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(71) Applicant: **Ancon CCL Limited**
Sheffield S4 7UR (GB)

(72) Inventor:
Chippendale, Aidan Mark Thomas
Castleton, Hope Valley S33 8WS (GB)

(74) Representative:
Murnane, Graham John et al
Murgitroyd & Company,
373 Scotland Street
Glasgow G5 8QA (GB)

(54) Support Bracket

(57) A cladding support bracket (10) comprises an L-shaped spine member (1) which is secured to the exterior of a building structure by a fixing bolt (3) which is fitted through a serrated bearing plate (3a) and a vertical slot (8) in a vertical leg (1a) of the spine member (1). The surface of the vertical leg which engages the bearing plate (3a) is also serrated, and so engages the horizontal serrations on the bearing plate (3a) allowing vertical adjustment during assembly but preventing relative vertical movement when the fixing bolt (3) is secured. The cladding panel (11) is supported on a horizontal elongate support member (5) which is adjustably mounted within a horizontal projecting arm (1b) of the spine member (1) in the form of a channel. When the horizontal support member (5) is located at the desired position it is fixed to the projecting arm (1b) by a bolt (7). The bracket of the invention allows a large amount of vertical and horizontal adjustment in the position of the cladding panel (11).

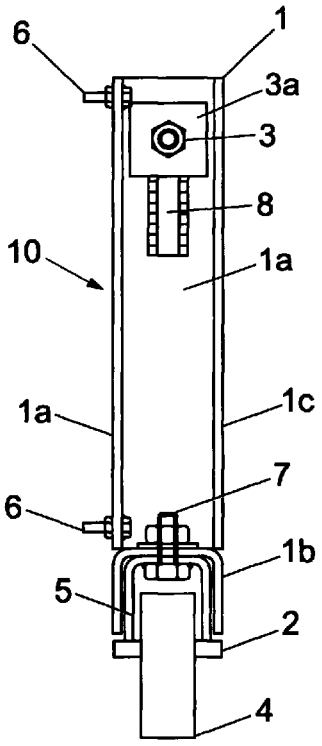

Fig. 1

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Description

[0001] The present invention relates to a support bracket, and in particular to a support bracket for the support of stone cladding on the main structure of a building.

[0002] When a new building is being built or an existing building is being externally refurbished, architects not only have to consider the functionality of the building, but also its impact on the surrounding area. Although a number of materials now being used to build new structures have improved material properties over older materials, the aesthetic qualities of these materials are sometimes not up to the standards of the older materials. In addition, building structures being erected in environmentally or architecturally sensitive areas invariably must blend in with the surrounding buildings.

[0003] One solution to this problem has been the use of cladding. In particular, the use of stone cladding on the exterior of a structure built from more convenient and cost effective modern materials gives the impression of a traditional stone building from the outside, but hides the more modern materials used to produce the structure behind a stone fascia.

[0004] Where a new or refurbished building is to be clad, it is known to use support brackets which are secured onto the structure of the building. These brackets commonly have a protruding plate on which the relatively slim stone fascia panels are secured. In this manner, the entire exterior of a building can be clad with stone panels to give the overall impression that the building, though actually built using modern materials, is made from traditional materials. The problem with the known support brackets is that there is only a small amount of potential adjustment in both the vertical and horizontal planes. Thus, only relatively small cavities between the external wall of the structure and the cladding can be provided. In addition, most known brackets are unable to support large loads, and thus heavier materials.

[0005] It is therefore an aim of the present invention to provide a support bracket for use in the cladding of buildings which offers improved adaptability, and provides a large amount of adjustment both vertically and horizontally, thereby allowing larger cavities to be provided and heavier loads to be accommodated.

[0006] According to the present invention, there is provided a bracket for the supporting of cladding panels, said bracket comprising:

a rigid spine member, said spine member having a substantially vertical elongate upper leg and a substantially horizontal elongate lower arm, said lower arm being substantially perpendicular to said upper leg;

fixing means adapted to fix said spine member to a wall of a structure;

a substantially horizontal elongate support member slidably attached to said elongate lower arm of said spine member; and

first adjustment means for the substantially vertical adjustment of said bracket.

[0007] Preferably, said lower arm forms a channel, said support member being located in said channel.

[0008] Preferably, said first adjustment means comprises a substantially vertical bearing plate provided with an aperture for said fixing means and at least one substantially vertical slot in said upper leg of said spine member, said at least one slot having a plurality of pitched serrations adjacent thereto, adapted to engage with corresponding serrations in said bearing plate.

[0009] Preferably, said fixing means is at least one bolt located in said at least one substantially vertical slot and secured to the wall of the structure. Preferably, the pitch of said pitched serrations is between 1-3mm.

[0010] Preferably, said bracket has a second adjustment means for the substantially horizontal adjustment of said bracket. Preferably, said second adjustment means comprises a bolt attached to said support member, and an elongate slot located within said lower arm of said spine member, said bolt being located in said slot and being adapted so as to secure said support member to said lower arm of said spine member. Preferably, one or more spacing members may be provided between said support member and said lower arm of said spine member to provide additional vertical adjustment of said bracket.

[0011] Preferably, said bracket has a third adjustment means for the rotational adjustment of said bracket. Preferably, said third adjustment means comprises at least one spacing member adapted to be fitted to said spine member between said spine member and the wall of the structure so that said bracket rests at an angle to the wall of the structure.

[0012] Preferably, said support member comprises a body portion and a first plate portion located outwardly of said body portion, said first plate portion receiving a cladding panel. Preferably, said support member further comprises a substantially vertical second plate portion perpendicular to said first plate portion to prevent lateral movement of the cladding panel. Alternatively, said first plate portion may be at an angle to the horizontal such that said second plate portion is not required.

