



(11) **EP 1 149 205 B1**

(12) **EUROPEAN PATENT SPECIFICATION**

(45) Date of publication and mention
of the grant of the patent:
13.06.2007 Bulletin 2007/24

(21) Application number: **99970700.3**

(22) Date of filing: **15.10.1999**

(51) Int Cl.:
E01F 15/08 ^(2006.01)

(86) International application number:
PCT/AU1999/000885

(87) International publication number:
WO 2000/023656 (27.04.2000 Gazette 2000/17)

(54) **A BARRIER ELEMENT**
LEITPLANKENELEMENT
ELEMENT DE BARRIERE

(84) Designated Contracting States:
AT BE CH CY DE DK ES FI FR GB GR IE IT LI LU
MC NL PT SE

(30) Priority: **15.10.1998 AU PP653098**

(43) Date of publication of application:
31.10.2001 Bulletin 2001/44

(73) Proprietor: **Kinabalu Investments Pty. Ltd.**
Sydney, NSW 2000 (AU)

(72) Inventor: **ADCOCK, Robin, Noel**
Gosford, NSW 2250 (AU)

(74) Representative: **Wenzel & Kalkoff**
Grubes Allee 26
22143 Hamburg (DE)

(56) References cited:

EP-A- 0 589 605	WO-A1-97/09485
AU-A- 4 734 593	CA-C- 2 021 870
DE-A- 1 658 664	DE-A- 4 038 538
FR-A- 2 619 400	FR-A- 2 691 728
US-A- 4 925 333	US-A- 5 217 318
US-A- 5 605 413	

Note: Within nine months from the publication of the mention of the grant of the European patent, any person may give notice to the European Patent Office of opposition to the European patent granted. Notice of opposition shall be filed in a written reasoned statement. It shall not be deemed to have been filed until the opposition fee has been paid. (Art. 99(1) European Patent Convention).

EP 1 149 205 B1

Description

[0001] This invention relates to a barrier element and a barrier comprising a plurality of said barrier elements arranged end to end.

[0002] This invention has particular but not exclusive application to a barrier element used in the construction of traffic barriers and for illustrative purposes reference will be made to such application.

[0003] Traffic barriers as disclosed in EP-A-0 589 605 typically include a plurality of hollow barrier elements that are arranged end to end. Adjacent barrier elements are usually retained in position by connecting means associated with same. Furthermore, each barrier element may be filled with ballast, such as water.

[0004] In many cases the connecting adjacent barrier elements does not adequately transmit loads applied thereto, such as loads resulting from a collision with a motor vehicle, to adjacent barrier elements. As a consequence the barrier element struck by the motor vehicle is often damaged and wherein the integrity of the barrier itself is severely compromised.

[0005] Furthermore, due to the configuration of the connecting means, in many instances barriers are constructed by moving individual barrier elements in a longitudinal direction into an engaging position with an adjacent barrier element. As a consequence, the removal of a damaged barrier element can be difficult and in some instances may necessitate the disassembly of a significant portion of the barrier.

[0006] The present invention aims to alleviate at least one of the above disadvantages and to provide a barrier element and a barrier comprising said barrier elements which will be reliable and efficient in use.

[0007] With the foregoing and other objects in view this invention resides in a barrier element according to claim 1.

[0008] The barrier element may be constructed from a plastics material using a rotational moulding process. Alternatively, the barrier element may consist of two moulded portions which are welded or otherwise joined together.

[0009] In one embodiment, adjacent barrier elements may be hingedly connected together by a substantially vertically orientated pin and wherein connecting means associated with each end portion shall facilitate such a connection. For example, the connecting means associated with one end portion may include a hollow, outwardly extending, flange that supports a vertically orientated pin. Preferably a portion of the pin extends into the interior of said flange and wherein use said portion provides a connection to which the linking means may be operatively connected to. The connecting means associated with the other end portion may include a hollow, outwardly extending, flange that includes a bore or recess which is adapted to receive a pin. The wall(s) of the bore or recess may provide an opposing connection to which the linking means is operatively connected.

