



Europäisches Patentamt
European Patent Office
Office européen des brevets



(11) Publication number:

0 360 585 B1

(12)

EUROPEAN PATENT SPECIFICATION

- (49) Date of publication of patent specification: **15.02.95** (51) Int. Cl.⁶: **B61D 17/04**, B61D 1/02,
B61D 1/04
(21) Application number: **89309563.8**
(22) Date of filing: **20.09.89**

(54) **Railway carriage and assembly method therefor.**

(30) Priority: **21.09.88 FI 884317**

(43) Date of publication of application:
28.03.90 Bulletin 90/13

(45) Publication of the grant of the patent:
15.02.95 Bulletin 95/07

(84) Designated Contracting States:
DE FR GB IT SE

(56) References cited:
FR-A- 1 129 713
GB-A- 798 228
US-A- 4 825 774

(73) Proprietor: **Masa-Yards Oy**
Munkkisaarekatu 1
SF-00150 Helsinki (FI)

(72) Inventor: **Kostiainen, Kari**
Sidoskatu 5
SF-20660 Littoinen (FI)
Inventor: **Wacker, Jarmo**
Aisakatu 7 as. 6
SF-20780 Kaarina (FI)

(74) Representative: **Newby, John Ross et al**
J.Y. & G.W. Johnson
Furnival House
14/18 High Holborn
London WC1V 6DE (GB)

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).

Description

This invention relates to a method for assembling railway carriages or similar constructions, as referred to in the preamble of claim 1. The invention also relates to railway carriages or the like assembled by using the method.

According to the prior art the assembly of railway carriages or similar constructions normally includes building a framework onto which are attached elements to form an outer shell and, when this is completed, the carriage is provided with its interior fittings including the building of sitting or sleeping cabins, toilets, recreation rooms, catering facilities, etc. inside the shell. The major disadvantage of such a system is that the assembly phase for the interior fittings is slow and difficult in the restricted space available within the shell and requires a high degree of manual work.

As an alternative it is known to build a framework of the carriage and then construct separate units inside the framework from segments or elements. This has the drawback that it is impossible to complete the outside shell of the construction until all the units are in position. This means that there must either be a large number of correct segments and elements for specific units available on site or a strict delivery schedule must be observed. In both cases it will be necessary to integrate two workshops of entirely different character into one production scheme, which is difficult.

One aim of this invention is to provide a method of producing railway carriages or other similar constructions which allows production of the frame, shell, undercarriage and other heavy metal parts of the carriage to a high state of completion and, on the other hand, allows prefabrication of the individual units or compartments, which are required within the shell, independently of the first mentioned production.

These units or compartments can be fully fitted out to serve a variety of purposes e.g. sitting compartments, sleeping cabins, toilet and/or shower compartments, video or children's compartments, or catering facilities.

The invention in its method aspect is defined in the following claim 1 and in terms of a railway carriage or the like in the following claim 4, each of these claims having a pre-characterising clause which acknowledges the disclosure of GB-A-798228.

By means of the method of the invention all the heavy metal parts of the construction form a separate assembled entity. The only exception is the provision of an opening in the shell which allows the free passage of prefabricated interior units into the shell. When all the required interior units have been fitted inside the shell the opening is closed

with an element forming the final portion of the shell structure.

Necessary services such as electric wiring, plumbing and air conditioning piping can be fitted in the shell before the prefabricated units are introduced, although care must be taken not to obstruct the movement path of the units. When the units are in their correct places, these wires and pipes will be enclosed in intermediate spaces between the shell and the units and can then be connected, for instance in connecting boxes provided for this purpose, to the corresponding service equipment already installed in the units. Thereby the installation of wiring and piping is greatly simplified.

For interconnecting two railway carriages and their technical functions the so-called technical module is used. This is positioned at the end of one carriage and includes the necessary terminals for attachment to the corresponding services in the adjacent carriage. Such a technical module, together with the corridor connecting the carriages and other equipment, forms a separate unit which may conveniently act as the closing element for the end opening into the shell of the carriage.

The bottom structure of the carriage is desirably flat and unobstructed in order that the individual units or compartments may be moved freely and rapidly from the opening in the shell to their correct location in the carriage and secured in their correct location. In one preferred embodiment of the invention the bottom structure of the carriage is fitted with a floor surface of a type which will serve the needs of the different compartment units. This means that the individual compartment units need no floor of their own, which facilitates bringing each compartment unit into its correct location, because moving a compartment unit can be achieved by pushing from inside the compartment unit. This can be a considerable advantage when positioning compartment units close together in the confined space available within the shell.

The invention will now be further described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a partly broken-away view of the shell of a railway carriage prepared for receiving separate prefabricated units with some of the separate units or compartments being moved into the shell,

Figure 2 shows an alternative way of moving units into the shell,

Figure 3 shows a third way of moving units into the shell,

Figure 4 shows a variation of the method of Figure 3,

Figure 5 shows a further variation of the method of Figure 3,

Figure 6 shows an individual unit or compartment,

Figure 7 shows a sectioned plan from above of the unit of Figure 6,

Figure 8 shows an "exploded" view of another embodiment of individual unit, and

Figure 9 shows a cross-section through a carriage showing one arrangement for connecting services to a unit located therein.

