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**Description**

[0001] The invention relates to a prefabricated inspection pit according to the preamble of claim 1 as well as to the use of a bus hatch cover means according to the preamble  
5 of claim 13.

[0002] Bus hatches of the type mentioned here are known. They are connected to an inspection pit and are arranged at the side thereof. Particularly in the case of low-entry buses there is the problem that for technical reasons the internal combustion engine can  
10 normally only be removed from underneath the bus. An inspection or repair pit is required for this, as is known from DE 20 2006 008 537 U1. The bus is in this case positioned above the inspection pit so that the engine can be removed from underneath. In order to remove the engine from the inspection pit by way of example for maintenance or repair purposes at least a so-called bus hatch is provided which extends  
15 along the side of the inspection pit and via which the underfloor motor can be lifted out from the inspection pit by way of example by means of a crane. Since the bus is positioned above the inspection pit there is no other possibility of removing the engine from the inspection pit. The same not only applies for the internal combustion engine of a bus but rather the bus hatch can also be used in order to remove other components  
20 from an inspection pit which is blocked by a vehicle.

[0003] If the bus hatch is not required, then for technical safety reasons it is provided with a drive-over grid or similar cover. Where an engine or the like is to be removed from the inspection pit via the bus hatch the grid or cover has first to be removed from  
25 outside in a complicated manner. This is linked with a considerable amount of time and work.

[0004] The object of the present invention is therefore to provide a bus hatch cover means which can be actuated easily and quickly and which furthermore offers  
30 increased working safety.

[0005] This is achieved through a prefabricated inspection pit according to claim 1 and the use of a bus hatch cover means having the features of claim 13. It is

characterised by a frame which is provided in at least some areas with a cover which can be traversed by vehicles and which is substantially twice as long as the width of a bus hatch which is to be covered. The bus hatch cover means is further characterised by a sliding element which is mounted movably in the frame and is substantially as long as the width of a bus hatch which is to be covered. The sliding element can be displaced relative to the frame into a first position in which it is arranged substantially entirely in the cover-free region of the frame. The sliding element can furthermore be displaced relative to the frame into a second position in which it is covered substantially completely by the cover.

10

**[0006]** A further essential point of the present invention thus consists in the fact that the sliding element which is guided in the frame forms a cover for a bus hatch which can be easily pushed into the frame in the manner of a drawer, from inside the inspection pit, so that it is safely stowed away – covered by the cover of the frame. The bus hatch is then accessible in its entire length and width, and can be used as a work room. If the bus hatch is no longer required, the sliding element is easily drawn out again, again from inside the inspection pit, preferably manually from the “drawer socket”. Contrary to conventional bus hatch covers a particularly simple rapid actuation of the bus hatch cover means is guaranteed by the invention which requires no great application of force, and which can be operated from inside the inspection pit.

20

**[0007]** The sliding element is preferably designed so that it can be traversed by vehicles when the bus hatch is not in use, the bus hatch is thus covered by the sliding element. For this the sliding element can have a frame part and supporting beam profiles which are releasably connected to the frame part. The supporting beam profiles can be made from aluminium, steel or plastic. Aluminium profiles are especially advantageous because they are particularly light but nevertheless stable. The inherent weight of the sliding element is consequently also low. The sliding element furthermore preferably has at least one handle element by means of which the sliding element can be moved in the frame.

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30

**[0008]** Between the sliding element and the frame there is preferably a bush conveyor chain which is more particularly fastened to the sliding element and serves as a

bearing. The bush conveyor chain can be configured to be ball bearing mounted or plain bearing mounted. Through the bush conveyor chain a particularly easy displacement and simple construction of the sliding element are possible. It is however also fundamentally conceivable to provide the sliding element with heavy-duty rollers which enable a displacement of the sliding element in the frame. Furthermore automatic closing means can preferably be provided which are arranged on the sliding element or interact therewith. Through the closure means accidental opening of the bus hatch by sliding the sliding element is avoided. As mentioned the sliding element is preferably manually operable. It is however also fundamentally possible to actuate an electrically driven displacement of the sliding element through an electric motor or the like. To increase the operating security an automatic warning signal device can furthermore be provided which produces a permanent optical and/or acoustic warning signal whilst the sliding element is removed from the first position when the bus hatch is thus opened.

15

**[0009]** The invention will now be explained in further detail below with reference to the drawings. In the drawings:

Fig. 1 shows a longitudinal section through a bus hatch cover means according to the invention;

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Fig. 2 shows a cross section through a prefabricated inspection pit with a bus hatch cover means according to the invention;

Fig. 3 shows a plan view of a bus hatch cover means according to the invention;

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Fig. 4 shows an end side view of a bus hatch cover means according to the invention;

Fig. 5 shows a detailed view of the bus hatch cover means according to the invention;

30

Fig. 6 shows a plan view of a concrete pit on the building side; and

Fig. 7 shows a cross section through a concrete pit on the building side with a bus hatch cover means according to the invention.

[0010] Fig. 1 shows a section through a bus hatch cover means 1 according to the invention along a longitudinal direction L. The bus hatch cover means 1 comprises a frame 3 which is provided with a cover 5 which can be traversed by vehicles. The bus hatch cover means 1 further comprises a sliding element 7 which is supported to be movable within the frame 3 by means of a bush conveyor chain 9 which is ball bearing mounted or plain bearing mounted. The bush conveyor chain 9 is arranged between the sliding element 7 and the frame 3 and is fastened on the sliding element 7. One bush conveyor chain 9 is provided on each side of the sliding element 7. Thus two conveyor chains 9 are provided in total.

