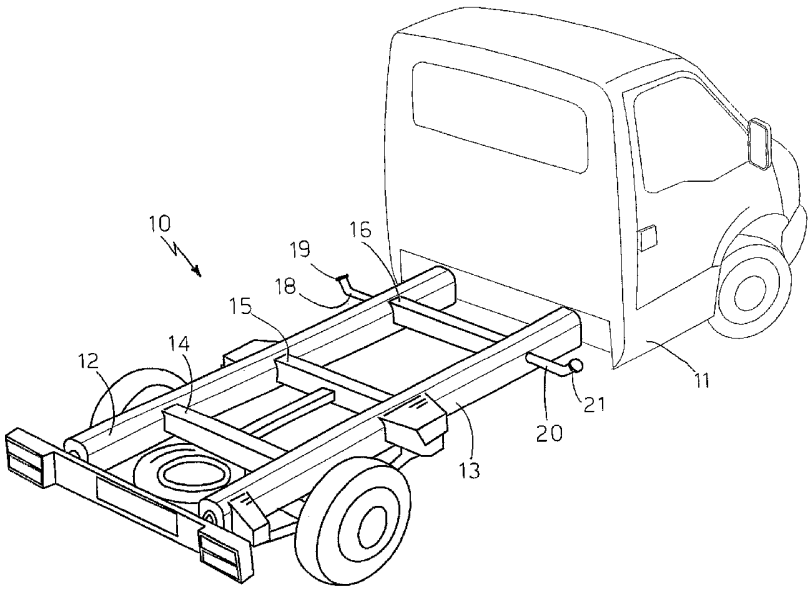
(54) **Title:** CHASSIS FOR VEHICLES EQUIPPED WITH TANKS FOR GASEOUS FUEL, AND IN PARTICULAR HYDROGEN



(57) **Abstract:** A chassis for vehicle comprises main, frame members structured and shaped in a way which is useful to directly restrain gaseous fuels under pressure, and in particular hydrogen, methane or their mixtures. Proper safety devices are provided to run, especially in case of fire. It is so reached a cheap solution to the matter of storing, in new ecologic vehicles equipped, in particular, with hydrogen-driven engines, an amount of fuel which is enough to assure driving ranges and overall performances suitable to the different fields of applications. It is also attained an increase of the maximum carrying capacity with the same overall weight of the vehicle.

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CHASSIS FOR VEHICLES EQUIPPED WITH TANKS FOR GASEOUS FUEL, AND IN PARTICULAR, HYDROGEN.

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TECHNICAL FIELD

The present invention refers to a chassis for vehicles.

Specifically, but not exclusively, the invention concerns a chassis for ecological vehicles equipped with hydrogen-driven engines.

STATE OF THE ART

In order to reduce exhaust emissions of engines for vehicles intended especially for urban utilization, recently have been developing vehicles equipped with hydrogen-driven engines, which at the present moment represent an effective and realer alternative choice to the common engines than the electric vehicles which have been developed for the same purpose but which have not still found a wide spreading due to the known limits relating costs, dimensions and managing of the battery sets installed in the vehicle; limits which penalize both the maximum driving range and the performances of this last kind of vehicles.

On the contrary, thanks to the calorific value and the specific weight of the hydrogen, the driving range and the performances of hydrogen-driven vehicles are far more interesting than the performances of electric vehicles.

Moreover, the same applicant developed solutions apt to overcome the matters that hampered spreading hydrogen-driven vehicles, mainly relating to the difficulties in supplying this kind of fuel and to the lack of expressly designed engines. In fact, as regards the first of the above problems, the applicant provided a method and apparatus for generating and supplying hydrogen specifically for the automotive sector, while, as regards the second problem, the applicant proposed a two-fuel engine particularly suitable to be hydrogen-driven, both the above solutions being object of patent applications in various countries.

