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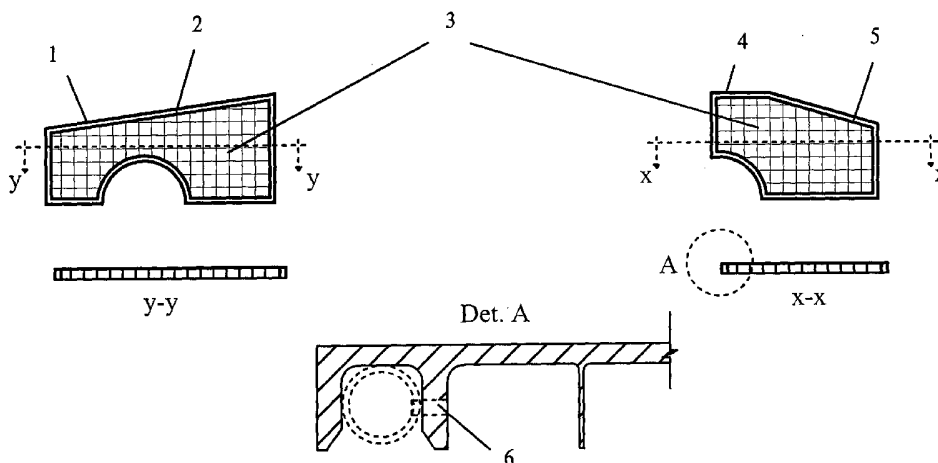
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(54) Title: METHOD FOR MANUFACTURING CARS BODIES FROM PLASTICS



(57) Abstract: This invention concerns a new method for manufacturing car bodies entirely from plastic parts. It proposes the use of a metallic Main Tubular Frame serving as a skeleton for the car, onto which are mounted the fixed parts of the car body, such as the fender and the roof, which will be made from plastics and will have grooves in their backsides into which the tubes of the Main Tubular Frame will be embedded when these parts are thrust onto it. As for the openable parts of the car body, such as the doors, the hood and the luggage compartment cover, they will also be made from plastics with grooves in their backsides and will be mounted onto respective Tubular Frames serving as skeletons for these parts. The Tubular Frames of the openable parts are hinged to the Main Tubular Frame. The application of the method proposed by this invention will greatly simplify the production of the bodies of automobiles and other means of transportation like buses, train and underground carriages and trucks cabins, and will drastically reduce the production costs. The use of huge and costly machines, equipment and welding assembly lines will no longer be needed. They will be replaced by tube benders and plastic injection machines. Painting, also, will be eliminated. On top of that, cars thus produced will be stronger and safer than the current ones.

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METHOD FOR MANUFACTURING CARS BODIES FROM PLASTICS

Technical Field

This invention concerns a new method for manufacturing the bodies of automobiles and other means of transportation like buses, train and underground carriages and also trucks cabins completely from plastics.

5 Background Art

Bodies of automobiles currently produced are mostly of the unitized or monocoque type consisting mainly of panels made from thin die stamped steel sheets stiffened with supporting elements, reinforcers and pillars. The lower part, or base of the car body, consists normally of the floor panel strengthened with two longitudinal beams welded to
10 the floor and joined to each other and to the sills by cross members. All these elements are also made from thin gauge steel sheets.

There are several problems and drawbacks of the current art in manufacturing cars bodies which can be summarized as follows:

1-Fabrication processes of car body panels and parts like the roof, fenders, engine hood,
15 luggage cover, doors, etc., and also of the supporting elements, stiffeners and pillars are lengthy, complicated and costly, for they comprise several operations: shearing, punching, bending, pressing, welding, etc. The assembly of such panels and parts to form the body of the car is also complicated and costly, and needs giant assembly lines that require huge investments.

20 2-Cars bodies thus made from steel sheets need painting, which is also a lengthy and costly operation. It also damages the environment.

3-Cars bodies thus made from steel sheets don't possess the requisite rigidity and toughness, for they really lack a "real" frame. Collisions can easily deform such bodies, which then become a source of hazard to their occupants instead of protecting them.

25 Disclosure of the Invention

This invention proposes the use of plastic parts for the production of cars bodies. By "plastics", it is meant all synthetic polymers and elastomers and also all polymeric composites reinforced by fiberglass, carbon, graphite or organic fibers.

