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(72) Inventor: **Shenton, Terence William**
Stoke-on-Trent, ST2 9EZ (GB)

(74) Representative: **Sales, Robert Reginald**
Swindell & Pearson,
48 Friar Gate
Derby DE1 1GY (GB)

(71) Applicant: **Staffordshire University**
Stafford ST18 0AD (GB)

(54) **Access Assemblies**

(57) An access assembly (10) permitting access beneath the ground, the assembly comprising a base (16), a frame (36), and a spacer means (24) mountable between the base (16) and the frame (36). Locking means

such as bolts (42) are provided to secure the frame (36) to the base (16). The spacer means (24) is adjustable to locate the frame (36) at a desired height and inclination relative to the base (16).

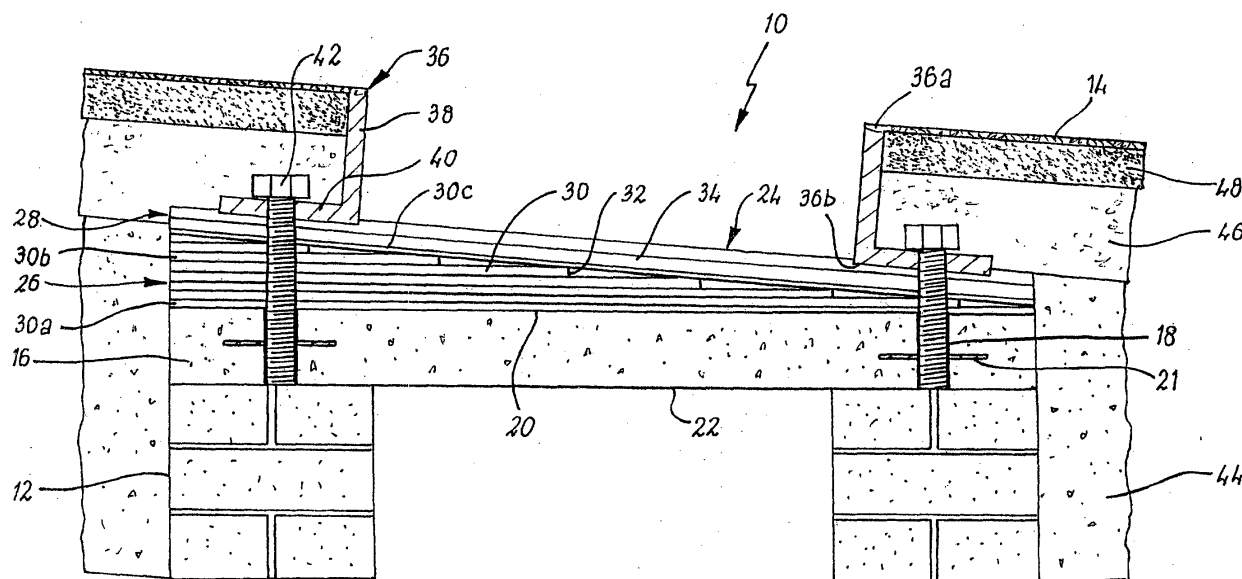


Fig. 1

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Description

[0001] The present invention relates to access assemblies, particularly but not exclusively to assemblies permitting access beneath the ground, and especially manhole access assemblies.

[0002] Traditional methods of manhole construction using tiles and mortar as the base for ironworks results in assemblies that are rigid and unable to cope with the stresses of high volumes of traffic and in particular heavy vehicles. The stresses imposed on such assemblies are both lateral and vertical and can cause failure of the tiles and mortar.

[0003] An additional problem relating to ironwork occurs during resurfacing works. When a road surface is being planed the ironwork presents an obstacle to the planing machine. Furthermore, once the surface has been planed the ironwork is a hazard to vehicles using the road and may result in accidents or damage to vehicles.

[0004] According to the present invention there is provided an access assembly the assembly including a base, a frame, a spacer means mountable between the base and the frame, and a locking means for releasably locking the frame to the base, said spacer means being adjustable to locate the frame at a desired height and inclination relative to the base.

[0005] Preferably the spacer means comprises a plurality of spacer members. The spacer members are preferably made of a polymer and may be made of rubber. Each spacer member may be of substantially constant thickness. The spacer means preferably comprises a height adjustment layer and/or an inclination adjustment layer. The inclination adjustment layer may be provided with spacer members of different sizes to form a plurality of steps. The height adjustment layer may be provided with at least one spacer member and may be provided with a plurality of spacers of the same or various thicknesses.

[0006] Preferably the releasable locking means comprises a fastening means engagable with the frame and the base. The fastening means may be a bolt extendable through a hole in the frame and engagable in a threaded tube located in the base. The bolt may be provided with a groove enabling it to be cut to a required length. Alternatively the fastening means may comprise a threaded member extending upwardly in use from the base.