Figure 1 shows the shell of a railway carriage, made up of side wall elements 1, end walls 2, a base element 3 and a roof element 4. At least one of the end walls 2, which can also be a self-supporting element, acts as the closing element for the opening 5 leading to the interior of the shell, and includes the corridor K. Alternatively one side wall element 1 may act as the closing element for a side opening 6, in which case compartment units can be moved into the shell over the entire length of the side wall. Each side wall element 1 is prefabricated with windows 7 and outer doors 8.

Figure 1 also shows compartment units being moved into the shell via the end opening 5. Air conditioning piping 9 and electrical cables 10 are shown - and a low pressure tank 11 and a water tank 12 are connected with the carriage's water/drainage system. These technical services for the carriage are connected to the corresponding systems in the rest of the train by means of a technical unit 13. The service items 9-12 are built in as part of the prefabrication of the elements 1, 3 and 4, being attached to or fabricated in the appropriate elements. Integer 14 in Figure 1 shows an internal wall for attachment to the inside of one of the side wall elements 1.

A prefabricated self-supporting unit 15 shown in Figure 1 comprises a WC-module 16, the electrical, air conditioning and plumbing systems of which are all in-built and are designed to be connected to the corresponding services in the shell after the unit 15 is moved into place and attached to the shell. Also in Figure 1 water pipe connections 17 and low pressure drain connections 18 are shown, which are so arranged that an unimpeded path remains for moving the units 15 inside the shell. The floor of the carriage is marked 19 in Figure 1 and the unit 15 can be attached to the floor 19 which is fixed on the base element 3. When all the units 15 and possibly separate toilet units or modules 16, have been moved inside the shell, attached, and necessary services connected, the opening 5 is closed by a separate self-supporting end element or technical module 20. The module 20 is made up from an interior wall construction comprising the technical unit 13 and corridor opening K. Using the module 20 ensures that the positioning of the technical unit 13 is independent of the moving of the units 15.

Figure 2 shows an arrangement whereby a unit 15 is being moved into the shell via an opening 6 in one side wall element 1. In this example a closing member 1a is used which completes the side wall element 1 and is fitted with a window 7. The advantage of this arrangement over the arrangement shown in Figure 1 is that the end portion of the carriage can be completed independently of the movement of the units 15.

Figures 3 and 4 show a unit 15 being lowered into the shell via an opening in the roof construction of the shell. It is possible to move units 15 that have slightly larger dimensions than normal into the shell via an opening 22, which is then closed by a roof element 21. Alternatively the entire roof can be removed for allowing units to be lowered into place (Figure 4). In this case the dimensions of the available opening 23 will be almost the same as the dimensions of the roof element 4. This is a particularly convenient method of operation if it is necessary to equip the carriage with units which are different from normal sized units 15. As an example reference should be made to unit 15a, which is fitted with an extension wall 15b, by means of which the passenger compartment of the carriage can be divided into different sections.

Figure 5 shows a unit 15 divided into segments 26. In this case the opening 24 can be smaller than the opening 22 in Figure 3 and the closing element 25 will be similarly smaller than the closing element 21.

Figures 6 and 7 illustrate a prefabricated self-supporting bottomless sleeping compartment unit 15 with its WC-module 16. The compartment unit 15 has a front wall E, side walls S, and back wall T, a bed 27, a table 28 and a wardrobe 29. In the WC-module 16 is a basin 30 and a WC 31, each fitted with its own connections for services.

Figure 8 shows a method of producing a unit 15 from prefabricated elements 16, 32-35. The front wall 35 is provided with an opening fitted with a door 36. The rear wall 34 is provided with a window opening and side walls are provided to bridge between the front and rear walls and the rear wall and the module 16. At the bottom of each wall 33, 34 and 35 is a supporting strip 37. A top wall 32 closes the unit from above. The strip 37 can serve to seal any gap left between a unit and the floor 19, e.g. after the unit has been moved into the precise position required from within the walls 33, 34, 35.

Figure 9 shows how the services of the units 15 can be connected to those of the shell. As an example the air conditioning pipe 9 is shown connected to piping 40 in the shell in the upper part of a carriage 39, and the water pipe 17 and drainage pipe 18 are shown connected to pipes below the floor 19.

Claims

1. A method for assembling a railway carriage or the like, comprising a frame and a substantially closed shell containing a plurality of compartment units, for example passenger seating or sleeping compartments, toilet and shower compartments, the frame being formed as a self-supporting structure supporting the shell, the compartment units (15, 15a, 16) being self-supporting, independently movable compartment units, or segments (26) of such units, the shell being provided with a closable opening (5, 6, 22, 23, 24) through which said compartment units (15, 15a, 16) or segments (26) may be moved into the shell to form the interior structure of the railway carriage or the like, characterised in that a technical module (20) provided with means for functionally interconnecting one railway carriage to the next carriage is used as an end member in the one carriage. 5 10 15 20
2. A method according to claim 1, characterised in that the technical module (20) is used as a member closing an end of the one railway carriage. 25
3. A method according to claim 1 or 2, where the railway carriage or the like is provided with a mainly flat bottom structure (19) of a type serving the needs of the compartment units, characterised in that at least a substantial number of the compartment units are made as box-like self-supporting room units (15, 15a) which to at least a substantial part are left without a floor surface of their own. 30 35
4. A railway carriage or the like, comprising a frame and a substantially closed shell containing a plurality of compartment units (15, 15a, 16) for example passenger seating or sleeping compartments, toilet and/or shower compartments, the frame being a self-supporting structure supporting the shell and the compartment units, the compartment units being prefabricated self-supporting, independently movable compartment units (15, 15a, 16), or segments (26) of such units, the shell being provided with a closable opening (5, 6, 22, 23, 24) until the final stage of assembly, which opening is dimensioned to allow insertion into the shell of said compartment units (15, 15a, 16) or segments (26), whereby substantially all the interior structure of the railway carriage or the like is formed by using said compartment units, characterised in that a technical module (20) including means for interconnecting one car- 40 45 50 55

riage and its functions to the next carriage is provided as an end member in the carriage.

