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(72) Inventors:
• **Gentili, Benito**
47900 Rimini (IT)
• **Gentili, Loris**
47900 Rimini (IT)

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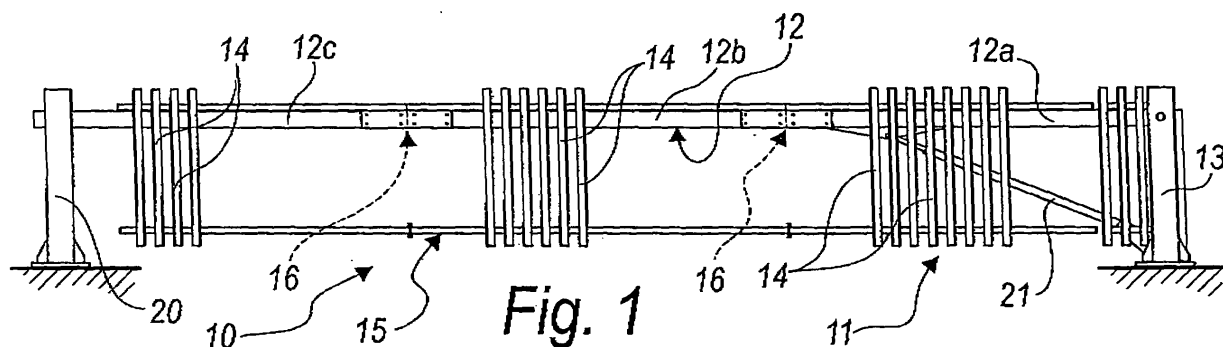
(74) Representative: **Paolizzi, Marco**
C/o Bugnion S.p.A.
Via A. Valentini, 11/15
47900 Rimini (IT)

(71) Applicant: **SMOES S.R.L.**
47900 Rimini (IT)

(54) **A gate structure of the type with vertically opening barrier**

(57) This invention relates to a gate structure (10) of the type with a vertically opening barrier comprising at least one wing (11) composed of a load-bearing, upper longitudinal beam (12) rotatably mounted on a support (13) allowing it to rotate about a horizontal axis, said load-

bearing longitudinal beam (12) having hinged to it a series of rods (14) hinged at the bottom to at least one connecting longitudinal beam (15). The load bearing longitudinal beam (12) is composed of segments (12a, 12b, 12c) of equal dimensions.



Description

[0001] This invention relates to a gate structure of the type with vertically opening barrier.

[0002] Vertically opening gates are currently well known and appreciated for their functionality. These gates are **characterized in that** they comprise at least one barrier composed of an upper longitudinal beam pivoted to a support in such a way as to rotate about a horizontal axis, a lower longitudinal beam attached to the same support and which moves parallel to the upper longitudinal beam under the action of a series of rods pivoted to the two longitudinal beams. The gate is equipped with drive means for imparting rotational motion to the upper longitudinal beam.

[0003] The drive means usually consist of a hydraulic cylinder fixed on one side to the base of the support and on the other side to the upper longitudinal beam substantially diagonally when the gate is in the lowered, closed condition.

[0004] Gates of this kind are highly appreciated because they occupy much less space when open than sliding gates or swing gates that open by turning about a vertical axis.

[0005] Although widely used and appreciated, however, these vertically opening gates comprise an upper longitudinal beam made in the form of a single tubular element.

[0006] Generally speaking, this single tubular element is too long to be transported in a small van, approximately three metres or little more in length, of the type usually used for transporting gates of this type.

[0007] Thus, if the gate has a longitudinal beam which is more than three metres long - and gates of this kind are often five to ten metres long - the manufacturer and the buyer are obliged to make arrangements to obtain special, dedicated transport means capable of carrying a tubular element as long as this, with all the additional costs that this inevitably involves.

[0008] Similar problems are involved in the storage of these gates which, when their longitudinal beams are more than three metres long, require large amounts of warehouse space especially set aside to store a small number of very long parts.

[0009] The main purpose of this invention is to provide a gate structure of the type with vertically opening barrier that is simpler and more economical to transport and store than vertically opening gates known to the prior art up to now.