Furthermore, taking on account that, thanks to the improvement of the technology in the iron metallurgy sector, are nowadays available special kinds of steel, particularly strong, which can be welded, it clearly worth inspecting innovative solutions, concerning in particular the chassis of vehicles, apt to optimise the storage of under pressure gaseous fuel on board the vehicles.

SUMMARY OF THE INVENTION

Main object of the present invention is to propose a solution for storing hydrogen, or mixtures of it with other gases, in vehicles in a way which is capable to exist together with the needs, especially as regard quantity and safety, coming from the usage of the above said engines driven with hydrogen, or other gaseous fuel.

Further aim of the invention is to propose a solutions for storing gaseous fuel on vehicles in a way which is cheap and safe.

The aforesaid purposes and other more are reached through a chassis for vehicles comprising one or more main frame members, said chassis

being characterized by the fact that at least one of said main frame members constitutes a tank for storing under pressure gaseous fuel. Said main frame member comprises at least one cylindrical or cylindrical like shaped hollow area, connected, by connecting means, to external systems for feeding and supplying the fuel.

The chassis according to the invention advantageously comprises a single main frame member placed along the longitudinal central axis of the vehicle.

Alternatively, the chassis of the invention may comprise two main frame members symmetrically placed with respect to the vertical central plane of the vehicle, said main frame members being linked each other by transversal parts of the chassis which can be structured to constitute themselves tanks for gaseous fuel. Advantageously, said transversal parts communicate with hollow areas of one or both the main frame members, one or more ducts being provided for refuelling gaseous fuel in the above said hollow areas.

Safety devices, as automatic valves or similar, are connected to said hollow areas provided in said main frame members of the chassis of the invention.

The advantages relating to the chassis of the invention are immediately clear, specially in consideration of the savings which can be attained making vehicles equipped with engines driven with various kind of fuel, and in particular hydrogen, and in consideration as well of the increased maximum payload thanks to the fact that one can give up using traditional gas cylinders to stock said fuel.

There are also clear advantages coming from the easiness of adapting the location and the volume of the fuel tanks according to the different needs of the field of use of the vehicle.

BRIEF DESCRIPTION OF THE DRAWINGS

For a better understanding of the characteristics and the advantages of the present invention, two embodiments will now be described by way of examples with reference to the accompanying drawings, in which:

- figure 1 shows a schematic global view of a chassis according to the present invention;
- figure 2 shows a schematic view of a different embodiment of the chassis of fig.1.

DESCRIPTION OF PREFERRED EMBODIMENTS

With reference to fig.1, it is pointed at as a whole, with 10, a supporting structure for a vehicle, 11, dedicated to carry goods. Said supporting structure is, in this embodiment of the invention, a supporting chassis comprising two main frame members, 12, 13, symmetrically disposed with respect to the central vertical plane of the vehicle, connected together by transversal components, 14, 15, 16, welded at their ends to said main frame members, 12, 13.

As we can notice in figure, said main frame members keep a closed rectangular, or rectangular like profile, all along their longitudinal extent and they comprise internal hollow areas, which can be, or not, connected each other by means of one or more of the transversal components 14, 15, 16.

A first input duct, 18, is bond to one, 12, of said main frame members, said duct providing a collector, 19, for connecting to fuel supplying systems, and in particular gaseous fuel, such as methane or hydrogen.

A second input duct, 20, is bond, in this embodiment of the invention, to another, 13, of said main frame members, said duct, 20, as well providing a collector, 21, for connecting to fuel supplying systems.

In the embodiment of fig.2 the main frame members, 12', 13', are cylindrical and their hollow areas communicate thanks to a transversal element, 16', this last one being cylindrical too. Such a kind of solutions is evidently recommended wherever a high volume of the fuel tanks is required, whilst the embodiment of fig.1 is preferable for his higher adaptableness, as the hollow areas of the two main frame members, 12, 13, can be separately used considering that each of them provides its own input duct and this last feature enable to utilize one of them as auxiliary tank, or even to store a different kind of fuel in vehicles supporting promiscuous feeding, as, for instance, vehicles equipped with engines driven with hydrogen and methane, or their mixtures.