Plastics are so prevalent in the world today that a complete and comprehensive list of
30 current applications is almost impossible. Plastics are used in industrial and medical equipment, computers, boat hulls, tubs, tanks, furniture, etc. Polymeric composites are

used in aerospace applications; the body of the B-2 Stealth bomber is made from carbon/epoxy composite.

Cars bodies made from plastic parts have many advantages over those made from steel sheets. From the fabrication perspective, plastic parts can easily be formed by a single injection shot, no matter how complicated they are, and require no further finishing or painting. On the other hand, parts made from steel sheets are fabricated through lengthy and complicated processes, and need painting work. Consequently cars bodies made from plastic parts will be simpler to manufacture and cheaper than those made from steel sheets.

Plastics, however, can't be used alone in manufacturing cars bodies, for its mechanical strength is inferior to that of steel and it is also fragile; a fact which restricted its use in automotive industry to internal trims, seats, bumpers and the like.

The proposition set forth in the present invention is to change the way cars bodies are manufactured in order to allow for the extensive use of plastic parts in their construction. Specifically, this invention proposes the following for building the bodies of cars and other means of transportation:

1- The use of a Main Tubular Frame, made from steel tubes, or any other suitable metallic tubes, with a circular, rectangular, square or any other convenient cross section (1, FIGS.1 &6). The tubes are cut, bent and welded together according to the required design so as to form the skeleton for the automobile, bus, or in general, the vehicle to be manufactured.

2- The fixed parts of the car body such as the front fenders (1, FIG. 2), the rear fenders (4, FIG. 2), and the roof (FIG. 3) will be made from plastics in the desired shape and will have grooves in their back sides (2 & 5, FIG. 2; 1, FIG. 3), corresponding to the tubes of the portion of the car Main Tubular Frame onto which they will be mounted, so that the tubes of the Main Tubular Frame will be embedded in these grooves (Det. A, FIGS. 2& 3).

3- The use of Tubular Frames made from steel tubes, or any other metallic tubes, with a circular, rectangular, square, or any other convenient cross section, cut, bent and welded to form the desired shape, for the openable parts of the car body such as the engine hood (FIG. 4), the doors (FIG. 5) and the luggage compartment cover, serving as skeletons outlining these parts. These Tubular Frames will be hinged to the car Main Frame (4, FIGS. 4 &5).

4- The openable parts of the car body such as the engine hood, the doors and the luggage compartment cover, will be made from plastics in the desired form and will have grooves in their back sides (1, FIGS. 4 &5) corresponding to the tubes of their Tubular Frames, so that these tubes will be embedded into the parts grooves (Det. A, FIGS. 4&5).

5 To increase the stiffness and rigidity of these plastic parts, they will be provided with ribs at adequate intervals (3, FIG. 2; 2, FIGS. 3 , 4 , 5 & 7). Use will be made of set screws (6, FIG. 2; 3, FIG. 3, 4, 5 & 7) to avoid relative motion between the plastic part and the Tubular Frame onto which it is mounted.

As for the floor of the car body, it will be made from steel sheets as is the case with the
10 current cars.

This invention exploits the advantages of both steel and plastics in building a new frame and a new body in a manner that drastically reduces the complexity and costs of cars manufacturing process. Thus instead of using huge and expensive shearing machines, press brakes, punching machines, presses, welding assembly lines, etc., we will simply use tube
15 benders for the car frame and plastic injection machines for the car body! Painting work will be eliminated. Surprisingly enough, this new car will be stronger and safer than the current ones. This new manufacturing method proposed by this invention can be used for the production of the bodies of automobiles, buses, train and underground passenger carriages and also trucks cabins.