[0013] Preferably, said bracket provides substantially vertical adjustment of up to 40mm. Preferably, said bracket provides substantially horizontal adjustment of up to 40mm.

[0014] The bracket may further comprise a second substantially horizontal elongate lower arm, and a second substantially horizontal elongate support member slidably attached to said second elongate lower arm. The second elongate lower arm may be connected to the first elongate lower arm and to the upper leg by a connecting member.

[0015] The bracket may further comprise an additional substantially horizontal support member, said additional support member being attached to said upper and lower portions of said spine member. The additional support member may be attached to said spine member by a stiffening member.

[0016] The bracket may further comprise a reinforcing member attached to said upper portion of said spine member.

[0017] Preferred embodiments of the invention will now be described, by way of example only, with reference to the following drawings, wherein:

Figure 1 is a front elevation of a first embodiment of a support bracket in accordance with the present invention;

Figure 2 is a plan view of the support bracket of Figure 1;

Figure 3 is a side elevation of the support bracket of Figure 1;

Figure 4 is a front elevation of a second embodiment of a support bracket in accordance with the present invention;

Figure 5 is a plan view of the support bracket of Figure 4;

Figure 6 is a side elevation of the support bracket of Figure 5;

Figure 7 is a front elevation of a third embodiment of a support bracket in accordance with the present invention;

Figure 8 is a plan view of the support bracket of Figure 7;

Figure 9 is a side elevation of the support bracket of Figure 7;

Figure 10 is a front elevation of a fourth embodiment of a support bracket according to the present invention;

Figure 11 is a plan view of the support bracket of Figure 10;

Figure 12 is a side elevation of the support bracket of Figure 10;

Figure 13 is a front elevation of a fifth embodiment of a support bracket according to the present invention;

Figure 14 is a plan view of the support bracket of Figure 13;

Figure 15 is a side elevation of the support bracket of Figure 13;

Figure 16 is a front elevation of a sixth embodiment of a support bracket according to the present invention;

Figure 17 is a plan view of the support bracket of Figure 16; and

Figure 18 is a side elevation of the support bracket of Figure 16.

[0018] The first embodiment of the support bracket according to the present invention is shown in Figs. 1-3 and is generally designated 10. It has a generally L-shaped back member or spine member 1 which is secured to the outer wall or structural frame of a building structure by a bolt 3 which is fitted through a bearing plate 3a and a vertical slot 8 located in an upper vertical leg portion 1a of the spine member 1. The stone fascia 11 is supported on a protruding plate 2 and is restrained against wind forces by a vertical fixing plate 4. The protruding plate 2 is fixed to a horizontal support member 5 which is adjustably mounted within a projecting arm portion 1b of the spine member 1. When the horizontal support member 5 is located at the desired position it is fixed to the projecting arm portion 1b of the spine member 1 by a setscrew or bolt 7. Slip of the horizontal member 5 is prevented by using a high torque value on the setscrew 7.

[0019] The stone fascia 11 used in conjunction with each of the embodiments described here is relatively thin, with an approximate thickness of between 30mm and 50mm. One of the main advantages of the present invention is the large amount of potential adjustment provided in the bracket 10 as a result of the vertical slot 8 and the horizontal member 5. Adjustment of up to 40mm both vertically and horizontally is possible with the present invention. As well as this adjustment, a right-angled shim (not shown) can be placed over one of a pair of welded setscrews 6 which are located at the top and bottom of flange portions 1c in the upper leg portion 1a of the spine or back member 1. When fitted, the shim extends behind the back member 1 between the back member 1 and the structure so as to provide angular adjustment of the bracket 10. A small amount of rotatable adjustment of the horizontal member 5 relative to the outstand portion 1b of the back member 1 is also possible.

[0020] The bearing plate 3a and vertical slot 8 are provided with horizontal serrations which lock the bearing plate 3a in place on the slot 8 and allows vertical adjustment of the bracket 10 in steps of 3mm as a result of there being a 3mm pitch in the serrations of the bearing plate 3a and slot 8. However, smaller vertical adjust-

ments of only 1mm can be achieved by inserting 1mm thick shims (not shown) at the setscrew 7 between the outstand portion 1b of the back member 1 and the horizontal member 5.

[0021] A second embodiment of the present invention is shown in Figs. 4-6 and is generally designated 20. For the most part, the bracket 20 is the same as the bracket 10 of the first embodiment. A back member or spine member 21 is secured to the outer wall of a structure by a bolt 23 which is fitted through a bearing plate 23a and a vertical slot 28 located in an upper portion 21a of the back member 21. However, one difference between the first and second embodiments is that the stone fascia 11 in the second embodiment is supported solely by a protruding plate 22 which is angled upwards, rather than by a vertical fixing plate, the plate 22 angled preferably 15° above the horizontal, though other angles can be used. The protruding plate 22 is fixed to a horizontal member 25 which is adjustably mounted within an outstand portion 21b of the back member 21. In the second embodiment, the outstand portion 21b is significantly - approximately 2.5 times - longer then the outstand portion 1b of the first embodiment, and can have a cavity of up to 300mm between the structure and the stone fascia 11. When the horizontal member 25 is located at the correct position it is fixed to the outstand portion 21b of the back member 21 by a setscrew 27. Slip of the horizontal member 25 is prevented by using a high torque value on the setscrew 27.