5. A railway carriage or the like according to claim 4, characterised in that the technical module (20) is used as a member closing said closable opening (5). 5
6. A railway carriage or the like according to claim 4 or 5, characterised in that it has a substantially flat bottom structure (3), to which the compartment units (15, 15a, 16) are attached and along which the units can be moved to their proper place of attachment, and in that the bottom structure is provided with a floor surface (19) of a type serving the needs of the compartment units (15, 15a, 16), and in that at least a considerable number of the compartment units have an open bottom. 10 15 20

Patentansprüche

1. Verfahren zum Zusammenbau eines Eisenbahnwagens oder dergleichen mit einem Rahmen und einer im wesentlichen geschlossenen Schale, die eine Vielzahl von Abteileinheiten wie z.B. Fahrgastsitz- oder Schlafabteile, Toiletten- und Duschabteile enthält, wobei der Rahmen als eine selbsttragende, die Schale stützende Konstruktion ausgebildet ist, die Abteileinheiten (15,15a,16), selbsttragende, unabhängig bewegbare Abteileinheiten oder Segmente (26) solcher Einheiten sind, die Schale mit einer verschließbaren Öffnung (5,6,22,23,24) versehen ist, durch welche die Abteileinheiten (15,15a,16) oder Segmente (26) in die Schale hineingebracht werden können, um den Innenaufbau des Eisenbahnwagens oder dergleichen zu bilden, dadurch **gekennzeichnet**, daß ein technischer Modul (20) mit Mitteln zum funktionsmäßigen Miteinanderverbinden eines Eisenbahnwagens mit dem nächsten Wagen benutzt wird als ein Endglied in dem einen Wagen. 1. Verfahren zum Zusammenbau eines Eisenbahnwagens oder dergleichen mit einem Rahmen und einer im wesentlichen geschlossenen Schale, die eine Vielzahl von Abteileinheiten wie z.B. Fahrgastsitz- oder Schlafabteile, Toiletten- und Duschabteile enthält, wobei der Rahmen als eine selbsttragende, die Schale stützende Konstruktion ausgebildet ist, die Abteileinheiten (15,15a,16), selbsttragende, unabhängig bewegbare Abteileinheiten oder Segmente (26) solcher Einheiten sind, die Schale mit einer verschließbaren Öffnung (5,6,22,23,24) versehen ist, durch welche die Abteileinheiten (15,15a,16) oder Segmente (26) in die Schale hineingebracht werden können, um den Innenaufbau des Eisenbahnwagens oder dergleichen zu bilden, dadurch **gekennzeichnet**, daß ein technischer Modul (20) mit Mitteln zum funktionsmäßigen Miteinanderverbinden eines Eisenbahnwagens mit dem nächsten Wagen benutzt wird als ein Endglied in dem einen Wagen.
2. Verfahren nach Anspruch 1, dadurch **gekennzeichnet**, daß der technische Modul (20) benutzt wird als ein Glied zum Abschließen eines Endes des einen Eisenbahnwagens. 2. Verfahren nach Anspruch 1, dadurch **gekennzeichnet**, daß der technische Modul (20) benutzt wird als ein Glied zum Abschließen eines Endes des einen Eisenbahnwagens.
3. Verfahren nach Anspruch 1 oder 2, wo der Eisenbahnwagen oder dergleichen mit einem hauptsächlich ebenen Bodenaufbau (19) eines Typs versehen ist, der den Notwendigkeiten der Abteileinheiten dient, dadurch **gekennzeichnet**, 3. Verfahren nach Anspruch 1 oder 2, wo der Eisenbahnwagen oder dergleichen mit einem hauptsächlich ebenen Bodenaufbau (19) eines Typs versehen ist, der den Notwendigkeiten der Abteileinheiten dient, dadurch **gekennzeichnet**,

daß zumindest eine wesentliche Anzahl der Abteileinheiten als schachtelartige, selbsttragende Raumeinheiten (15,15a) hergestellt sind, die zu zumindest einem wesentlichen Teil ohne eigenen Boden belassen sind.