Obviously, in both cases can be provided valves or other devices apt to automatically run to assure safeness whenever faults or dangerous situations occur.

Clearly the above said advantages and the features of the above disclosed chassis keep safe also making further changes or according to different embodiments.

For example, the chassis could comprise a single central main frame member, especially in case of vehicles having little maximum payload and small size.

The ducts taking to the hollow areas of the main frame members could be separately provided, as already said, for one or more tanks.

The profile of the main frame members and of the transversal elements of the chassis could be differently shaped with respect to what shown in the appended drawings; the main frame member, for instance, may comprise internal hollow areas placed just close to its central part, or close to two end parts, or in other different locations.

The safety devices may obviously be different, both as regards their number and their type, in agreement with the laws in force.

Further modifications may obviously affect the means for connecting the input ducts to the fuel supplying system, said connecting means being made to grant the proper transfer of fuel under pressure.

Finally it is useful to underline that the tanks are able to store both pure hydrogen and mixtures of said gas and methane or other fuels, in the proper and suitable ratios, as a function of the easiness of supplying said fuels.

Other changes or modifications can be brought to the invention still remaining in the sphere of protection defined by the following claims.

CLAIMS

1- Chassis for vehicles comprising one or more main frame members, characterised in that at least one of said main frame members forms a tank for gaseous fuel under pressure.

2- Chassis for vehicles according to the previous claim characterized in that said at least one main frame member comprises at least one hollow area approachable from the outer space thanks to connecting means apt to connect to external systems for feeding and supplying fuel.

3- Chassis for vehicles according to the previous claim characterized in that said at least one hollow area is cylindrical or cylindrical like shaped.

4- Chassis for vehicles according to claim 2 or 3 characterized in that said chassis comprises a single central main frame member.

5- Chassis for vehicles according to claim 2 or 3 characterized in that said chassis comprises two main frame members, 12, 13, symmetrically placed with respect to the central vertical plane of the vehicle, said main frame members being connected each other by transversal components, 14, 15, 16, whose end parts are welded to the main frame members, 12, 13.

6- Chassis for vehicles according to the previous claim characterized in that said two main frame members provide ducts connecting their hollow areas to the outer space.

7- Chassis for vehicles according to claim 5 or 6 characterized in that said transversal components are structured to form fuel tanks

communicating with the hollow areas of at least one of said main frame members 12, 13.

8- Chassis for vehicles according to one of the claims from 4 to 7 characterized in that said main frame members have a closed rectangular, or rectangular like, profile.

9- Chassis for vehicles according to one of the previous claims characterized in that it comprises safety devices, such as automatic valves or similar, connected to said hollow areas of said main frame members.

10- Chassis for vehicles according to one of the previous claims characterized in that said at least one of said main frame members is a tank for gaseous fuel, in particular hydrogen or mixtures of hydrogen.

11- Chassis for vehicles according to one of the claims from 5 to 9 characterized in that one of said main frame members is a tank for hydrogen and another of said main frame members is a tank for methane.