[0022] Again, as with the first embodiment, a large amount of potential adjustment is provided in the bracket 20 as a result of the vertical slot 28 and the horizontal member 25. Adjustment of up to 40mm vertically and horizontally is again possible with the second embodiment. As well as this adjustment, a right-angled shim (not shown) can be placed over one of a pair of welded setscrews 26 which are located at the top and bottom of flange portions 21c in the upper portion 21a of the back member 21 to provide angular adjustment of the bracket 20. A small amount of rotatable adjustment of the horizontal member 25 relative to the outstand portion 21b of the back member 21 is again also possible.

[0023] The vertical slot 28 allows vertical adjustment of the bracket 20 in the same manner as the first embodiment. Smaller vertical adjustments of only 1mm can again be achieved by inserting 1mm thick shims (not shown) at the setscrew 27 between the outstand portion 21b of the back member 21 and the horizontal member 25. Irrespective of the length of the outstand portions in each of the embodiments described herein, the horizontal member is always mounted adjacent to the outer extremity of the outstand portion.

[0024] The primary benefit of the second embodiment is that large cavities can be provided between the structure and the stone fascia 11 thanks to the long outstand portion 21b. The large cavity makes the second embodiment particularly suitable for use where the thin stone fascia 11 is to be used as a rain screen with open joints. Known support brackets usually can only provide cavities of 100mm which would not be suitable for this purpose.

[0025] Figs. 7-9 show a third embodiment of the present invention, in which the bracket 30 is intended to support a heavier than normal stone fascia 11. Figs. 7 and 8 show that this embodiment utilises a second outstand portion 31b fixed to a single bracket as disclosed in the first and second embodiments of the invention. The second outstand portion 31b is attached to the first outstand portion 31b by a connector member 70 which runs parallel to the exterior wall of the structure (not shown). In addition to the connector 70, a stiffening member 71 is also fitted between the second outstand portion 31b and the back member 31.

[0026] The back member 31 is much the same as those of the first and second embodiments as it has flange portions 31c containing setscrews 36. The only exception is that a second slot 72 is provided midway down the upper portion 31a of the back member 31, and a third slot 73 is provided on a flange member 74 which is fixed to the back member 31 on the opposite side from the second outstand portion 31b. The second slot 72 has a second bolt 33 fitted through it and is provided to ensure that the bracket 30 remains securely fastened to the structure despite the increased load of the heavier fascia 11. The third slot 73 may or may not be used for a further bolt 33 if further fixing support is required for the bracket 30. Aside from these differences the bracket 30 is the same as those described in the previous embodiments, with the horizontal members 35 and their respective angled protruding plates 32 being attached by setscrews 37 to the outstand portions 31b of the back member 31. As a result of the extra support, this third embodiment of the present invention can support relatively large loads of around 3kN, as well as still being adjustable both vertically and horizontally in the same manner as described for the preceding embodiments.

[0027] A fourth embodiment of the present invention can be seen in Figs. 10-12. It is similar to the third embodiment in that the bracket 40 uses a back member 41 and a pair of outstand portions 41b with horizontal members 45 attached thereto by setscrews 47 in order to support the stone fascia 11. However, unlike the third embodiment, the pair of outstand portions 41b are located either side of the back member 41 on a connecting member 70, and are equidistant from the centre line of the back member 41. As with the third embodiment, the upper portion 41a of the back member 41 has flange portions 41c and a pair of setscrews 46. A pair of slots 48,72, a bearing plate 43a, and bolts 43 are also provided in order to provide extra support for the bracket 40. This embodiment is intended primarily for use where small cavities are required, as the outstand portions 41b are relatively short in length. It should be noted that this embodiment reverts to the use of a plate member 44 attached to the protruding plate 42 of the horizontal

member 45 in order to keep the stone fascia 11 in place.

[0028] The fifth embodiment of the present invention is shown in Figs 13-15. Like the third and fourth embodiments, the fifth embodiment of the bracket 50 uses a pair of outstand portions 51b connected by a connector member 70 in order to support the stone fascia 11. However, this embodiment is intended for supporting the heaviest stone fascias 11, and to do so the outstand portions 51b are located close together to take the increase in distributed load. In common with the third and fourth embodiments, the upper portion 51a of the back member 51 has a bearing plate 53a and a pair of slots 58,72 in which are located bolts 53 for securing the bracket 50 to a structure. As with the previous embodiment, this embodiment again uses a plate member 54 attached to the protruding plate 52 in order to secure the fascia 11 against wind forces.

[0029] The sixth and final embodiment of the present invention can be seen in Figs 16-18. This is another bracket 60 which is intended for use with heavier than normal loads. However, where this embodiment differs from the previously described embodiments for supporting increased loads is that this bracket only has one outstand portion 61b. However, so as to support heavier loads, the outstand portion 61b is offset from the back member 61 by, in this instance, 110mm, although a variety of different size offsets can be produced. The back member 61 again has a bearing plate 63a and pair of bolts 63 which are located in slots 68,72, but in this instance there is a reinforcing plate 75 attached to the back member 61 behind the lower slot 72 to provide extra support. Aside from these differences, the bracket 60 has the majority of the components included in the previous embodiments, such as the angled protruding plate 62 as seen in the second and third embodiments.

[0030] As previously stated, these embodiments have only been illustrative examples, and it is the intention that the various components of each can be mixed and matched depending on the requirements for the cladding job in question. Thus, with the adjustability of the brackets allied to the increased support provided by the additional components, the brackets can be customised to suit any job requirement. It should also be noted that although the brackets are most preferably manufactured from stainless steel, this does not mean that other metals or alloys could not also be used for the purpose.