[0010] In an alternative embodiment, adjacent barrier elements may be connected to each other by the operative engagement of complimentary interlocking end portions that are retained in operative engagement by one or more fasteners which extend through aligned tubular apertures formed in both barrier elements. In use the flexible linking member may be operatively connected to an intermediate portion of the aforementioned tubular apertures.

[0011] In the preferred embodiment, the end portions are adapted to interlock in both a horizontal and a vertical direction with an end portion of a similar barrier element and wherein disengagement of the two adjacent barrier elements may be affected by movement of said barrier elements in a transverse direction as opposed to movement in a longitudinal direction. For example, each of the end portions may include castigations in both vertical and transverse directions, said end portions may include castigations in both vertical and transverse directions, said end portions being of opposite hand. In use the end portions are preferably maintained in operative engagement by one or more fasteners that extend through aligned apertures in the adjacent barrier elements.

[0012] The flexible linking member, instead of consisting of a rigid linking member such as a rod like member or a plate like member made of metal, such as steel, may be constructed from a length of chain or wire. Preferably the linking means comprises a strap which is constructed from a web like material.

[0013] Each barrier element may include more than one linking member and wherein the linking members may be interconnected to one another. For example, the barrier element may include two linking members extending between diagonally opposed connections and wherein the intermediate portions of the two linking members may be interconnected.

[0014] The barrier elements may also include one or more openings formed therein which in use enable persons to obtain access to the interior of the barrier elements so that they may operatively connect the linking means to opposing end portions of said barrier element.

[0015] In order that this invention may be more easily understood and put into practical effect, reference will now be made to the accompanying drawings which illustrate a preferred embodiment of the invention.

FIG 1. is a top view of a barrier element constructed in accordance with the present invention which are shown prior to engagement, and

FIG 2. is a side view of the barrier element illustrated in FIG 1.

FIG 3 is a side cross-sectional view of the barrier element illustrated in FIG 1.

FIG 4 is a pictorial view of two barrier elements, one of which is shown in section.

[0016] Figures 1 to 4 show a barrier element 10 which includes a hollow body 11 manufactured from a plastics

material using a rotational moulding process. The body 11 includes two longitudinal side walls 12a and 12b which are interconnected by two opposing end portions 13 and 14 of opposite hand, a base 15 and a top wall 16.

[0017] The side walls 12a and 12b have a generally corrugated shape consisting of a plurality of flattened ridges 17 located between opposing longitudinally extending grooves 18. Preferably the lowermost ridge 17a is spaced a sufficient distance above the base wall 15 such that in use it is located above a bumper bar of a vehicle that is travelling beside the barrier element 10.

[0018] The base wall 15 includes a plurality of recesses 22 formed therein that extend transversely across the base 15 of the barrier element 10. The recesses 22 allow water that may otherwise build up on one side of the barrier element 10 to flow through said recesses.

[0019] The grooves 18 each include two elongate tubular slits 23 that extend between and are connected to opposing side walls 12a and 12b. The slits 23 are each adapted to receive a respective fork-lift tine. Each of the slits 23 may be selectively closed by the insertion therein of a respective, complementary shaped plug, not shown. It is believed the insertion of the plugs in the respective slits 23 will aid in resisting distortion of the barrier element.

[0020] The external surface 20 of the top wall 16 preferably slopes away from a central longitudinal axis which it is believed will be easier to mould than a flat surface.

[0021] The top wall 16 of the barrier element 10 includes a rectangular shaped recess 24 that is adapted to receive a light fitting, not shown. The top wall 16 further includes a groove 19 formed therein which cooperates with the recess 24, said groove 19 being adapted to frictionally receive a portion of a light fitting when seated in said recess 24.

[0022] The top wall 16 also includes access openings 36 and 37 formed therein which may be selectively closed by respective lids, not shown.