[0007] The invention also provides an access assembly permitting access beneath a surface of the ground and being mountable in a recess in the ground, the assembly being according to any of the preceding three paragraphs.

[0008] The present invention further provides a method of assembling an access assembly permitting access beneath a surface of the ground and being mountable on a foundation surface at the bottom of a recess in the ground, the method including placing a base on the

foundation surface, determining the dimensions of a spacer means required for holding a frame at a desired height and inclination relative to the base, mounting the spacer means of the determined dimensions on the base, locating the frame on the spacer means and locking the frame to the base.

[0009] The present invention still further provides a method of adjusting the height of an access assembly, the assembly permitting access beneath a surface of the ground and being mountable on a foundation surface at the bottom of a recess in the ground, the assembly including a base, a frame, a spacer means mounted between the base and the frame, and a locking means for releasably locking the frame to the base, said spacer means being adjustable to locate the frame at a desired height and inclination relative to the base, the method including unlocking the frame from the base, removing the frame from the assembly, raising or lowering the height of the spacer means, replacing the frame on the spacer means and relocking the frame to the base.

[0010] The spacer means may be removed. The height of the spacer means may be temporarily varied.

[0011] Embodiments of the present invention will now be described, by way of example only, with reference to the accompanying drawings, in which:-

Fig. 1 is a cross-sectional side view through a first access assembly according to the invention in use;

Fig. 2 is a top perspective view of part of the assembly of Fig. 1 during formation;

Fig. 3 is a cross-sectional side view through part of the assembly of Fig. 1;

Fig. 4 shows part of the assembly of Fig. 1 during formation;

Fig. 5 is a sectional plan view of part of the assembly of Fig. 1;

Fig. 6 is a cross-sectional side view through a second access assembly according to the invention in use; and

Fig. 7 is a plan view of part of a third embodiment of the invention.

[0012] Figs. 1-4 show an access assembly 10 in the form of a manhole assembly (with the manhole cover removed) mounted on an upper surface of a brickwork foundation layer 12 below a ground surface 14. The assembly 10 includes a base in the form of a reinforced concrete beam 16 which is substantially square in plan view. The beam 16 is provided with a plurality of threaded tubes 18 extending therethrough between upper and lower surfaces 20, 22. Each threaded tube 18 is provided with an annular plate 21 which serves to anchor the threaded tubes 18 within the beam 16.

[0013] A spacer means 24 having a inclination adjustment layer 26 and a height adjustment layer 28 is provided on the beam 12. The inclination adjustment layer 26 is provided to compensate for the camber or other inclination in the surface 14 and is formed by a plurality

of spacer members in the form of 2 mm rubber shims or gaskets 30 forming evenly spaced steps 32 which are aligned with the surface 14. The steps 22 are arranged to ascent from one corner 16a of the beam 16 to an opposing corner 16b of the beam 16 as shown in Fig. 2. This arrangement of the steps 32 diagonally across the access assembly 10 compensates for both the camber and fall of the road. However it will be understood that the alignment of the steps 32 with respect to the access assembly 10 will depend on the inclination of the surrounding surface 14.

[0014] The means for measuring the inclination adjustment layer 26 are shown in use in Fig. 2 and comprise two bars 70 of square cross section, a cross bar 74 also of square cross section and a tri square 76. The two bars 70 are located in use one each side of the access assembly 10 under construction and parallel with a kerb 72. The cross bar 74 is located in use on the bars 70 and extending perpendicular thereto. A tri square 76 is located in use on the cross bar 74 to act as a depth gauge. The position of the cross bar 74 along the bars 70 and the position of the tri square can be adjusted to enable the tri square to be positioned above any point of the access assembly. One such position is illustrated in full lines in Fig. 2 and a second such position is illustrated in dotted lines.

[0015] The method of constructing the inclination adjustment member will now be described. The measurement means are set up as shown in Fig. 2 and the desired depth of the tri square determined to give the required level of the inclination adjustment member. The tri square is moved until it touches the highest corner of the shims. The shims may need to be built up to this level. A further shim 30 is then placed on the existing shims 30 and the tri square 76 moved so that it touches an outer edge of the shim 30. The shim 30 is marked at this position. The second position at which the tri square 76 touches an outer edge of the shim 30 is likewise marked. This is repeated until the half way point across the access assembly 10 has been reached. The marked shims 30 are then removed and cut in a straight line between the two marked points. Each shim 30 is cut into a larger shim 30a and a smaller shim 30b. The larger shims 30a are replaced on the beam 16 to form the lower steps 32 and the smaller shims 30b are placed on top of the larger shims to form the upper steps 32. A further 2 mm shim 30c is located across the steps 32 to allow for deflection of the steps 32. Two spacer members in the form of 10 mm shims 34 are located on top of the 2 mm shims 30 forming the height adjustment layer 22. The shims 30 and 34 are each provided with holes (not shown) which align in use with the threaded tubes 18 of the beam 16.