[0031] These and other modifications and improvements can be incorporated without departing from the scope of the invention. For example, where slotted bolt connections are described, it is to be understood that the relative position of the hole and slot may be reversed where appropriate so that either one or both of the engaging parts may be provided with a slot, while either one or none of the engaging parts may be provided with a circular hole. Additional bracing and stiffening members and plates may be provided as is necessary for adequate structural performance of the bracket. Variations are possible in the cladding panel engagement means 22, to suit the type and shape of cladding panels used, without departing from the scope of the invention. Different types of fixing means 23 may be used, other than the anchor bolts of the illustrated embodiments.

Claims

1. A bracket for supporting cladding panels, said bracket comprising:

   a rigid spine member, said spine member having a substantially vertical elongate upper leg and a substantially horizontal elongate lower arm, said lower arm being substantially perpendicular to said upper leg;
   fixing means adapted to fix said spine member to a wall of a structure;
   a substantially horizontal elongate support member slidably attached to said elongate lower arm of said spine member; and
   first adjustment means for the substantially vertical adjustment of said bracket.

2. A bracket according to Claim 1, wherein the lower arm comprises a channel, said support member being located within said channel.

3. A bracket according to Claim 1 or 2, wherein said first adjustment means comprises a substantially vertical bearing plate provided with an aperture for said fixing means and at least one substantially vertical slot in at least one of said upper leg of said spine member and said vertical bearing plate, said at least one slot having a plurality of serrations adjacent thereto, adapted to engage with corresponding serrations in said bearing plate.

4. A bracket according to Claim 3, wherein said fixing means comprises at least one bolt located in said at least one substantially vertical slot and adapted to secure said bracket to the wall of the structure.

5. A bracket according to any preceding Claim, having a second adjustment means for the substantially horizontal adjustment of said bracket.

6. A bracket according to Claim 5, wherein said second adjustment means comprises a threaded fixing means and an elongate slot provided in at least one of said lower arm of said spine member and said elongate support member, said threaded fixing means being located in said slot and being adapted so as to secure said support member to said lower arm of said spine member.

7. A bracket according to any preceding Claim, further comprising one or more spacing members provided

between said support member and said lower arm of said spine member to provide additional vertical adjustment of said bracket.

8. A bracket according to any preceding Claim, further comprising a third adjustment means for the rotational adjustment of said bracket.

9. A bracket according to Claim 8, wherein said third adjustment means comprises at least one spacing member adapted to be fitted to said spine member between said spine member and the wall of the structure so that said bracket rests at an angle to the wall of the structure.

10. A bracket according to any preceding Claim, wherein said support member comprises a body portion and a cladding support portion located outwardly of said body portion and adapted to support a cladding panel.

11. A bracket according to Claim 10, wherein said cladding support portion comprises a substantially horizontal flange adapted to support the weight of the cladding panel and a substantially vertical web adapted to engage with a corresponding slot in the cladding panel to prevent lateral movement of the cladding panel.

12. A bracket according to Claim 10, wherein said cladding support portion comprises an inclined flange at an angle to the horizontal adapted to engage with a corresponding recess in the cladding panel to support the weight of the cladding panel and to prevent lateral movement of the cladding panel.

13. A bracket according to any preceding Claim, further comprising a second substantially horizontal elongate lower arm, and a second substantially horizontal elongate support member slidably attached to said second elongate lower arm.

14. A bracket according to Claim 13, wherein the second elongate lower arm is connected to the first elongate lower arm and to the upper leg by a connecting member.

15. A bracket according to Claim 14, wherein the second elongate lower arm is connected to the first elongate lower arm and to the upper leg by a substantially horizontal connecting member.