20 **Brief Description of the Drawings**

FIG. 1: Car Main Tubular Frame

1. Tubes

FIG. 2: Car Fenders

1. Front fender

25 2. Grooves

3. Ribs

4. Rear fender

5. Grooves

6. Set screw

30 FIG. 3: Car Roof

1. Grooves

2. Ribs

3. Set screw

FIG. 4: Engine Hood

1. Frame embedded in the grooves

2. Ribs

5 3. Set screw

4. Hinges

FIG. 5: Car Door

1. Frame embedded in the grooves

2. Ribs

10 3. Set screw

4. Hinges

FIG. 6: Bus Main Tubular Frame

1. Tubes

FIG. 7: Bus Body Side Panel

15 1. Grooves

2. Ribs

3. Set screw

Best Mode for Carrying Out the Invention

The car body Main Frame will be made from steel tubes, with a circular cross section
20 of a suitable diameter $\frac{1}{2}$ - 2 inch. The tubes will be cut, bent and welded together according
to the required design so as to form a rigid skeleton for the car, bus, or generally the
vehicle to be manufactured. With this frame, several members of the lower part of the
frame currently employed for cars can be eliminated including the sills and the cross
members. In fact what will be retained from the lower frame currently employed for
25 automobiles is the two longitudinal beams, which will in our case be welded to the car
Main Tubular Frame.

Tubular Frames for the openable parts, such as the doors, the hood and the luggage
compartment cover, will be made from steel tubes, with a circular cross section of $\frac{1}{2}$ - 1
inch. These tubes will be cut, bent and welded together according to the required design so
30 as to form skeletons for the openable parts of the car. The panels and parts of the car body
will be made from plastics, injected in the desired form, and then mounted onto the car

Main Tubular Frame, if they are fixed parts such as the fenders, the roof and the front and rear parts; or mounted onto the corresponding Tubular Frames, if they are openable parts, such as the doors, the hood and the engine compartment cover. The tubes of the Main Tubular Frame and of the Tubular Frames of the openable parts will be embedded into the
5 grooves existing in the backsides of the car body plastic parts when assembled together. Set screws will secure their fixing together.

Industrial Applicability

The method proposed in this invention can be applied for the manufacture of the bodies of automobiles and other means of transportation such as buses, train and underground
10 carriages and also trucks cabins from plastics.

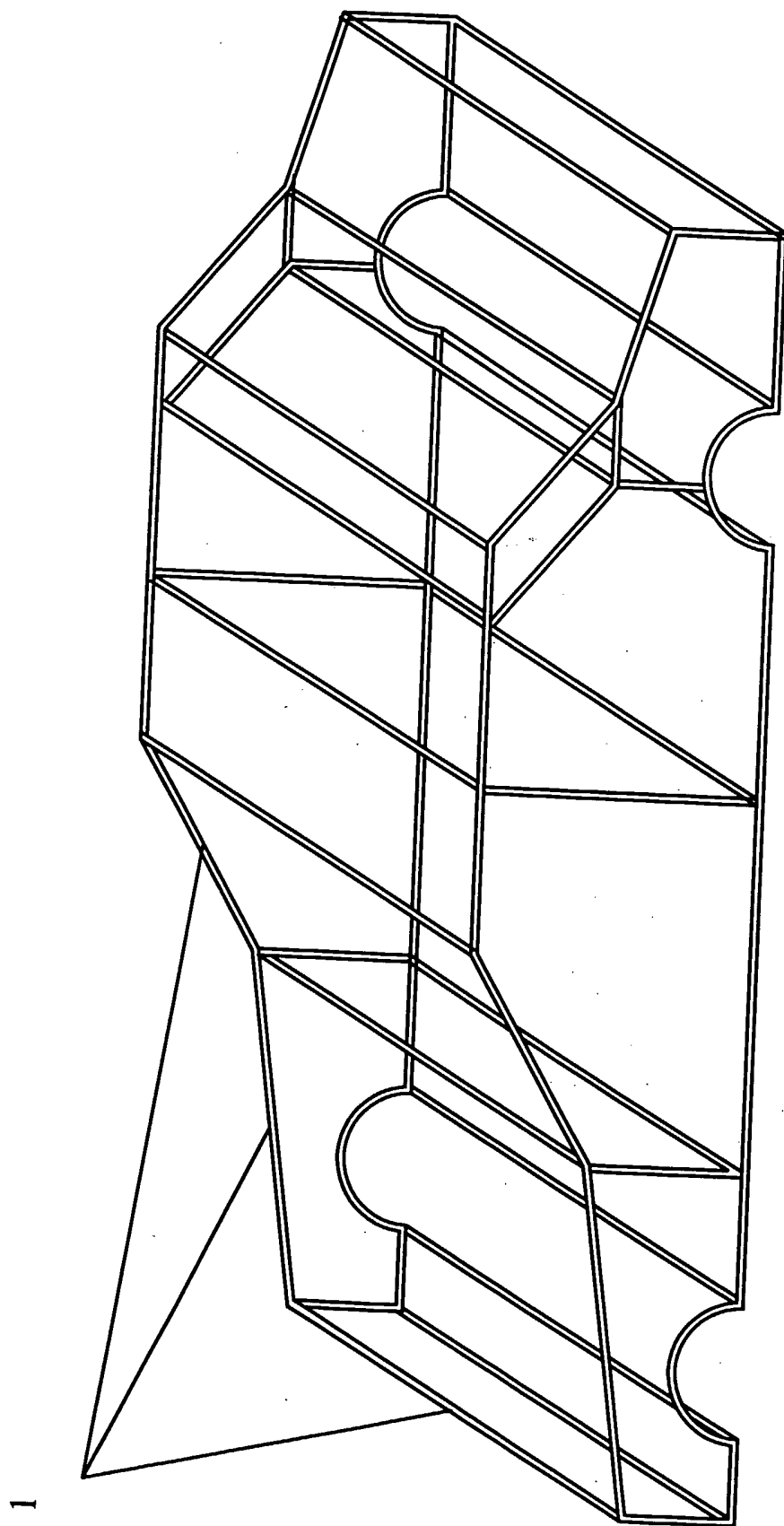
It is clear that the application of the method outlined in this invention will greatly simplify the manufacture of cars, buses, and train carriages and will drastically reduce their production cost; for only tube benders will be needed for the manufacture of the vehicle frame and only plastic injection machines will be required to manufacture the parts and
15 panels of the vehicle body. The manufacture process will be less damaging to the environment due to the elimination of the painting work. Cars and other means of transportation will be stronger and safer. Repair of body damage will be effected instantly by the driver; for he simply should remove the damaged fender and thrust on a new one!