[0011] The frame 3 need not necessarily comprise cohesive interconnected parts. It is conceivable by way of example that the frame comprises only two supporting and guide profiles which are arranged parallel to one another. It is decisive that the frame or frame parts of the frame are provided with the cover 5, and the frame 3 and the cover 5 form a receptacle for the sliding element 7.

[0012] The sliding element 7 is formed by a frame structure which is made from special profiles and connected releasably to the supporting beam profiles 11 which are preferably made of aluminium. The sliding element 7 has an upper frame part 13a and a lower frame part 13b which in the closed state of the sliding element 7 ensure the continuity of a side wall of a steel cassette inspection pit or a concreted-in pit. Through this measure it is possible to use the upper and lower accessible pit frame of the prefabricated inspection pit in the closed state of the bus hatch to the full length of the prefabricated inspection pit unhindered which can be driven through by the pit lift, oil wagon and the like, as will be explained in further detail below.

[0013] Fig. 1 clearly shows that the sliding element 7 can be moved by means of suitable bearings, more particularly by means of the ball-bearing mounted bush conveyor chains 9 on or in the frame, so that the sliding element 7 can occupy a first position, shown in Fig. 1, in the cover-free region of the frame 3. In this position the

sliding element 7 is located in a closed position and the bus hatch is covered. The sliding element 7 can be pushed, preferably by manually mechanical actuation, along the frame 3 underneath the cover 5 so that the sliding element 7 is arranged in its second position. In this position the sliding element 7 is located in an opened position.

5 The bus hatch is freely accessible in this position, i.e. is open at the top and can be used as a work room.

[0014] Fig. 2 shows a cross section through an inspection pit 15 prefabricated by the manufacturer with a bus hatch cover means 1 according to the invention. Inspection  
10 and repair pits of this kind are known from the prior art. They comprise a single or multi-part cassette of steel or similar rigid corrosion-resistant material which can be inserted in a recess in the ground and have two longitudinal side walls 17a and 17b, end walls, not visible here, arranged at the ends, and a base 19 wherein the walls and/or the base are formed at least in part with single or double walls with a cavity  
15 arranged inbetween to receive the hard-setting filler material, such as light concrete or the like. The side walls have for this purpose preferably large-volume perforated baffle plates.

[0015] Inspection and repair pits of this kind are used by workshops or production  
20 operations for inspecting or repairing motor vehicles, railed vehicles, machines or machine parts. The personnel can then work comfortably upright underneath the corresponding vehicles and machines. Conventional inspection and repair pits are normally produced on site. For this, first outer and inner shuttering walls are made which are then cast with a filler material, preferably with concrete. Setting up the  
25 shuttering walls and creating the conventional inspection and repair pits thus requires a long and sometimes complicated involvement of a plurality of in part different workers on site so that high production costs are incurred and long construction times arise. These disadvantages can be avoided by a cassette of steel or the like which is prefabricated by the manufacturer and which is inserted in a recess in the ground on  
30 site.

[0016] Fig. 2 clearly shows the bus hatch 21 which extends along the side of the inspection pit and is connected therewith. The bus hatch 21 is preferably about 1 m

wide and about 2 m long, wherein the width of the bus hatch refers to the transverse direction Q of the inspection pit 15 which corresponds to the longitudinal direction L of the bus hatch cover means 1. The longitudinal direction of the inspection pit extends on the other hand perpendicularly in the plane of the drawing. The inspection  
5 pit 15 is in Fig. 2 inserted into a recess in the ground and is fixedly connected to the surrounding ground area by means of concrete or similar material.

[0017] The bus hatch cover means 1 is arranged above the bus hatch 21 and is shown in a closed position in Fig. 2 in which the bus hatch 21 is thus covered by the sliding  
10 element 7. If the bus hatch 21 is to be used as a work room then the sliding element 7 can be simply pushed into the hollow space 23 of the “drawer socket” which is surrounded by the frame 3 and the cover 5. If the sliding element 7 was completely removed from the bus hatch region, thus is completely received by the rear part of the frame 3, the lower frame part 13b of the sliding element 7 preferably bears against the  
15 side wall 25 of the bus hatch 21.

[0018] It is clear that the frame 3 has a length L1 which is essentially twice as long as the width B of the bus hatch 21 which is to be covered.

20 [0019] The sliding element 7 which is mounted to be movable in the frame 3 has on the other hand a length L2 which corresponds essentially to the width B of the bus hatch 21 which is to be covered.

[0020] The frame 3 preferably comprises supporting and guiding profiles which on  
25 one side rest on the walls of the bus hatch 21 extending in the transverse direction Q, and which on the other side extend beyond the bus hatch walls and are preferably arranged on track rails which rest directly on the ground. The two side supporting and guiding profiles are connected to one another at the end of the frame 3 opposite the bus hatch 21, preferably by a U-profile 27.

30 [0021] Fig. 3 shows in plan view a bus hatch cover means 1 according to the invention. The sliding element 7 is shown corresponding to Fig. 1 and Fig. 2 in a closed position in which the bus hatch 21 is covered by the sliding element 7. Fig. 3

clearly shows the aluminium supporting beam profiles 11 which extend in the transverse direction Q of the inspection pit and in the longitudinal direction L of the bus hatch cover means 1 and which form a surface which can be completely driven over. The cover 5 of the frame 3 which can likewise be completely driven over  
5 extends directly adjoining the sliding element 7 and more particularly the supporting beam profiles 11.