16. A bracket according to any preceding Claim, wherein the upper leg of the spine member comprises a channel.

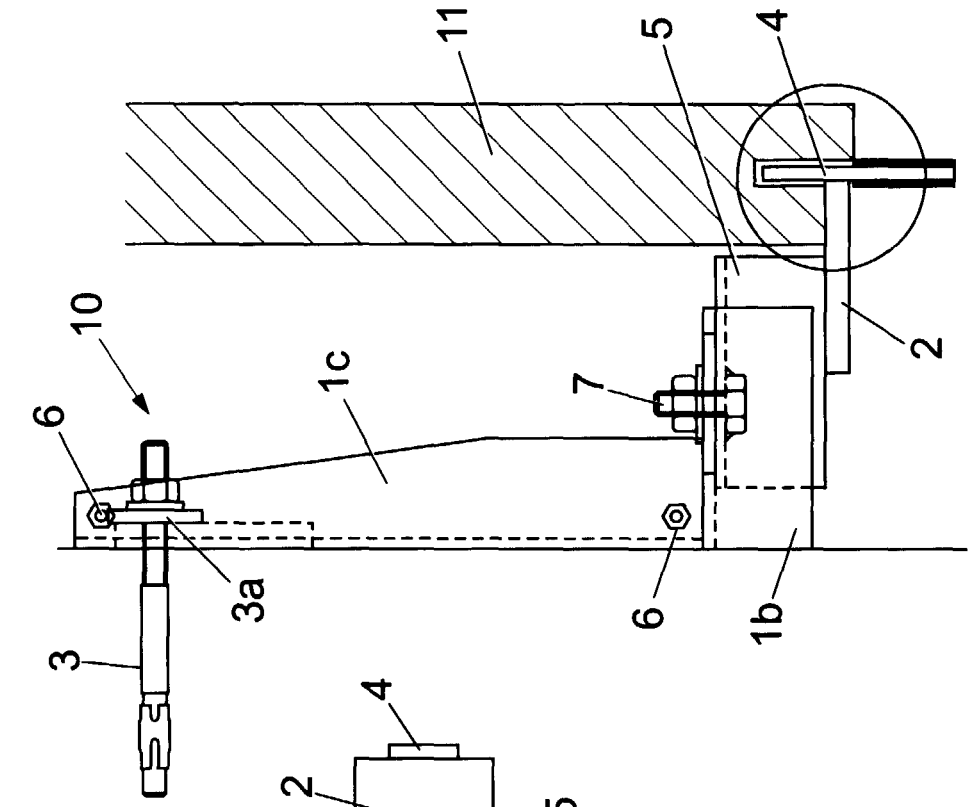

Fig. 3

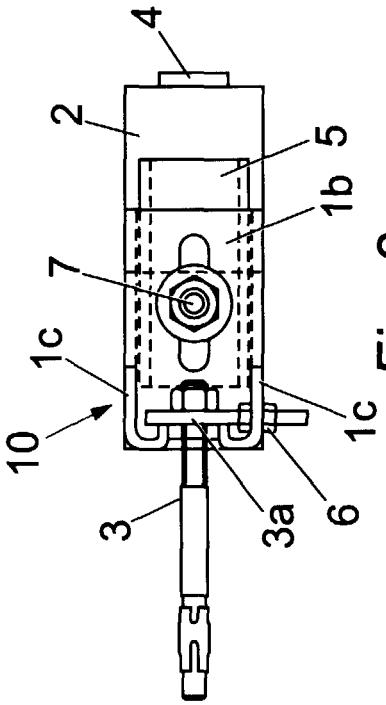

Fig. 2

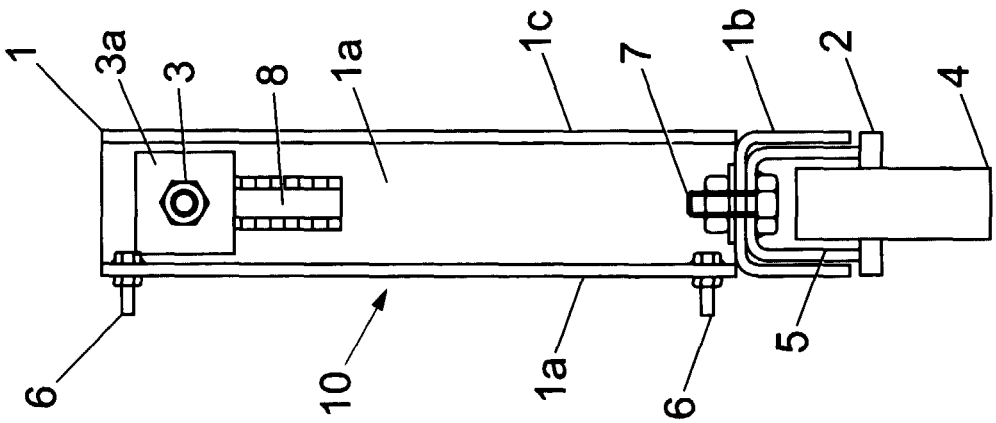

Fig. 1

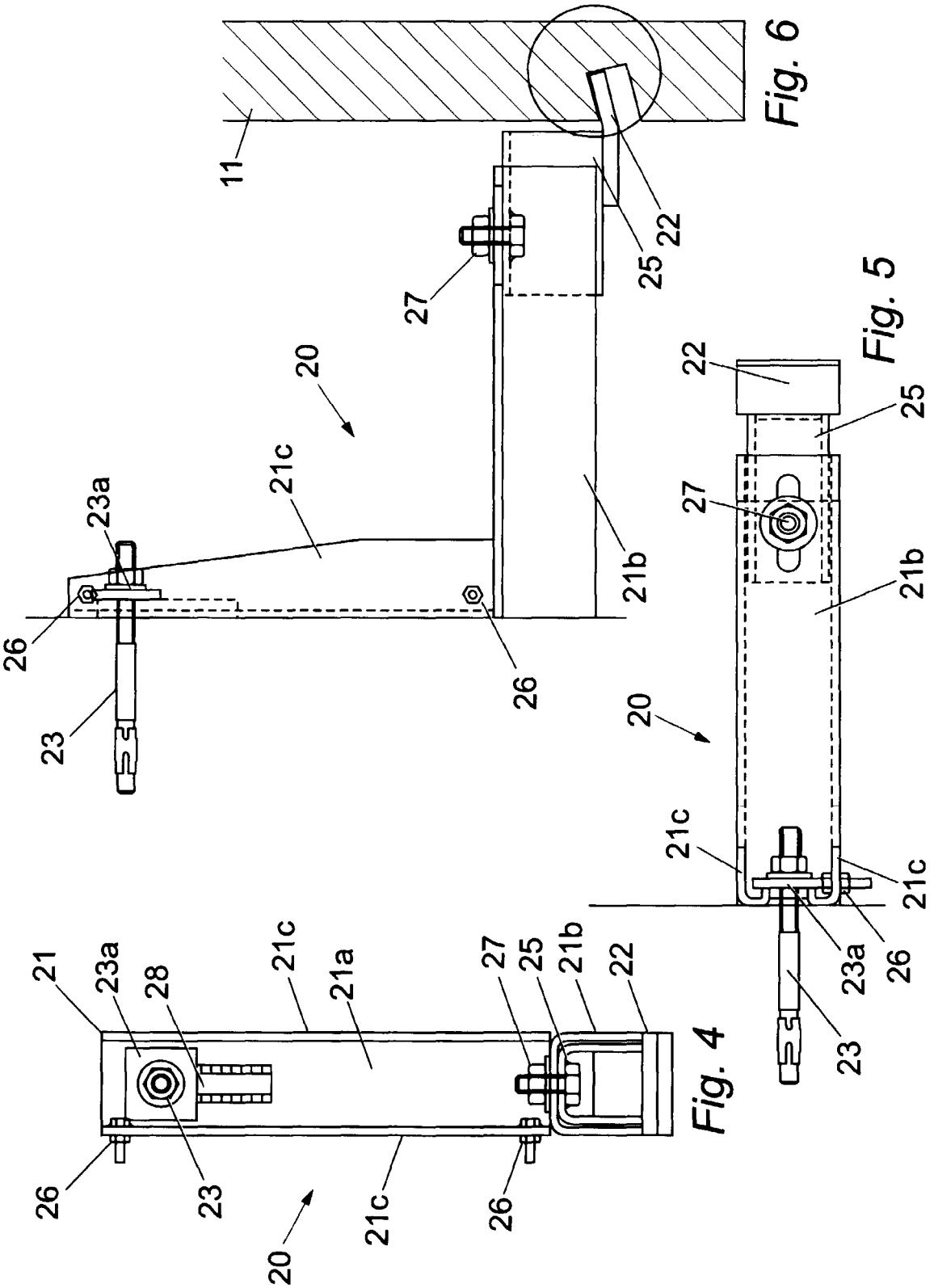
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Fig. 6
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Fig. 5
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Fig. 4