CLAIMS

1. The subject matter of the present invention concerns a new method for the production of the bodies of automobiles, buses, train and under ground carriages and trucks cabins from plastics, and is characterized by mounting the fixed parts of the car body, like the fenders and roof, which will be made from plastics, onto a Metallic Main Tubular Frame
5 serving as the car skeleton, and by mounting the openable parts of the car body, like the doors, the hood and the luggage compartment cover, also made from plastics, onto respective Metallic Tubular Frames serving as skeletons for these parts.
2. In accordance with what is indicated in item 1 above, a Metallic Main Tubular Frame characterized by being made from steel tubes, or any other metallic tubes, with a circular,
10 rectangular, square or any other cross section, cut, bent and welded according to the specified design. This Main Tubular Frame will serve as the skeleton of the car or the vehicle onto which the fixed plastic parts of the body will be mounted.
3. In accordance with what is indicated in item 1 above, the fixed parts of the car body, like the fenders and the roof, characterized by being made from plastics and having
15 grooves in their backsides inside which the corresponding tubes of the Main Tubular Frame will be embedded when these parts are thrust and mounted onto them. These plastic parts will have ribs on their backsides to enhance their rigidity.
4. In accordance with what is indicated in item 1 above, Tubular Frames for the openable parts of the car body such as the doors, the hood and the luggage compartment cover,
20 characterized by being made from steel tubes, or any other metallic tubes, with a circular, rectangular, square or any other cross section, cut, bent and welded according to the specified design. These Tubular Frames will serve as skeletons, onto which the corresponding openable plastic parts of the body will be mounted.
5. In accordance with what is indicated in item 1 above, the openable parts of the car
25 body, such as the doors, the hood and the luggage compartment cover, characterized by being made from plastics and having grooves in their backsides, inside which the tubes of the respective Tubular Frames will be embedded when these plastic parts are thrust and mounted onto them. These plastic parts will have ribs on their backsides to enhance their rigidity.