[0010] In the context of the main purpose set out above, it is an important aim of this invention to provide a gate structure that is easy to assemble and disassemble for personnel that is not especially skilled or trained for the purpose.

[0011] Another no less important aim of the invention is to develop a gate structure with a vertically opening barrier that can be manufactured in existing production facilities using known technology.

[0012] These and other aims, which will become more apparent as this description continues, are achieved by a gate structure of the type with a vertically opening barrier comprising at least one wing composed of a load-bearing, upper longitudinal beam rotatably mounted to a support and rotationally driven about a horizontal axis by drive means, said load-bearing longitudinal beam having hinged to it a series of rods hinged at the bottom to at least one connecting longitudinal beam, said gate structure being **characterized in that** the load bearing longitudinal beam is composed of at least two segments of equal dimensions that can be joined to each other by reversible fastening means.

[0013] Further characteristics and advantages of the invention are more apparent in the non-limiting description of a preferred embodiment of it, illustrated in the accompanying drawings, in which:

- Figure 1 is a front view of a gate structure according to the invention in the assembled condition;
- Figure 2 is an exploded view of the gate structure according to the invention;
- Figure 3 illustrates a detail of the gate structure according to the invention;
- Figure 4 is a perspective view of the reversible fastening means of the gate structure according to the invention.

[0014] With reference to the accompanying drawings, listed above, a gate structure of the type with a vertically opening barrier according to the invention is denoted in its entirety by the numeral 10.

[0015] In the non-limiting embodiment described here, the gate structure 10 comprises a wing 11.

[0016] The wing 11 is composed of a load-bearing, upper longitudinal beam 12 rotatably mounted to a support 13 and rotationally driven about a horizontal axis by drive means.

[0017] The load-bearing longitudinal beam 12 has hinged to it a series of equispaced rods 14 forming a barrier, hinged at the bottom to a connecting longitudinal beam 15.

[0018] The characteristic feature of the invention lies in the fact that the load-bearing longitudinal beam 12 is composed of at least two segments of equal dimensions that can be joined to each other by reversible fastening means.

[0019] In the embodiment described here, which, it is stressed, is an example embodiment that does not limit the scope of the invention, the load-bearing longitudinal beam 12 is composed of three segments 12a, 12b, 12c.

[0020] The last segment - in this case 12c - can be cut to the required size if the gate structure 10 must be adapted to a gateway whose size is not proportional to an exact multiple of the length of one segment.

[0021] Each of the segments 12a, 12b, 12c of the load-bearing longitudinal beam 12 is in the form of a ready-machined, perforated tubular element.

[0022] The reversible fastening means between two consecutive segments are in the form of an insert 16 especially shaped so that a first part of it 16a can be inserted into a corresponding end of a first segment, for example 12a, and the second part of it 16b can be inserted into one end of a second segment, for example 12b, to be joined to the first.

[0023] All the inserts 16 used are substantially the same.

[0024] The insert 16 is designed to be reversibly fitted in the ends of the segments using removable connection means.

[0025] The removable connection means are in the form of a plurality of threaded elements and respective nuts, not illustrated for simplicity and being of customary type; for example, each coupling may be embodied by eight through bolts, each with a tapered head and nut.

[0026] The joint between the segments 12a 12b 12c is provided by a connection that is novel in the trade and such that once assembled, the segments form a rigid longitudinal beam 12 perfectly comparable to the one-piece beam typical of similar gates of known type.

[0027] The threaded elements pass through the facing ends of the segments 12a, 12b and 12c and the corresponding parts 16a and 16b of an insert 16 inside the ends themselves.

[0028] The insert 16 is a tubular element with internal reinforcing crossbars 17 located at the holes for the threaded elements used for the connection with the ends of the segments.

[0029] The insert 16 is also equipped with shimming and centring plates 18, located on its outside surface to determine the correct positioning of its parts 16a and 16b in the ends of the segments 12a, 12b and 12c.

[0030] The segments 12a, 12b and 12c are fitted with L-profile sections 19a, 19b and 19c for hingeing the rods 14.