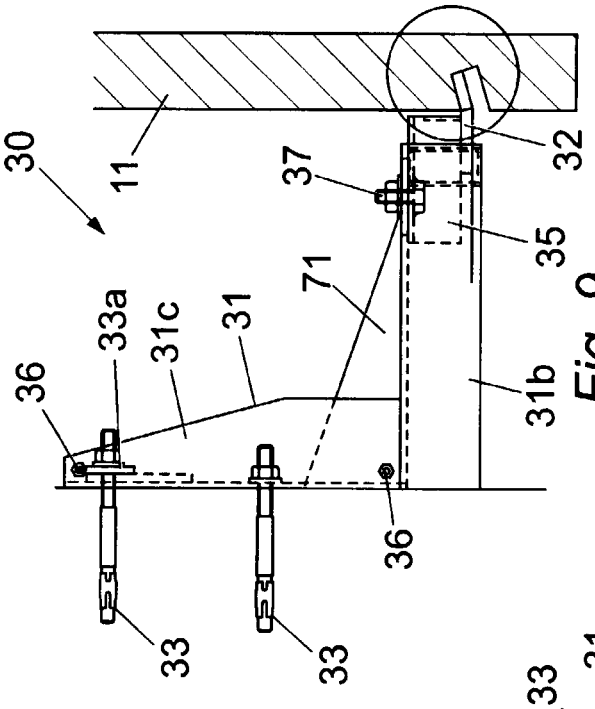

Fig. 9

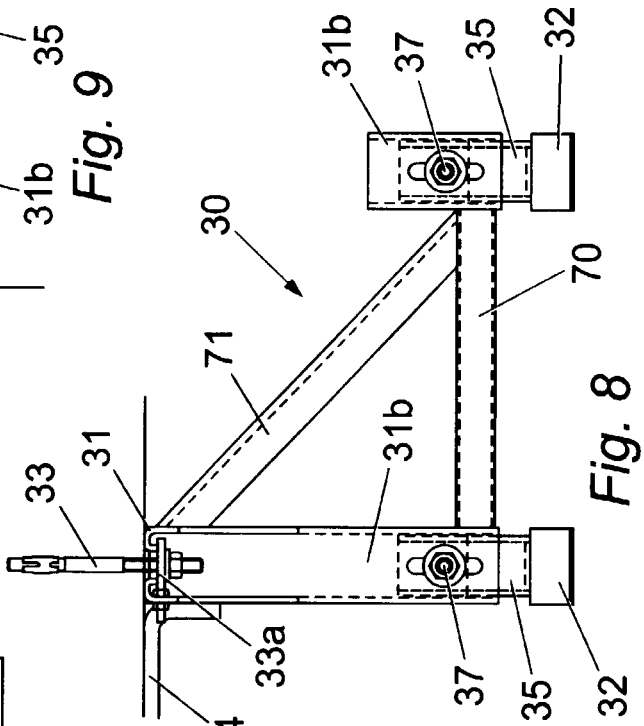

Fig. 8

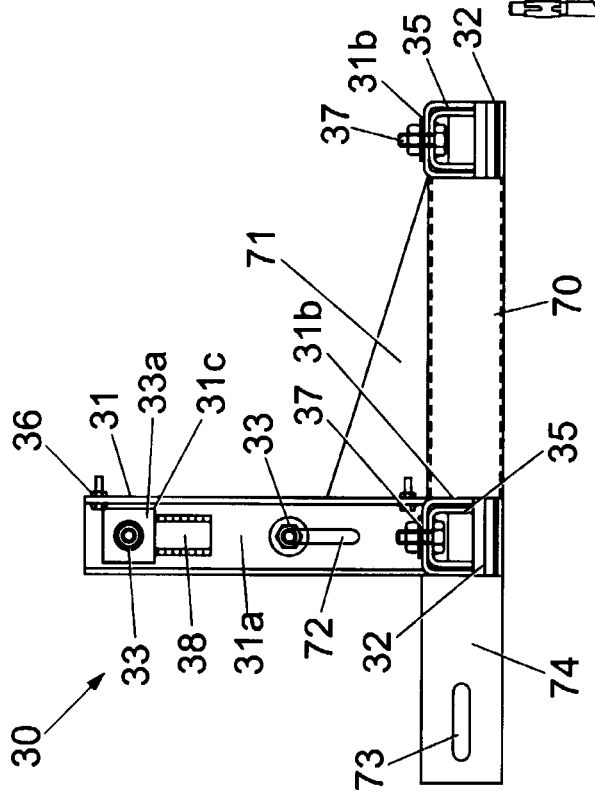

Fig. 7

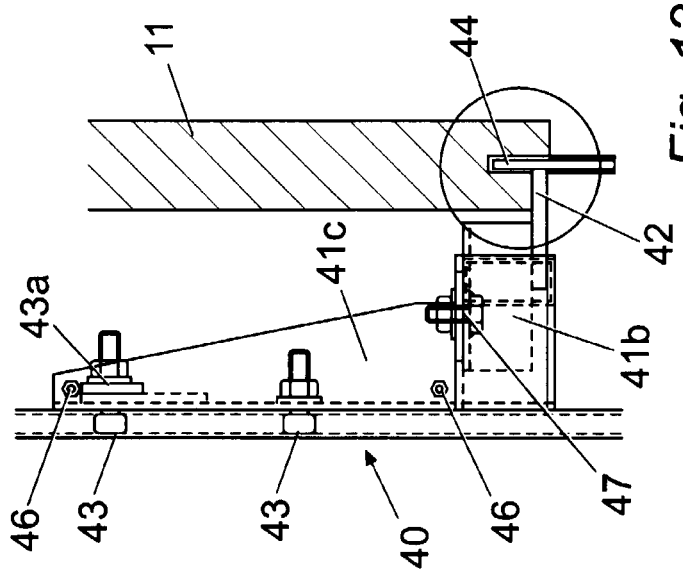