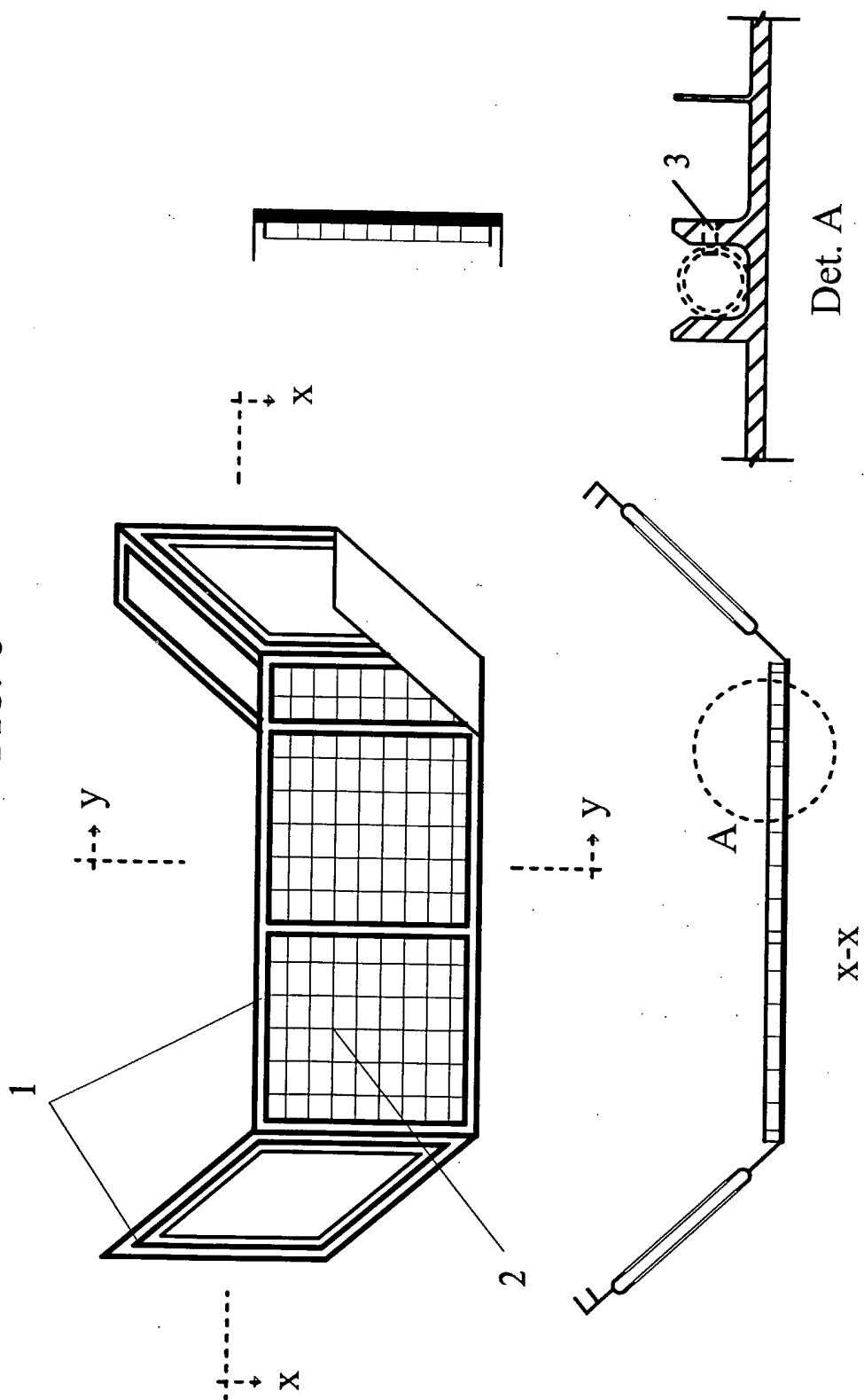
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FIG. 1



