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(54) **TRAFFIC CONTROL DEVICE AND METHOD FOR ERECTION THEREOF**

(57) A traffic control device comprises a standing mast body (20) and a support arm (40) which extends at height therefrom. The support arm is intended and configured to carry at least one traffic control unit (51,52). The mast body is connected at a base to a foot body, wherein the mast body is rotatable about a vertically oriented longitudinal axis. The support arm extends from a

carriage (30) which is connected to the mast element and which is axially adjustable relative to the mast body. Lifting means (60) are provided with which the carriage together with the support arm can be carried from a base position located close to the foot body to an elevated position located at height. Fixation means retain the support arm in the elevated position.

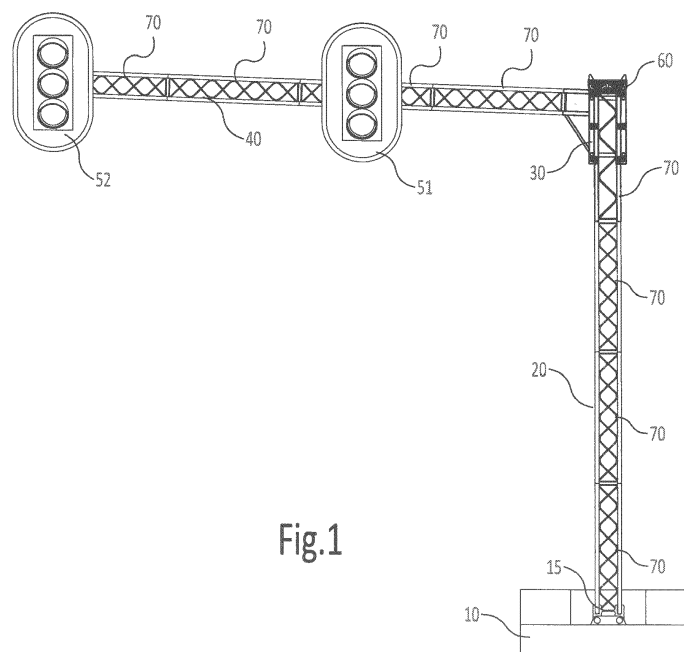


Fig.1

Description

[0001] The present invention relates to a traffic control device comprising at least one standing mast body and a support arm which extends at height from the at least one mast body, wherein the support arm is intended and configured to carry at least one traffic control unit and the at least one mast body is connected at a base to a foot body.

[0002] Such a device is applied particularly along roads and at junctions for mounting one or more traffic control units at height, such as traffic lights, matrix displays and signposting. The support arm from which these means are suspended is held at height here by one, or in some cases two mast bodies which stand alongside a roadway while the support arm extends wholly or partially over the road. When such a known traffic control unit has to be provided in an existing situation, this usually entails relatively great traffic disruption. This is because traffic has to be halted so that the support arm can be arranged and the traffic control units mounted thereon and connected to a control unit.

[0003] Particularly for temporary provisions, for instance in the case of roadworks and for diversions, recourse is therefore not infrequently had to a provisional arrangement which can be erected in a relatively short time in order to disrupt traffic as little as possible. Such provisional devices are characterized by a construction which is not very stable and which in no way meets requirements of safety and wind resistance laid down for permanent devices. Such temporary devices are nevertheless often utilized for longer periods of time, whereby a real danger of collapse can be envisaged.

[0004] The present invention has for its object to provide a traffic control device which complies fully, or at least to great extent, with requirements set for permanent installations but which can nevertheless be erected in a short time without any disruption to traffic.

[0005] In order to achieve the stated object a traffic control device of the type described in the preamble has the feature according to the invention that the mast body is connected to the foot body for rotation about a vertically oriented longitudinal axis, that the support arm extends from a carriage which is connected to the mast element and which is axially adjustable relative to the mast body, that lifting means are provided which are at least connectable to the carriage and which are intended and configured to carry the carriage together with the support arm from a base position located close to the foot body to an elevated position located at height, and that fixation means are provided to retain the support arm in the elevated position. The foot body can here comprise a dead-weight ballast or an anchoring in the ground and serves as counterweight for the support arm.

