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(71) Applicants:
- **Gasparetto Stori, Leopoldo**
  33170 Pordenone (IT)
- **Serafin, Luigi**
  I-31047 Negrisia di Ponte di Piave (IT)

(72) Inventors:
- **Gasparetto Stori, Leopoldo**
  33170 Pordenone (IT)
- **Serafin, Luigi**
  I-31047 Negrisia di Ponte di Piave (IT)

(74) Representative: **Petraz, Gilberto Luigi**
GLP S.r.l.
Piazzale Cavedalis 6/2
33100 Udine (IT)

(54) Metal safety barrier for use in the median strip in roads

(57) Metal safety barrier for use in the median strip in roads comprising a fixed metal element (12) and at least one movable modular metal element (13) associated with each other by hinge means (14), the at least one movable modular metal element (13) having anchoring means (115) which can be temporally disactivated and lifting means (18) which can be temporally activated.

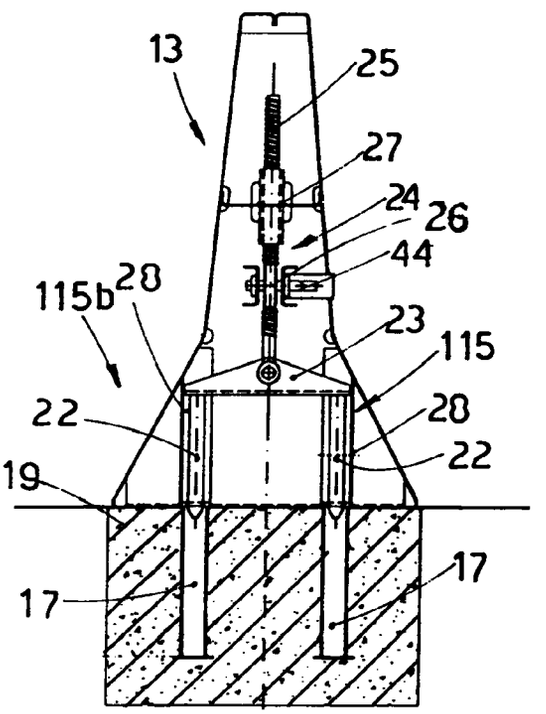

fig.7a

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Description

This invention concerns a metal safety barrier for use in the median strip in roads as set forth in the main claim.

The metal safety barrier according to the invention refers to the metal safety barriers used on the roads, of the type shown in EP-A-0.575.705 and is used both as an element to separate the traffic and as a temporal element to divert and direct the traffic from one carriageway to another.

The metal barrier according to the invention may also be associated with other types of barriers to separate the traffic such as for example the guard-rail type or those made of modular concrete elements..

The state of the art covers road safety barriers used to separate the traffic in a median position between the two carriageways.

One type of said barriers is constituted by a plurality of pre-fabricated concrete elements with a profile known as the "New Jersey" type.

These barriers, when used with systems to anchor them to the ground and with contiguous pre-fabricated elements, have given good results with regard to both safety and reliability.

However these pre-fabricated concrete elements have the disadvantage that they are considerably heavy, which makes moving them difficult and requires the appropriate lifting means.

To be more exact, when it is necessary to make a diversion in order to temporarily divert the traffic from one carriage-way to another, for example when there is an opening in the barrier, in fact it is not convenient to use the concrete pre-fabricated elements if they are not to be used for more than a few days.

This is because the lifting and moving operations of the pre-fabricated elements are long and laborious, which creates considerable inconvenience to motorists with consequent tail-backs and obstructions during these moving operations.

Moreover, lifting and moving the pre-fabricated concrete elements requires lifting means, such as cranes, appropriately equipped, which must be transported to the work-place.

What is more, moving the pre-fabricated elements, which are of a considerable weight, can be a source of accidents for the workers carrying out these operations.

It should also be remembered that the openings in the safety barriers are usually closed by chains, or movable modular elements in plastic or some light material, which do not perform any function of containing a vehicle which has skidded, but only serve to prevent motorists from doing illegal U-turns.

These segments of road without any safety barriers are therefore the source of possible accidents, allow vehicles to change carriageway, and should therefore be avoided.

The present applicants have designed, tested and embodied this invention to overcome the shortcomings of the state of the art and to achieve further advantages.

This invention is set forth and characterised in the main claim, while the dependent claims describe variants of the idea of the main embodiment.

The purpose of this invention is to supply a metal safety barrier and to close the openings in the median strip on roads.

A further purpose of the invention is to serve as a temporal element to divert and direct traffic from one carriageway to the other.

The safety barrier according to the invention is composed of metal modular elements whose first function is to separate the traffic, in which case they are aligned and attached to the ground to form a continuous barrier, closing the opening in the permanent barrier.

According to another formulation of the invention, the modular metal elements can be put side by side, or placed off-set, at an angle or parallel with respect to the barrier which separates the traffic.

With the road safety barrier according to the invention, the operations to move and position the metal modular elements are simple and do not require any particular equipment.

The road safety barrier according to the invention includes a first fixed element, solidly associated laterally with the barrier which separates the traffic and underneath with the ground by means of anchoring means.

The first fixed element can be solidly associated with barriers to separate the traffic of any known type, such as the "New Jersey" type, made of concrete or steel or guard-rail type elements.

According to the invention, the first fixed element cooperates with at least one movable modular element, the cooperation taking place advantageously by means of hinge means.

According to a variant, the road safety barrier according to the invention has several movable modular elements associated together in order to close the opening in the barrier which separates the traffic.

The movable modular element has, at least near the terminal areas of the head and tail, anchoring means and/or lifting means.

The lifting means have at their lower end wheel means which can have a resting position and a working position.