[0016] A frame 36 is mounted on the spacer means 24 and has an upper edge 36a and a lower surface 36b. The frame 36 is substantially L shaped in cross-section having an upright portion 38 and an outwardly extending portion 40. The outwardly extending portion 40 is pro-

vided with holes (not shown) in alignment in use with the threaded tubes 18 of the beam 16. The top edge 36a of the frame 36 is substantially level with the ground surface 14.

[0017] A locking means is provided in the form of bolts 42 extending through the aligned holes of the frame 36 and the shims 30 and 34 to engage in the corresponding threaded tube 18 of the beam 16.

[0018] The method of construction of an access assembly will now be described in more detail. The brickwork foundation layer 12 is laid at a suitable height taking into consideration the height of the beam 16, the frame 34 and the height adjustment required for resurfacing. The beam 16 is then bedded in position on the brickwork layer 12 using an epoxy resin, ensuring that the beam 16 does not rock.

[0019] The camber adjustment layer 26 is then formed using 2 mm shims 30 to form steps 32 as illustrated in Fig. 2. The steps 22 are arranged to ascend from one corner 16a of the beam 16 to an opposing corner 16b of the beam 16 as shown in Fig. 2. This arrangement of the steps 32 diagonally across the access assembly 10 compensates for both the camber and fall of the road. However it will be understood that the alignment of the steps 32 with respect to the access assembly 10 will depend on the inclination of the surrounding surface 14. The means for measuring the inclination adjustment layer 26 are shown in use in Fig. 2 and comprise two bars 70 of square cross section, a cross bar 74 also of square cross section and a tri square 76. The two bars 70 are located in use one each side of the access assembly 10 under construction and parallel with a kerb 72. The cross bar 74 is located in use on the bars 70 and extending perpendicular thereto. A tri square 76 is located in use on the cross bar 74 to act as a depth gauge. The position of the cross bar 74 along the bars 70 and the position of the tri square can be adjusted to enable the tri square to be positioned above any point of the access assembly. One such position is illustrated in full lines in Fig. 2 and a second such position is illustrated in dotted lines.

[0020] The method of constructing the inclination adjustment member will now be described. The measurement means are set up as shown in Fig. 2 and the desired depth of the tri square determined to give the required level of the inclination adjustment member. The tri square is moved until it touches the highest corner of the shims (the shims may need to be built up to this level). A further shim 30 is then placed on the existing shims 30 and the tri square 76 moved so that it touches all outer edge of the shim 30. The shim 30 is marked at this position. The second position at which the tri square 76 touches an outer edge of the shim 30 is likewise marked. This is repeated until the half way point across the access assembly 10 has been reached. The marked shims 30 are then removed and cut in a straight line between the two marked points. Each shim 30 is cut into a larger shim 30a and a smaller shim 30b. The larger shims 30a

are replaced on the beam 16 to form the lower steps 32 and the smaller shims 30b are placed on top of the larger shims to form the upper steps 32. The final 2 mm shim 30c is then placed over the steps 32 and the two 10 mm shims 34 placed on top. The frame 36 is placed on top of the completed spacer layer 24 and the bolt 42 inserted through the aligned holes of the frame 36 and shims 30 and 34 and fastened in the threaded tubes 18. The upper edge 36a of frame 36 is now substantially flush with the inclined ground surface 14.

[0021] Concrete backfill 44 can then be placed around the access assembly up to the level of the lower side 36b of the frame 36 and compacted. The base course 46 and a wearing course 48 of asphalt or tarmac can then be laid around the frame 36.

[0022] Should it be desired to carry out resurfacing works, the level of the frame 36 can be lowered before use of the planing machine. The wearing course 48 and the base course 46 around the frame 36 are removed such that the frame 36 and the bolt 42 are completely accessible. The frame 36 is unbolted and the two 10 mm shims 34 removed. The frame 36 is then bolted back down to the beam 16, the upper edge 36a of the frame 26 now being 20 mm below the road surface 14. The two 10 mm shims 34 may be left in the access assembly 10 so they do not become lost. The planing machine can now plane the entire road surface and the access assembly 10 does not present an obstacle to vehicles using the planed road. When it is desired to resurface the road, the frame 36 can be raised by reversing the above method until the frame 36 is 20 mm above the planed surface. The road can then be resurfaced in the usual way.

[0023] The access assembly 10 described above can also be used for retrofitting and failure replacement, for instance in the following manner. A floor saw is used to cut, for example, a 1.5m² excavation around an old 600 mm² frame and the surfacing material, frame, cover and supporting layers are removed. An access assembly 10 can then be installed as described above on a clean cover slab or existing brickwork if this is found to be sound.