[0006] The construction can if desired be erected wholly on-site adjacently of a roadway without traffic having to be greatly disrupted thereby. The support arm still extends here in the line of and adjacently of the roadway

and the necessary traffic control units can already be arranged thereon and wholly or partially connected thereto. As soon as this has been completed, the carriage with the support arm thereon is raised by means of the lifting means and, because of the rotatability of the lower assembly, moved in a rotation above the road surface. Only for this latter step does the traffic have to be halted for a short time. However, because the preceding construction phase can take place with no disruption whatsoever for the traffic, no concessions need be made here in respect of the stability and strength of the construction, which can therefore comply without problem to the stricter safety requirements than the temporary mobile traffic control devices used heretofore.

[0007] In order to be able to carry out the construction of such a traffic control device in quick and practical manner, a preferred embodiment of the traffic control device has the feature according to the invention that at least one of the mast body and the support arm is at least substantially assembled from a number of successive, at least substantially identical segments provided at opposite outer ends with rapid-action coupling means intended and configured for co-action with corresponding rapid-action coupling means of a connecting segment in order to bring about an at least substantially firm connection thereto. The associated parts of the construction thus allow of relatively simple construction in a short time by coupling a number of such segments to each other. A proximal segment of the support arm is preferably coupled in similar manner via such rapid-action coupling means to the carriage, for which purpose the carriage is in this case also provided with such rapid-action coupling means.

[0008] Not only can the construction of the traffic control device in respect of the mast body and/or the support arm be performed in relatively short time and in relatively simple manner from such mutually coupled segments, such a traffic control device can also be dismantled again relatively quickly when it is no longer required. The segments and other parts of the construction can then be reused at another location, whereby an additional advantage of such a traffic control device is that costs per location can remain limited.

[0009] The erection and dismantling of the construction are further simplified in a further preferred embodiment of the traffic control device which is characterized according to the invention in that the segments are provided at opposite outer ends with rapid-action coupling means which are at least substantially the same. During the construction of this embodiment it is not necessary to take into account a specific orientation of the segments now that they thus take the same form on opposite sides and the rapid-action coupling means as a whole are thus neutral. Nor for the same reason is it necessary to take a specific orientation into account when dismantling and stowing away the segments.

[0010] In a particular embodiment the traffic control device has the feature according to the invention that the

rapid-action coupling means comprise complementary coupling members provided on mutually facing outer ends of successive segments, and more particularly that the coupling members comprise a receiving cavity and a member receivable in at least substantially play-free manner therein, that at least one such receiving cavity and such receiving member extends from each of the mutually facing outer ends of the segments. The rapid-action couplings between the segments do not therefore require any further, at least separate components, and segments can be coupled directly to each other. This situation can if desired be secured using locking means provided for this purpose which avoid unintentional release of an effected coupling.

[0011] Although use can be made of varying constructions for the segments, an exceptionally strong and stiff entity is found to be obtained with a further particular embodiment of the traffic control device according to the invention which is characterized in that the segments have a polygonal, in particular square cross-section and that the coupling members are provided at least substantially at corner points of an imaginary polygon. The polygonal cross-section moreover provides a high packing density when the segments have to be stored or transported, this resulting in a cost reduction.

[0012] A further particular embodiment of the traffic control device according to the invention is characterized in that the segments comprise a frame of a number of elongate edge bodies which extend at least substantially according to corner points of successive polygons of the same form and are mutually connected by brace bodies placed therebetween. The edge bodies and the brace bodies are particularly manufactured here from optionally preserved steel. The open construction of such segments results in a relatively low own weight without detracting from the strength and stiffness of the whole. Material and likewise costs can moreover thus be saved. A further contribution is made toward a low own weight of the construction by a further preferred embodiment of the traffic control device according to the invention which is characterized in that the edge bodies and brace bodies are formed from a lightweight metal, in particular aluminium.