The lifting means have a first resting position and a second anchoring position in which they cooperate with the appropriate anchoring means in the carriageway in the area connected with the opening.

When the movable modular elements are aligned with the fixed elements in order to separate the traffic, the anchoring means are activated in such a way as to make the movable modular elements solid with the ground and the lifting means are disactivated; in this way, the movable modular elements which constitute the road safety barrier according to the invention rest on the ground and are fixed to it in such a way that at least they are prevented from moving sideways.

When the movable modular elements are posi-

tioned in such a way as to divert and direct the traffic, the anchoring means are disactivated so as to release the movable modular elements from the ground, and the lifting means are temporally activated to support the movable modular elements once they have been lifted from the ground, to allow them to be moved and positioned.

Afterwards, the lifting means are put into the rest position and the anchoring means, if necessary, are put into the anchoring position.

According to one formulation of the invention, the anchoring means comprise pin means which are inserted into the ground, and more particularly in appropriately predisposed vertical holes with a containing seating.

The anchoring means and the lifting means may be both of the mechanically driven type, or the hydraulic, oil-hydraulic, or pneumatic type.

In the road safety barrier according to the invention, the movable modular elements are associated with each other and with the respective fixed element by means of the appropriate hinge means which allow a 180° rotation so that a movable modular element may be brought alongside a contiguous movable modular element, on one side or the other side of the same.

The attached figures are given as a non-restrictive example and show a preferred embodiment of the invention as follows:-

Fig.1a	shows a diagrammatic front view of a road safety barrier according to the invention in a closed position;
Fig.1b	shows a diagrammatic view from above of the barrier in Fig.1a;
Fig.2a	shows a diagrammatic front view of the barrier in Fig.1a raised and with the first element alongside;
Fig.2b	shows a diagrammatic view from above of the barrier in Fig.2a;
Fig.3	shows a diagrammatic view from above of the barrier in Fig.2a in its final position to divert and direct the traffic;
Figs.4a to 4g	show a second form of the road safety barrier according to the invention in its different operating positions;
Fig.5a	shows on an enlarged scale and in partial section, a front view of the fixed element and a movable modular element of the raod safety barrier according to the invention;
Fig.5b	shows on an enlarged scale the section A-A of the barrier in Fig.5a;
Fig.6a	shows on an enlarged scale the section A-A of the barrier in Fig.5a, with the lifting means disactivated;
Fig.6b	shows on an enlarged scale the section A-A of the barrier in Fig.5a, with the lifting means activated;
Fig.7a	shows on an enlarged scale the section B-B of the barrier in Fig.5a, with the anchoring means almost completely disactivated;
Fig.7b	shows on an enlarged scale the section B-B of the barrier in Fig. 5a, with the anchoring means completely activated;
Fig.8	shows a front view of the connecting hinge between two contiguous elements which make up the barrier according to the invention;
Figs.9a and 9b	show a view from above of the hinge in Fig.8 in two different positions;
Fig.10a	shows the transverse section of a variant of the anchoring means of the barrier according to the invention;
Fig.10b	shows a section C-C of the anchoring means of Fig.10a.

The reference number 10 in the attached figures generally denotes a metal safety barrier for roads according to the invention.

The road safety barrier 10 is associated with the barriers to separate the traffic 11, whether they be of the "New Jersey" type with modular elements in steel or in concrete, or of the guard-rail type.

The road safety barrier 10 according to the invention comprises a fixed metal element 12 and at least one movable modular metal element 13 which are associated with each other, in this case, by hinge means 14.

In the embodiment shown in Figs.1 to 3, the barrier 10 comprises two movable modular metal elements 13a, 13b, whereas in the embodiment shown in Figs.4a to 4g, the barrier 10 comprises three movable modular elements respectively 13a, 13b and 13c.

The fixed metal element 12 has anchoring means 15 comprising connecting rods 16 which cooperate with the shoe 19 to make the fixed metal element 12 stably solid with the shoe 19.

The barrier 10 according to the invention may function both to separate the traffic, in which case it is aligned to form a continuous barrier with the barrier to separate the traffic 11 with which it is associated, and also to divert and direct the traffic, in which case it may be bent back upon itself (Figs.2b and 4f) so as to define an opening 20 through which vehicles can change carriageways.

The barrier 10 bent back upon itself can also be placed at an appropriate angle to the barrier to separate the traffic 11 in order to lead into and/or start the diversion (Figs.3 and 4g).

According to another configuration, the movable modular elements 13 which constitute the barrier 10 can be placed according to various dispositions, for example parallel to but off-set with respect to the barrier to separate the traffic 11 according to particular requirements, as indicated in the line of dashes in Figs.3 and

4g.

Each movable modular metal element 13 has anchoring means 115 inside which can be temporally activated and lifting means 18 which can be temporally activated.

When it functions as a barrier to separate the traffic, the movable modular metal element 13 has anchoring means 115 in the activated position 115a (Fig.7b) so as to fix it solidly to the shoe 19 in order to withstand at least the lateral thrusts, whereas the lifting means 18 are disactivated and withdrawn to an unseen position (Fig.6a).

To function as an element to divert and direct the traffic, the anchoring means 115 are put into the disactivated position 115b (Fig.7a), while the lifting means 18 are put into the activated position 18b (Fig.6b) where the movable modular element 13 is lifted from the shoe 19 and rests on the wheels 21 associated on the lower part with the lifting means 18.

More particularly, in this case, the anchoring means 115 comprise two vertical anchoring pins 22 (Figs.7a and 7b) fixed at their lower part to a horizontal support 23 which is movable vertically and cooperates with a drive unit, 24, in this case which functions in both directions.