4. Eisenbahnwagen oder dergleichen mit einem Rahmen und einer im wesentlichen geschlossenen Schale, die eine Vielzahl von Abteileinheiten (15,15a,16) wie z.B. Fahrgastsitz- oder Schlafabteile, Toiletten und/oder Duschabteile enthält, wobei der Rahmen eine selbsttragende, die Schale und die Abteileinheiten stützende Konstruktion ist, die Abteileinheiten vorfabrizierte, selbsttragende, unabhängig bewegbare Abteileinheiten (15,15a,16) oder Segmente (26) solcher Einheiten sind, die Schale bis zur Endstufe des Zusammenbaues mit einer verschließbaren Öffnung (5,6,22,23,24) versehen ist, welche Öffnung so bemessen ist, um das Einbringen der Abteileinheiten (15,15a,16) oder der Segmente (26) in die Schale zu erlauben, wodurch im wesentlichen der gesamte Innenaufbau des Eisenbahnwagens oder dergleichen durch Benutzung dieser Abteileinheiten gebildet ist, dadurch **gekennzeichnet**, daß ein technischer Modul (20) mit Mitteln zum Miteinanderverbinden eines Wagens und seiner Funktionen mit dem nächsten Wagen als ein Endglied in dem Wagen vorgesehen ist.
5. Eisenbahnwagen oder dergleichen nach Anspruch 4, dadurch **gekennzeichnet**, daß der technische Modul (20) als ein diese verschließbare Öffnung (5) verschließendes Glied (5) benutzt ist.
6. Eisenbahnwagen oder dergleichen nach Anspruch 4 oder 5, dadurch **gekennzeichnet**, daß er einen im wesentlichen ebenen Bodenaufbau (3) hat, auf dem die Abteileinheiten (15,15a,16) befestigt sind und längs dem die Einheiten zu ihrem eigentlichen Befestigungsplatz bewegt werden können, und daß der Bodenaufbau mit einer Bodenfläche (19) eines Typs versehen ist, der den Notwendigkeiten der Abteileinheiten (15,15a,16) dient, und daß zumindest eine beträchtliche Anzahl der Abteileinheiten einen offenen Boden hat.

Revendications

1. Procédé de montage d'une voiture de chemin de fer ou analogues, comprenant un châssis et une caisse sensiblement fermée contenant une

pluralité de blocs de compartiment, par exemple des compartiments pour voyageurs, assis ou couchés, des compartiments de toilette et de douche, le châssis étant formé en tant que structure autonome supportant la caisse, les blocs de compartiment (15, 15a, 16) étant des blocs autonomes, déplaçables séparément, ou des sections (26) de tels blocs, la caisse étant munie d'une ouverture pouvant être fermée (5, 6, 22, 23, 24) à travers laquelle lesdits blocs de compartiment (15, 15a, 16) ou sections (26) peuvent être introduits dans la caisse afin de former la structure intérieure de la voiture de chemin de fer ou analogues, caractérisé en ce qu'un module technique (20) muni de moyens permettant d'interconnecter de manière fonctionnelle une première voiture de chemin de fer à la voiture suivante est utilisé comme élément d'extrémité dans la première voiture.

2. Procédé selon la revendication 1, caractérisé en ce que le module technique (20) est utilisé comme élément fermant une extrémité de la première voiture de chemin de fer.
3. Procédé selon la revendication 1 ou 2, dans lequel la voiture de chemin de fer ou analogues est munie d'une structure de fond (19) principalement plate du type satisfaisant les besoins des blocs de compartiment, caractérisé en ce qu'au moins une quantité substantielle des blocs de compartiment sont fabriqués en tant que blocs de salles autonomes en forme de boîte (15, 15a) qui pour une part substantielle au moins sont laissés sans surface de plancher qui leur soit propre.
4. Voiture de chemin de fer ou analogues, comprenant un châssis et une caisse sensiblement fermée contenant une pluralité de blocs de compartiment (15, 15a, 16) par exemple des compartiments pour voyageurs assis ou couchés, des compartiments de toilette et/ou de douche, le châssis étant une structure autonome supportant la caisse et les blocs de compartiment, les blocs de compartiment étant des blocs de compartiment déplaçables séparément autonomes préfabriqués (15, 15a, 16) ou des sections (26) de ces blocs, la caisse étant munie d'une ouverture pouvant être fermée (5, 6, 22, 23, 24) jusqu'à l'étape finale de montage, ouverture qui est dimensionnée de manière à permettre l'insertion dans la caisse desdits blocs de compartiment (15, 15a, 16) ou sections (26), d'où il résulte que sensiblement la totalité de la structure intérieure de la voiture de chemin de fer ou analogues est formée en utilisant lesdits blocs de compartiment, carac-

térisée en ce qu'un module technique (20) comprenant des moyens permettant d'interconnecter une première voiture ainsi que ses équipements à la voiture suivante est prévu en tant qu'élément d'extrémité dans la voiture.

5

5. Voiture de chemin de fer ou analogues selon la revendication 4, caractérisée en ce que le module technique (20) est utilisé comme élément fermant ladite ouverture pouvant être fermée (5).

10

6. Voiture de chemin de fer ou analogues selon la revendication 4 ou 5, caractérisée en ce qu'elle comporte une structure de fond sensiblement plate (3) à laquelle les blocs de compartiment (15, 15a, 16) sont fixés et le long de laquelle les blocs peuvent être amenés à leur emplacement propre de fixation, et en ce que la structure de fond est munie d'une surface de plancher (19) d'un type satisfaisant les besoins des blocs de compartiment (15, 15a, 16), et en ce qu'une quantité considérable au moins des blocs de compartiment comportent un fond ouvert.