**[0022]** The upper and lower frame parts 13a and 13b which are connected to one another in suitable manner, more particularly by screws or welding, are provided  
10 particularly advantageously on a bus hatch cover means 1 according to the invention. The frame parts 13a and 13b in the closed position of the sliding element 7 merge seamlessly into the upper and lower pit profiles 29a and 29b of the inspection pit. Fig. 3 shows the transition regions 31 in which the frame parts 13a and 13b merge continuously into the pit profiles 29a and 29b.

15

**[0023]** In prefabricated steel cassette inspection pits and also in concreted pits the pit profiles 29a and 29b normally serve as track rails for auxiliary devices such as pit lifts, oil wagons etc., which can be moved to and fro in the longitudinal direction of the inspection pit 15. For the aforementioned purpose the pit profiles 29a and 29b each  
20 project inwards into the inspection pit. The bus hatch 21 causes a gap however in the pit profiles which prevents such parts from moving through unhindered. This drawback is avoided in that the end side of the sliding element 7 facing the inspection pit according to the invention has an upper and a lower frame profile which correspond to the pit profiles 29a and 29b. Thus in the closed position of the sliding element 7 it is  
25 ensured that a pit lift or similar auxiliary device can move through along the pit profiles of the inspection pit unimpeded, not only in the unloaded state, but more importantly even when loaded. The frame parts 13a and 13b are preferably fastened on the frame of the sliding element 7 and supporting beam profiles 11 in such a way that a pit lift loaded with heavy weight can readily move over the profiles 13a and 13b.

30

**[0024]** Fig. 4 shows a side end view of a bus hatch cover means 1 according to the invention. The aluminium supporting beam profiles 11 which are arranged side by side in the longitudinal direction L of the bus hatch cover means 1 are shown

particularly clearly here. The supporting profiles or supporting beams 11 have a trapezoidal cross section and are each divided up by two longitudinal webs into three separate longitudinal chambers. This produces a particularly stable but nevertheless lightweight construction of the supporting profiles. The supporting profiles are  
5 connected preferably detachably to the frame part 13a of the sliding element 7.

[0025] Fig. 5 shows a detailed view of the bus hatch cover means 1 according to the invention. The bush conveyor chain 9, which is ball-bearing mounted here by way of example, can be seen particularly clearly here. The bush conveyor chain 9 is fastened  
10 on the underside of a U-profile 35 of the sliding element 7 and is supported on a double-T profile 37 which is part of the frame 3. The bush conveyor chain 9 is thus arranged between the sliding element 7 and the frame 3. Above the double-T profile 37 there is a further double-T profile 39 which serves in the first instance for guiding the sliding element 7. An L-profile 33 is fastened on the U-profile 35 of the sliding  
15 element 7 and engages on the side of the double-T profile 37 which is opposite the bush conveyor chain 9 so that a secure guidance of the sliding element 7 in the frame 3 is guaranteed.

[0026] Fig. 6 shows a plan view of a concrete pit 41 on the building side which has  
20 bus hatches 43 and 43' on both sides. Sheet metal plates 45 are arranged peripherally around the side walls of the bus hatches as separating partitions on which the bus hatch cover means 1 (not shown here) can be arranged. Contrary to the inspection pit 15 prefabricated at the manufacturer the concrete pit 41 is only made on site in a corresponding ground recess.

25

[0027] Fig. 7 shows a cross section through a concrete pit on the building side with a bus hatch cover means 1 of the invention. The bus hatch cover means 1 corresponds essentially to the cover means shown in Figs. 1 to 5. Fig. 7 clearly shows that both bus hatches 43 and 43' are each provided with a bus hatch cover means 1 according to the  
30 invention. The frame 3 is preferably mounted on track rails which extend in the transverse direction of the concrete pit 41 on the sheet metal plates 45 beyond the side walls of the bus hatches.

[0028] The cover 5 is preferably level flat with the ground surrounding the inspection pit. In order to avoid trip hazards the ground surrounding the bus hatch cover means 1 can be formed slightly rising in the direction of the bus hatch cover means 1.

5

[0029] Overall it is clear that the bus hatch cover means 1 according to the invention can be used both for inspection pits prefabricated at the manufacturer and also for concrete pits made on site where the dimensions of the bus hatch(es) of the concrete pit and the dimensions of the bus hatch cover means 1 are matched with one another. In this connection it should be pointed out that the width of the bus hatch cover means 1 corresponds preferably substantially to the length of the bus hatch 21 or 43 and 43' respectively.

[0030] A handle element can be attached to the lower and/or upper frame part 13a, 13b by which the operator can easily slide the sliding element 7 into the frame 3 underneath the cover 5. An automatic closure can furthermore be attached to the frame parts at the ends and has lateral ramp and restriction plates. This automatic closure can have by way of example a spring mechanism and prevents accidental opening and closing, thus accidental displacement of the sliding element. For this purpose it is possible to lock the sliding element 7 preferably both in the opened and also in the closed position. The closure is preferably actuated by means of a handle element.

[0031] Stop elements can furthermore be arranged more particularly in the region of the lower frame part 13b or on the adjoining pit profile 29b in order to prevent the sliding element 7 from being completely drawn out from the frame 3. The end positions of the sliding element 7 are preferably provided with proximity sensors which as the sliding element 7 is opened produce an optical and/or acoustic signal to indicate that the bus hatch is open, thus is not covered. I.e. the proximity sensor is preferably located in the region of the frame parts 13a, 13b and/or the pit profiles 29a, 29b. The warning signal can be produced by way of example by a red rotating light or the like. The warning signal indicates that the bus hatch is opened for a work process. The working safety is thereby

considerably increased. The warning signal is preferably generated until the bus hatch is fully closed again and locked, the sliding element 7 is thus located in its end position again in which more particularly the frame parts 13a and 13b align flush with the pit profiles 29a and 29b.