In this case, the drive unit 24 comprises a worm screw 25, solidly associated at the end with the support 23, and cooperating with a helical wheel 26.

The worm screw 25 cooperates with guide means 27 which are solid with the movable modular element 13, inside which the worm screw 25 runs on its axis.

The helical wheel 26 is associated with a drive pin 44.

The helical wheel 26 is made to rotate by means of a crank which cooperates with the drive pin 44, and this makes the worm screw 25 travel on its axis to bring the anchoring pins 22 into or out of the respective containing seatings 17.

According to a variant not shown here, the helical wheel 26 is motor-driven.

According to a variant shown in Figs.10a and 10b, the anchoring means 115 comprise an anchoring pin 122, which is axially movable and able to rotate on its own axis, the anchoring pin 122 having a hook 34 at its upper end and a transverse locking element 35 at its lower end.

In this case, the movable modular element 13 has at its upper part a hole 37 on an axis with the anchoring pin 122 through which is inserted the tool used to hook up with, turn and lift the anchoring pin 122.

The hole 37 cooperates advantageously with removable plug-type closing means 38.

When it is necessary to lift the metal element 13, it is possible to make the anchoring pin 122 run on its axis until the hook 34 comes out of the hole 37, in such a way that it is possible to hook up the lifting cables with the hook 34.

In this case, the containing seating 17 has means to prevent withdrawal 36 in its lower part with which the transverse locking element 35, associated at the end with the anchoring pin 122, goes temporally to cooperate.

The anchoring pin 122 can be turned on its axis and has an angular release position in which the transverse locking element 35 is free to run between the anti-withdrawal means 36, and a second angular locking position, turned by 90° with respect to the transverse release position, in which the ends of the transverse locking element 35 cooperate with the anti-withdrawal means 36 and thus prevent the withdrawal of the anchoring pin 122.

The lifting means 18 comprise, in this case, oil-hydraulic jack screw means 29 substantially vertical, associated at the upper end with an attachment bracket 30 which is solid with the movable modular element 13, the oil-hydraulic jack screw means 29 presenting at the lower end a support 31 under which the wheels 21 are mounted, advantageously of the caster type.

In this case, so as to improve the connection of the movable modular element 13 to the ground when it is in the lowered position, the lower base plate 42 of the movable modular element 13 has seatings 43 with which the locking pins 46 cooperate, the locking pins 46 being fixed in the shoe 19 in a coordinate position partially protruding from said shoe 19.

The oil-hydraulic jack screw means 29 are associated with an oil-hydraulic power unit 33 which ensures the contemporary lifting/lowering of all the oil-hydraulic jack screw means 29, in such a way as to prevent stresses which could cause deformations in the movable modular elements 13 if they were lifted in a non-uniform way.

To prevent oscillations, and to facilitate the correct running of the support 23 and the support 31, the movable modular element 13 has guide profiles respectively 28, 32 with which the ends of the respective supports 23, 31 cooperate in their vertical travelling movement.

In this case, each movable modular element 13 has lifting means 18 near the two end areas, while there are anchoring means 115 both in the central area and in the two end areas of the movable modular element 13.

Figs.8, 9a and 9b show a possible form of the hinge means 14 which can be used to connect the movable modular elements 13 with the fixed element 12 or with a contiguous movable modular element 13.

The hinge means 14 must allow the movable modular element 13 to move from an aligned position to a parallel position with respect to the other movable modular element 13 or the contiguous fixed element 12.

According to a variant, the hinge means 14 allow the movable modular elements 13 to rotate in both directions with respect to each other.

In this case, the hinge means 14 comprise two plates, respectively the first plate 45a and the second plate 45b, horizontal and partially superimposed.

The first plate 45a has at one end a first hinge pin 39 on which it is mounted, and is free to rotate on the lower part of the fixed element 12, or of the movable

modular element 13.

The second plate 45b has at its other end a third hinge pin 41 with which it is connected to the lower part of the movable modular element 13.

In this case, in order to bring the movable modular element 13 parallel to the fixed element 12, or the other contiguous movable modular element 13, it is enough to bring the two plates 45a, 45b coaxial and orthogonal to the longitudinal axis of the barrier to separate the traffic 11 and make the movable modular element 13 rotate around the third hinge pin 41.

Figs. from 1a to 3 show the different operating stages to bring the barrier 10 from the position when it is used to separate the traffic into the position when it is used to divert and direct the traffic.

In Figs.1a and 1b, the barrier 10 is associated with the barrier to separate the traffic 11 in such a way that it has the same function, with the anchoring means 115 in the activated position and the lifting means 18 in the resting position.

In Figs.2a and 2b, after the anchoring means 115 have been disactivated and the lifting means 18 have been activated, the second movable modular element 13b is made to turn by means of the hinge means 14 so as to bring it alongside the first movable modular element 13a.

Then, in Fig.3, the first movable modular element 13a, together with the second movable modular element 13b, has been made to turn on the hinge means 14 which connect it to the fixed element 12 to take it into the position when it is used to divert and direct the traffic.

In Figs.4a to 4g the barrier 10, comprising a fixed element 12 and three movable modular elements 13a, 13b and 13c, is shown in the various stages of being moved.

Claims

1. Metal safety barrier for use in the median strip in roads, the device being characterised in that it comprises a fixed metal element (12) and at least one movable modular metal element (13) associated with each other by means of hinge means (14), the at least one movable modular metal element (13) having anchoring means (115) which can be temporally disactivated and lifting means (18) which can be temporally activated.

2. Barrier as in Claim 1, in which the lifting means (18) have wheel means (21) at the lower part.

3. Barrier as in Claims 1 or 2, in which the anchoring means (115) comprise at least a vertical anchoring pin (22,122), movable on its axis and cooperating temporally with a containing seating (17) in the shoe (19).

