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(71) Applicant:
F.A.S.P. Augusto Sbalchiero S.p.A.
36031 Dueville (VI) (IT)

(72) Inventor: **Sbalchiero, Antonio**
36031 Dueville (VI) (IT)

(74) Representative: **Bonini, Ercole**
c/o STUDIO ING. E. BONINI SRL
Corso Fogazzaro 8
36100 Vicenza (IT)

(54) Improved gully top and manhole top for vehicular and pedestrian areas

(57) The invention concerns a perfected gully and manhole top (1; 100; 201) for zones where the circulation is permitted to pedestrians and vehicles comprising: a frame (2; 520; 202) applied on the outline of an opening (20) realized on the ground (3);and a lid (4; 54; 204; 240) connected to said frame (2; 520; 202) by one or more hinges (5; 50; 205; 250; 350). There are first fixed striker means (10; 510; 200) that during the opening of said lid (4; 54; 204; 240) contrast with said protrusion (9; 59; 209) and realize the lifting up of said lid. Said first striker means (10; 510; 200) release the contact against said protrusion (9; 59; 209) allowing the lowering according to the gravity of said lid (4; 54; 204; 240) when this is arranged in opened position with an angle (16) greater than 90° in order to realise the contact of said protrusion (9; 59; 209) against second striker means (72; 73; 51) suitable for preventing the closing of said lid (4; 54; 204; 240) by simple rotation around said hinge (5; 50; 205; 250; 350).

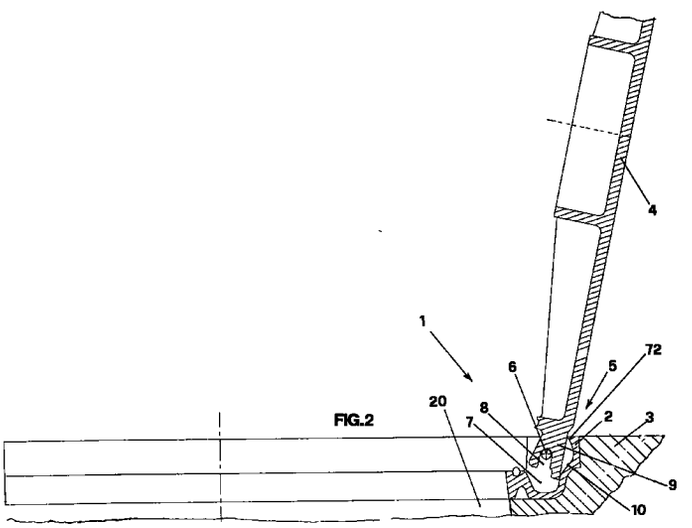

FIG.2

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Description

The invention concerns a perfected gully and manhole top for zones where the circulation is permitted to pedestrian and vehicles, usually called street manhole cover.

It is known that the openings of access to canalisation realized underneath the feather-edge, for example the underground passages for the laying of electric and telephonic cables, for sewers, for aqueducts and similar, are closed with suitable manhole covers that are formed substantially of a cover that can be opened and which is coupled with a frame applied to said opening.

The lid is connected to the frame by one or more hinges suitable for opening and closing operations and is provided with screws or preferably of a lock suitable for securing it to the frame when is arranged in a closed position.

When the lid is opened, it has to be supplied of suitable safety devices in order to prevent the accidental closing.

According to a well known realization, said safety anti-closing devices consists of rods that are lifted up manually by the operator who opens the manhole cover and that are arranged in contrast with the lid in order to act as struts for preventing the accidental closing.

According to other embodiments the manhole cover is provided with contrast means that are interposed between the frame and the lid blocking the last one in opened position and allowing the closing only if the operator manually provides with the removing of said contrast means.

Safety means suitable for preventing the closing of the lid, belonging to the known technique above mentioned, beyond manual or automatic moving into safety position at the opening of the lid, they all show the characteristic of being mobile elements and then subject during their use to jamming or to breaking.

Therefore they need suitable maintenance for keeping them in efficient condition.

In order to overcome such inconveniences, manhole covers are known in which safety devices are fixed to the lid and to the frame and they cooperate reciprocally when the lid is arranged in a maximum opening position.

One of the such realizations provide for a lid connected to the frame by some hinges consisting of a pivot which passes through some holes realized in the lid and in the frame where the lid shows also a protruding element which is received in another hole realized in the frame, in which said protruding element contrasts internally in order to act as a limit switch that stops the lid in the maximum opening position.

In order to secure the lid from the accidental closing, this is provided with a groove having an U shape which is received in a seat having a V shape realized in the frame, when the lid, arranged in a substantially vertical position, is going down by gravity. In order to close the lid it is necessary to lift it up in order to disjoin said U shaped groove from said V shaped seat and restore it in a closed position by rotation around the hinges.

Also the manhole covers of the known mentioned technique show some disadvantages.

A first disadvantage is that the elements acting as a stop and the safety elements that prevent the accidental closing of the lid, does not constitute an integral part of the hinge. Namely, the safety elements are in correspondence of the hinge but they do not constitute integral part of it and the stop elements are realized even sideways on it. This causes a greater complexity in the realization of the models and the necessity of providing for cores, particularly for the realization of passing through holes of the lid and the frame.

Another disadvantage is that the stop and safety elements just mentioned are realized protruding towards the inside of the frame and they therefore occupy part of the opening space of the manhole cover. Besides, with such embodiment, when the lid is in opened position, it occupies additional opening space of the manhole cover and therefore it has to be removed in order to use all the free passing through surface of the manhole cover.

Another disadvantage is that for the lid removing, it is necessary to draw out the pivot that connects it to the frame.

It is the object of the present invention to overcome all the mentioned disadvantages.

Therefore it is the object of the present invention to propose a perfected manhole cover that, compared with the manhole covers belonging to the known technique, is provided of fixed safety means, suitable for blocking the lid in open position and preventing the accidental closing and belonging to at least one of said hinges.

It is another object of the present invention that said safety means do not interfere with the passing through of the manhole cover in order to offer, compared to the manhole cover of the known technique having the same external overall dimensions, a useful greater passing through section.

It is another object that the manhole cover of the invention requires less complex models compared to the models necessary to obtain equivalent manhole covers of the known technique.

It is not the last object that such safety means do not need any maintenance. Said objects are achieved with the realization of a perfected gully and manhole top for zones where the circulation is permitted to pedestrians and vehicles that according to the main claim comprises:

- a frame applied on the outline of an opening realized on the ground;
- a lid connected to said frame by one or more hinges suitable for the opening and the closing of said lid, each of said hinges comprising a pivot which is located into a hollow of said frame and which is received in a seat realized in a protrusion belonging to said lid suitable for coupling with said hollow, and

it is characterized in that at least one of said hollows presents first fixed striker means that, during the opening of said lid contrast with said protrusion and realize the lifting up of said lid by sliding of said seat against said pivot, said first striker means releasing the contact against said protrusion, allowing the penetration of the last one, towards the bottom of said hollow, by the lowering according to the gravity of said lid when this is arranged in opened position with an angle greater than 90° in order to realize the contact of said protrusion against second striker means belonging to said hollow suitable for preventing the closing of said lid by simple rotation around said hinge.

According to a preferred embodiment, every seat realized in the corresponding protrusion of said lid consist of a slot that is received in a pivot passing through a hollow realized in said frame. Said hollow in turn, receives said protrusion when said seat is coupled with said pivot.

During the opening of the lid, said protrusion contrasts with said first striker means that consists of an inclined plane realized in an unique body with said frame.

Said second striker means, that prevent the closing of the lid with a simple rotation around said hinge when it is arranged in opened position rotated with an angle greater than 90° against the horizontal plane, they are formed by two contact zones, made on the surface that defines said hollow and placed on the same side against said pivot, one above and the other under the pivot itself.

According to a different embodiment said second striker means are formed by a slit presents in said hollow, in which said protrusion of said lid is received.

According to another embodiment at least one of said protrusions is provided with a prong that prevents the separation of the lid by simple translation when is in opened position.

The lid of the gully top of the invention, in all its different embodiments, is supplied of at least one blocking element suitable for preventing the removal when it is in opened position.

Advantageously, the device of the invention provided with the mentioned safety means, suitable for keeping blocked the lid in an open position, results of more reliable functioning compared with equivalent devices of the known technique.

Likewise advantageously, the device of the invention is provided of safety means suitable for blocking the lid in opened position that do not require any maintenance.