5

**[0032]** The handle element mentioned above, which can serve at the same time to displace the sliding element, can be a type of door handle which when pressed down actuates a spring element so that the position of the sliding element is released. As soon as the sliding element reaches a determined position the locking mechanism can engage by the spring force in corresponding recesses, more particularly in the side walls of the bus hatch. In this way a secure locking of the sliding element 7 is possible and its accidental displacement is prevented.

10

## REFERENCE NUMERAL LIST

|    |     |                                                     |
|----|-----|-----------------------------------------------------|
|    | 1   | Bus hatch cover means                               |
|    | 3   | Frame                                               |
| 5  | 5   | Cover                                               |
|    | 7   | Sliding element                                     |
|    | 9   | Bush conveyor chain                                 |
|    | 11  | Supporting beam profile                             |
|    | 13a | Upper frame part                                    |
| 10 | 13b | Lower frame part                                    |
|    | 15  | Inspection pit                                      |
|    | 17a | Longitudinal side wall                              |
|    | 17b | Longitudinal side wall                              |
|    | 19  | Base                                                |
| 15 | 21  | Bus hatch                                           |
|    | 23  | Hollow space                                        |
|    | 25  | Side wall                                           |
|    | 27  | U-profile                                           |
|    | 29a | Upper pit profile                                   |
| 20 | 29b | Lower pit profile                                   |
|    | 31  | Transition region                                   |
|    | 33  | L-profile                                           |
|    | 35  | U-profile                                           |
|    | 37  | Double-T profile                                    |
| 25 | 39  | Double-T profile                                    |
|    | 41  | Concrete pit                                        |
|    | 43  | Bus hatch                                           |
|    | 43' | Bus hatch                                           |
|    | 45  | Sheet metal plate                                   |
| 30 | L1  | Length of the frame                                 |
|    | L2  | Length of the sliding element                       |
|    | B   | Width of the bus hatch cover means                  |
|    | L   | Longitudinal direction of the bus hatch cover means |