4. Barrier as in any claim hereinbefore, in which the anchoring means (115) cooperate with a drive unit (24) which lifts/lowers the at least one anchoring pin (22) from/into its containing seating (17).

5. Barrier as in any claim from 1 to 4 inclusive, in which the drive unit (24) comprises worm screw means (25) associated with the anchoring means (22), the worm screw means (25) cooperating with helical wheel means (26).

6. Barrier as in Claim 5, in which the helical wheel means (26) are acted on manually by means of a crank.

7. Barrier as in Claim 5, in which the helical wheel means (26) are motor-driven.

8. Barrier as in any claim from 1 to 4 inclusive, in which the anchoring pin (122) can be turned on its axis and has locking means (35, 36) which have a locking position and a release position angularly offset.

9. Barrier as in Claim 8, in which the anchoring pin (122) has hook means (34) at its upper end.

10. Barrier as in Claims 8 and 9, in which the containing seating (17) has anti-withdrawal means (36) with which the transverse locking means (35) associated with the lower end of the anchoring pin (122) cooperate temporally.

11. Barrier as in any claim hereinbefore, in which the hinge means (14) comprise two parallel plates (45a, 45b) associated with each other by a second hinge pin (40), each plate (45a, 45b) being associated with the respective fixed element (12) or movable element (13) respectively by means of a first hinge pin (39) and a third hinge pin (41).

12. Barrier as in any claim hereinbefore, in which the lifing means (18) comprise actuating means (29) associated with a power unit (33).

13. Barrier as in any claim hereinbefore, in which the base plate (42) of the movable modular elements (13) has seatings (43) cooperating temporally with locking pins (46) associated with the shoe (19).