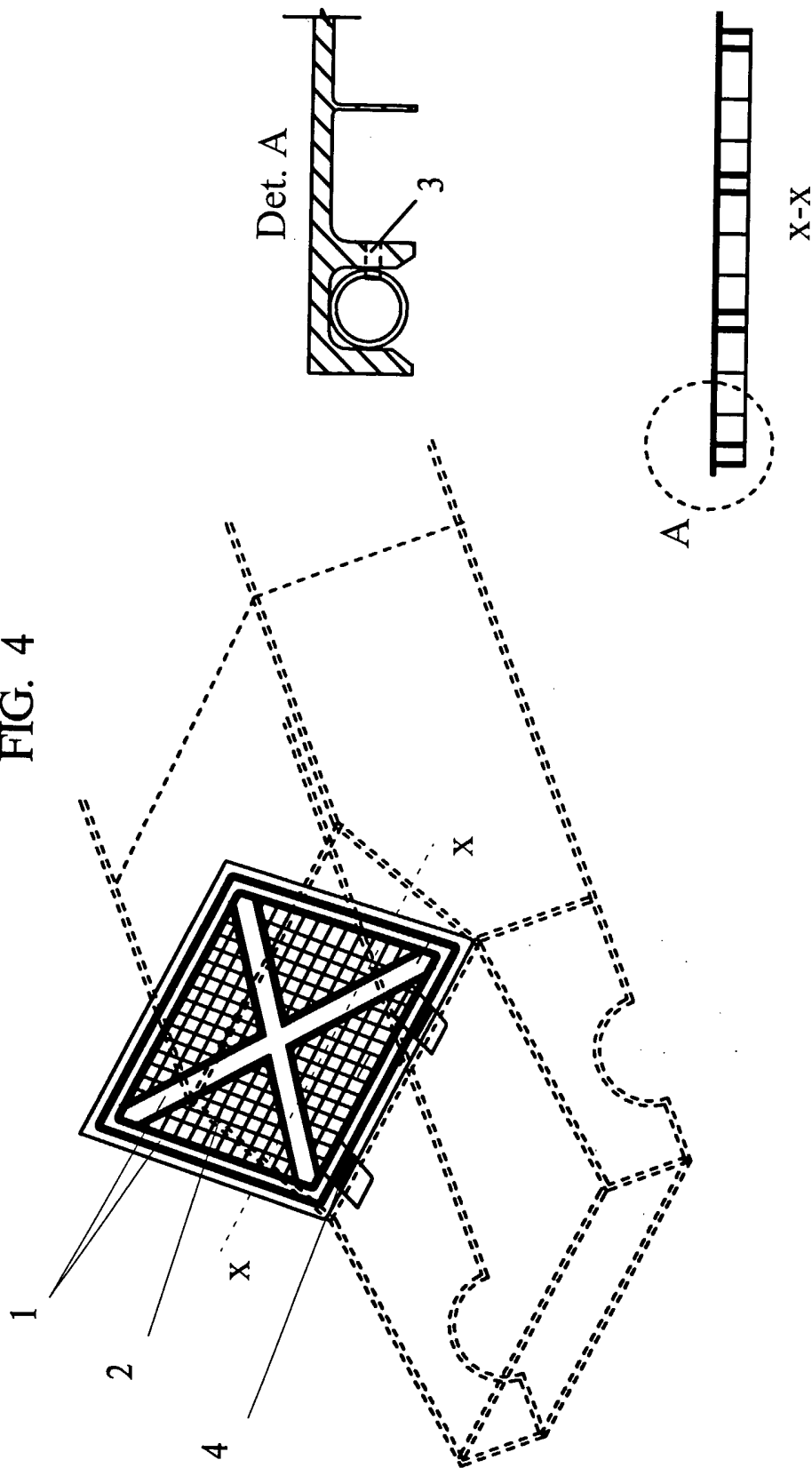
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FIG. 3



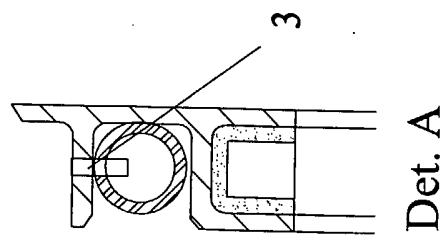
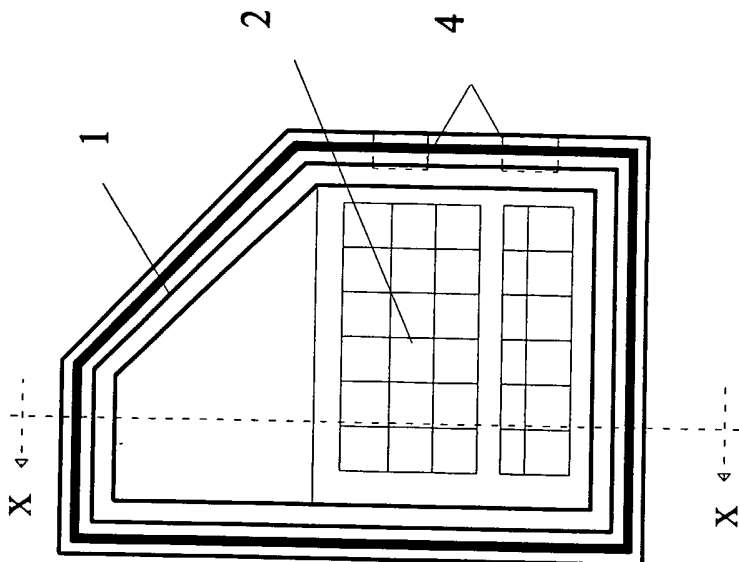
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FIG. 4