Q Transverse direction of the inspection pit

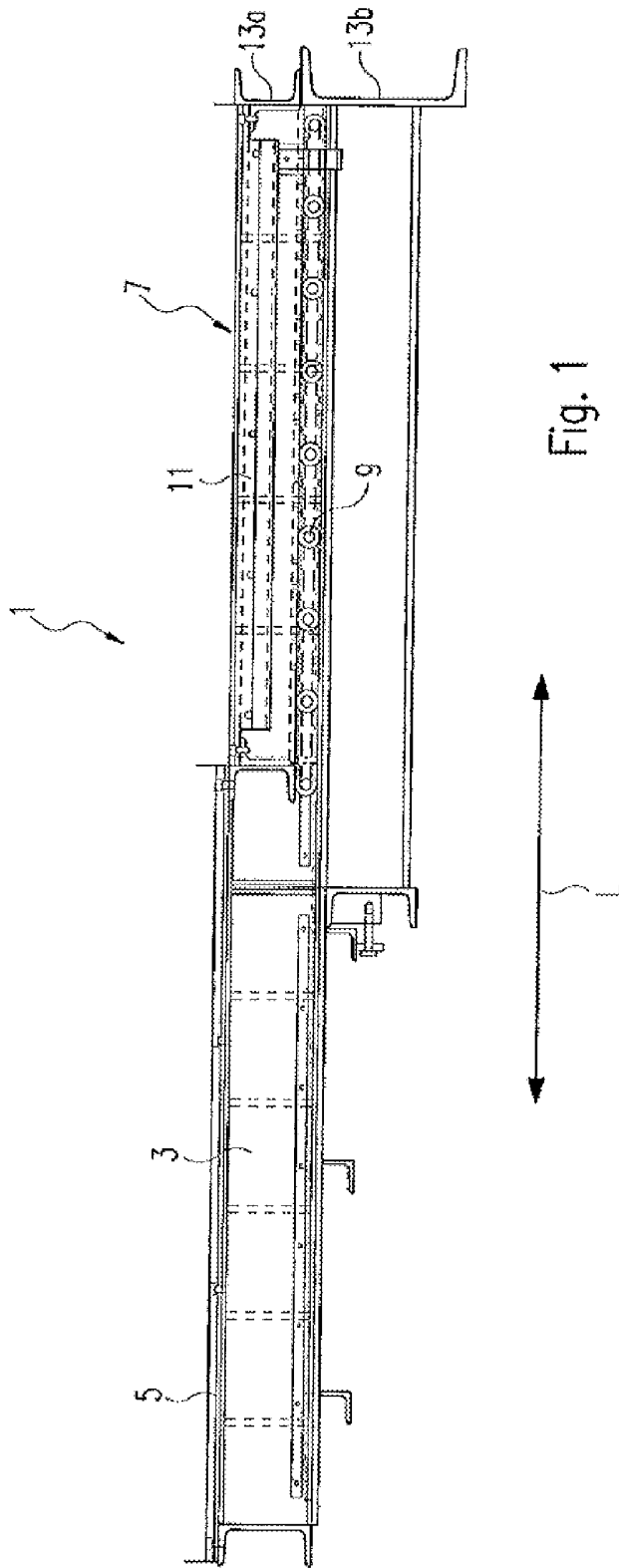
## PATENTKRAV

1. Præfabrikeret montagegrav (15) med en busluge (21, 43, 43'), som er i forbindelse med montagegraven og lateralt strækker sig til montagegraven, hvorved montagegraven  
5 omfatter busluge-afdækningsmiddel (1) til afdækning af buslugen (21, 43, 43'),
- kendetegnet ved**
- en ramme (3), som er tilvejebragt i det mindste i sektioner og med et dæksel (5), der kan passeres af køretøjer, hvilken ramme stort set er dobbelt så lang som bredden (B) af en busluge (21, 43, 43'), der skal dækkes, og med et glideelement (7), der bevægeligt  
10 understøttes i rammen (3) og i det væsentlige er lige så langt som bredden (B) af en busluge (21, 43, 43'), der skal dækkes, hvorved glideelementet (7) kan forskydes til en første position i forhold til rammen (3), hvor den i det væsentlige helt er placeret i rammens (3) dæksselfrie område, og hvorved glideelementet (7) kan forskydes til en anden position i forhold til rammen, hvor den i det væsentlige helt er dækket af dækslet  
15 (5).
2. Præfabrikeret montagegrav ifølge krav 1, **kendetegnet ved, at** glideelementet (7) er udformet således, at det kan passeres af køretøjer.
- 20 3. Præfabrikeret montagegrav ifølge et hvilket som helst af de foregående krav, **kendetegnet ved, at** en bøsningstransportørkæde (33) er anbragt mellem glideelementet (7) og rammen (3).
4. Præfabrikeret montagegrav ifølge krav 3, **kendetegnet ved, at** bøsningstransportørkæden  
25 (33) er kuglelejemonteret eller glidelejemonteret.
5. Præfabrikeret montagegrav ifølge krav 3 eller krav 4, **kendetegnet ved, at** bøsningstransportørkæden (33) er fastgjort til glideelementet (7).
- 30 6. Præfabrikeret montagegrav ifølge et hvilket som helst af de foregående krav, **kendetegnet ved, at** glideelementet (7) omfatter støttebjælkeprofiler (11), der er fremstillet af aluminium, stål eller plast.

7. Præfabrikeret montagegrav ifølge et hvilket som helst af de foregående krav,  
**kendetegnet ved, at** glideelementet (7) omfatter et gribeelement.
- 5 8. Præfabrikeret montagegrav ifølge et hvilket som helst af de foregående krav,  
**kendetegnet ved, at** glideelementet (7) omfatter eller virker sammen med automatiske  
lukkemidler.
- 10 9. Præfabrikeret montagegrav ifølge et hvilket som helst af de foregående krav,  
**kendetegnet ved, at** glideelementet (7) kan opereres manuelt, mekanisk.
10. Præfabrikeret montagegrav ifølge et hvilket som helst af de foregående krav,  
**kendetegnet ved, at** der er tilvejebragt en automatisk advarselssignal-indretning, som  
frembringer et signal, når glideelementet (7) forlader den første position.
- 15 11. Præfabrikeret montagegrav ifølge et hvilket som helst af de foregående krav,  
**kendetegnet ved, at** rammen (3) omfatter bære- og transportprofiler.
- 20 12. Præfabrikeret montagegrav ifølge et hvilket som helst af de foregående krav,  
**kendetegnet ved, at** glideelementet (7) omfatter en øvre rammedel (13a) og en nedre  
rammedel (13b), som sikrer kontinuiteten af grav-profiler (29a, 29b) i glideelements  
lukkede tilstand.
- 25 13. Anvendelse af et bus-luge dækselmiddel (1) til dækning af en bus-luge (21, 43, 43'), som  
er i forbindelse med en montagegrav og lokalt strækker sig til montagegraven,  
**kendetegnet ved, at**  
bus-luge dækselmidlet omfatter:  
En ramme (3), som er tilvejebragt i det mindste i sektioner og med et dæksel (5), der kan  
passeres af køretøjer, hvilken ramme stort set er dobbelt så lang som bredden (B) af en  
30 busluge (21, 43, 43'), der skal dækkes, og med et glideelement (7), som bevægeligt  
understøttes i rammen (3) og i det væsentlige er lige så langt som bredden (B) af en  
busluge (21, 43, 43'), der skal dækkes, hvorved glideelementet (7) kan forskydes til en  
første position i forhold til rammen (3), hvor den i det væsentlige helt er placeret i  
rammens (3) dæksel-frie område, og hvorved glideelementet (7) kan forskydes til en

anden position i forhold til rammen, hvor den i det væsentlige helt er dækket af dækslet (5).

- 5 14. Anvendelse ifølge krav 13, **kendetegnet ved, at** glideelementet (7) omfatter støttebjælkeprofiler (11), der er fremstillet af aluminium, stål eller plast.
15. Anvendelse ifølge krav 13 eller krav 14, **kendetegnet ved, at** glideelementet (7) omfatter en øvre ramme-del (13a) og en nedre ramme-del (13b), hvilket sikrer kontinuiteten af gravprofiler (29a, 29b) i glideelementets lukkede tilstand.