[0024] Fig. 3 shows the locking means in more detail when the frame 36 is in a lowered condition. A tapered washer 50 is located under the head of the bolt 42 to compensate for the camber or inclination of the surface 14 relative to the base 16. Fig. 4 shows a bolt 52 that can be used when the range of adjustment required in the access assembly 10 is particularly large. The bolt 52 has an annular groove 54 forming a weakened portion and can be cut at this groove 54 to form the shortened bolt 42 illustrated in Figs. 1 and 3. The remaining portion 56 of the bolt 52 can be discarded.

[0025] Fig. 5 shows the beam 16 of the access assembly 10 in more detail. The beam 16 is provided with two reinforcing bars 58 each being substantially square in plan, each of the four sides reinforcing a corresponding side of the beam 16. Only one such reinforcing bar is shown in Fig. 5.

[0026] Fig. 6 shows a second embodiment of the invention which is generally similar to that of the first embodiment, and where possible the same reference numerals have been used. The spacer means 24 includes a lower layer 60 comprising three 10 mm shims 34. The height adjusting layer 28 is formed in this embodiment by a 10 mm shim 34 and a 5 mm shim 62. A cover member 64 is shown in place on the assembly 10.

[0027] Fig. 7 shows a third embodiment of the invention in which grab bars 66 are provided as a hand hold for a person climbing out of a manhole. The grab bars 66 extend across the corners of the beam 16 and are set into recesses 68 by means of silicon. The shims of the spacer means 24 hold the bars 66 in place once the flange 36 has been bolted to the beam 16.

[0028] The access assembly of the present invention has the advantage that the height and inclination of the frame relative to the base can be readily adjusted according to the height and inclination of the surface below which the access assembly is mounted. The frame can easily and quickly be lowered for planing of a road surface and then raised again in preparation for resurfacing. The use of rubber shims for the spacer means gives the assembly a certain degree of resilience, which means that the assembly is less likely to fail under the stress of vehicles passing over it and also there is a considerable reduction in road noise. The access assembly is readily installed and once installed can be easily and quickly adjusted. The materials used in the access assembly can be readily recycled.

[0029] Various other modifications can be made without departing from the scope of the present invention. For example, the assembly need not be square in cross-section, but could for example be rectangular or circular. The number and thickness of the shims could vary according to the desired range of adjustment and height and angle of the frame relative to the base. The steps in the rubber gasket could, if desired be sealed by silicone rubber. The foundation upon which the access assembly is laid does not have to be brickwork but could be any suitable surface such as a concrete slab. The base could also be formed as a ductile flange having bolts fixed therein and protruding upwardly, these bolts passing through holes in the shims and flange and being secured by means of nuts and possibly washers and locking tabs.

[0030] Whilst endeavouring in the foregoing specification to draw attention to those features of the invention believed to be of particular importance it should be understood that the Applicant claims protection in respect of any patentable feature or combination of features hereinbefore referred to and/or shown in the drawings whether or not particular emphasis has been placed thereon.

Claims

1. An access assembly including a base (16) and a frame (36), **characterised in that** the assembly also includes a spacer means (24) mountable between the base (16) and the frame (36), and a locking means (42) for releasably locking the frame (36) to the base (16), said spacer means (24) being adjustable to locate the frame (36) at a desired height and inclination relative to the base (16). 5
2. An assembly according to claim 1, **characterised in that** the spacer means (24) comprises a height adjustment layer (28) and/or an inclination adjustment layer (26). 10
3. An assembly according to claims 1 or 2, **characterised in that** the spacer means comprises a plurality of spacer members (30), which spacers members (30) may be made of a polymer or rubber. 15
4. An assembly according to claim 3, **characterised in that** each spacer member (30) is of substantially constant thickness. 20
5. An assembly according to claims 3 or 4 when dependent on claim 2, **characterised in that** the inclination adjustment layer (26) is provided with spacer members (30) of different sizes to form a plurality of steps. 25
6. An assembly according to any of claims 3 to 5 when dependent on claim 2, **characterised in that** the height adjustment layer 28 is provided with at least one spacer member (30). 30
7. An assembly according to any of the preceding claims, **characterised in that** the releasable locking means (42) comprises a fastening means engageable with the frame (36) and the base (16). 35
8. An assembly according to claim 7, **characterised in that** the fastening means is a bolt (42) extendable through a hole in the frame, (36) and engagable in a threaded tube located in the base (16). 40
9. An assembly according to claim 8, **characterised in that** the bolt (42) is provided with a groove (54) enabling it to be cut to a required length. 45
10. An assembly according to claim 7, **characterised in that** the fastening means comprises a threaded member extending upwardly in use from the base. 50
11. An access assembly permitting access beneath a surface of the ground and being mountable in a recess in the ground, **characterised in that** the assembly (10) is according to any of the preceding

claims.