Fig. 12

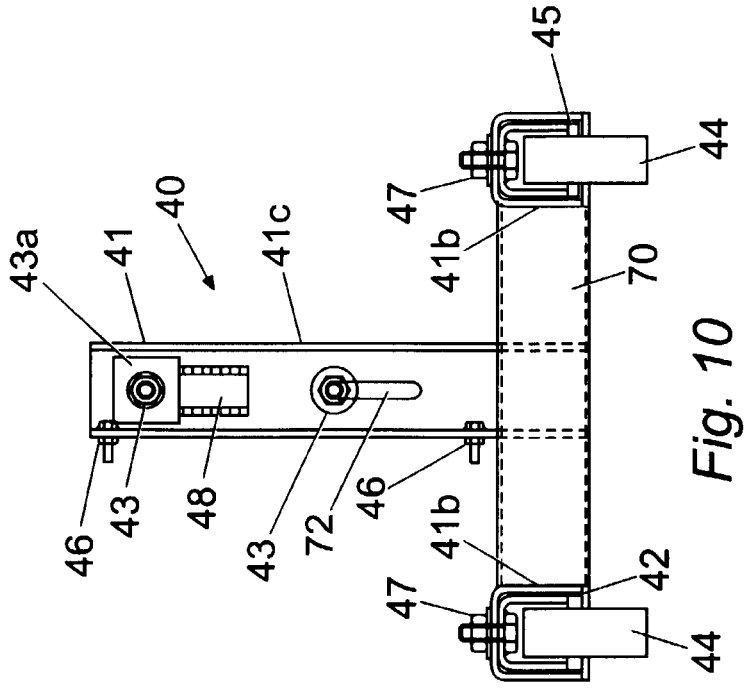

Fig. 10

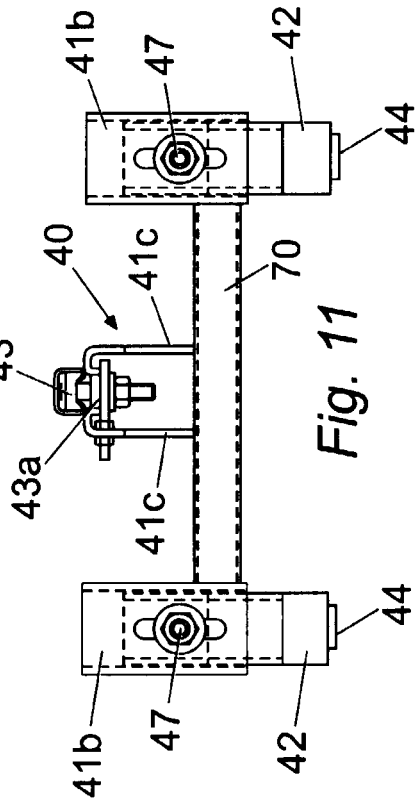

Fig. 11

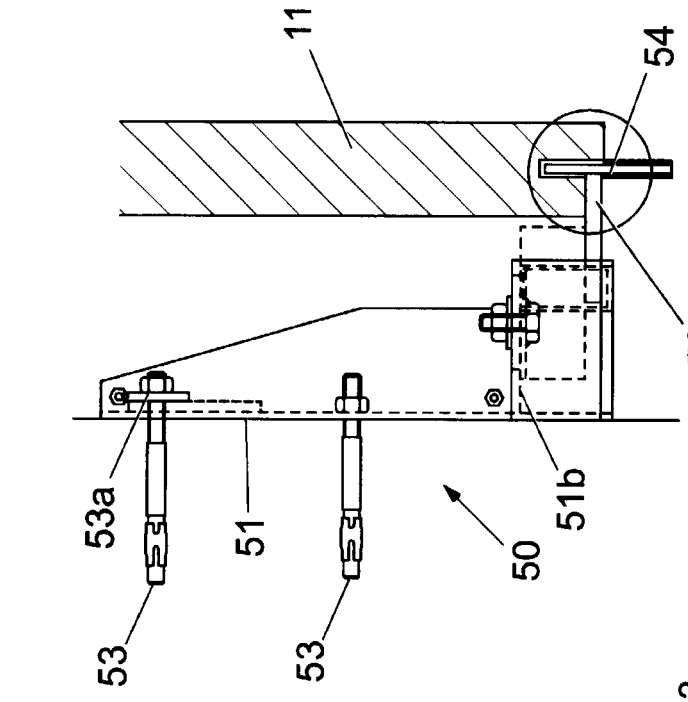

Fig. 15