[0013] The edge bodies can be connected to each other per se in various ways, although a particular embodiment of the traffic control device according to the invention is characterized in that the brace bodies comprise first brace bodies which are connected at least substantially transversely between opposite edge bodies and second brace bodies which mutually connect the opposite edge bodies diagonally at least once. Such a unique relation established with the two types of brace body results in a strong construction which can be at least substantially open and free of obstacles internally in order to allow passage of for instance conduits and cables.

[0014] In a further preferred embodiment the traffic control device according to the invention is characterized in that the foot body is provided with a mounting base to which the mast body is connectable, wherein the mount-

ing base extends rotatably from the foot body and is connected thereto particularly via bearing means such as a ball bearing or slide bearing. The foot body does not therefore need to be taken out of position in order to place the support arm in its operating position, the rotation intended for this purpose can be performed wholly from and with the mast body. This provides the option of adequately ballasting and/or anchoring the foot body beforehand so that the swing of the support arm can be performed safely without further support.

[0015] For placing of the support arm at height use can be made of separate lifting means in the form of for instance a mobile crane. In a further preferred embodiment of the traffic control device according to the invention the lifting means are however provided in or on the mast body itself. A further preferred embodiment of the traffic control device according to the invention is characterized for this purpose in that the lifting means comprise a tackle device provided close to a free outer end of the mast body. The support arm can thus be placed at height from the mast body itself, and if desired also be lowered again later, using the tackle device provided thereon.

[0016] The invention also relates to a method for erecting a traffic control device and is characterized in this respect in that, once the foot body has been placed in position, the mast body is constructed thereon, wherein the carriage is connected thereto in the base position located close to the foot body, the support arm is constructed and coupled in the base position to the carriage, at least one traffic control unit is provided on the support arm, the carriage is carried together with the support arm into an operating position located at height with the lifting means and the support arm is swung above a road surface by means of a rotation of the mast body performed about the longitudinal axis.

[0017] The invention will be further elucidated hereinbelow with reference to an exemplary embodiment and an accompanying drawing. In the drawing:

- figure 1 is a front view of an exemplary embodiment of a traffic control device according to the invention;
- figure 2 is a perspective view of a rotating foot as applied in the traffic control device of figure 1;
- figure 3 is a perspective view of a segment of the traffic control device of figure 1 for assembling a mast body and/or support arm thereof;
- figure 4 is a perspective view of a carriage which can travel over the mast body of the traffic control device of figure 1; and
- figure 5 shows a cross-section and transparent top view of lifting means as applied in the traffic control device of figure 1.

[0018] The figures are otherwise purely schematic and not drawn to scale. Some dimensions in particular may be exaggerated to a greater or lesser extent for the sake of clarity. Corresponding parts are designated as far as

possible in the figures with the same reference numeral.

[0019] The traffic control device shown in figure 1 comprises a foot body 10 which is formed in this embodiment by a stack of concrete blocks with a combined mast in the order of 4000-5000 kg. The foot body measures about 2.5 x 2.5 metres and thereby takes up no more than about 6 m² of space. The deadweight of the concrete foot functions as ballast and provides counterweight to the other part of the construction.

[0020] Instead of using concrete it is also possible if desired to opt for a stack of steel plates or a body filled with sand or other material which can provide a similar counterweight. It is also possible in respect of the foot body to make use of a lighter construction which will in that case be connected and anchored permanently to the ground surface in order to provide sufficient strength.

[0021] Extending from the foot body is an erected mast body 20 which typically extends to a height in the order of 4-8 meters above ground level. Mast body 20 is connected rotatably to foot body 10 by means of the rotation coupling further shown in figure 2. This coupling comprises a first flange part 11 which is connected to foot body 10 and a second flange part 12 which extends rotatably from first flange part 11 via a slide bearing. This second flange part 12 in turn provides a reliable mounting base 14 with the holes 16 for a firm nut and bolt attachment of a base part of mast body 20. Holes 16 are positioned here such that the mast body can be coupled first in a horizontal position to a first set of holes 16 and eventually pivoted around these holes in order to be erected. The mast body is thus initially connected pivotally to mounting base 14 and ultimately still free to perform a rotation about a vertical axis owing to the freedom of rotation of the mounting base itself.