[0023] The top wall 16 also includes an inlet port 38 that may be selectively closed by a lid 38a. The inlet port 38 may be used to fill the barrier element with ballast, such as water.

[0024] The barrier element also includes an outlet port 39 formed in side wall 12a that may be selectively closed by a plug, not shown. The outlet port 39 may be used to drain ballast from the barrier element.

[0025] The hollow end portion 13 includes a mating face 40 which itself includes two generally rectangularly shaped splines 41 that extend outwardly therefrom and extend horizontally there across. The two splines 41 are separated by a rectangularly shaped groove 43 and each include a vertically orientated tubular bore 42 formed therein. The hollow end portion 13 also includes upper and lower cut out portions 44 and 45 respectively.

[0026] The hollow end portion 14 is adapted to mate with an end portion 13 of an adjacent barrier element 10a, shown in section in figure 4. The end portion 14 includes three generally rectangularly shaped splines 46

that extend outwardly from a mating face 47. The splines 46 are separated by two rectangularly shaped grooves 48 and each include a vertically orientated tubular bore 49 formed therein. In use, the upper spline 46a is locatable in the cut out portion 44 and the lower spline 46c is locatable in the cut out portion 45. Similarly the splines 41 are locatable within the complimentary shaped grooves 48.

[0027] The interlocked end portions 13 and 14 may be maintained in operative engagement by threading the stem 50 of a pin 51 through aligned bores 42 and 49. In addition, bolts 52 may be threaded through aligned apertures 53 and 54 formed in the respective end portions 13 and 14 and subsequently secured by the application of nuts 55. Preferably the head portion 56 of each bolt 52 and the nuts 55 are contained within grooves 18. The bolts 52 may also be used to secure a metal guard rail, not shown, to the side wall of the barrier element and wherein it will be appreciated that the shape of the guard rail may compliment the shape of the side wall or selected portions of same.

[0028] The barrier element also includes the flexible linking member or energy transfer means consisting of flexible straps 60, made from a web like material or webbing, connecting diagonally opposed tubular bores 42a and 48a, and 42b and 48b as illustrated in figure 3.

[0029] The straps 60 are fitted to the barrier element after the manufacture of the barrier element 10. Access to the interior of the barrier element 10 for the purpose of fitting the straps 60 will be via access openings 36 and 37.

[0030] In use, a traffic barrier may be constructed using a plurality of barrier elements 10 arranged end to end such that adjacent end portions 13 and 14 operatively interlock. The barrier elements in turn may be filled with water and wherein each barrier element may include a float having a stem that projects vertically through an aperture formed in the top wall 16. The float may be used as a visual means of determining whether the barrier requires refilling.

[0031] In the event that a motor vehicle should strike the barrier, it is believed that the ballast will absorb at least some of the forces of the impact. It is also believed that some of the forces applied to the connection between the barrier element and an adjacent barrier element will be transmitted internally to other barrier elements via the straps 60 and that the ballast may absorb some of these forces.

[0032] It will of course be realised that the above has been given only by way of illustrative example of the present invention and that all such modifications and variations thereto as would be apparent to persons skilled in the art are deemed to fall within the broad scope and ambit of this invention as is herein before defined in the appended claims.

Claims

1. A barrier element (10) of hollow construction which may be selectively filled with ballast, said barrier element being capable of attachment to similar barrier elements (10a) which are arranged end to end so as to form a barrier, said barrier element including:

two opposing longitudinal side walls (12a and 12b);

two opposing end portions (13 and 14) of opposite hand that are spaced apart and interconnected by said side walls, each of said end portions being adapted for connection to an end portion of opposite hand belonging to an identical barrier element, **characterized in that** said barrier element further includes, a flexible linking member (60) that is located inside said hollow barrier element and which is connected to said opposing end portions whereby in use forces applied to the barrier element due to vehicle impact may be transferred to an adjacent barrier element, to which said barrier element is connected, by said linking member.