15

20

25

30

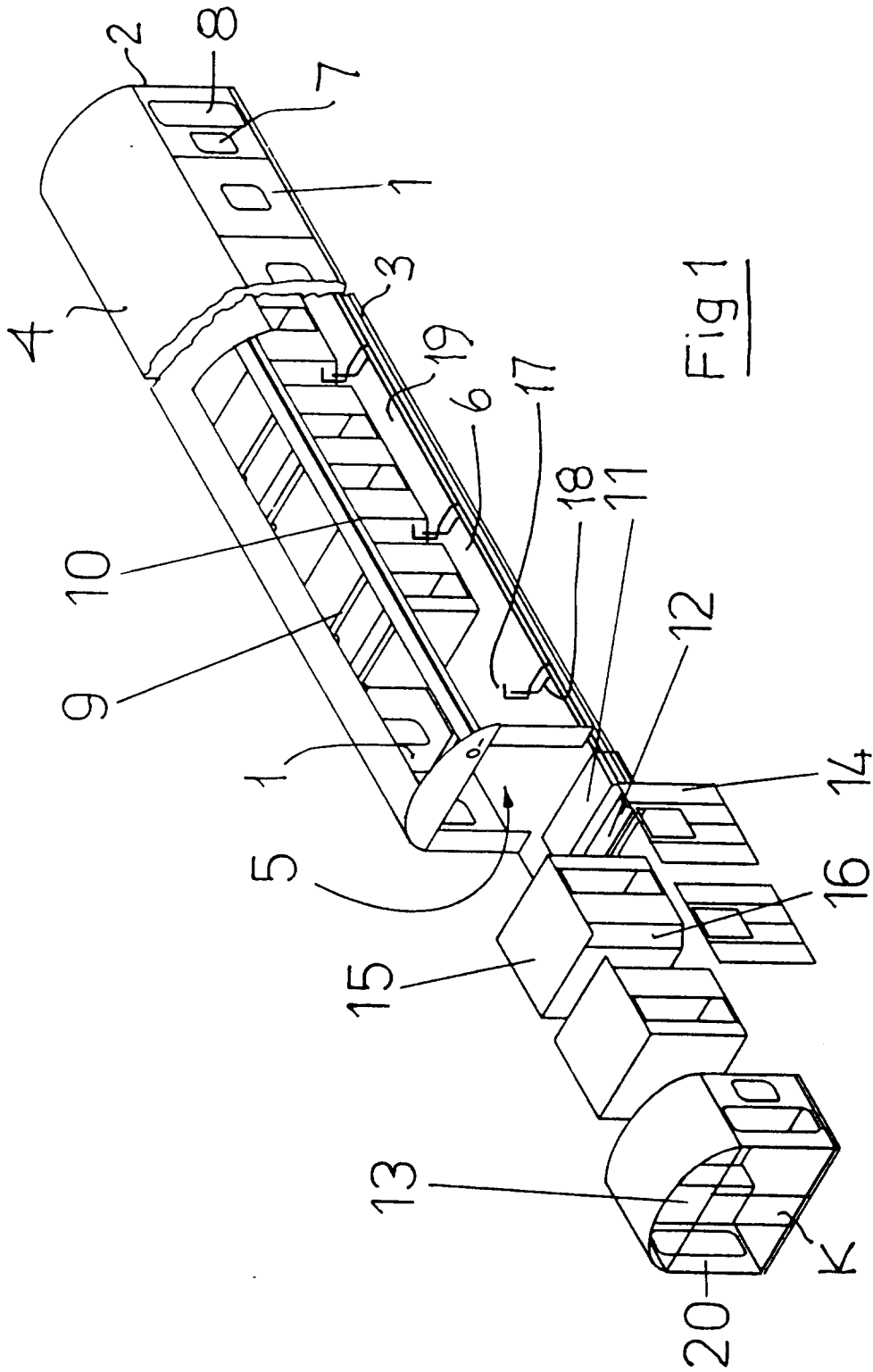
35

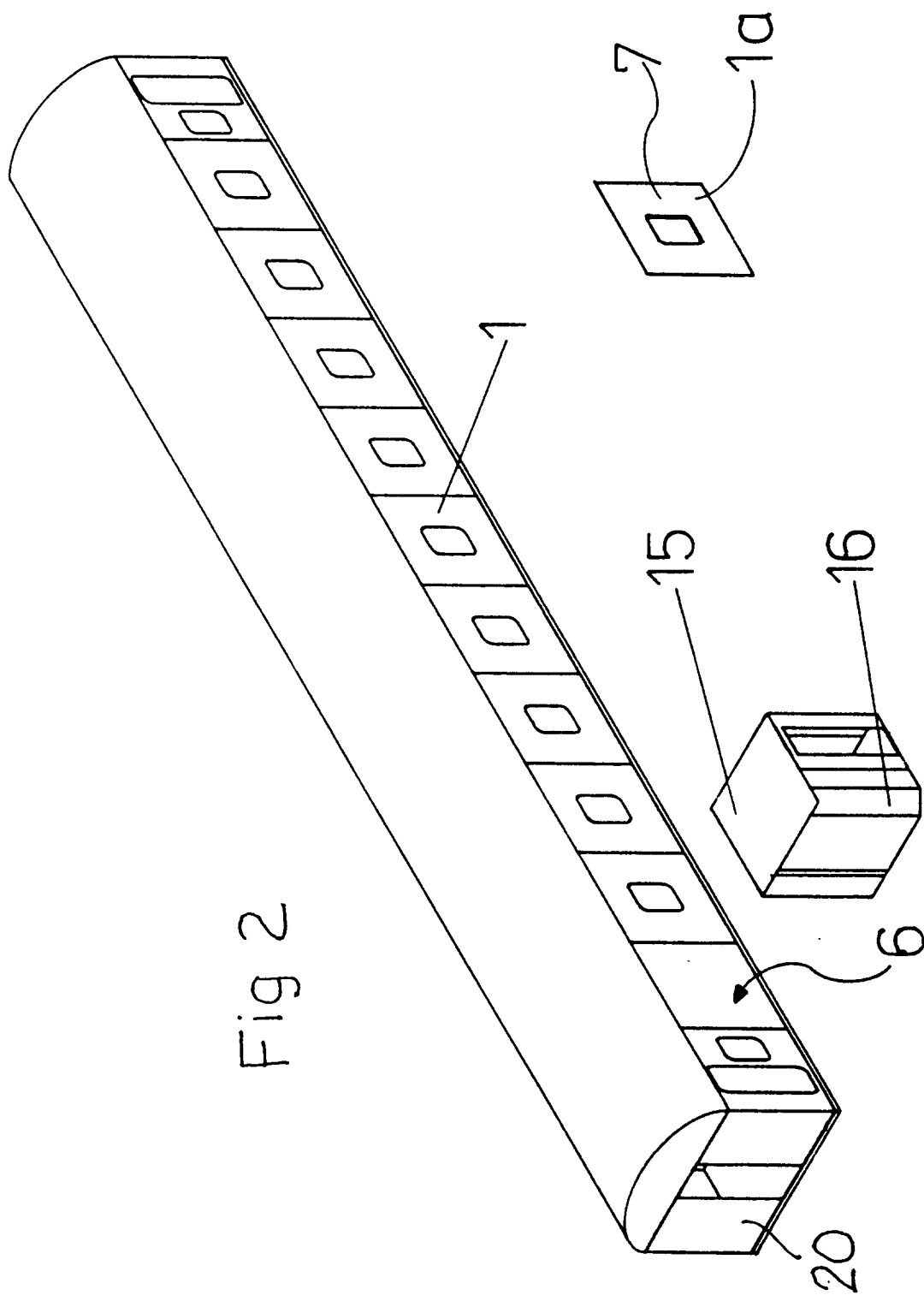