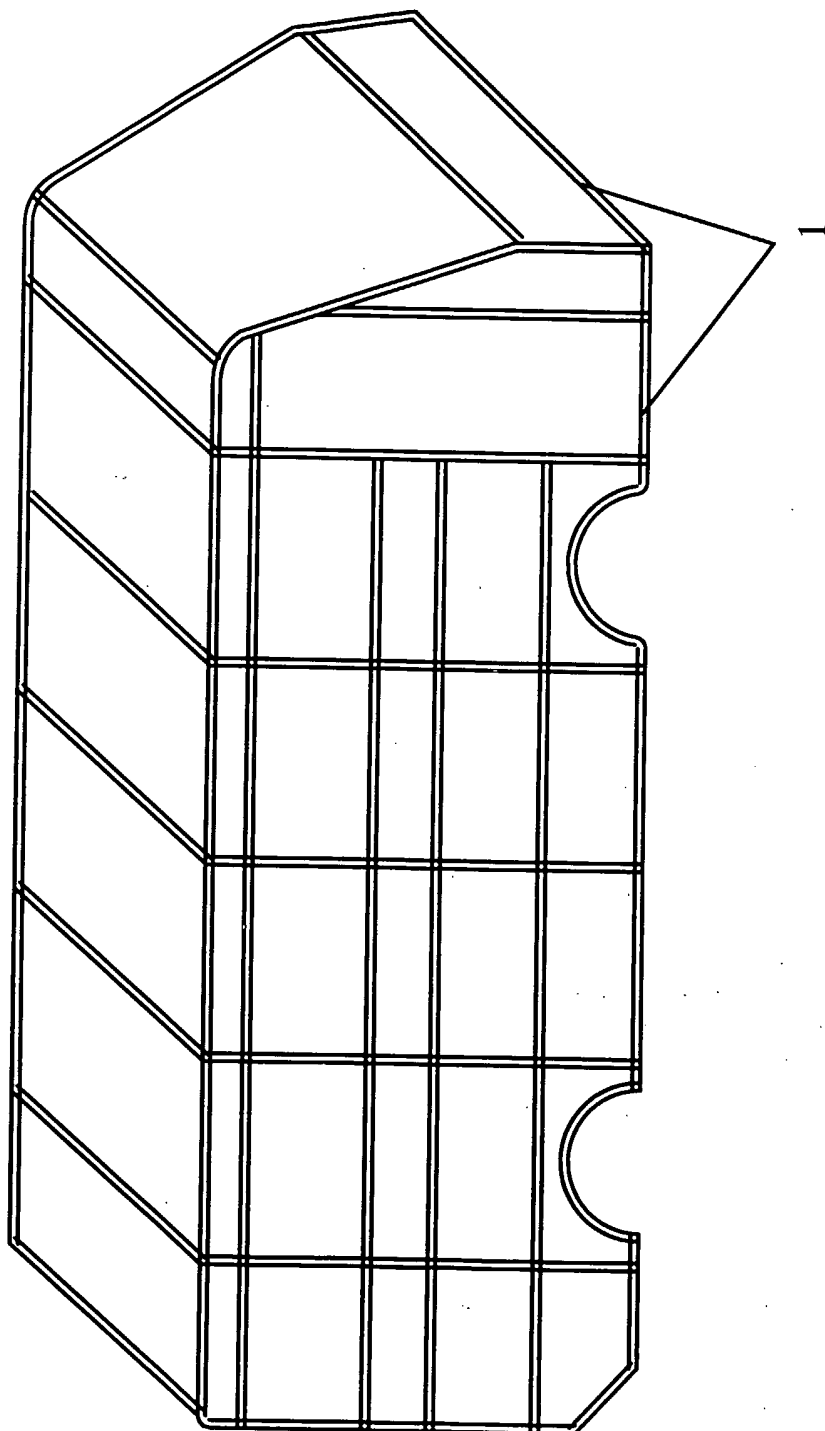


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FIG. 5

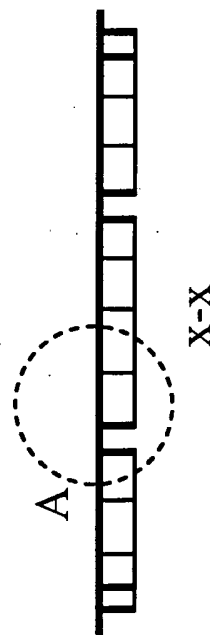
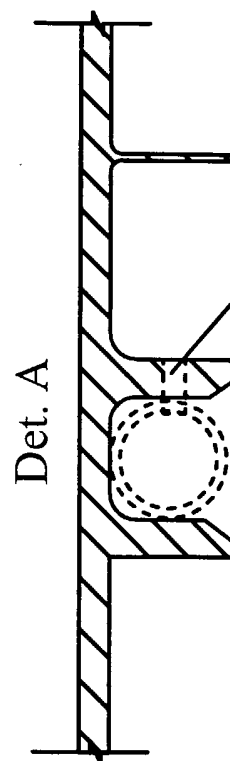
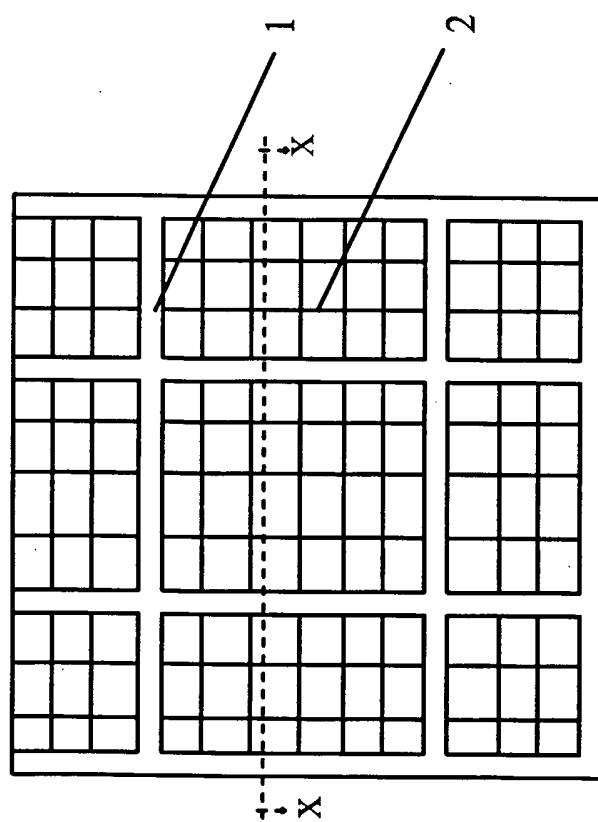


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FIG. 6



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FIG. 7



INTERNATIONAL SEARCH REPORT

International application No.
PCT/EG 2003/000002-0

CLASSIFICATION OF SUBJECT MATTER

IPC⁷: B62D 29/00, B62D 29/04, B62D 65/02

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)

IPC⁷: B62D

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

B62D 29/00 F/EC

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

EPODOC, WPI, TXTE, TXTG

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4440434 A (CELLI) 3 April 1984 (03.04.1984) <i>the whole document.</i>	1-5
X	US 6250410 B1 (BALESTRINI ET AL.) 26 June 2001 (26.06.2001) <i>column 2, line 48 - column 3, line 45, claim 11, figs. 1-4.</i>	1,2,4
A	US 2269451 A (FORD) 13 January 1942 (13.01.1942) <i>description page 1, right column, line 23 - page 2, left column, line 56, figs. 1-5.</i>	1,2
A	US 4045075 A (PULVER) 30 August 1977 (30.08.1977) <i>column 7, lines 42-64, figs. 1-3.</i>	1,2
A	GB 526159 A (AUTO UNION) 11 September 1940 (11.09.1940) <i>figs. 1-3.</i>	1-3

Further documents are listed in the continuation of Box C.

See patent family annex.

* Special categories of cited documents:

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Date of the actual completion of the international search

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International application No.
PCT/EG 03/00002-0

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