2. A barrier element (10) as claimed in claim 1, wherein said flexible linking member extends diagonally from one of said end portions to the other of said end portions.

3. A barrier element as claimed in claim 2, wherein said barrier element includes at least one pair of longitudinally spaced tubular slits (23) that extend between said opposing side walls through which respective forklift tines may extend and whereby said flexible linking member extends between said tubular slits.

4. A barrier element as claimed in any one of the preceding claims wherein said flexible linking member consists of a flexible webbing.

5. A barrier element as claimed in any one of the preceding claims, wherein said end portions each consist of generally horizontally orientated spline (41, 46) and groove (43, 48) like formations that extend in a longitudinal direction, said end portions being of opposite hand and are each adapted to interlock with an end portion of opposite hand belonging to an identical barrier element.

6. A barrier element as claimed in claim 5, wherein there is provided aligned apertures (42 and 49) formed in said spline like formations and wherein interlocked end portions of adjacent barrier elements may be interconnected by a pin (51) that extends through said apertures of both of said interlocked end portions.

Patentansprüche

1. Barriereelement (10) von hohler Konstruktion, das selektiv mit Ballast befüllbar ist, wobei es möglich ist, das Barriereelement an ähnlichen Barriereelementen (10a) anzubringen, die Ende zu Ende angeordnet sind, um eine Barriere zu bilden, wobei das Barriereelement umfasst:

zwei gegenüberliegende Längsseitenwände (12a und 12b);

zwei gegenüberliegende Endabschnitte (13 und 14) von komplementärer Form, die beabstandet und durch die Seitenwände miteinander gekoppelt sind, wobei jeder der Endabschnitte zur Kopplung mit einem Endabschnitt von komplementärer Form eingerichtet ist, der zu einem identischen Barriereelement gehört, **dadurch gekennzeichnet, dass** das Barriereelement weiterhin

ein flexibles Verbindungselement (60) umfasst, das sich in dem hohlen Barriereelement befindet und mit den gegenüberliegenden Endabschnitten gekoppelt ist, wodurch in das Barriereelement eingeleitete Kräfte bei Verwendung aufgrund einer Stoßwirkung eines Fahrzeugs auf ein benachbartes Barriereelement, an das das Barriereelement durch das Verbindungselement gekoppelt ist, übertragbar sind.

2. Barriereelement nach Anspruch 1, wobei sich das flexible Verbindungselement diagonal von einem der Endabschnitte zu dem anderen der Endabschnitte erstreckt.

3. Barriereelement nach Anspruch 2, wobei das Barriereelement mindestens ein Paar längs beabstandeter rohrförmiger Schlitze (23) aufweist, die sich zwischen den gegenüberliegenden Seitenwänden erstrecken, durch die sich zugehörige Gabelstaplerzinken erstrecken können und wodurch sich das flexible Verbindungselement zwischen den rohrförmigen Schlitzen erstreckt.

4. Barriereelement nach einem der vorstehenden Ansprüche, wobei das flexible Verbindungselement aus einem flexiblen Gewebe besteht.

5. Barriereelement nach einem der vorstehenden Ansprüche, wobei die Endabschnitte jeweils aus im Wesentlichen horizontal ausgerichteten, nach Art von Rippen (41, 46) und Nuten (43, 48) gebildeten Formationen bestehen, die sich in einer Längsrichtung erstrecken, wobei die Endabschnitte von komplementärer Form sind und eingerichtet sind, um in einen Endabschnitt von komplementärer Form zu greifen, der zu einem identischen Barriereelement gehört.

6. Barriereelement nach Anspruch 5, wobei ausgerichtete Öffnungen (42 und 49) vorgesehen sind, die in den rippenartigen Formationen gebildet sind, und wobei ineinander greifende Endabschnitte von benachbarten Barriereelementen durch einen Zapfen (51) miteinander gekoppelt werden können, der sich durch die Öffnungen beider ineinander greifender Endabschnitte erstreckt.