40

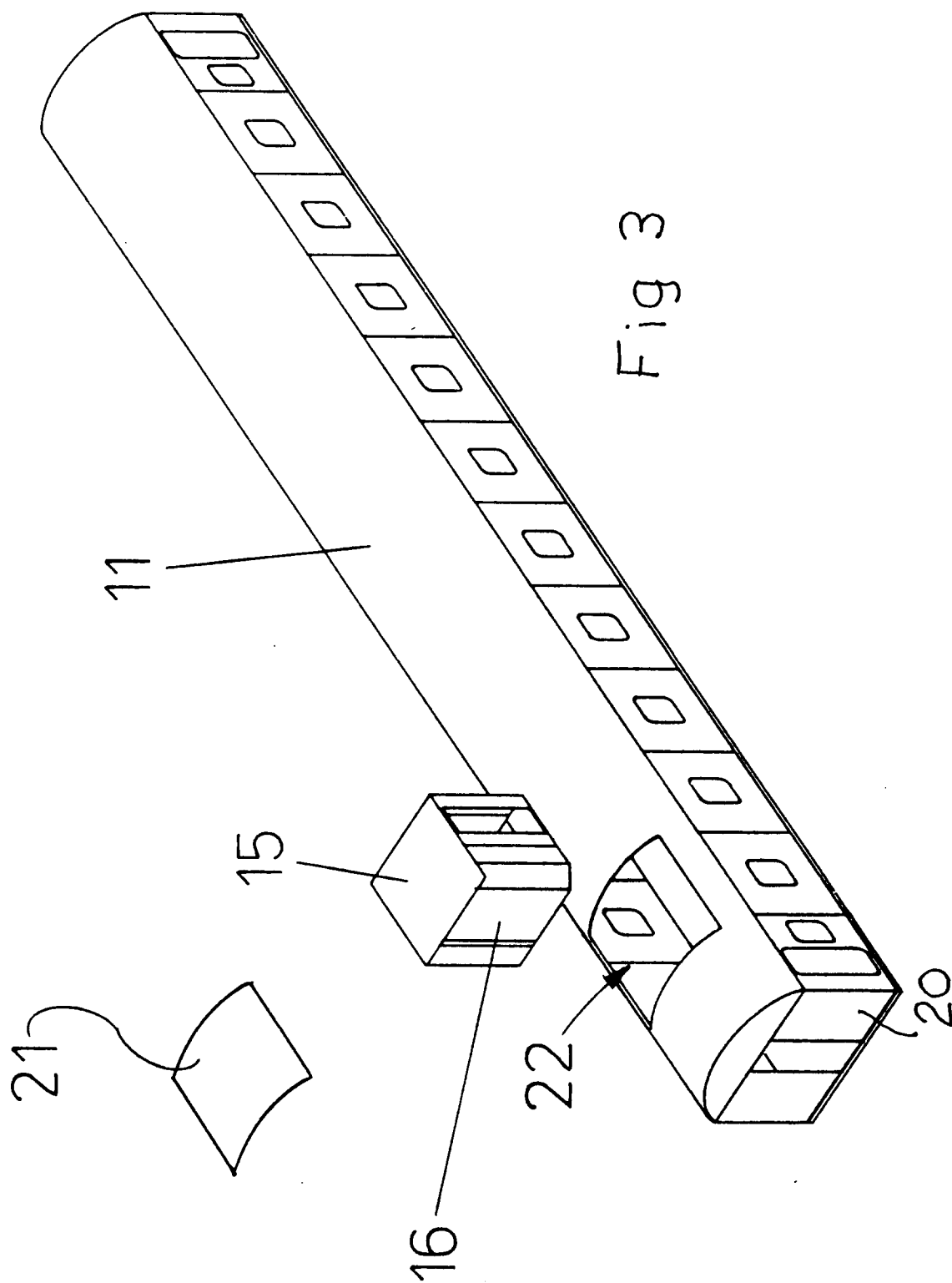
45

50

55