Still advantageously, the device of the invention in a different embodiment, can be closed more easily.

The purposes and the mentioned advantages will be better stressed during the description of a preferred embodiment of the invention given as an example but not as a restriction and represented in the enclosed drawings wherein:

- in fig. 1 it can be observed the gully and manhole top of the invention in axonometric view and with the lid in a closed position;
- in fig. 2 it can be observed the gully and manhole top of the invention represented in a lateral sectioned view and with the lid in opened position;
- in fig. 3 it can be observed the section of the detail of one of the hinges that joins the frame to the lid which is represented in a closed position;
- in figs. 4 and 5 it can be observed the detail of the hinge represented in fig. 3 in two different steps during the opening of the lid;
- in fig. 6 it can be observed the detail of the hinge represented in fig. 3 with the lid in opened position and blocked by safety means;
- in fig. 7 it can be observed the detail of the hinge in a different embodiment, with the lid placed in opened position and blocked by safety means;
- in fig. 8 it can be observed the plan view of the frame belonging to the manhole cover of the invention, realized according to another embodiment;
- in fig. 9 it can be observed the profile from the hinges view of the lid assembled with the frame of fig. 8;
- in fig. 10 it can be observed the frame of the fig. 8 in a cross section view and the relating lid in open position, both of them in an exploded view;
- in the figs. 11 and 12 it can be observed the assembling of the frame and the lid of fig. 10;
- in fig. 13 it can be observed the section view of one hinge of the manhole cover provided with first striker means and represented in its position as the lid is placed in closed position;
- in figs. 14 and 15 it can be observed the hinge represented in fig. 13 in two different steps during the opening of the lid;
- in fig. 16 it can be observed the hinge represented in figs. 13, 14 and 15 in its position as the lid is placed in opened position;
- in figs. from 17 to 20 it can be observed the hinge of fig. 13 in different positions during the separation of the lid from the frame;
- in fig. 21 it can be observed a different embodiment of the manhole cover of the invention in which one of the hinges is lacking in said first striker means;
- in fig. 22 it can be observed the hinge of the manhole cover of fig. 21 lacking in said striker means in its position as the lid is placed in closed position;
- in fig. 23 it can be observed the hinge of fig. 22 in its position as the lid is placed in opened position.

As it can be observed in fig. 1 and in fig. 2 the gully and manhole top object of the invention is indicated, as the whole with 1, and it is provided with two trapezoidal lids.

In a different embodiment to which the concepts that are expressed in the following description have to

be applied, the gully and manhole top, also said manhole cover, can be provided with a unique lid having a rectangular shape.

Generally, however, the lid or lids can present any shape.

It is also obvious that the number of the hinges can be anyone, different from two.

The gully and manhole top comprises a frame 2 that is applied on the outline of an opening 20 realized on the ground 3 and a lid 4 that is joined to said frame 2 by a couple of hinges, each of them indicated as a whole with 5.

It is obvious that the number of the hinges 5 can be anyone. Each of said hinges 5 as it can be observed in fig. 2 and particularly in fig. 3, consists of a pivot 6 that belongs to the frame 2 and is placed in a hollow 7 of the same frame 2, said pivot being received in a seat 8 realized in a protrusion 9 belonging to the lid 4 and having a fork shape that couples with said hollow 7.

Each hinge is realized in correspondence of the hedge of the frame of the manhole cover and does not protrude towards the inside in order not reduce the free passing through surface, of the manhole cover. Besides, as it can be observed, the hinge 5 presents an outline extremely simple and it is without holes in order that the model, for its realization by fusion, results of a simple construction and requires the use of limited number of cores compared to the manhole covers of the known technique.

In addition it can be observed that the seat 8 receiving the pivot 6 presents an open outline that, if necessary, makes easy the removing of the lid when it is in open position.

Into said hollow 7 first striker means are present and consist of an inclined plane 10 that, as it can be observed in fig. 4, contrasts with said protrusion 9 when the lid is rotated according to the clockwise direction 11 in order to open it.

During such rotation indeed the protrusion 9 contrasts with said striker plane 10 and the lid 4 is subject to a thrusting 12 that causes its lifting up by sliding of the slot 8 against the pivot 6.

Continuing the rotation according to the direction 11, under the thrusting 12, the lid 4, as it can be observed in fig. 5, reaches its maximum lifting position as it is placed in a substantially vertical position.

Beyond this position, as it can be observed in fig. 6, the protrusion 9 releases the contact with the striker plane 10 which is developed in a horizontal direction of a length 13 in order to release the contact with said protrusion 9 when the axis 14 of the lid 4, that crosses the centre 60 of the pivot 6 forms with the horizontal hedge 15 of the frame 2 an opening angle 16 of about 105°. In such a position the protrusion 9 of the lid 4 does not contrast with the striker plane 10 and the lid 4, by the action of its weight and supported by the fact that the striker plane 10 is inclined towards the hollow 7, it lowers itself until the bottom 81 of its slot 8 contrasts with the pivot 6. The protrusion 9 penetrates towards the bottom 71 of the hollow 7 and it is in contact with second striker means belonging to said hollow and comprising the upper hedge 72 of the hollow next to the upper plane 15 of the frame 2 and the lower side plane 73 that connects the striker plane 10 to the bottom wall 74 of the said hollow 7.

When the lid is placed in such a position, it can be understood that each force acting on it, which attempts turning it according to the counterclockwise direction 160 in order to closing it, is neutralized by the contrast between the extremity 91 of the protrusion 9 against the lower hedge 73 of the hollow 7.

Therefore it can be reached the purpose of preventing that, for accidental causes, the lid 4 can be closed starting from the greater open position represented in fig. 6.

In order to close the lid 4 it is necessary to apply a force 17 along the direction of its axis 14 in order to lift it up over the pivot 6 till releasing the contrast between said extremity 91 of its protrusion 9 against the lower edge 73 of the hollow 7 in order to bring it in the position that in fig. 6 is represented by the broken line. Beginning from this position, applying a counterclockwise direction according to the sense 160 it is possible to bring again the lid 4 in a closing position on the frame 2.

A different embodiment of the device of the invention is represented in fig. 7 where it can be observed that each hinge 50 of the device of the invention indicated as a whole with 100, shows the second striker means that prevent the closing of the lid from the reached maximum opening position, and comprising a slit 51 in which the extremity 591 of the said protrusion 59 of the lid 54, is getting into. It can be observed that said slit 51 is defined by the lower side plane 573 which joints said striker plane 510 to the bottom surface wall 574 of said hollow 52 and a projecting part 55 belonging to the frame 520 and placed next to said pivot 56 that receives said seat 58 realized in said protrusion 59.

Preferably the device of the invention according to the described different embodiment presents, in correspondence of said protrusion 590, a protruding pivot 500, visible in fig. 7, suitable for contrasting with the pivot 56 in order to prevent the separation of the lid 54 from the frame 520 when said lid is in open position.

Another embodiment is represented in figs. from 8 to 20 where it can be observed that in correspondence of the extremity 291 of the protrusion 209 belonging to the hinge 205 a prong 292 is present whose function is of preventing that the lid 204 can be separated from the pivot 206 and from the frame 202 by a simple application of a force 217 that acts according to the axis 214 as it can be observed in fig. 16.

In fact, considering the lid in an open position, the application of a force 217 according to the axis 214 implies, as it can be observed in fig. 17, the contrast of the prong 292 against the pivot 206.

In order to separate the lid from the frame it is necessary, starting from the position of fig. 17, to turn it according to the counterclockwise direction 360, for

bringing it in the arrangement of fig. 18 from which, by a vertical moving according to the direction 218, as it can be observed in fig. 19, it is possible to cause the sliding of the seat 208, out of the pivot 206 till the lid 204 is definitively separated from the frame 202 as it can be observed in fig. 20.

Practically, in order to separate the lid 204 from the frame 202 it is necessary to apply to the lid a combined movement of translation 217 according to its longitudinal axis 214 and contemporary a rotation 360 around the pivot 206 in order to allow that the last one overcomes the interference with the prong 292, with an upwards final moving according to the direction 218 represented in fig. 19.

Another embodiment is represented in figs. from 21 to 23 where it can be observed that in correspondence of only one hinge, and precisely the hinge indicated as a whole with 250, the first fixed striker means are present consisting of an inclined plane 200 and they are not present in correspondence of the other hinge 350.