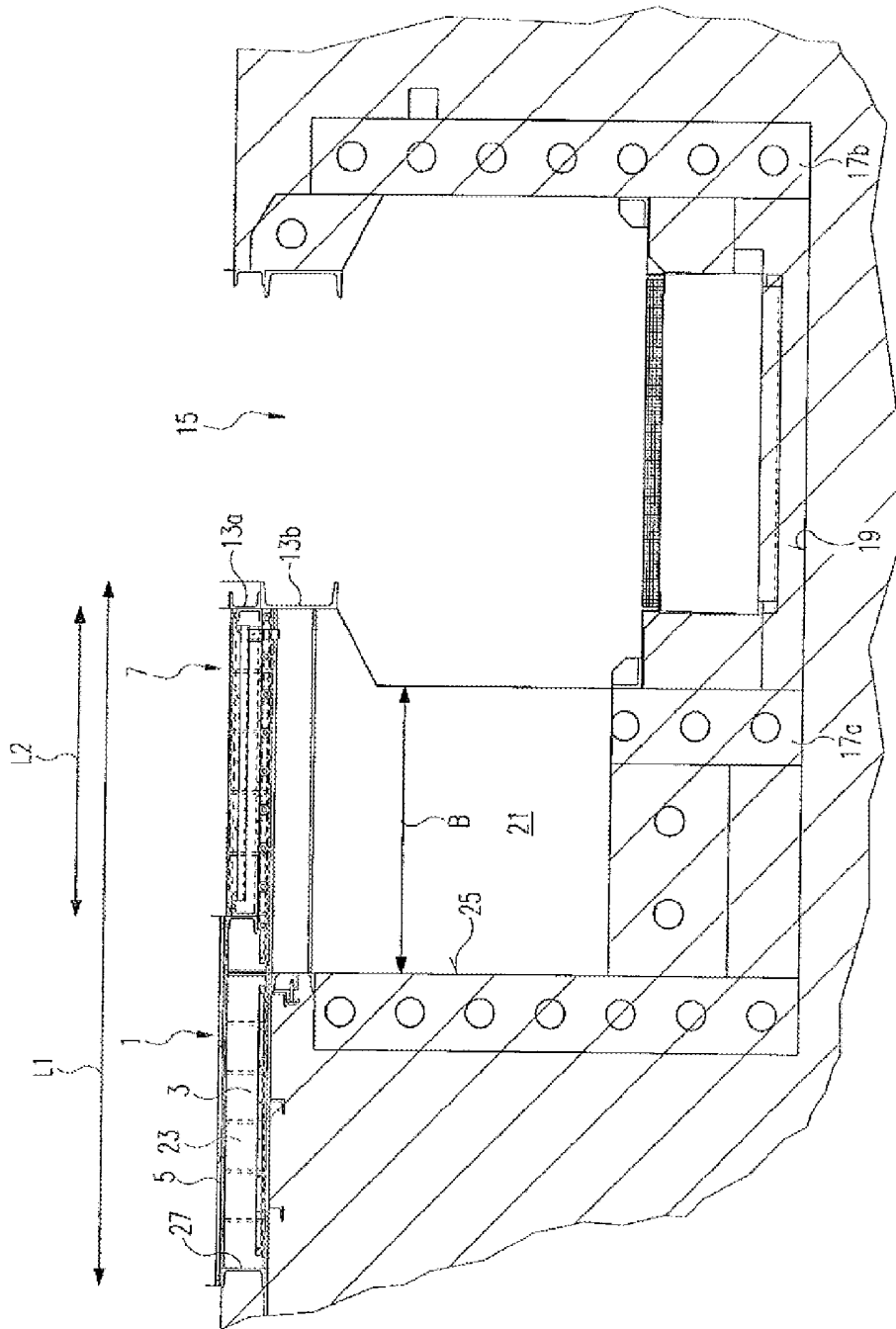


Fig. 2

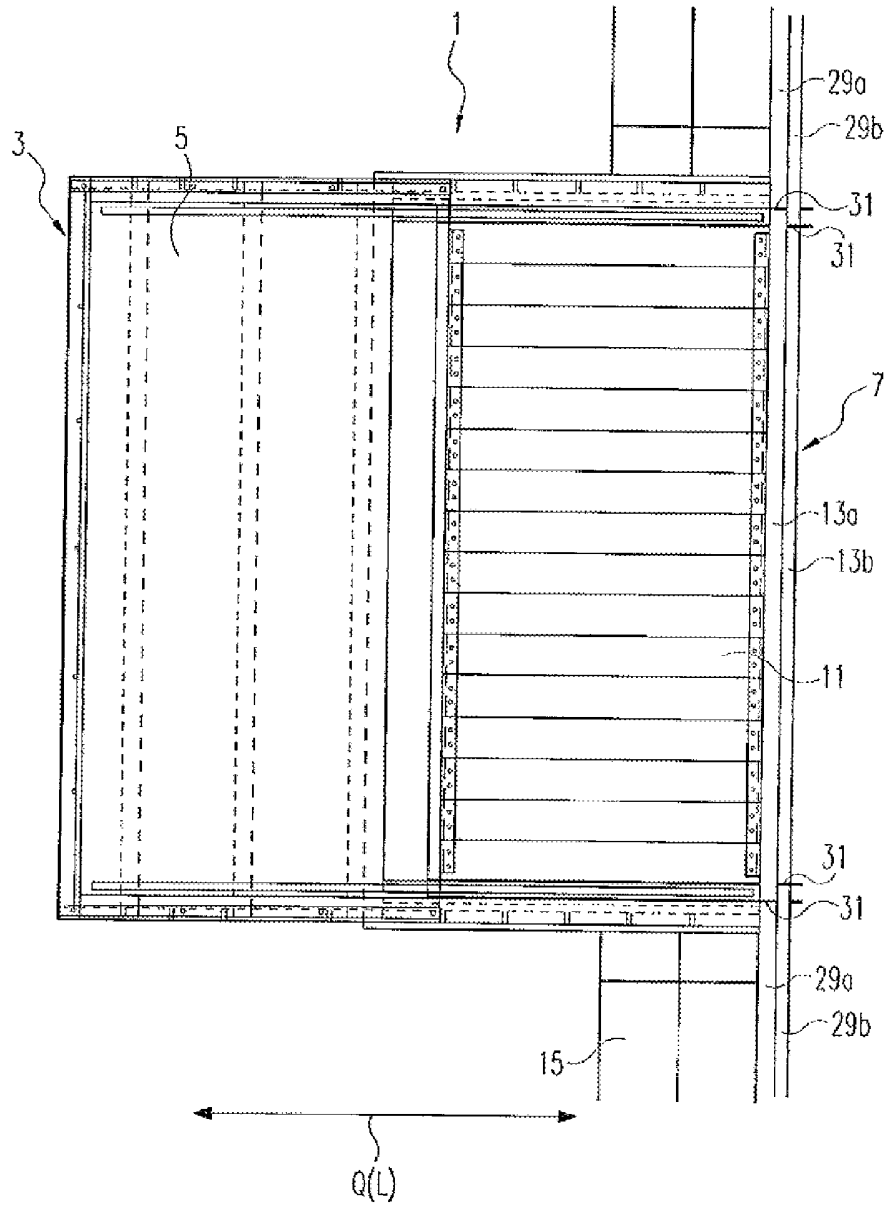


Fig. 3