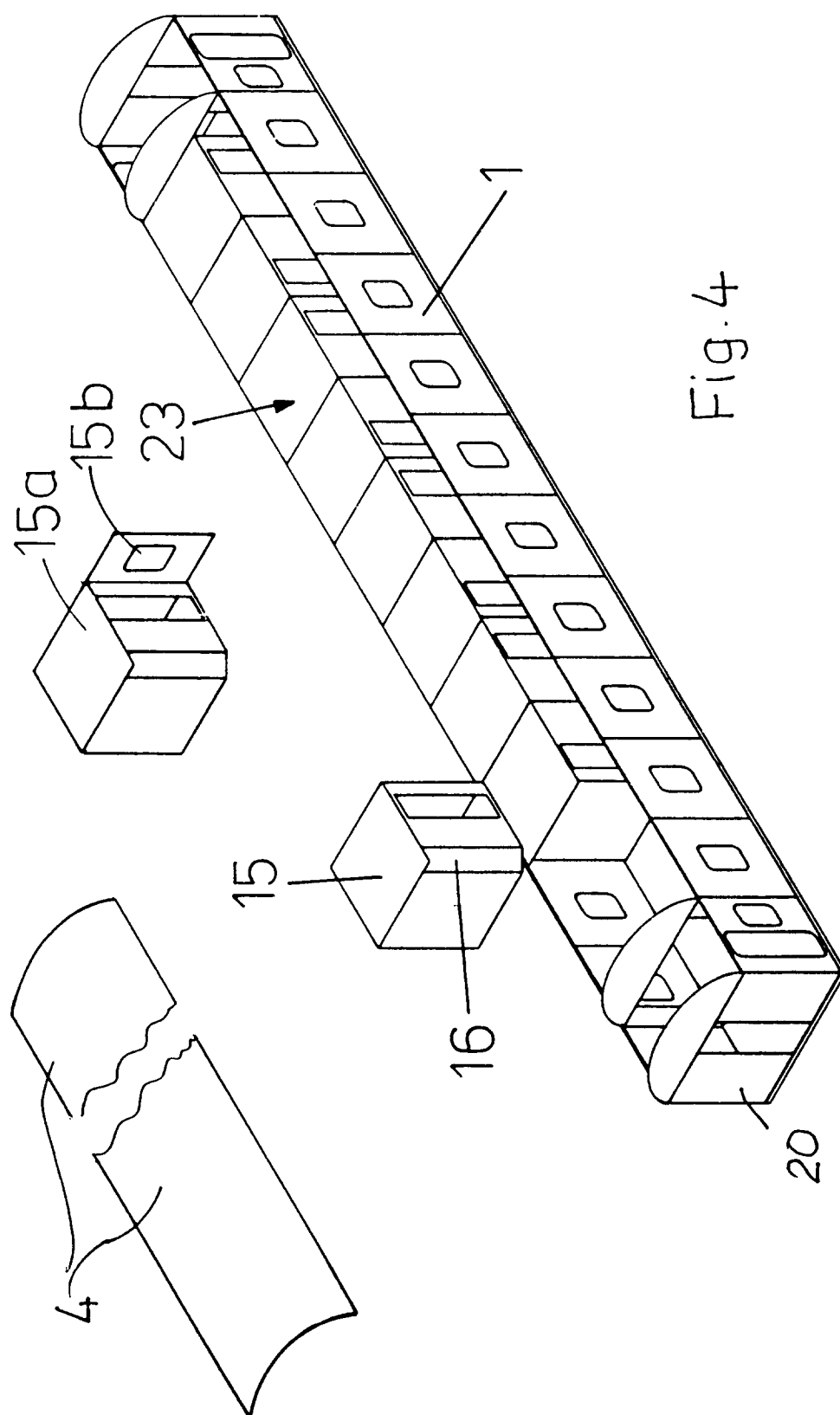
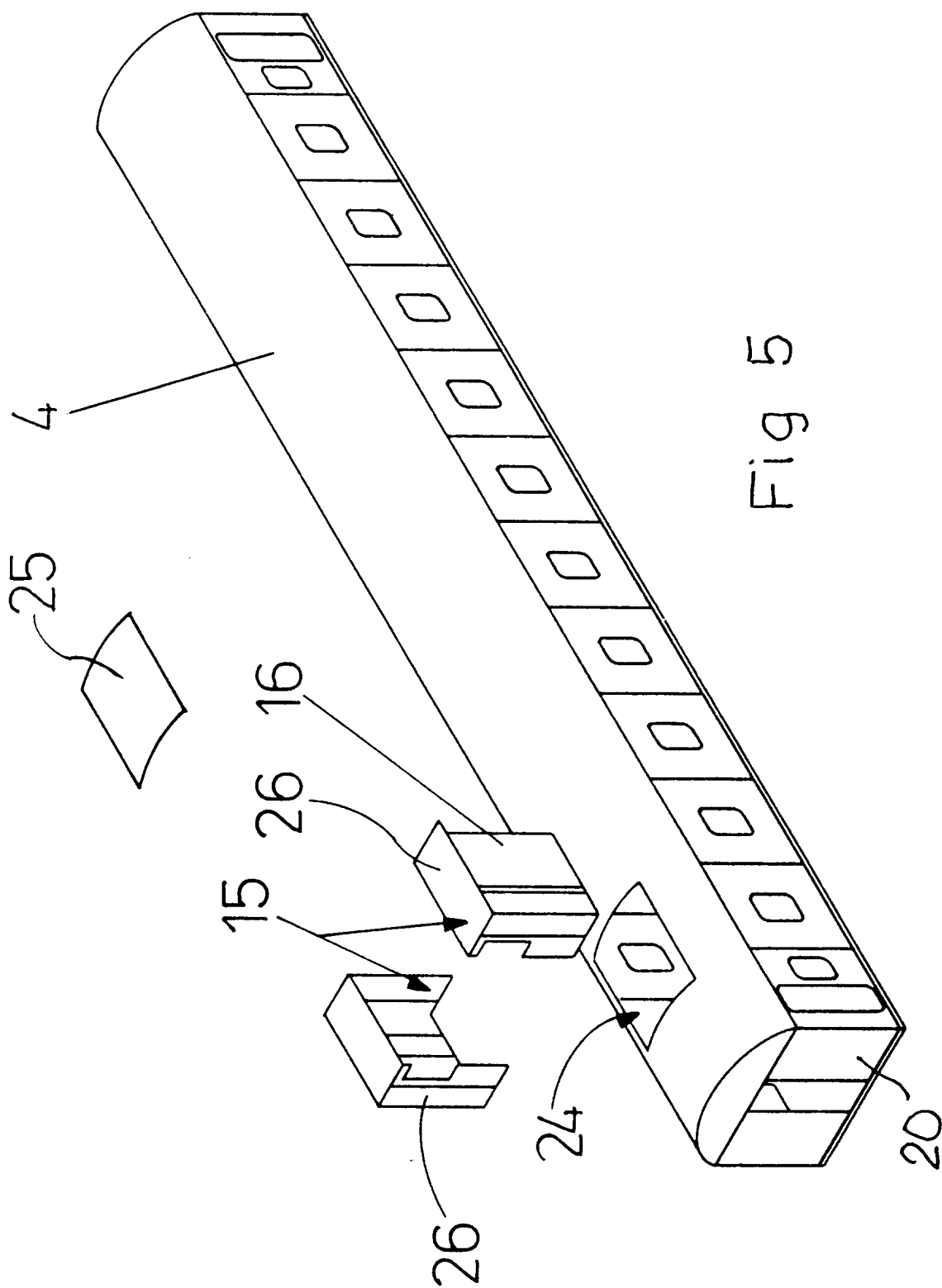