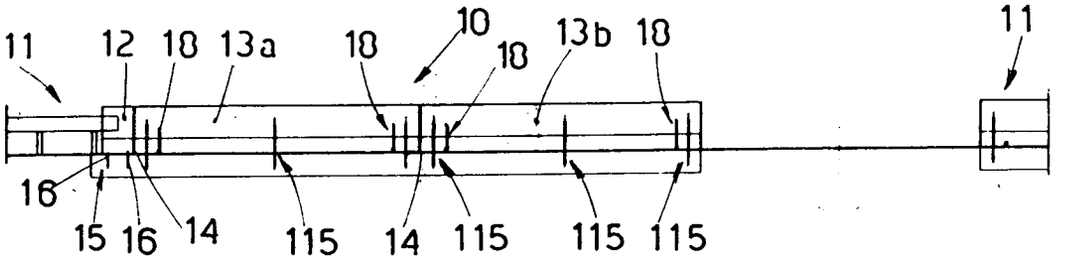

fig.1a

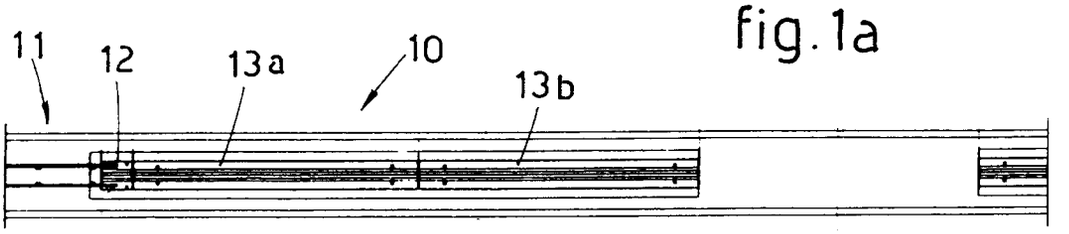

fig.1b

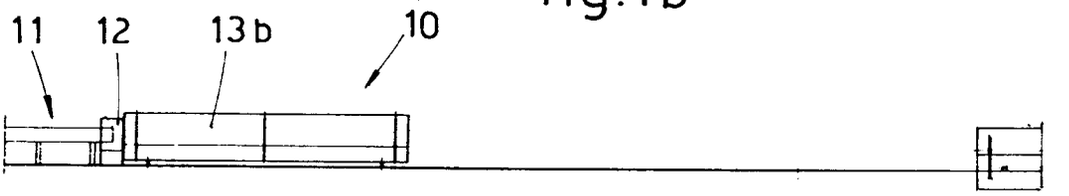

fig.2a

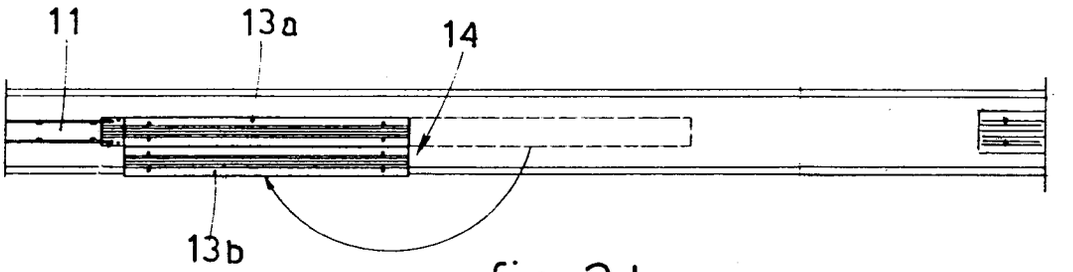

fig.2b

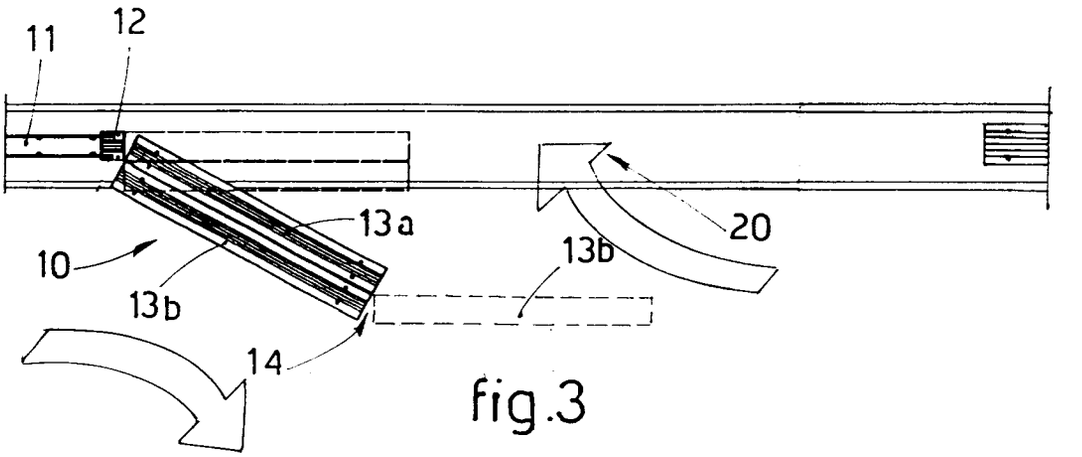

fig.3

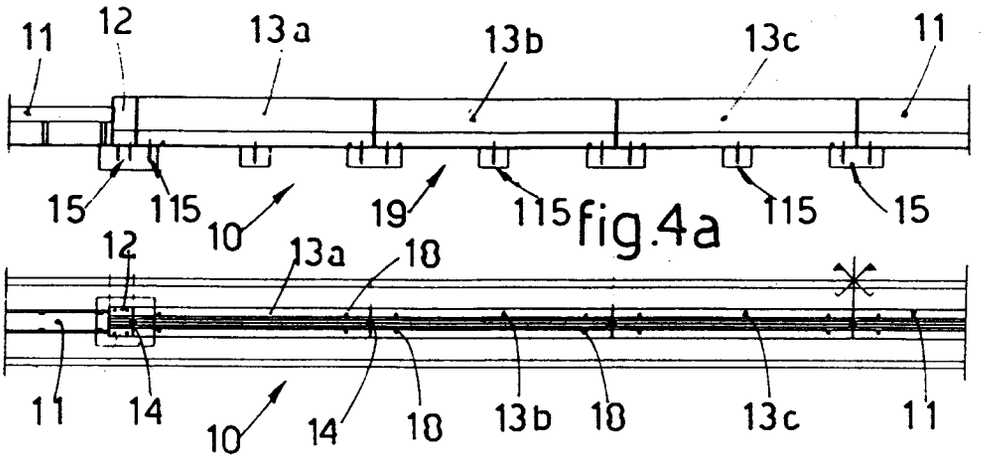

fig.4a

fig.4b