Revendications

1. Élément (10) de barrière de construction creuse, qui peut être rempli sélectivement d'un lest, l'élément de barrière pouvant être fixé à des éléments analogues (10a) de barrière qui sont disposés bout à bout pour former une barrière, l'élément de barrière comprenant :

deux parois longitudinales opposées (12a et 12b) de côté,
deux parties opposées (13 et 14) d'extrémité de formes complémentaires qui sont espacées et interconnectées par les parois de côté, chacune des parties d'extrémité étant destinée à être connectée à une partie d'extrémité de forme complémentaire appartenant à un élément identique de barrière, **caractérisé en ce que** l'élément de barrière comporte en outre :

un organe flexible (60) de liaison qui est disposé à l'intérieur de l'élément creux de barrière et qui est raccordé aux parties opposées d'extrémité afin que, pendant l'utilisation, les forces appliquées à l'élément de barrière et dues au choc d'un véhicule puissent être transférées par l'organe de liaison à un élément adjacent de barrière auquel est raccordé ledit élément de barrière.

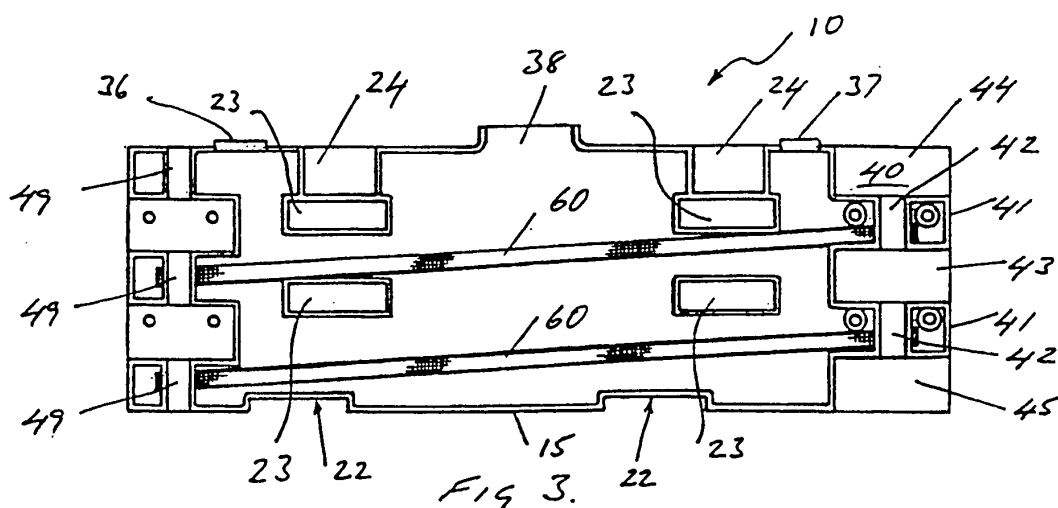
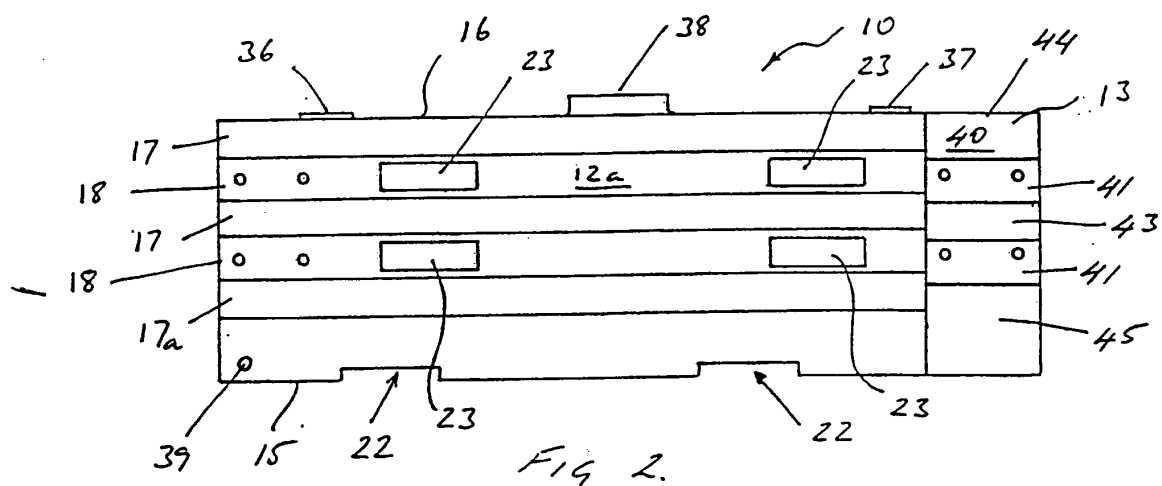
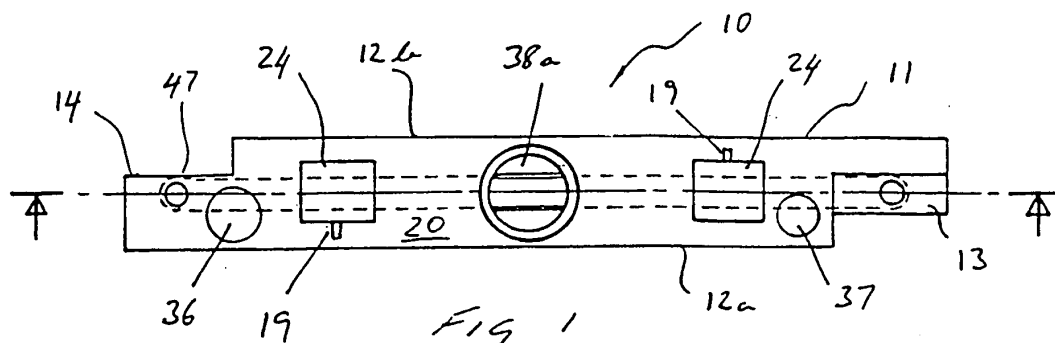
2. Élément (10) de barrière selon la revendication 1, dans lequel l'organe flexible de liaison s'étend en diagonale de l'une des parties d'extrémité vers l'autre des parties d'extrémité.