Fig. 4



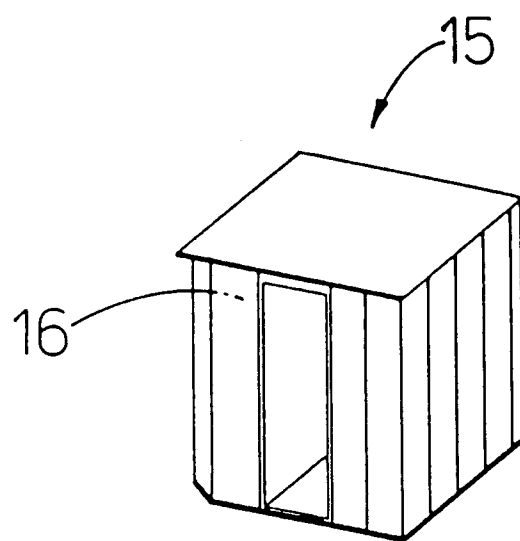


Fig 6

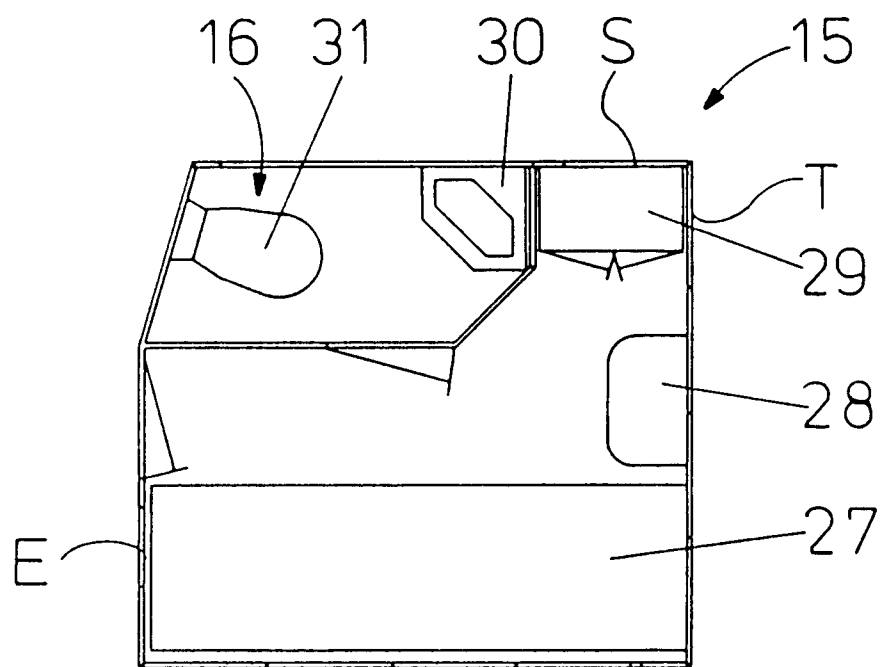


Fig 7