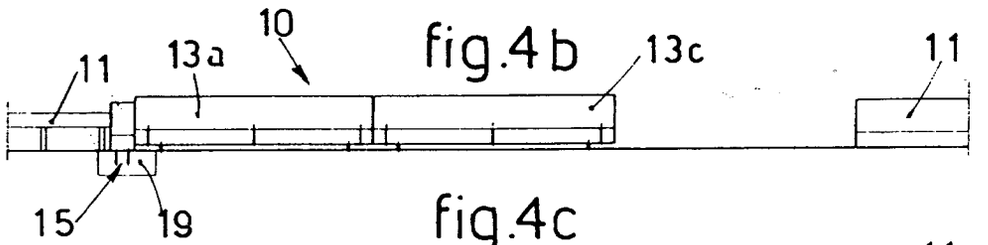

fig.4c

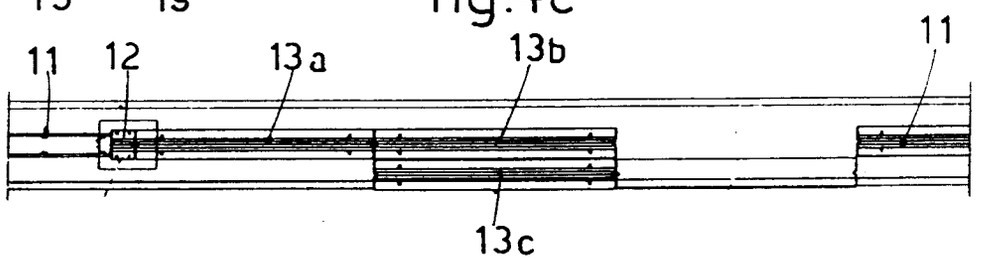

fig.4d

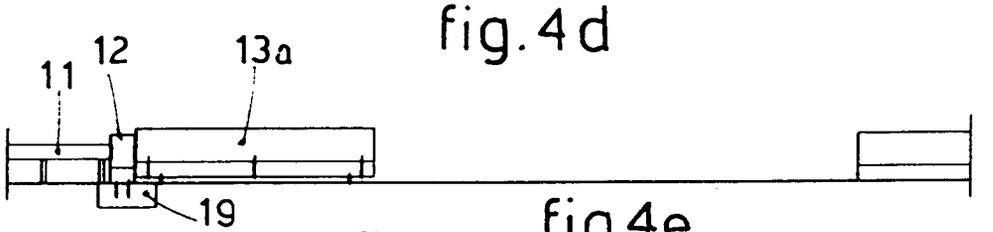

fig.4e

fig.4f

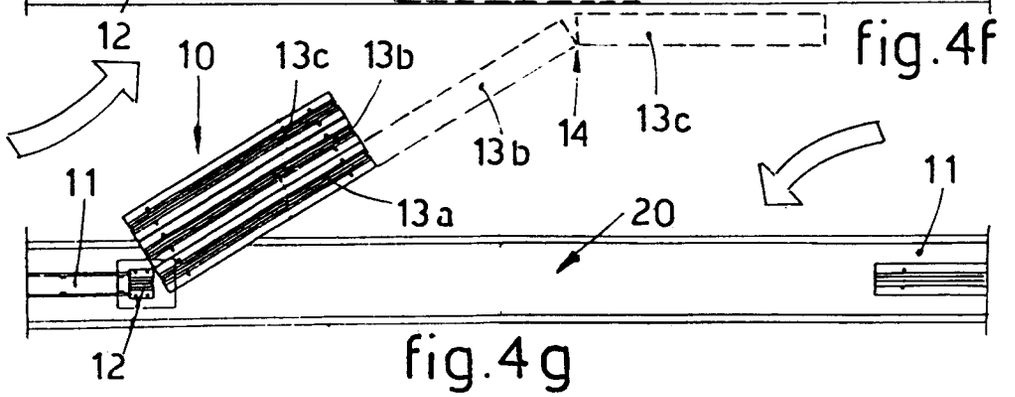

fig.4g

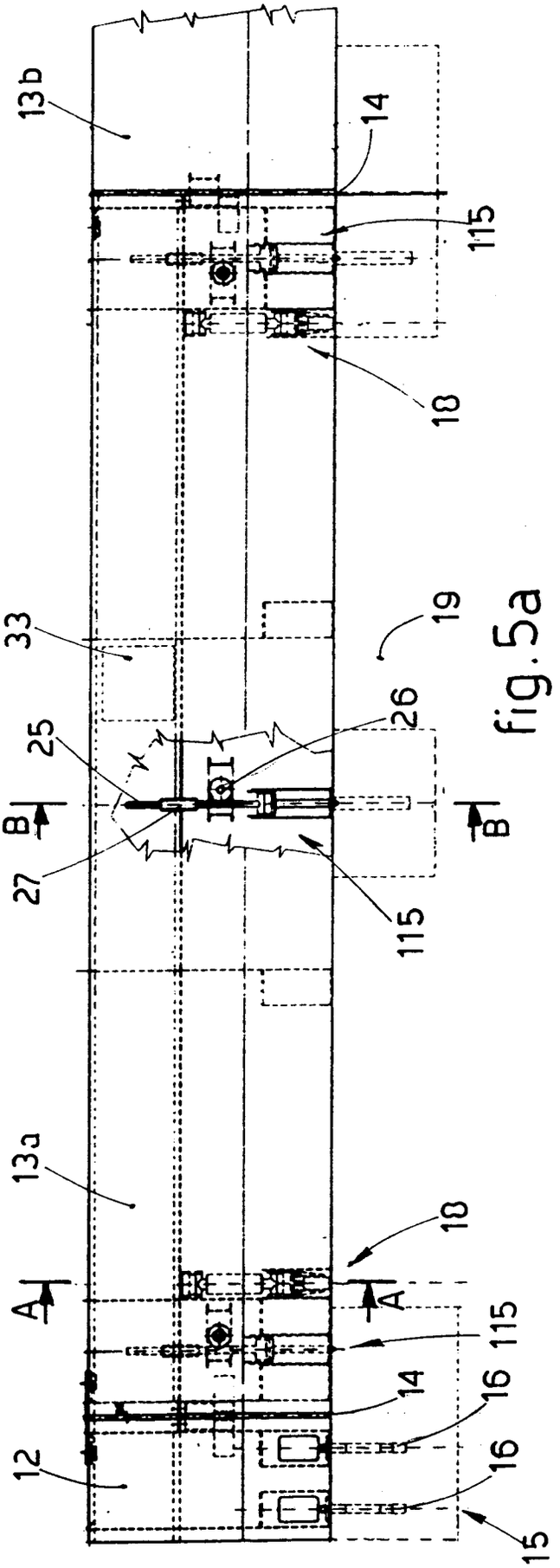
13b
14
115
18
33
19
26
25
B
27
115
B
13a
A
18
A
115
14
16
16
12
15