[0022] Provided between the two flange parts are locking means which can be applied in order to maintain a relative position following rotation. In the shown embodiment these locking means comprise four securing bolts 13 screwed through second flange part 12 into first flange part 11 and enclosing a relative degree of arc of about 90 degrees. Mast body 20 can thus be adjusted about an angle of 90 degrees at a time relative to the foot body and secured in this position.

[0023] Mast body 20 is at least substantially wholly constructed from mutually coupled segments 70 of the type shown in more detail in figure 3. These segments 70 each comprise a set of mutually parallel edge bodies in the form of a set of tubes 71 placed at the corner points of an imaginary polygon, in this example a square. Brace bodies 72,73 are connected between tube bodies 71 in order to impart strength and torsional stiffness to the whole despite the open construction thereof. Use is made for this purpose in this embodiment of the invention of the combined action of first brace bodies 72, which mutually connect tube bodies 72 at regular distances along the sides of the above stated imaginary polygons, and second brace bodies 73 which, per side of such a polygon, alternately connect opposite tube bodies diagonally

in each case between first brace bodies.

[0024] The separate parts 71,72,73 of segments 70 are formed from steel, in this example galvanized or otherwise preserved steel and connected to each other by welds. It is optionally also possible to opt for a lightweight metal such as aluminium instead. This results in a relatively lightweight construction of the whole which is moreover corrosion-resistant. It is otherwise also possible, depending on the nature of the material to be connected, to opt for another connecting technique such as soldering, glueing, riveting or screwing instead of welding.

[0025] Segments 70 are provided at an outer end with rapid-action coupling means. These means comprise in this embodiment receiving cavities 76 which are formed on each side of a segment at free outer ends of a first set of edge bodies in combination with complementary receiving members 77 which are receivable in the receiving cavities of a subsequent segment 70 and are formed on free outer ends of a second set of edge bodies. Each edge body here comprises such a receiving cavity at a one free outer end and a receiving member at an opposite free outer end. By making use of even and equal numbers of receiving cavities 76 and receiving members 77 on both sides of the segments the rapid-action coupling means can be given a substantially identical form on both sides, whereby segments can always be coupled to each other irrespective of their specific length orientation. Overlapping holes (not further shown) can if desired be arranged in the walls of the receiving cavities and receiving members for the purpose of receiving therein locking means, in the form of for instance a locking pin fitting therein, in order to secure a coupling once it has been realized.

[0026] Mutual connection of four such segments enables the mast body 20 shown in figure 1 to be constructed quickly and easily on-site, wherein a lower segment is connected to the rotatable mounting base 14 of the foot body. Likewise constructed in similar manner from such segments is a support arm 40 to which one or more traffic control units 51,52 are coupled. In this example the units 51,52 comprise a set of traffic lights, although the support arm can also accommodate one or more signposts, matrix displays or other means with the object of orderly regulation of traffic flows.

[0027] Provided between support arm 40 and mast body 20 is an adjustable carriage 30 which is connected in axially adjustable manner to the mast body. Carriage 30 of this embodiment is shown in further detail in figure 4 and can travel over the tubular frame of the mast body via sets of rollers 31 which are provided at opposite corner points and engage fittingly on edge bodies 71 of segments 70. Transversely of mast body 20 the carriage comprises rapid-action coupling means 76,77 of the above specified type to which a proximal segment 70 of support arm 40 is connectable. Just as segments 70 themselves, carriage 30 is also constructed as an open tubular frame of galvanized steel edges with preserved steel braces placed therebetween.

[0028] Carriage 30 with support arm 40 with control units 51,52 thereon can be placed at height with lifting means suitable for the purpose. This can be a mobile crane, although the lifting means, as in this embodiment, can also comprise a tackle device 60 provided at an outer end of mast body 20. Tackle device 60 comprises one or more pulleys 65 over which can be trained a cord attached with an outer end to carriage 30. At a base of the mast body the cord can be taken in, optionally via a winch, in order to thus lift the carriage to the desired height, or the cord can be payed out in order to lower the support arm.