12. A method of assembling an access assembly, the assembly (10) permitting access beneath a surface of the ground and being mountable on a foundation surface (12) at the bottom of a recess in the ground, **characterised in that** the method includes placing a base 16 on the foundation surface (12), determining the dimensions of a spacer means (24) required for holding a frame (36) at a desired height and inclination relative to the base (16), mounting the spacer means (24) of the determined dimensions on the base (16), locating the frame (36) on the spacer means (24) and locking the frame (36) to the base (16).
13. A method of adjusting the height of an access assembly, the assembly (10) permitting access beneath a surface of the ground and being mountable on a foundation surface (12) at the bottom of a recess in the ground, the assembly including a base (16), a frame (36), a spacer means (24) mounted between the base (16) and the frame (36), and a locking means (42) for releasably locking the frame (36) to the base (16), said spacer means (24) being adjustable to locate the frame (36) at a desired height and inclination relative to the base (16), **characterised in that** the method includes unlocking the frame (36) from the base (16), removing the frame (36) from the assembly, raising or lowering the height of the spacer means (24), replacing the frame (36) on the spacer means (24) and relocking the frame (36) to the base (16).
14. A method according to claim (13), **characterised in that** the spacer means (24) is removed, and the height of the spacer means (24) may be temporarily varied.

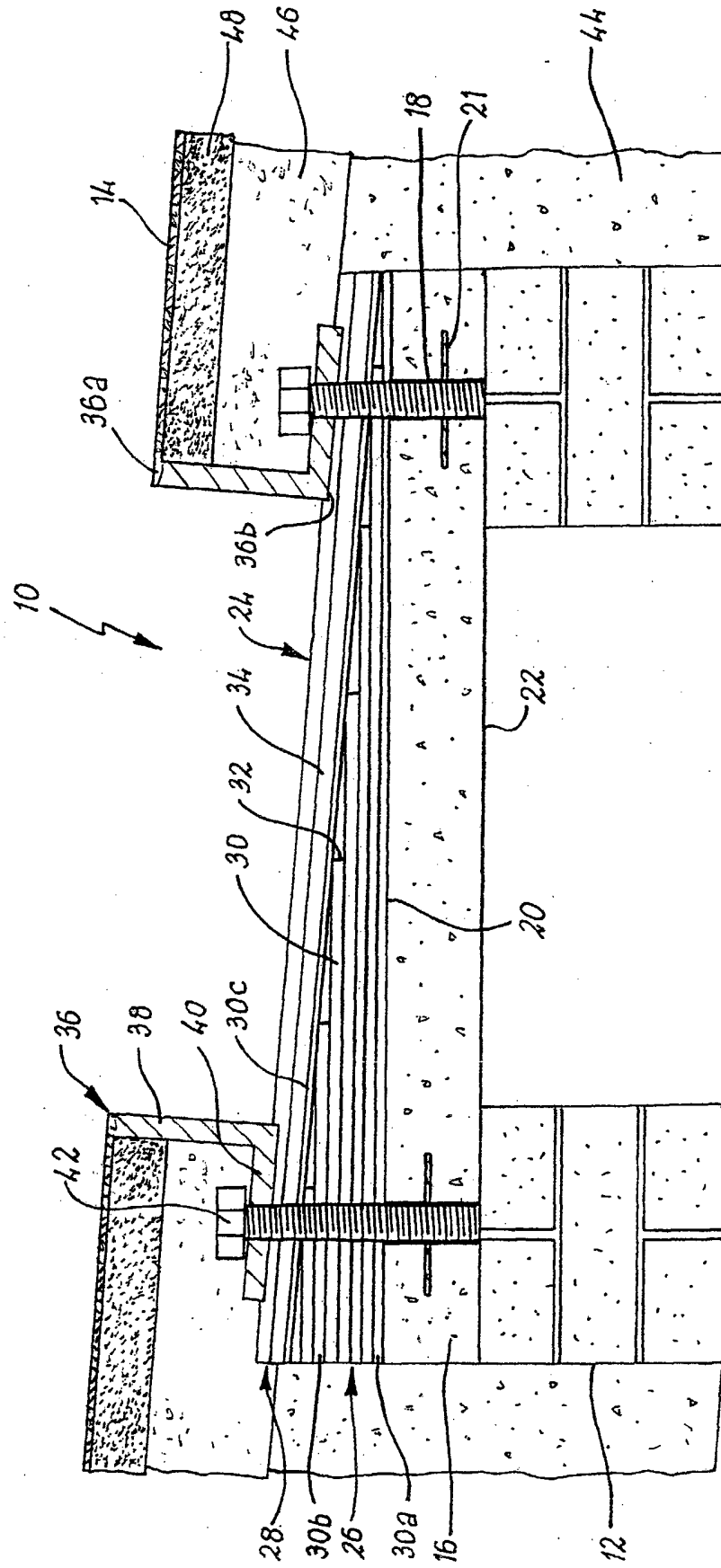
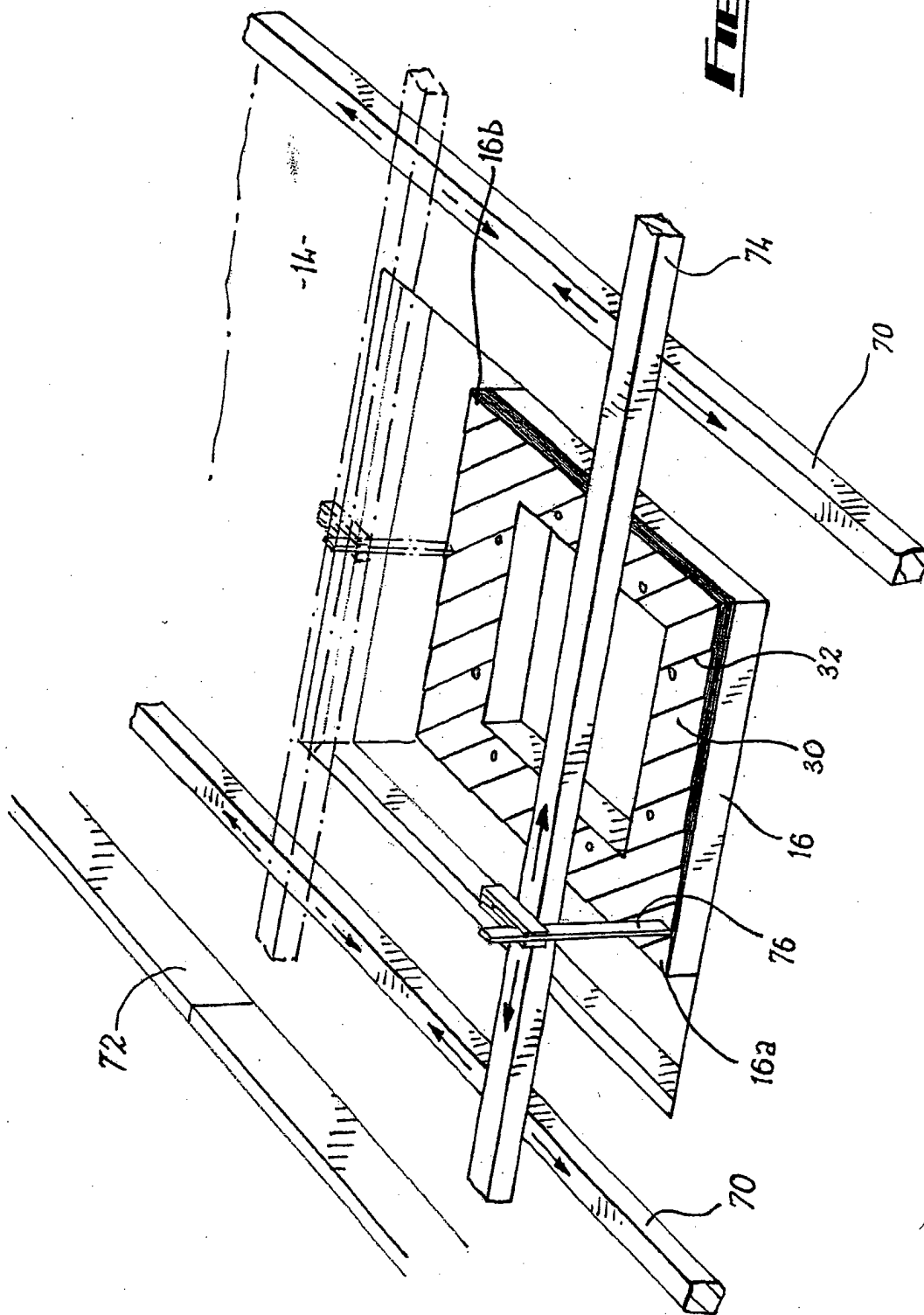