fig.5a

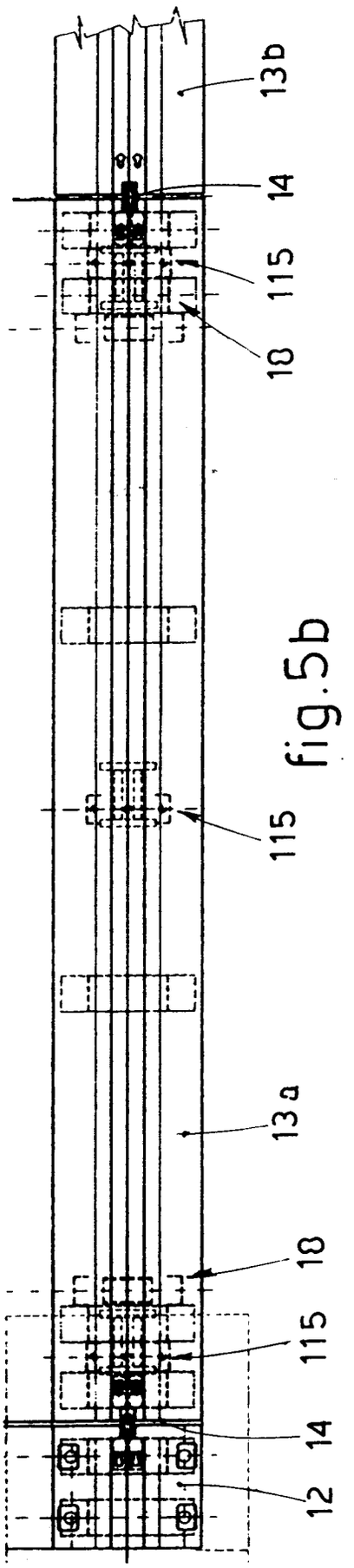
13b
14
115
18
115
13a
18
115
14
12

fig.5b

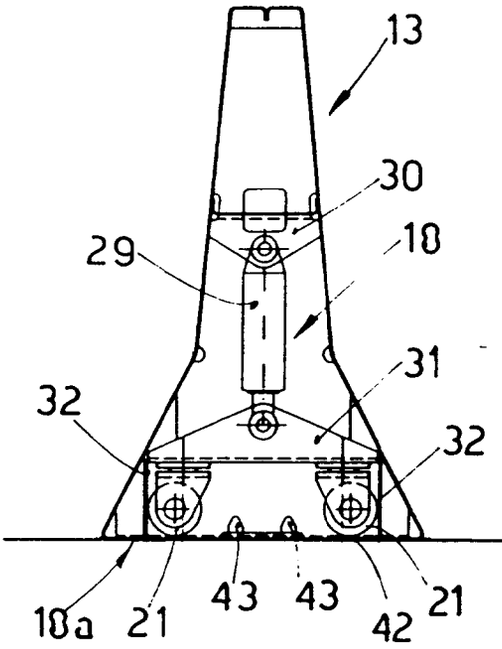

fig.6a

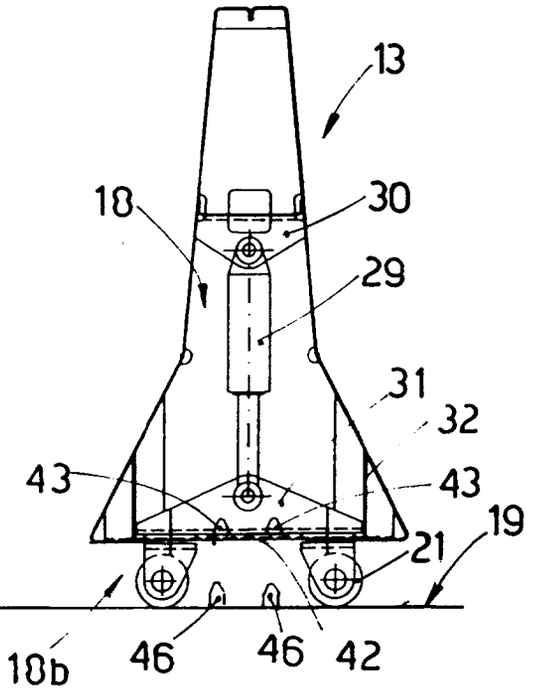

fig.6b

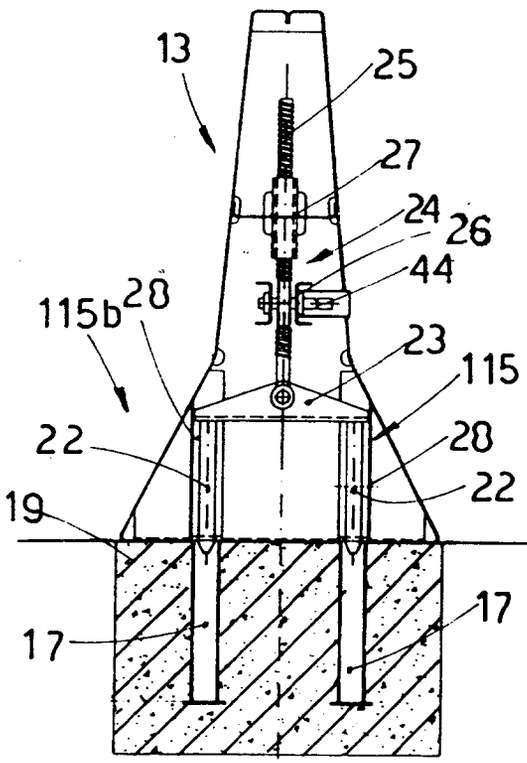

fig.7a

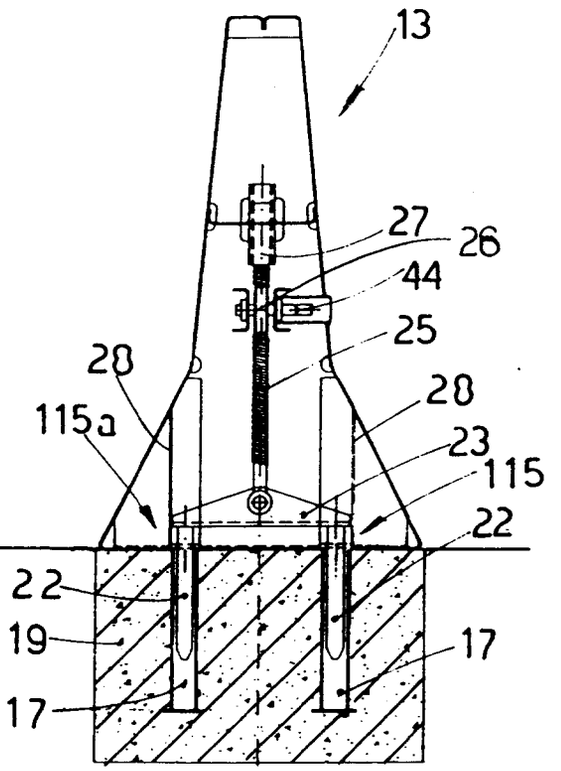

fig.7b

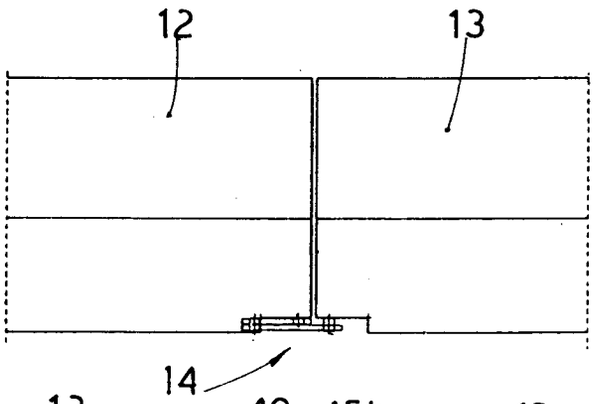

fig.8

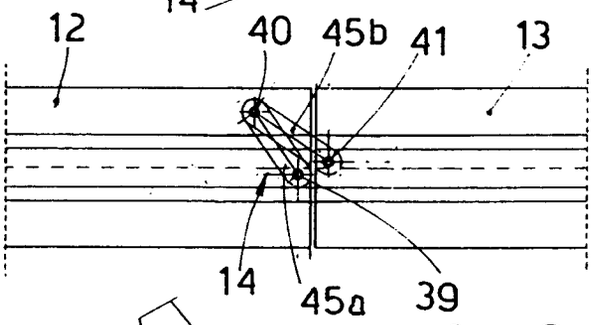

fig.9a

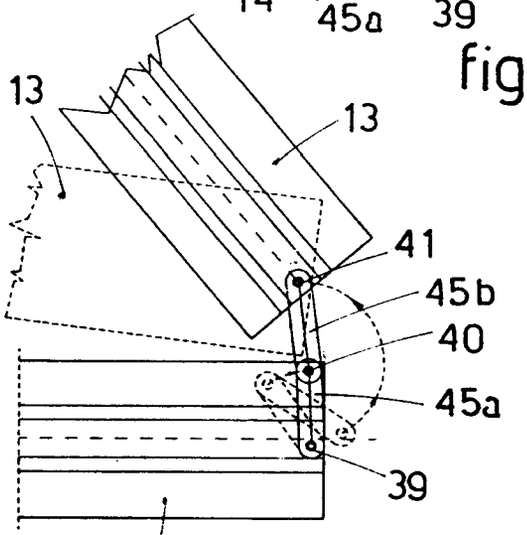

fig.9b

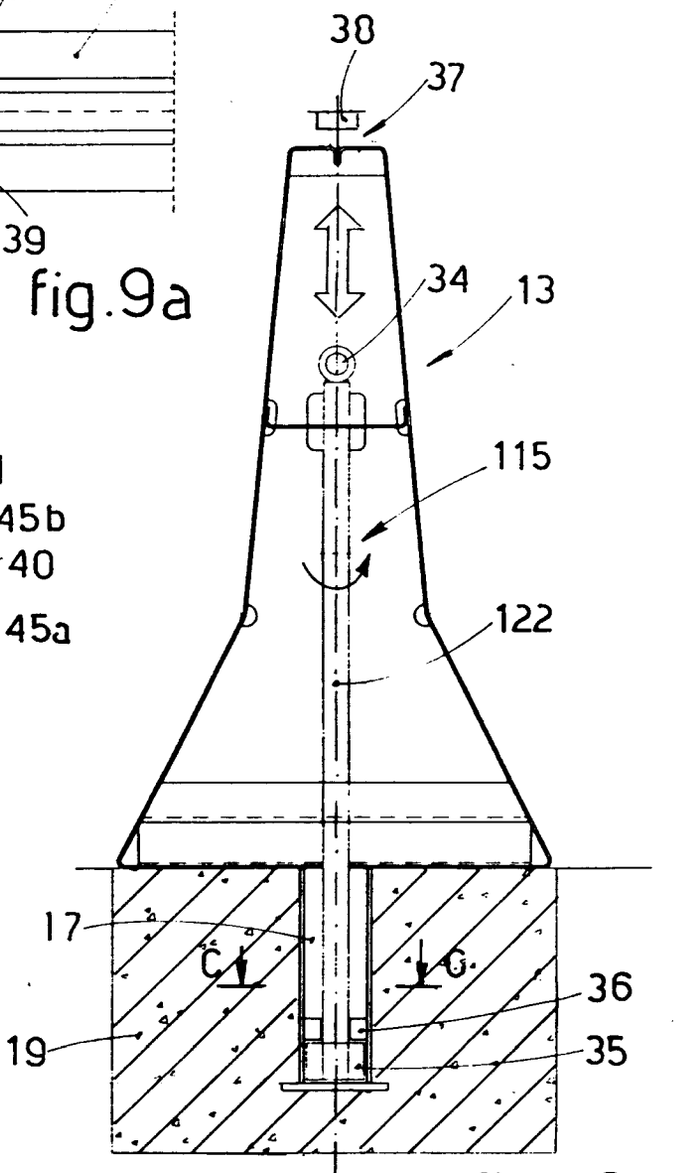

fig.10a

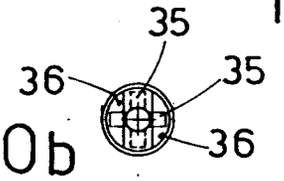

fig.10b

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 11 2628

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	DE-U-93 08 265 (SPS) * page 3, paragraph 5 - page 5, paragraph 4; figures *	1,2	E01F15/12
A	DE-A-18 03 862 (VER. METALLWERKE RANSHOFEN-BERNDORF)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E01F

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	19 November 1996	Verveer, D

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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