According to such embodiment, it is possible to close the lid 240 without a vertically lifting up applying only a single rigid translation. Namely, as it can be observed in fig. 21, when the lid 240 is opened, applying a lateral force 440 which tray to rotate it around the hinge 350 where said first fixed striker means are not present, exploiting the existing clearance in the hollow where the hinge 350 takes place, the lid 240 is inclined as represented in figure.

The protrusion 290 inserted in the hinge 250 that, on the contrary, is supplied with said first striker means 200, lifts up diagonally of a quantity enough to pass the contrast with the first striker means themselves, in order that the lid can be easily closed by a simple rotation around the pivot 260.

According to what has been described it is possible to understand that the invention reaches all the established purposes.

The manhole cover of the invention results of easier construction compared to the manhole covers of the known technique which are provided with safety devices and in comparison to the ones having the same external dimensions, it presents also a useful higher passing through surface.

During the manufacturing, the device of the invention and particularly the means suitable for maintaining the lid in fixed position when it is placed in open position, can be appropriately modified and such modifications are to be considered protected by the present invention.

Claims

1. Gully and manhole top (1; 100; 201) for zones where the circulation is permitted to pedestrians and vehicles comprising:

   - a frame (2; 520; 202) applied on the outline of an opening (20) realized on the ground (3);
   - a lid (4; 54; 204; 240) connected to said frame (2; 520; 202) by one or more hinges (5; 50; 205; 250; 350) suitable for the opening and the closing of said lid (4; 54; 204; 240), each of said hinges comprising a pivot (6; 56; 206; 260) which is located into a hollow (7; 52) of said frame and which is received in a seat (8; 58; 208) realized in a protrusion (9; 59; 209) belonging to said lid (4; 54; 204; 240) suitable for coupling with said hollow (7; 52) **characterized in that** at least one of said hollows (7; 52) presents first fixed striker means (10; 510; 200) that during the opening of said lid (4; 54; 204; 240) contrast with said protrusion (9; 59; 209) and realize the lifting up of said lid (4; 54; 204; 240) by sliding of said seat (8; 58; 208) against said pivot (6; 56; 206; 260), said first striker means (10; 510; 200) releasing the contact against said protrusion (9; 59; 209) allowing the penetration of the last one, towards the bottom (71) of said hollow (7; 52), by the lowering caused by the gravity of said lid (4; 54; 204; 240) when this is arranged in opened position with an angle (16) greater than 90° in order to realise the contact of said protrusion (9; 59; 209) against second striker means (72; 73; 51) belonging to said hollow (7; 52) suitable for preventing the closing of said lid (4; 54; 204; 240) by simple rotation around said hinge (5; 50; 205; 250; 350).

2. Gully and manhole top (1; 100; 201) according to the claim 1) **characterized in that** said protrusion (9; 59; 209) presents a fork shape and is provided with said seat (8; 58; 208) formed by a slot.

3. Gully and manhole top (1; 100; 201) according to the claim 1) **characterized in that** said first striker means consist of a striker plane (10; 510; 200) which realises an unique body together with said frame (2; 520; 202) and located inside said hollow (7; 52).

4. Gully and manhole top (1; 100; 201) according to the claim 3) **characterized in that** said striker plane (10; 510; 200) is an inclined plane towards the bottom (71) of said hollow (7;52) and it is jointed with the bottom plane (74) of the same hollow (7; 52).

5. Gully and manhole top (1; 100; 201) according to the claim 1) **characterized in that** said second striker means consist of an upper edge (72) of said hollow (7) placed on the continuity of the upper plane (15) of said frame(2) and a lower side plane(73) inside said hollow (7) which joints said first striker means (10) with the bottom surface (74) of the same hollow (7).

6. Gully and manhole top (1; 100; 201) according to the claim 1) **characterized in that** said second striker means consist of a slit (51) inside said hollow (52) and defined by a lower side plane (573) which joints said first striker means (510; 200) to the bottom surface (574) of said hollow (52) and a projecting part (55) belonging to the frame (520; 202) and placed next to said pivot (56; 206; 260).

7. Gully and manhole top (100) according to the claim 1) **characterized in that** is provided with a lock consisting of a pivot (500) located passing through said protrusion (59) of said lid (54) suitable for contrasting against said pivot (56) in order to prevent the separation of said lid (54) from said frame (52) by lifting up of the same lid (54) when it is placed in open position.

8. Gully and manhole top (201) according to the claim 1) **characterized in that** the extremity (291) of at least one of said protrusion (209; 290) is provided with a prong (292) suitable for contrasting against said pivot (206; 260) in order to prevent the separation of said lid (204; 240) from said frame (202) by a simple rigid translation of the same lid (204; 240) in vertical direction starting from the position obtained when it is completely open.

9. Gully and manhole top (201) according to the claim 8) **characterized in that** is made with two hinges (205; 250; 350) in which each protrusion (209; 290) is provided with said prong (292).

10. Gully and manhole top according to the claim 8) **characterized in that** only one of said hinges (205; 250) is provided with said first striker means (200).