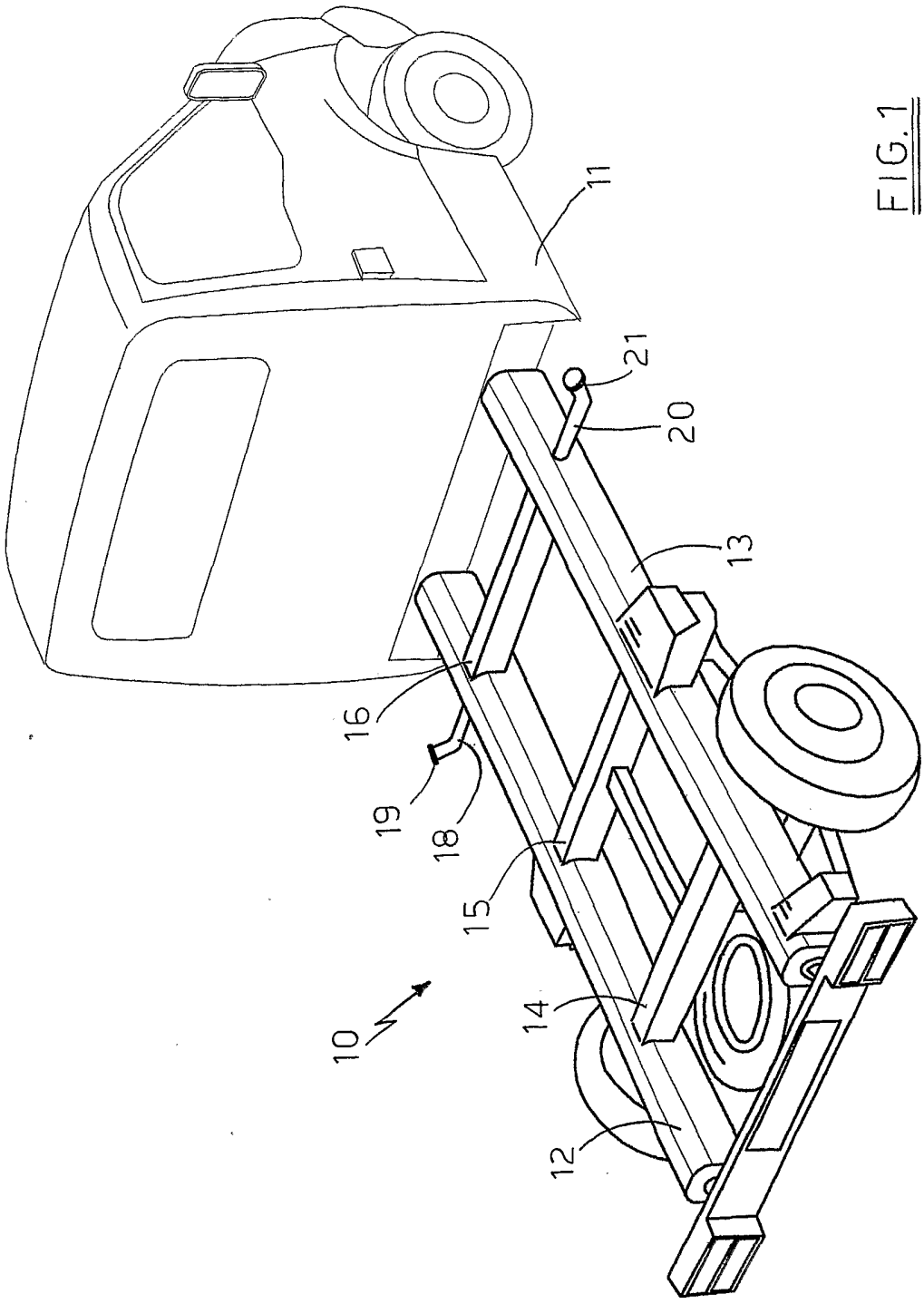

FIG.1

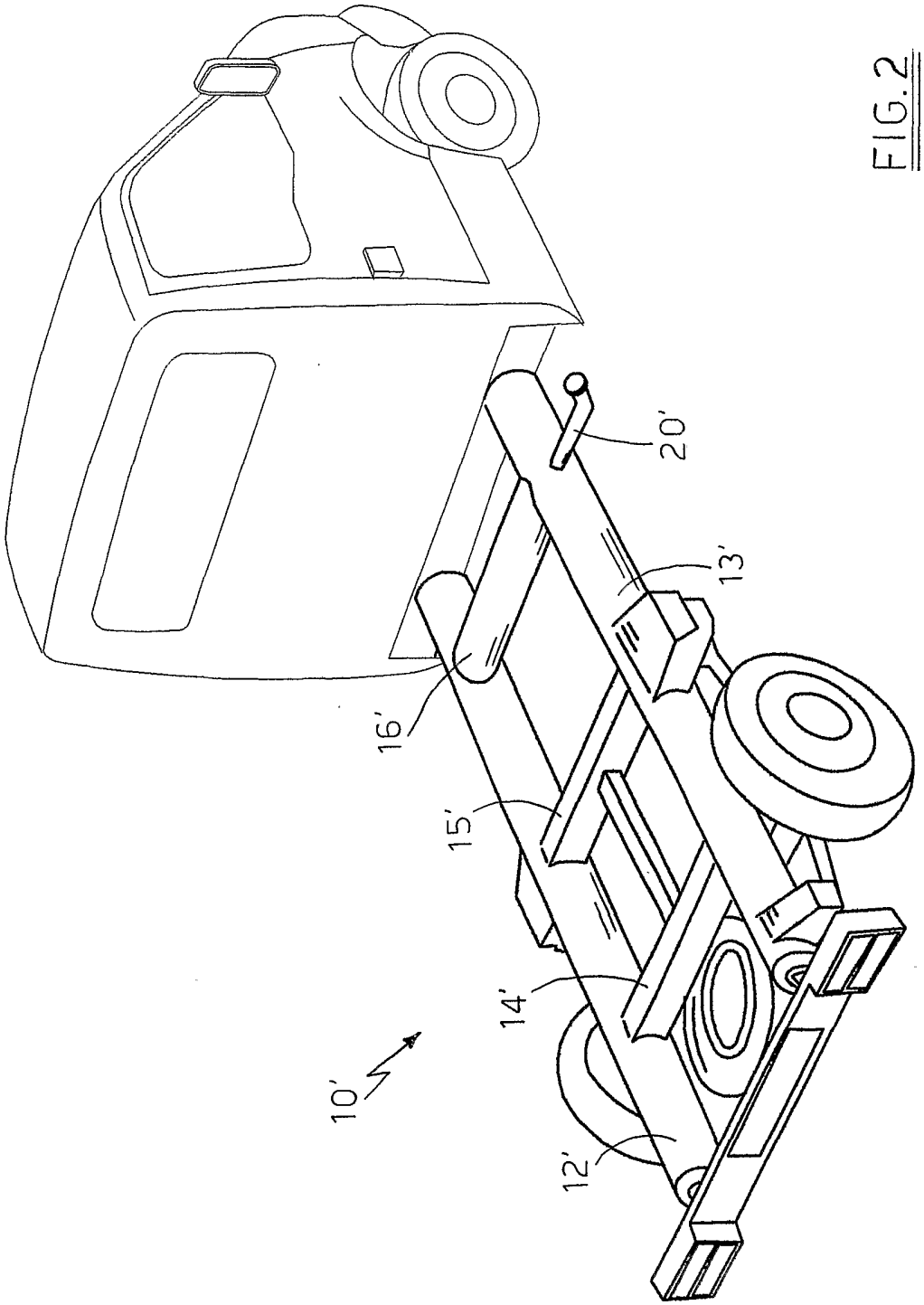

FIG.2

INTERNATIONAL SEARCH REPORT

IB2005/003288

A. CLASSIFICATION OF SUBJECT MATTER
B62D21/16

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
B62D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
EPO-Internal, PAJ

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category*	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	FR 2 742 403 A (SBARRO FRANSCECO) 20 June 1997 (1997-06-20) figures page 3, line 30 - page 4, line 9	1-4,10
X	EP 1 092 612 A (VOLVO PERSONVAGNAR AB) 18 April 2001 (2001-04-18) figures 1-3 paragraph '0022! - paragraph '0035!	1,2,5-8, 10
Y		11
Y	US 5 370 418 A (PUGH ET AL) 6 December 1994 (1994-12-06) figures 1-3 column 3, line 4 - column 4, line 37	11
A		1-6,10

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[X] Further documents are listed in the continuation of Box C.

[X] See patent family annex.

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Date of the actual completion of the international search	Date of mailing of the international search report
1 March 2006	09/03/2006

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C(Continuation). DOCUMENTS CONSIDERED TO BE RELEVANT

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