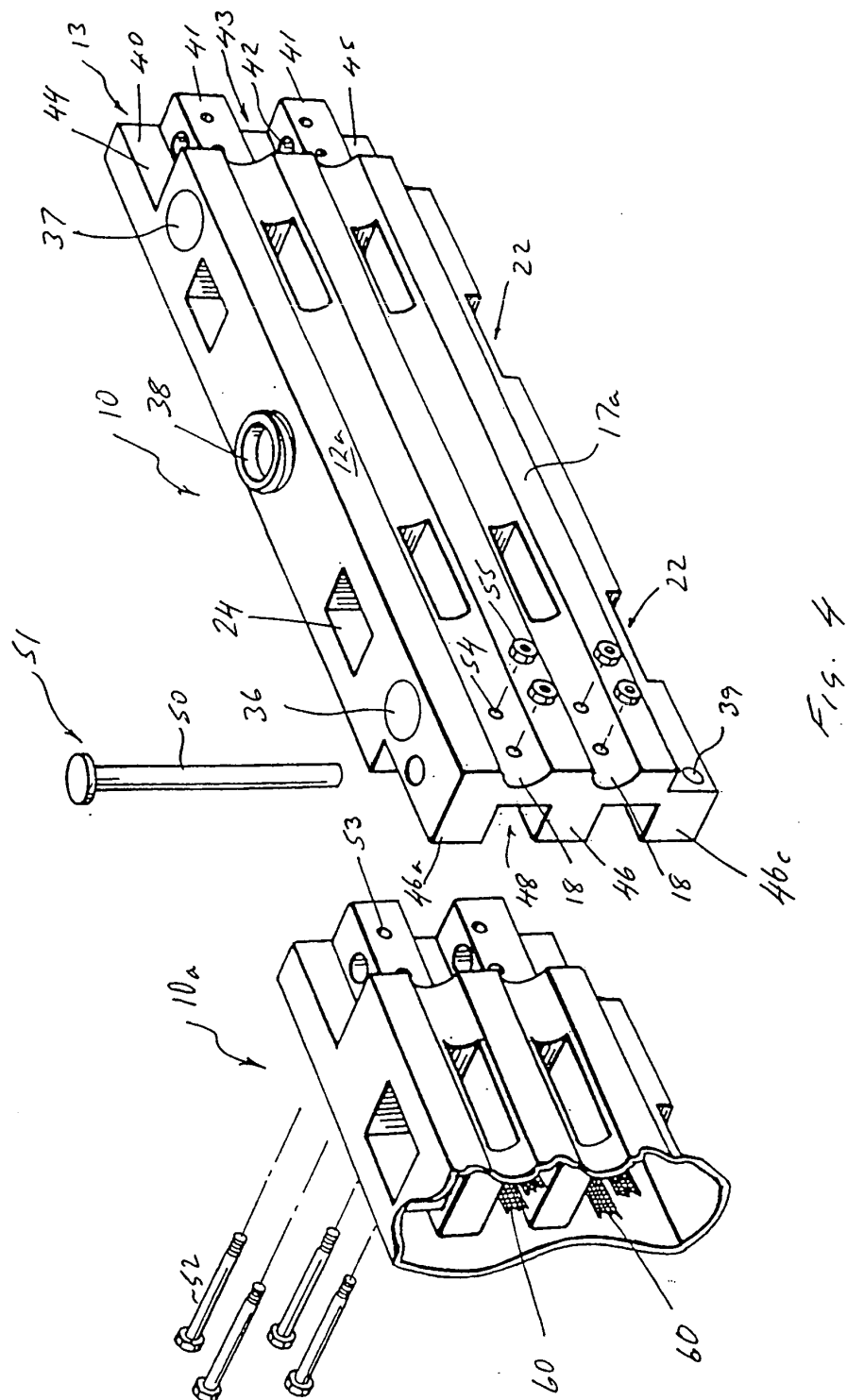
3. Élément de barrière selon la revendication 2, dans lequel l'élément de barrière comprend au moins une paire de fentes tubulaires (23) espacées longitudinalement et qui s'étendent entre les parois opposées de côté et par lesquelles des dents respectives de fourche de chariot élévateur peuvent s'étendre et telles que l'organe flexible de liaison s'étend entre les fentes tubulaires.

4. Élément de barrière selon l'une quelconque des revendications précédentes, dans lequel l'organe flexible de liaison comprend une sangle flexible.

5. Élément de barrière selon l'une quelconque des revendications précédentes, dans lequel les parties d'extrémité sont constituées chacune d'organes conformés d'orientation générale horizontale analogues à des saillies (41, 46) et des gorges (43, 48) qui s'étendent dans une direction longitudinale, les parties d'extrémité ayant des formes complémentaires et étant destinées chacune à s'emboîter dans une partie d'extrémité de forme complémentaire appartenant à un élément identique de barrière.

6. Élément de barrière selon la revendication 5, dans lequel des ouvertures alignées (42 et 49) sont formées dans les organes conformés analogues à des saillies, et dans lequel les parties emboîtées d'extrémité des éléments adjacents de barrière peuvent être interconnectées par une broche (51) qui passe dans les ouvertures des deux parties emboîtées d'extrémité.





REFERENCES CITED IN THE DESCRIPTION

This list of references cited by the applicant is for the reader's convenience only. It does not form part of the European patent document. Even though great care has been taken in compiling the references, errors or omissions cannot be excluded and the EPO disclaims all liability in this regard.

Patent documents cited in the description

- EP 0589605 A [0003]