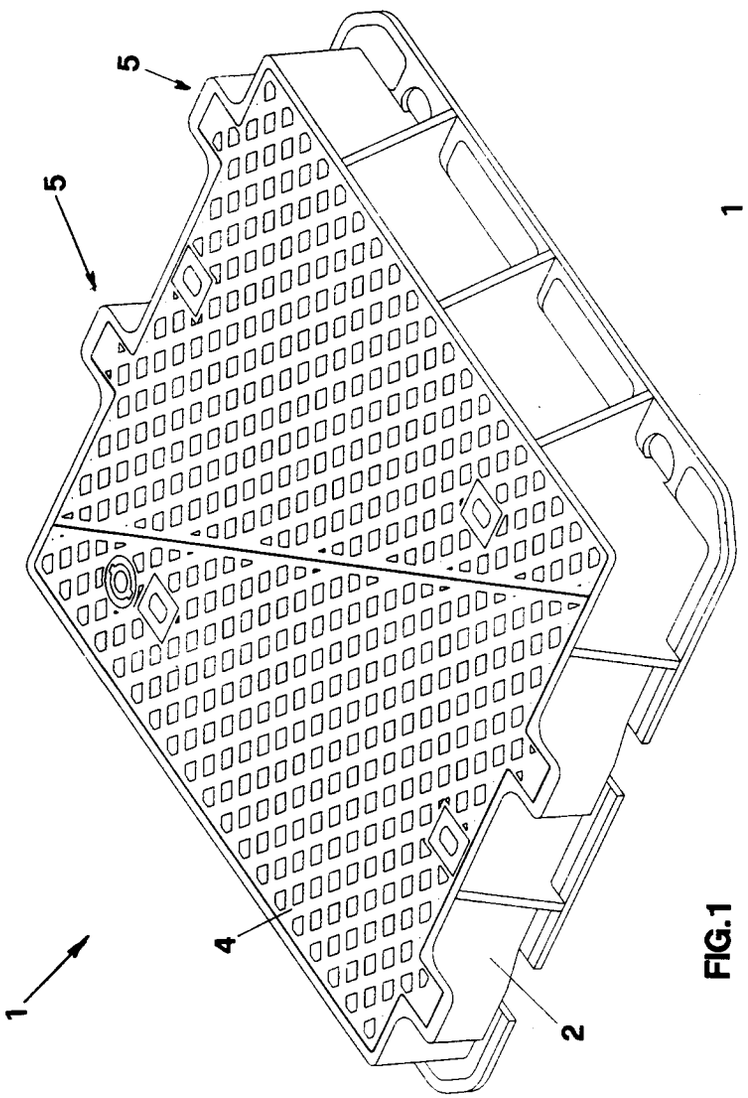

FIG.1

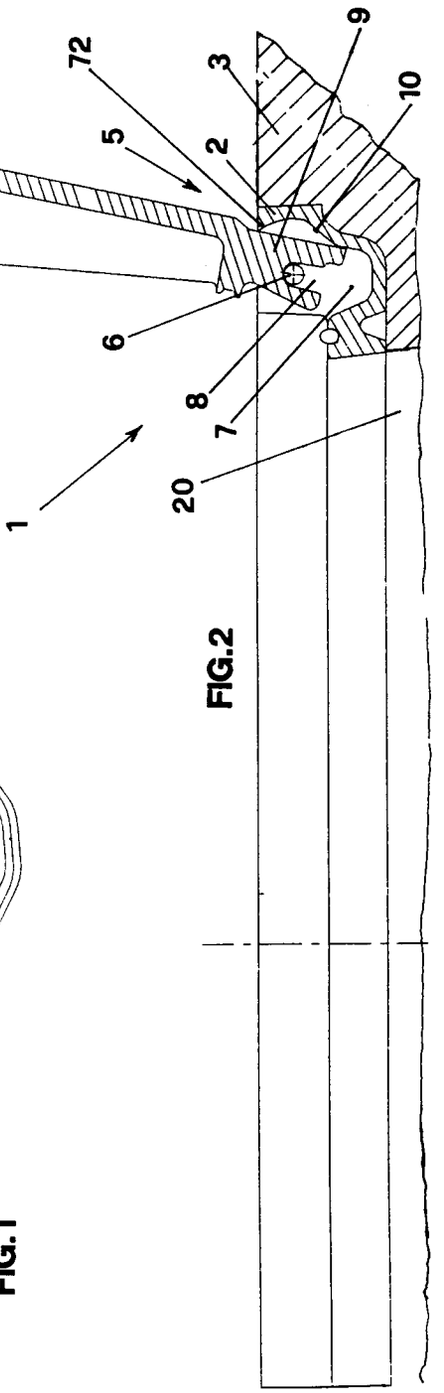

FIG.2

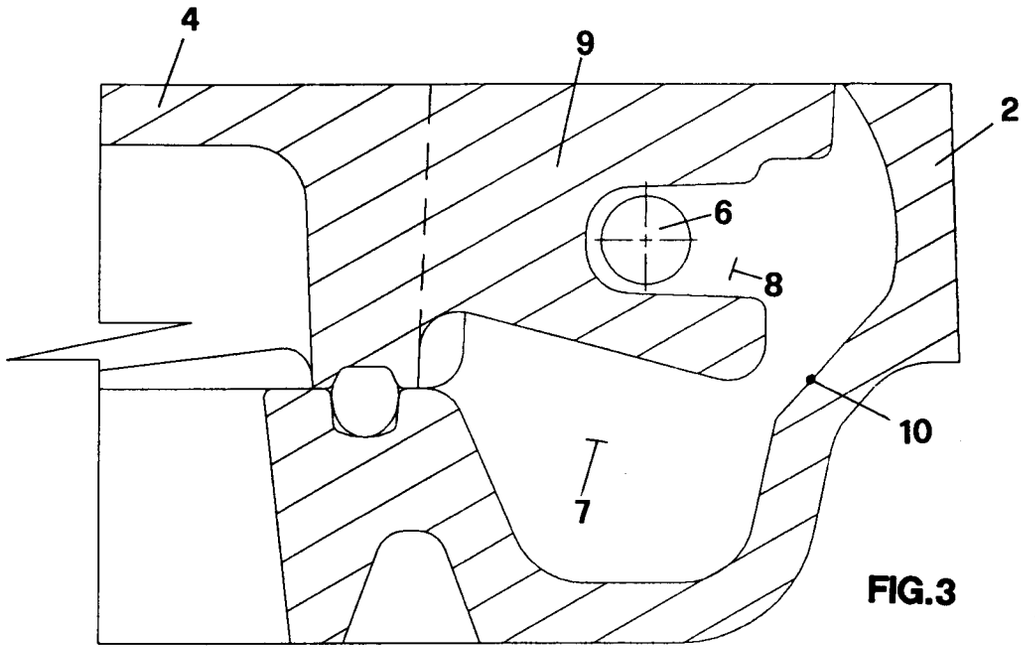

FIG.3

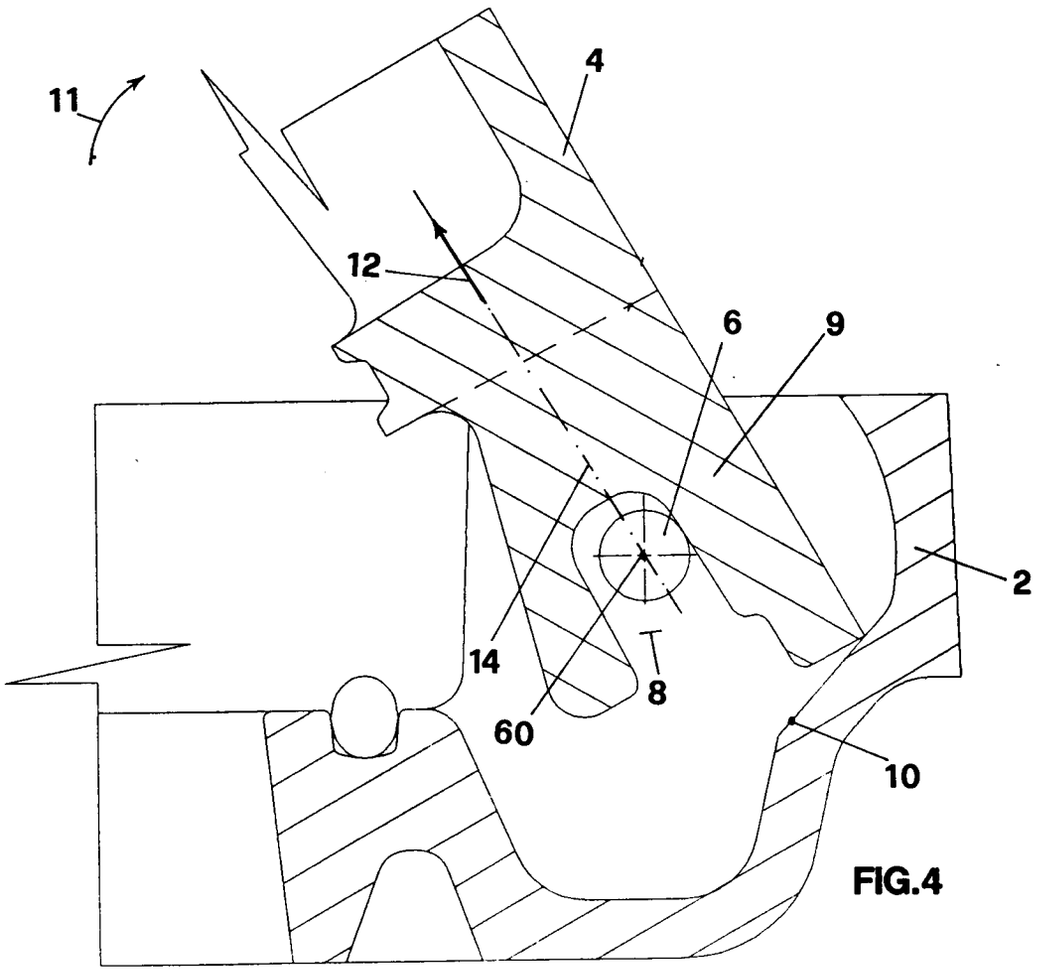

FIG.4

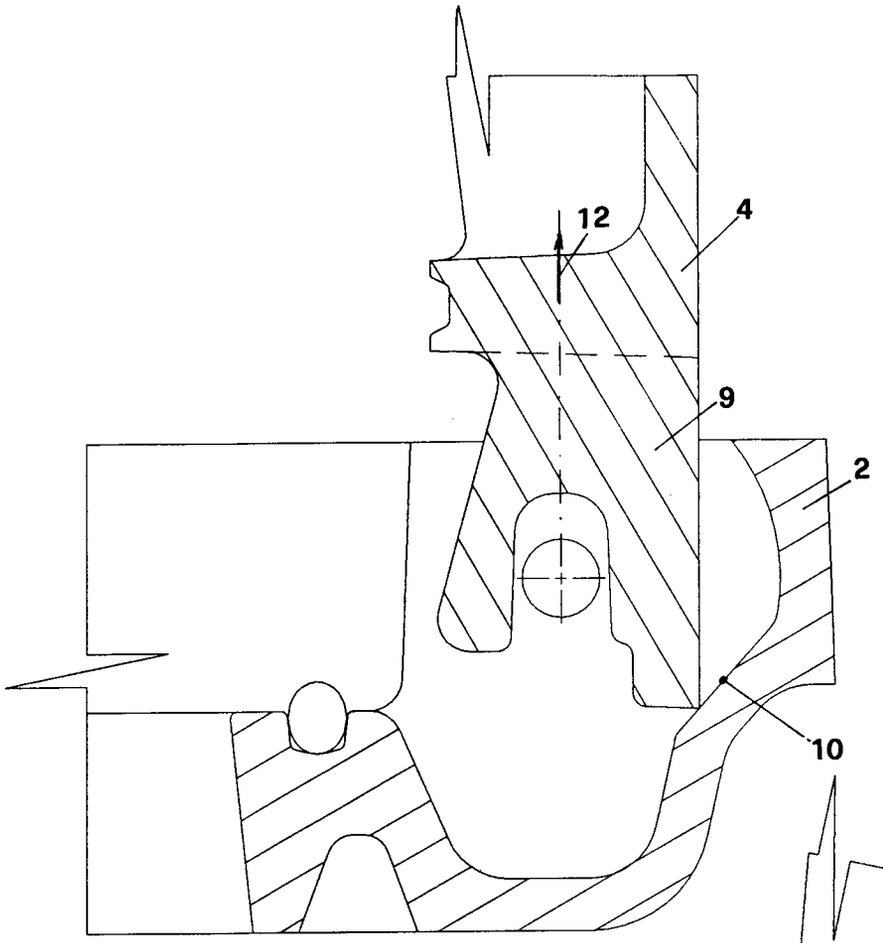

FIG.5

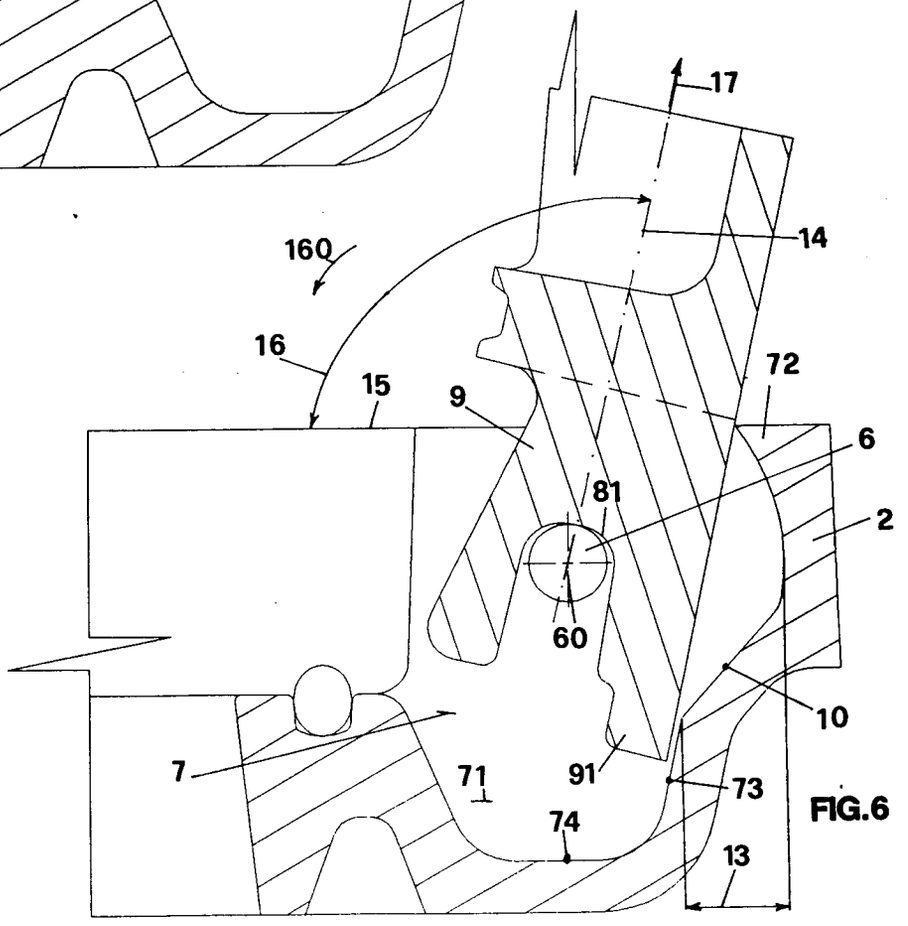

FIG.6

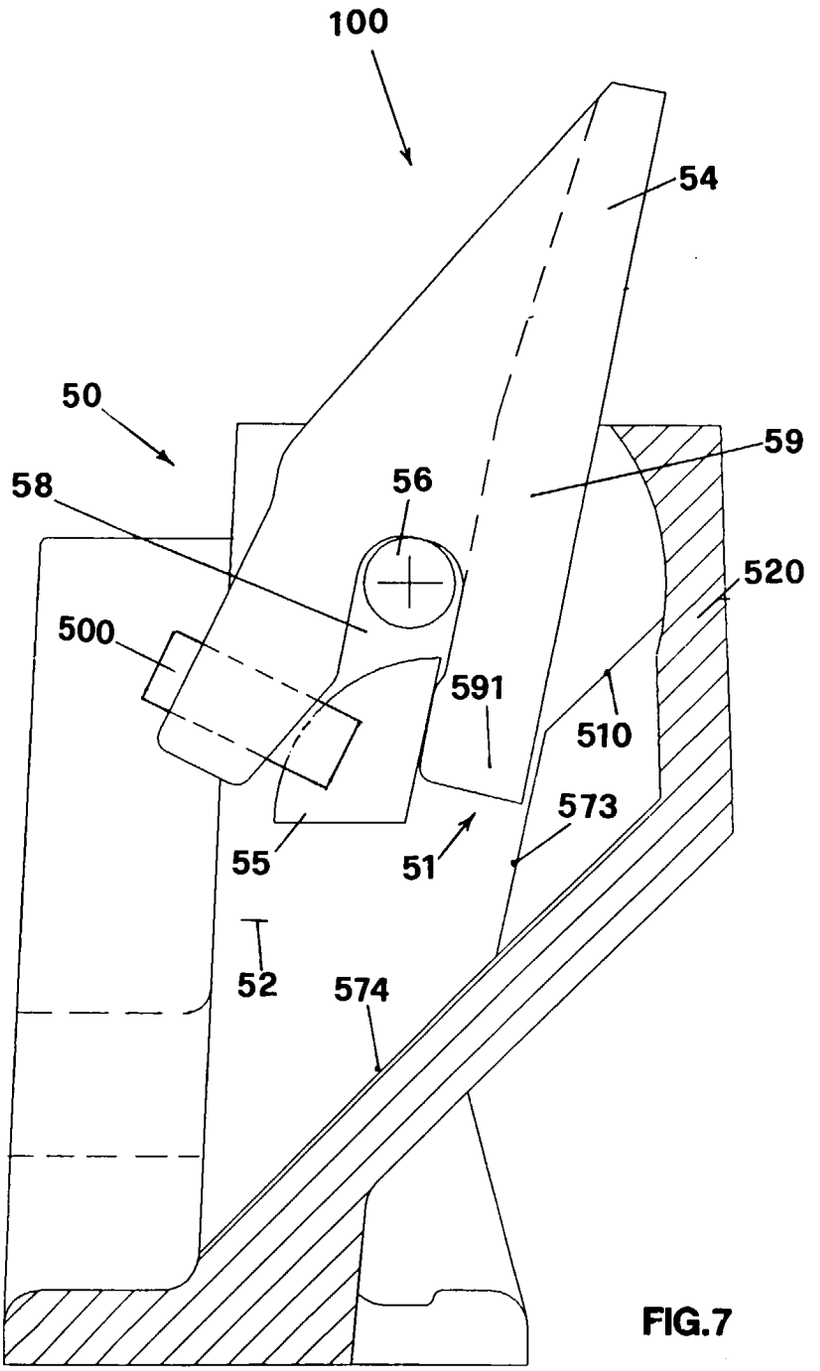

FIG.7