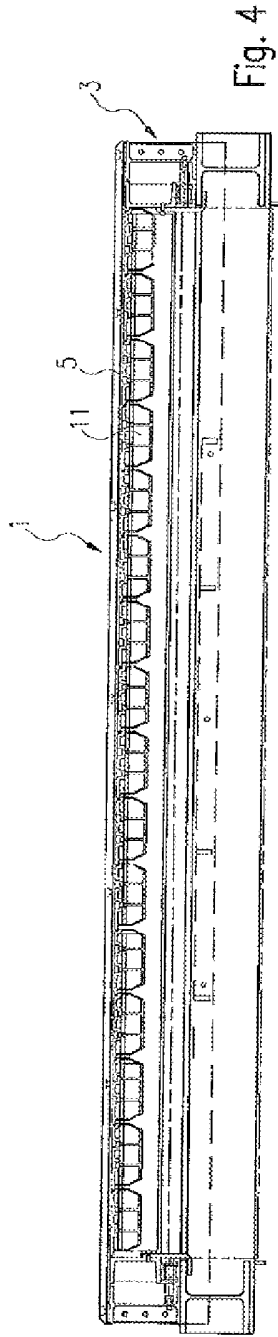


Fig. 4

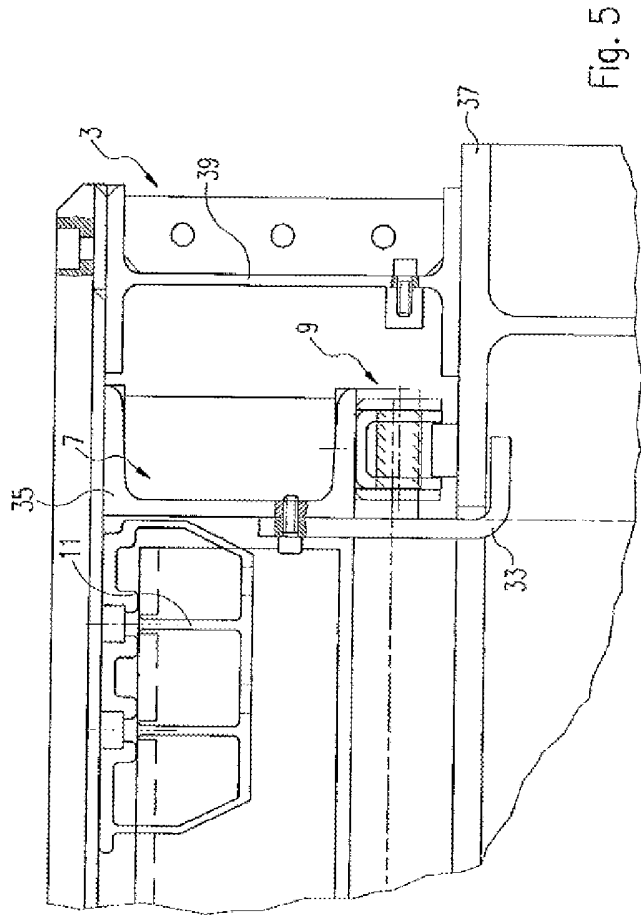


Fig. 5