FIG. 1

FIG. 2



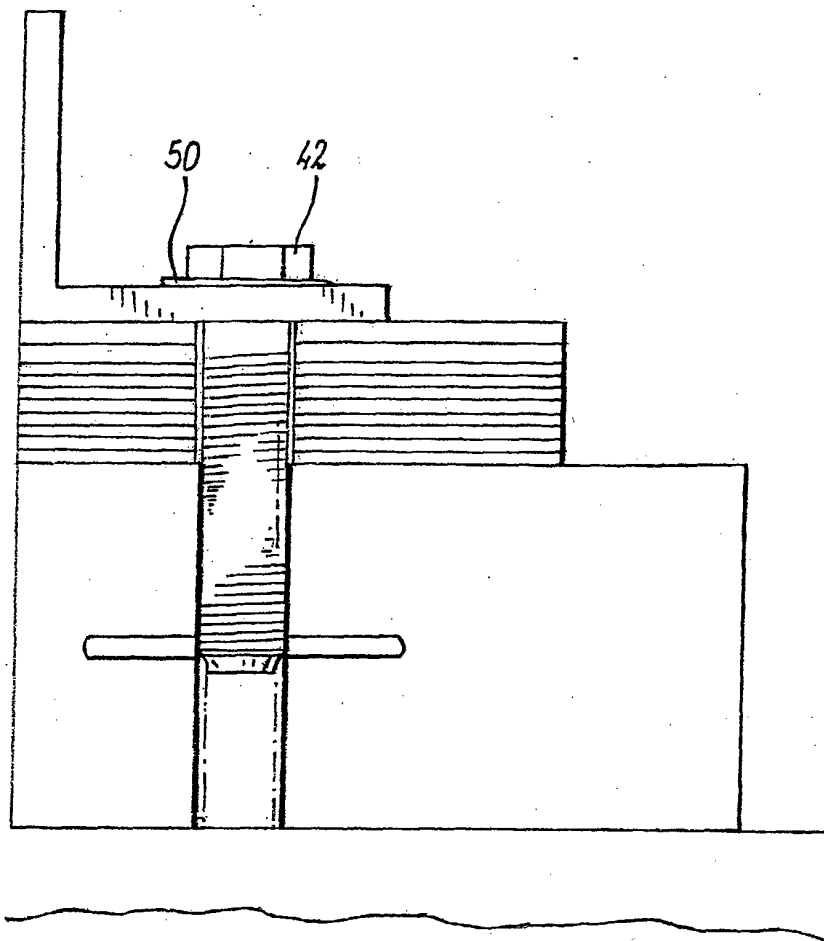


FIG. 3

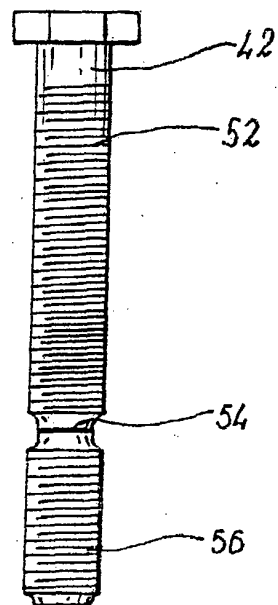


FIG. 4

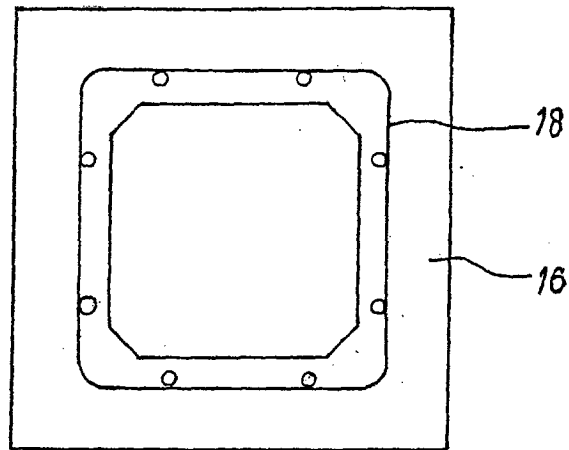


FIG. 5

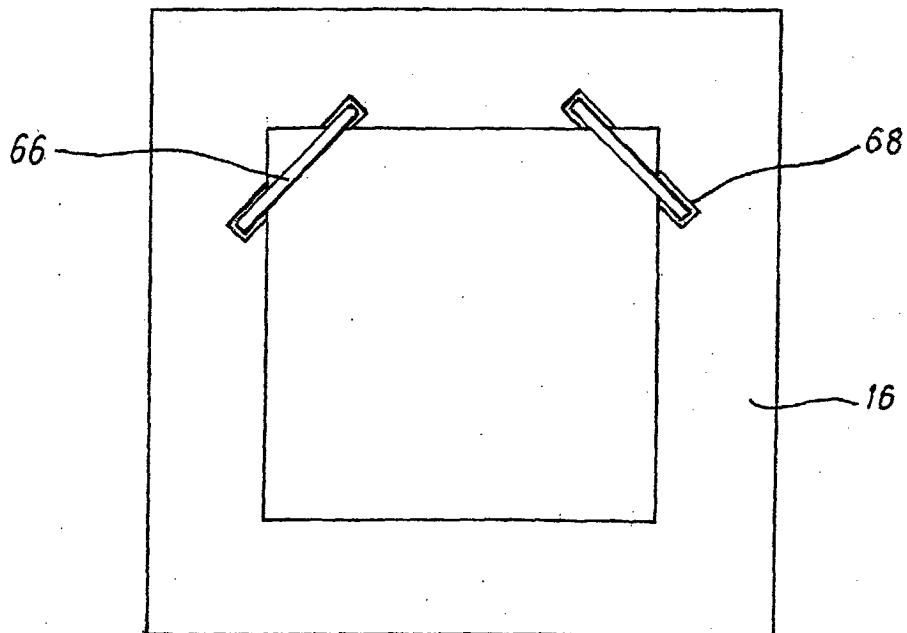


FIG. 7

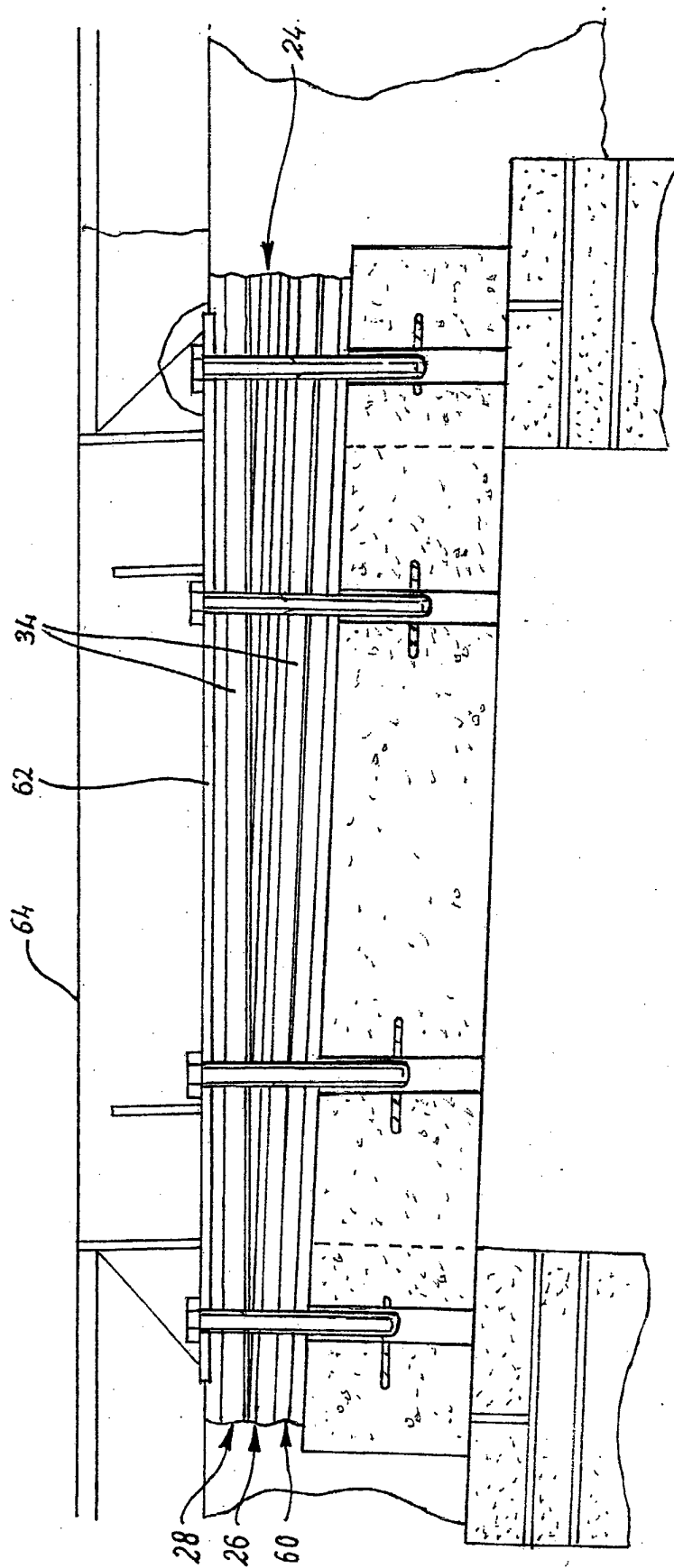


FIG. 6



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EUROPEAN SEARCH REPORT

Application Number
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Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
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			TECHNICAL FIELDS SEARCHED (Int.Cl.7)
			E02D
The present search report has been drawn up for all claims			
Place of search MUNICH		Date of completion of the search 22 October 2003	Examiner Geiger, H
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