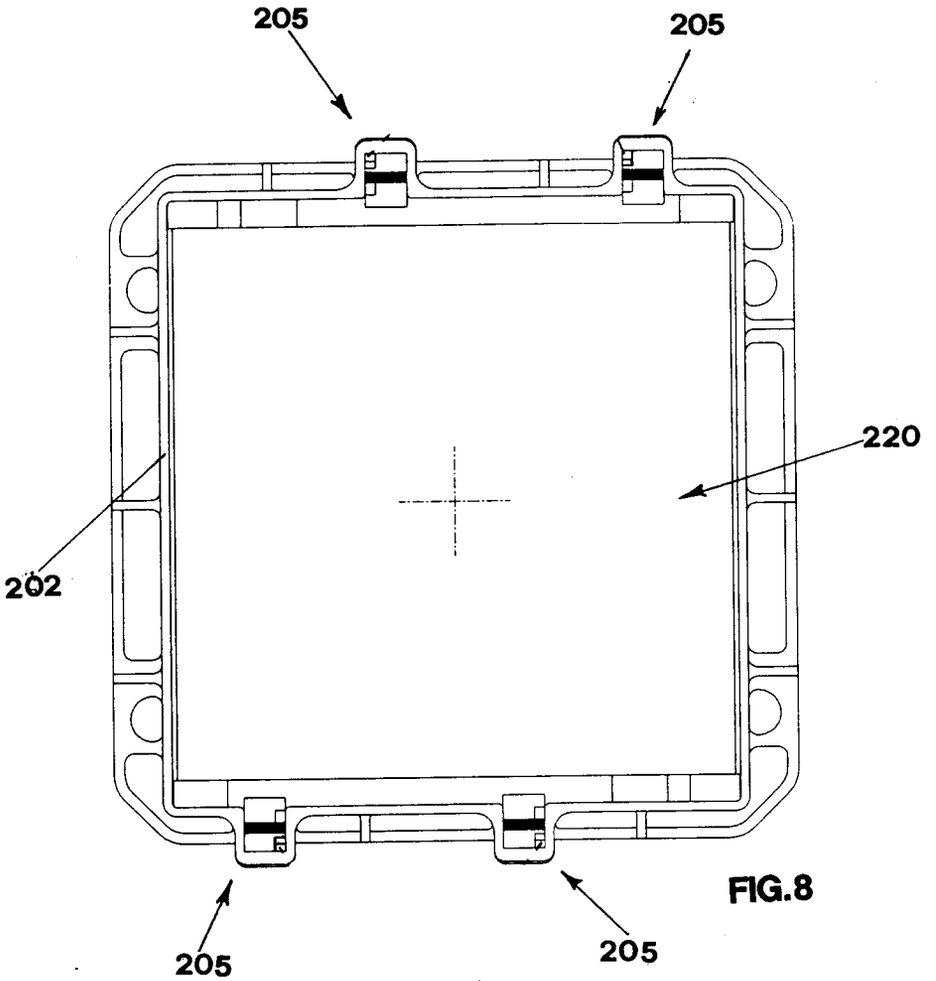

FIG.8

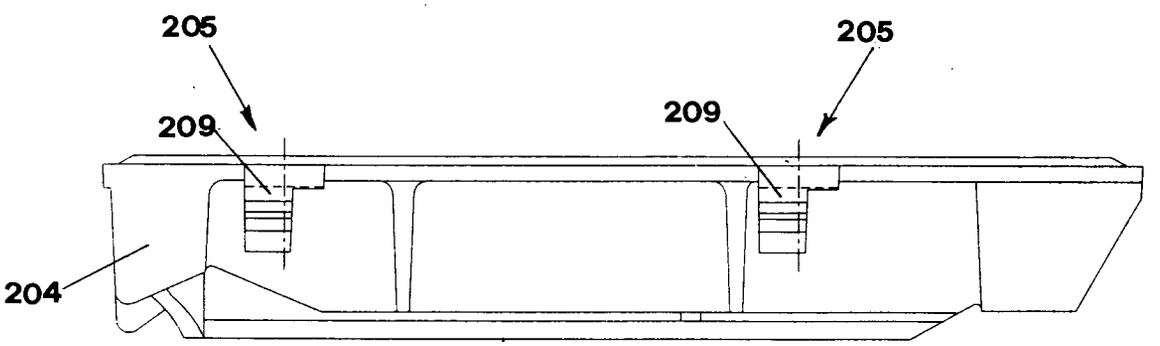

FIG.9

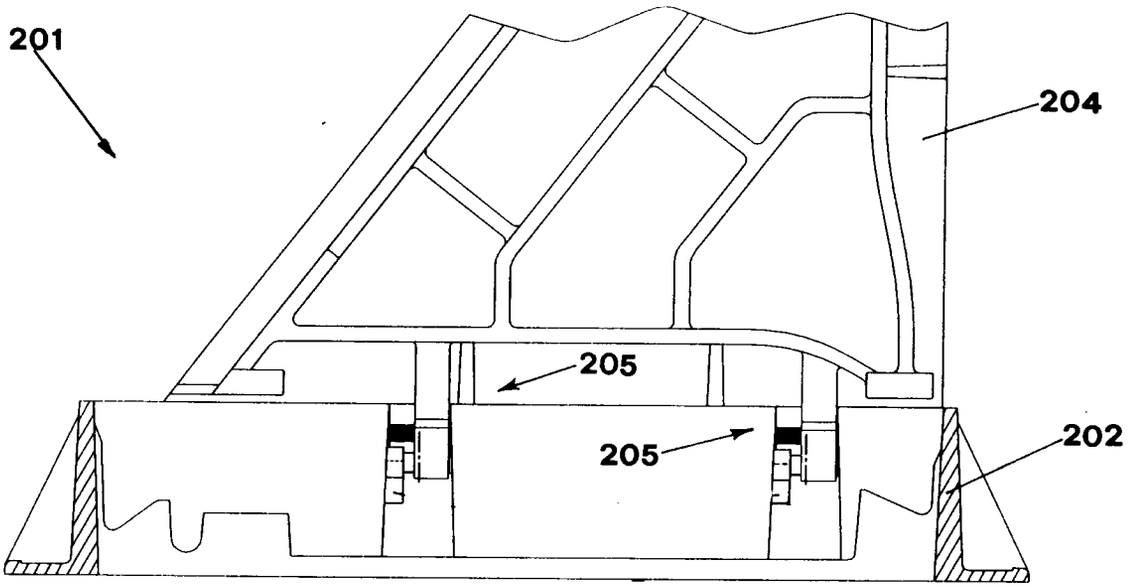

FIG.11

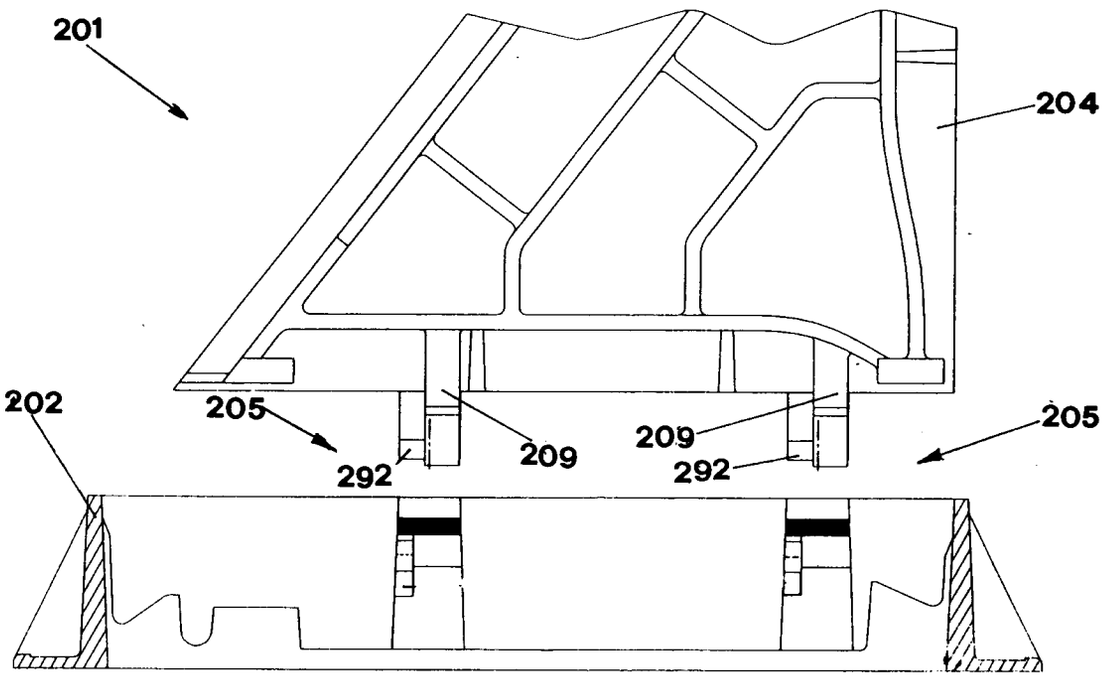

FIG.10

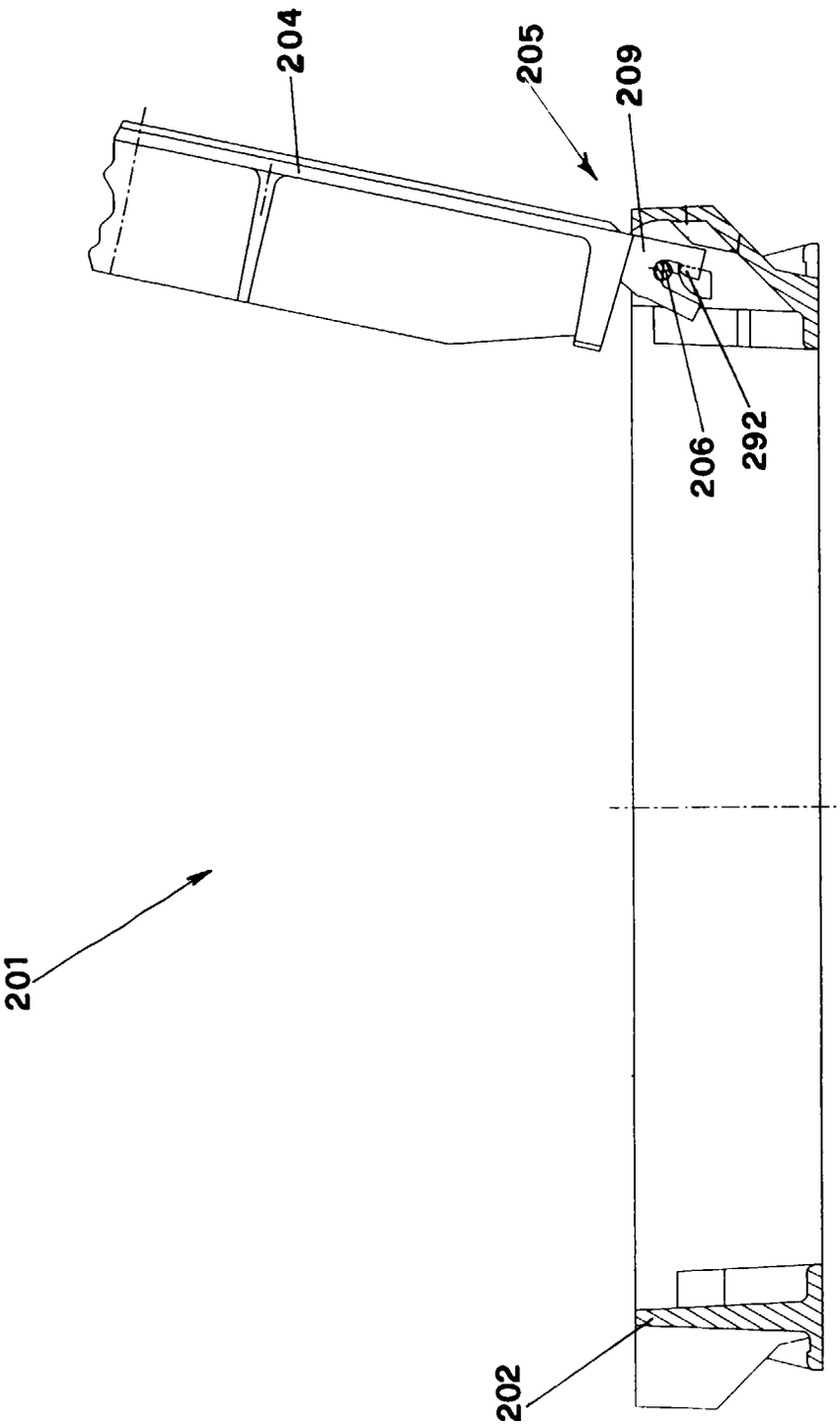

FIG.12

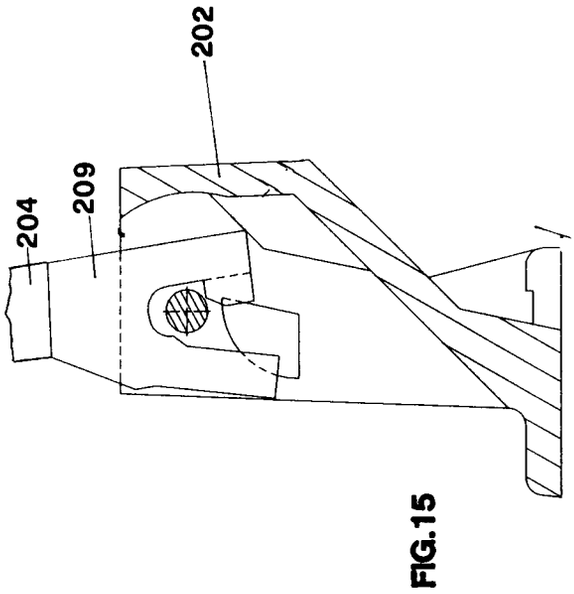

FIG.15

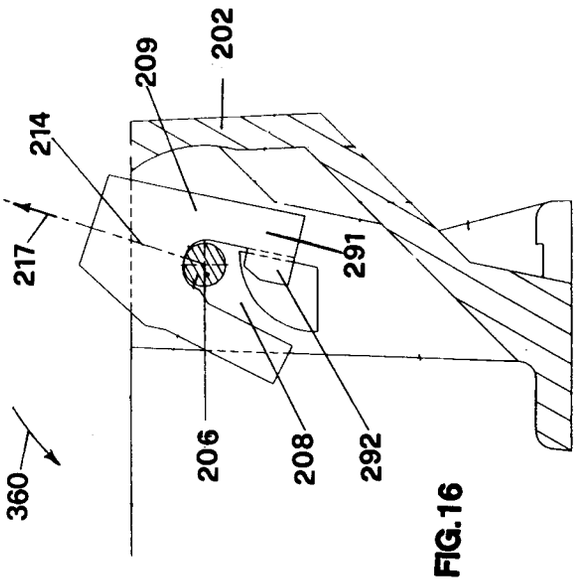

FIG.16

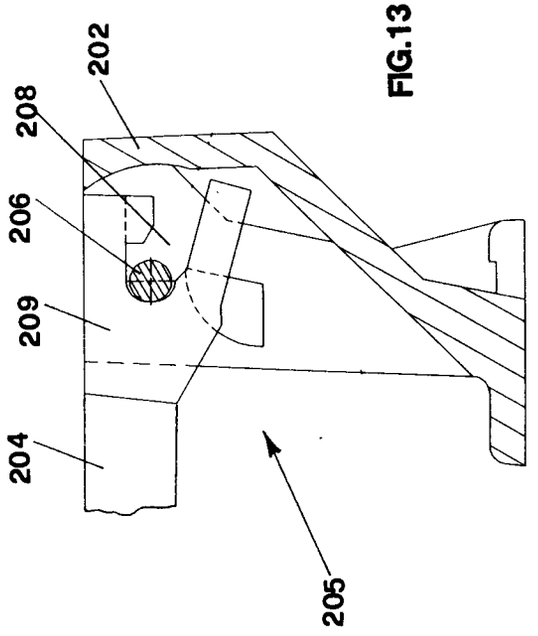