[0031] The lower longitudinal beam 15 is also composed of a series of tubular bars 15a, 15b and 15c (preferably U-shaped in section), preferably not longer than the segments 12a, 12b and 12c.

[0032] The segments 12a, 12b and 12c are preferably not more than 3 metres long so that they can easily be loaded even on a van of the type that is normally used for transporting vertically opening gates.

[0033] The gate structure 15 is completed by a supporting post 20 and by drive means, normally embodied by a hydraulic cylinder 21.

[0034] The hydraulic cylinder 21 can slow down the longitudinal beam 12 as the latter nears the end of its vertical rotational movement, both when going up and when going down.

[0035] The gate structure 10 according to the invention is reversible, that is to say, it can be mounted for opening upwards either towards the right or towards the left without changing any of the components.

[0036] In practice, the invention as described achieves the above mentioned purpose and aims.

[0037] In particular, the invention provides a gate structure of the type with vertically opening barrier which, being substantially modular, is simpler and more economical to transport and store than vertically opening gates known to the

prior art.

[0038] The above is made possible by the fact that the load-bearing longitudinal beam 12 can be divided into two or more segments 12a and following, which can be quickly and easily joined using ordinary, well-known tools.

[0039] Moreover, using this invention it has been possible to develop a gate structure that is easy to assemble and disassemble for personnel that are not especially skilled or trained for the purpose. Thus, the gate structure can be easily packed in the form of kit that is easy to transport and install.

[0040] Furthermore, the gate structure according to the invention is easier to install because there is no need to use a crane or other special equipment to lift the longitudinal beam since the latter is divided into two or more parts, that is to say, the segments, which are lighter and easier to handle than prior art longitudinal beams consisting of a single tubular element of considerable length. Last but not least, the invention provides a gate structure with a vertically opening barrier that can be manufactured in existing production facilities using known technology.

[0041] The invention described above is susceptible of industrial application and may be modified and adapted in several ways without thereby departing from the scope of the inventive concept. Moreover, all the details of the invention may be substituted by other, technically equivalent elements.

[0042] In practice, the gate structure may be made from any materials, provided they are compatible with the specific use, and in any size, according to requirements and the state of the art.

[0043] Any reference characters used in the claims to denote specific features and methods of the invention are provided solely for the purpose of improving the intelligibility of the claims. Consequently, no such reference character shall have any limiting effect on the interpretation of the item denoted by the reference character itself by way of example.

Claims

1. A gate structure (10) of the type with a vertically opening barrier comprising at least one wing (11) composed of a load-bearing, upper longitudinal beam (12) rotatably mounted on a support (13) and rotationally driven about a horizontal axis by drive means, said load-bearing longitudinal member (12) having hinged to it a series of rods (14) hinged at the bottom to at least one connecting longitudinal mem-

ber (15), said gate structure being **characterized in that** the load bearing longitudinal member (12) is composed of at least two segments (12a, 12b, 12c) of equal dimensions that can be joined to each other by reversible fastening means.

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2. The gate structure according to claim 1, **characterized in that** each of the segments (12a, 12b, 12c) of the load-bearing longitudinal beam (12) is in the form of a tubular element.

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3. The gate structure according to the foregoing claims, **characterized in that** the reversible fastening means are in the form of an insert (16) especially shaped so that a first part of it (16a) can be inserted into a corresponding end of a first segment, and the second part of it (16b) can be inserted into one end of a second segment to be joined to the first, said insert (16) being designed to be reversibly fitted in the ends of the segments using removable connection means.

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4. The gate structure according to the previous claim, **characterized in that** the removable connection means are in the form of a plurality of threaded elements, and respective nuts, passing through the facing ends () of the segments () and the corresponding parts of an insert inside the ends () themselves.

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5. The gate structure according to the foregoing claims, **characterized in that** the insert is a tubular element with internal reinforcing crossbars located at the holes for the threaded elements used for the connection with the ends of the segments.

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6. A gate structure of the type with a vertically opening barrier as in one or more of the foregoing claims and **characterized in that** it is as described herein and illustrated in the accompanying drawings.

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