[0029] The above described traffic control device is particularly suitable as mobile and temporary solution of shorter or longer duration for traffic control in diverse traffic situations, such as at roadworks, events or a road diversion. Foot body 10 is taken for this purpose to the intended location and arranged adjacently of a roadway. Mast body 20 is then constructed, optionally on-site, by coupling together a sufficient number of segments 70 to reach an intended height and arranging a tackle device 60 at a distal outer end thereof. The carriage is pushed over at least a lower segment 70 of the mast body and the mast body is fixed with bolts in opposite holes 16 to mounting base 14 of the foot body in a manner such that a freedom of rotation is still available about a central axis of the bolts. Mast body 20 lies parallel to the roadway here in order to disrupt through traffic as little as possible.

[0030] Once mast body 20 has been erected by being pivoted upward about the central axis, the mast body is also connected firmly and reliably with bolts to the foot body via the other holes 16. Support arm 40 is also assembled, optionally on-site, by mutually coupling a sufficient number of segments 70. A proximal segment thereof is coupled by means of the rapid-action coupling means 76,77 provided for the purpose to carriage 30 which can travel over mast body 20. Before or after this the desired traffic control units 51,52 are also connected at the desired positions to the support arm and provided with optional cabling. Support arm 40 is now still lying parallel to the roadway so that there is still the least possible disruption to the traffic.

[0031] Lifting device 60 is meanwhile coupled to carriage 30 and the carriage is brought to height therewith together with the support arm 40 and traffic control units 51,52 coupled thereto. Once support arm 40 has been fixed and secured at the desired height, the traffic is halted for a short time in order to swing the support arm transversely over and above the roadway by a rotation of mast body 20 relative to foot body 10. The traffic can then once again resume its normal flow and the device can be further finished and optionally connected electrically and electronically. The device is now ready to be utilized for a temporary or more permanent local control of traffic.

[0032] Although the invention has been further elucidated above on the basis of only a single embodiment, it will be apparent that the invention is by no means limited

thereto. On the contrary, many variations and embodiments are still possible within the scope of the invention for a person with ordinary skill in the art.

Claims

1. Traffic control device comprising at least one standing mast body and a support arm which extends at height from the at least one mast body, wherein the support arm is intended and configured to carry at least one traffic control unit and the at least one mast body is connected at a base to a foot body, **characterized in that** the mast body is connected to the foot body for rotation about a vertically oriented longitudinal axis, that the support arm extends from a carriage which is connected to the mast element and which is axially adjustable relative to the mast body, that lifting means are provided which are at least connectable to the carriage and which are intended and configured to carry the carriage together with the support arm from a base position located close to the foot body to an elevated position located at height, and that fixation means are provided to retain the support arm in the elevated position.
2. Traffic control device as claimed in claim 1, **characterized in that** at least one of the mast body and the support arm is at least substantially assembled from a number of successive, at least substantially identical segments provided at opposite outer ends with rapid-action coupling means intended and configured for co-action with corresponding rapid-action coupling means of a connecting segment in order to bring about an at least substantially firm connection thereto.
3. Traffic control device as claimed in claim 2, **characterized in that** the segments are provided at opposite outer ends with rapid-action coupling means which are at least substantially the same.
4. Traffic control device as claimed in claim 2 or 3, **characterized in that** the rapid-action coupling means comprise complementary coupling members provided on mutually facing outer ends of successive segments.
5. Traffic control device as claimed in claim 4, **characterized in that** the coupling members comprise a receiving cavity and a member receivable in at least substantially play-free manner therein, that at least one such receiving cavity and such receiving member extends from each of the mutually facing outer ends of the segments.
6. Traffic control device as claimed in claim 4 or 5, **characterized in that** the segments have a polygonal, in

particular square cross-section and that the coupling members are provided at least substantially at corner points of an imaginary polygon.