FIG.13

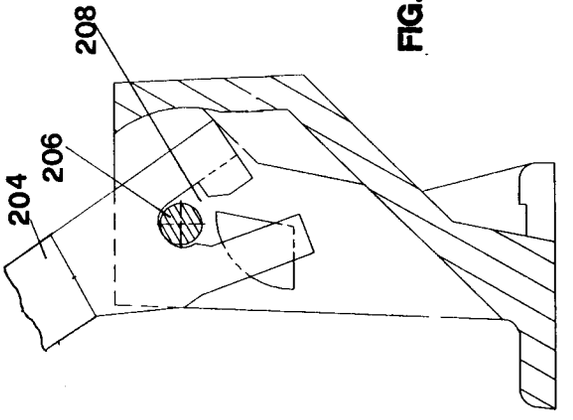

FIG.14

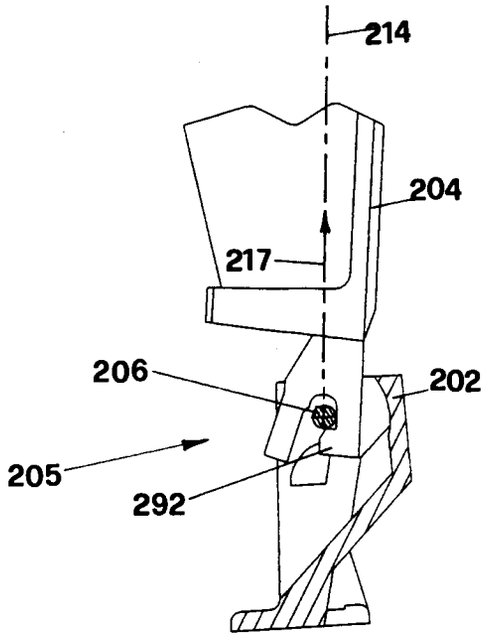

FIG.17

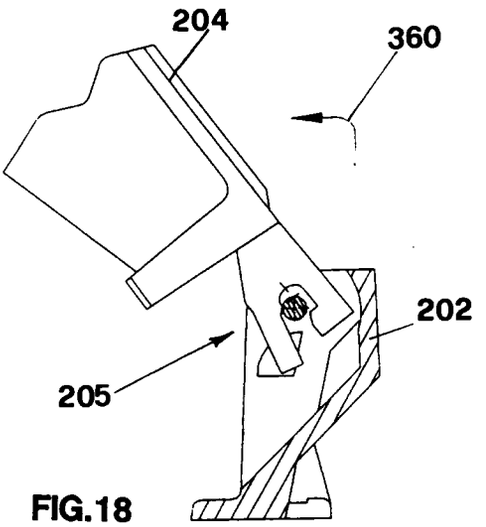

FIG.18

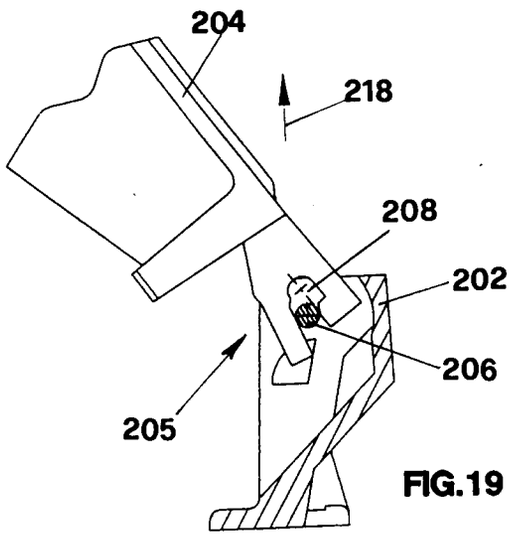

FIG.19

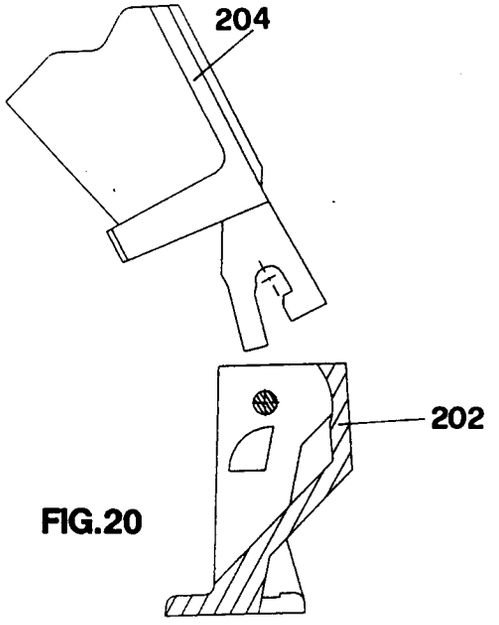

FIG.20

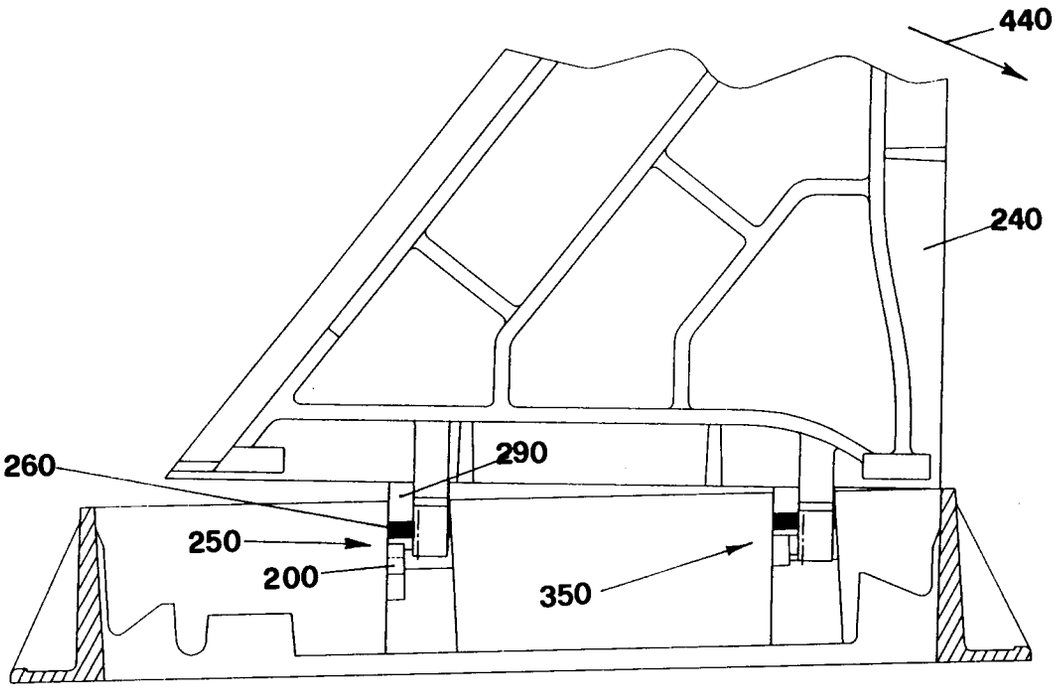

FIG.21

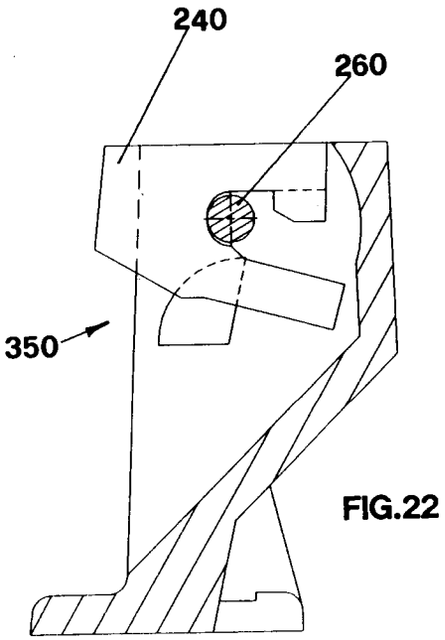