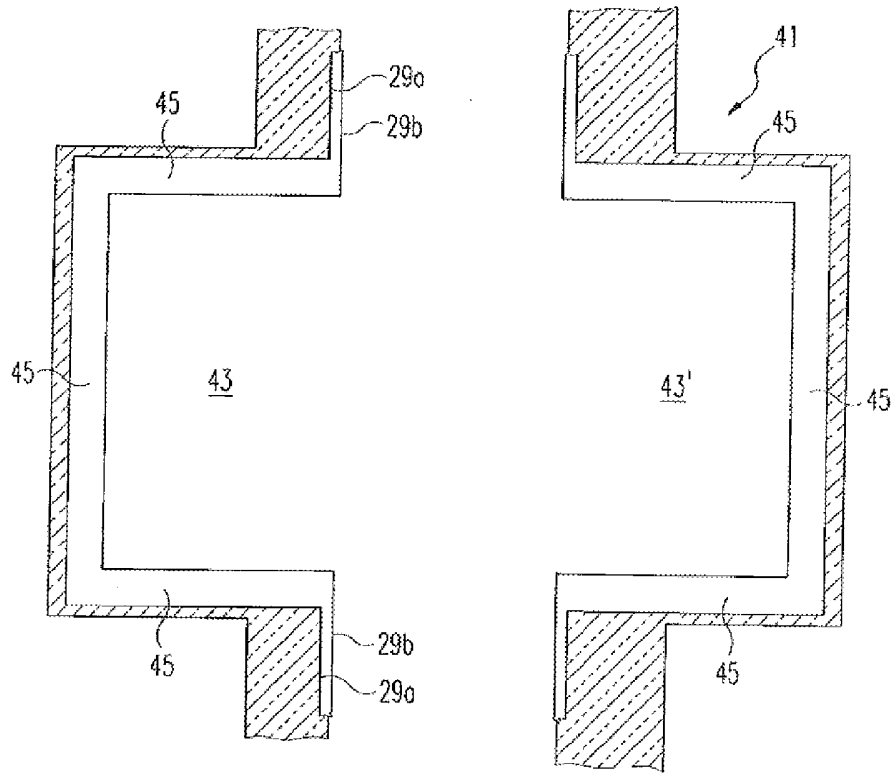


Fig. 6

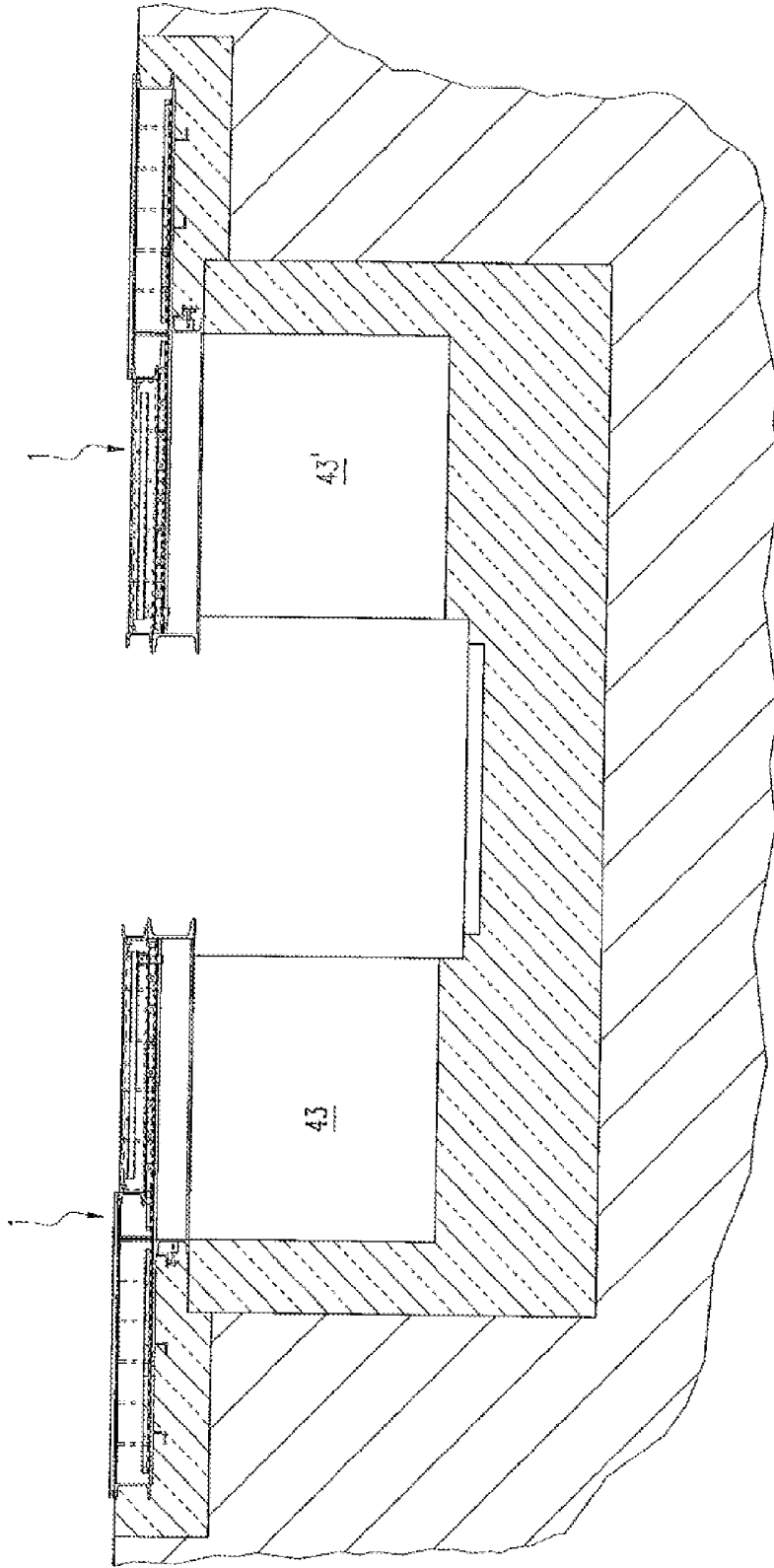


Fig. 7