7. Traffic control device as claimed in claim 6, **characterized in that** the segments comprise a frame of a number of elongate edge bodies which extend at least substantially according to corner points of successive polygons of the same form and are mutually connected by brace bodies placed therebetween. 5
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8. Traffic control device as claimed in claim 7, **characterized in that** the edge bodies and brace bodies are formed from optionally preserved steel or a light-weight metal, such as aluminium in particular. 15
9. Traffic control device as claimed in claim 7 or 8, **characterized in that** the brace bodies comprise first brace bodies which are connected at least substantially transversely between opposite edge bodies and second brace bodies which mutually connect the opposite edge bodies diagonally at least once. 20
10. Traffic control device as claimed in one or more of the foregoing claims, **characterized in that** the foot body is provided with a mounting base to which the mast body is connectable, wherein the mounting base extends rotatably from the foot body and is preferably connected thereto via bearing means such as a ball bearing or a slide bearing. 25
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11. Traffic control device as claimed in one or more of the foregoing claims, **characterized in that** the lifting means comprise a tackle device provided close to a free outer end of the mast body. 35
12. Method for erecting a traffic control device as claimed in one or more of the foregoing claims, **characterized in that**, once the foot body has been placed in position, the mast body is constructed thereon, wherein the carriage is connected thereto in the base position located close to the foot body, the support arm is constructed and coupled in the base position to the carriage, at least one traffic control unit is provided on the support arm, the carriage is carried together with the support arm into an operating position located at height with the lifting means and the support arm is swung above a road surface by means of a rotation of the mast body performed about the longitudinal axis. 40
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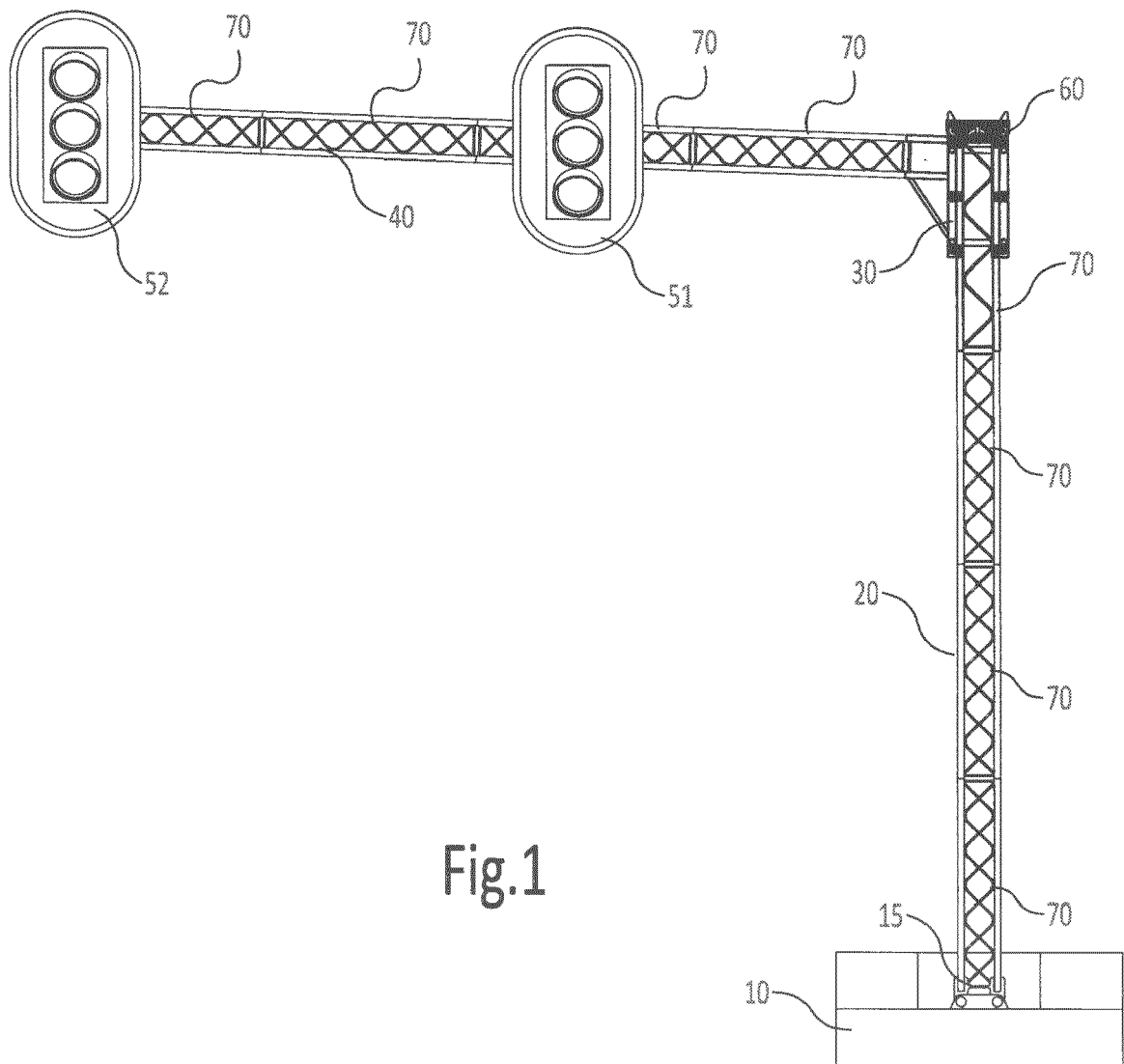