FIG.22

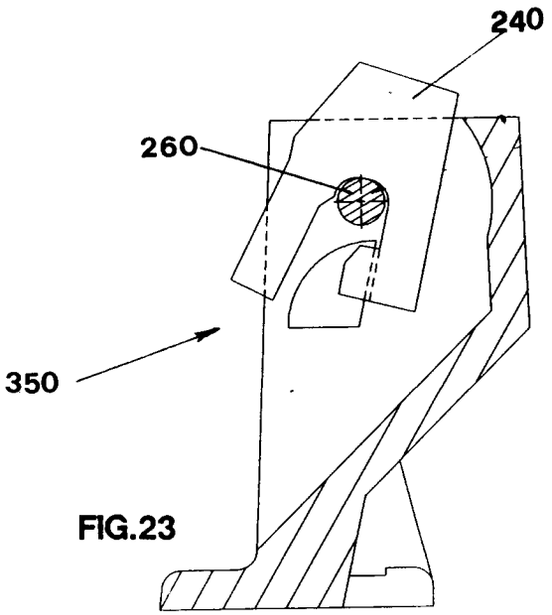

FIG.23

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 97 10 8378

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
A	US 3 130 651 A (WERNER) 28 April 1964 * column 1, line 55 - column 2, line 35; figures 1-7 *	1,3-6,9, 10	E02D29/14
A	EP 0 391 825 A (PONT A MOUSSON) * column 2, line 31 - column 4, line 31; figures 1-4 *	1,3,4,6, 7	
A	GB 366 700 A (EYRES LTD) 3 March 1932 * the whole document *	1-7,9	
A	EP 0 451 064 A (SODIF SA) * the whole document *	1-10	

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E02D
E03F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	21 October 1997	Tellefsen, J

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