Fig.1

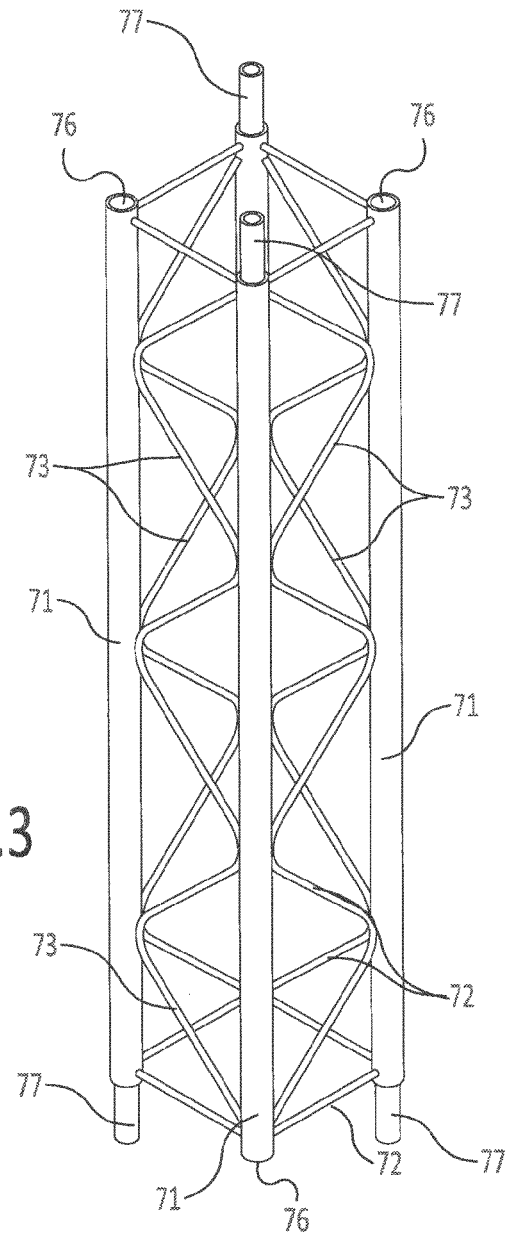


Fig.3

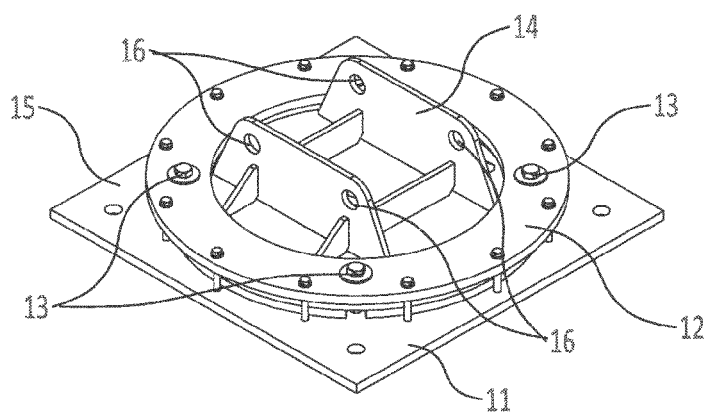


Fig.2

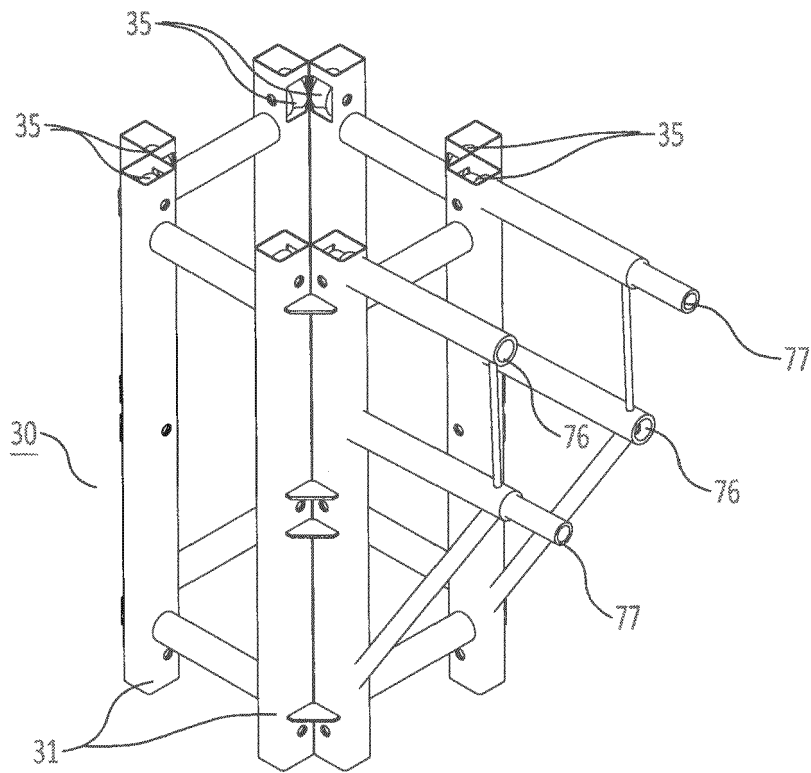


Fig.4

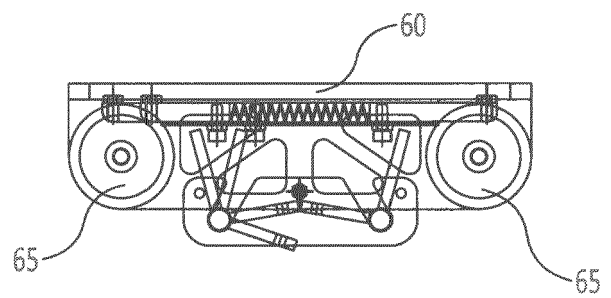
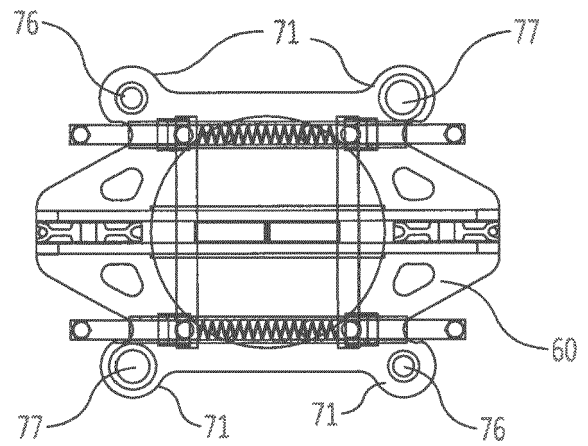


Fig.5



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Application Number
EP 15 16 2809

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The present search report has been drawn up for all claims			
Place of search Munich		Date of completion of the search 26 August 2015	Examiner Flores Hokkanen, P
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