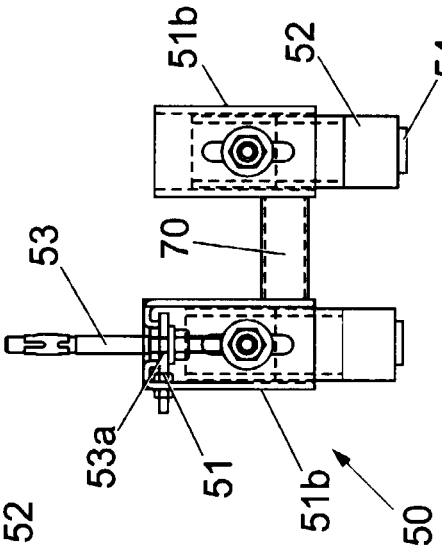

Fig. 14

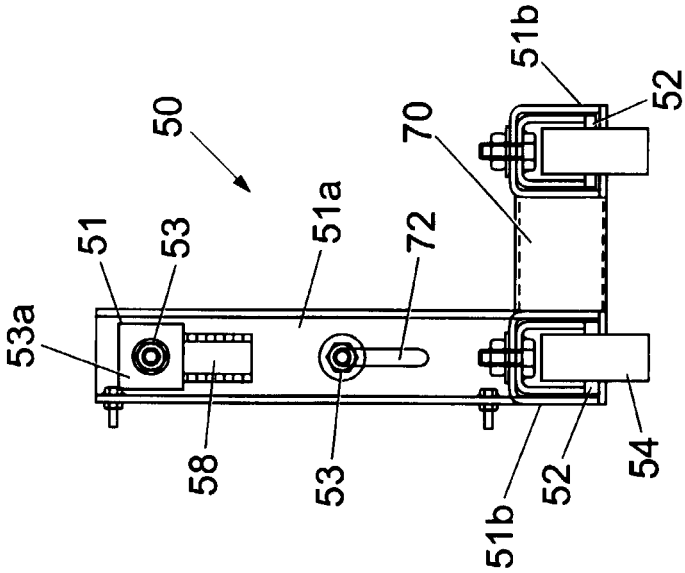

Fig. 13

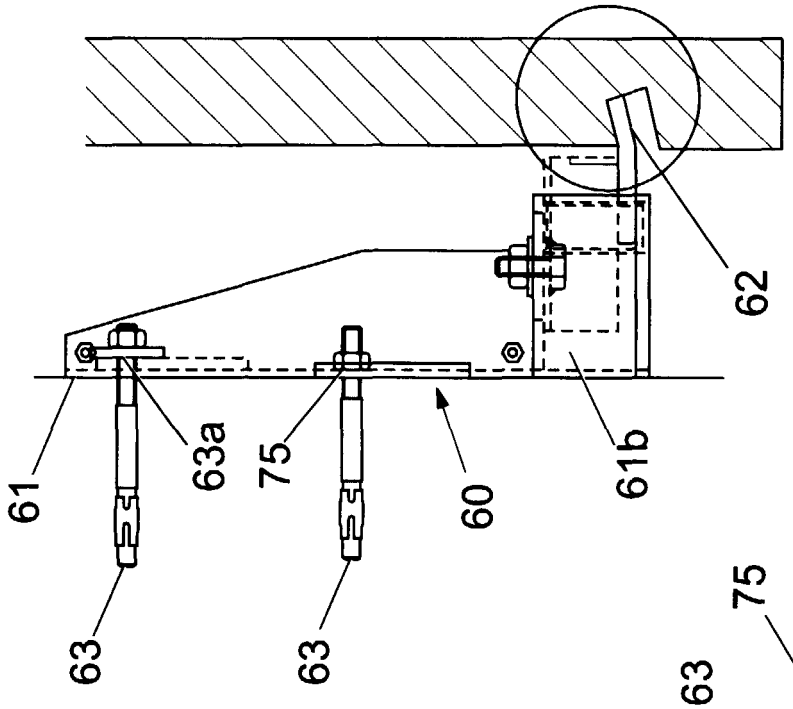

Fig. 18

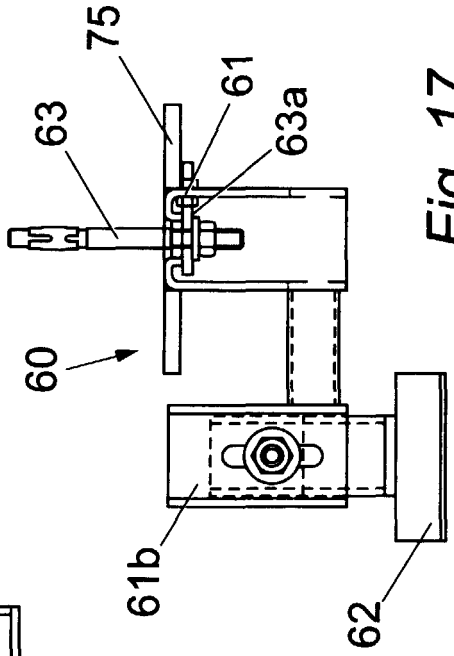

Fig. 17

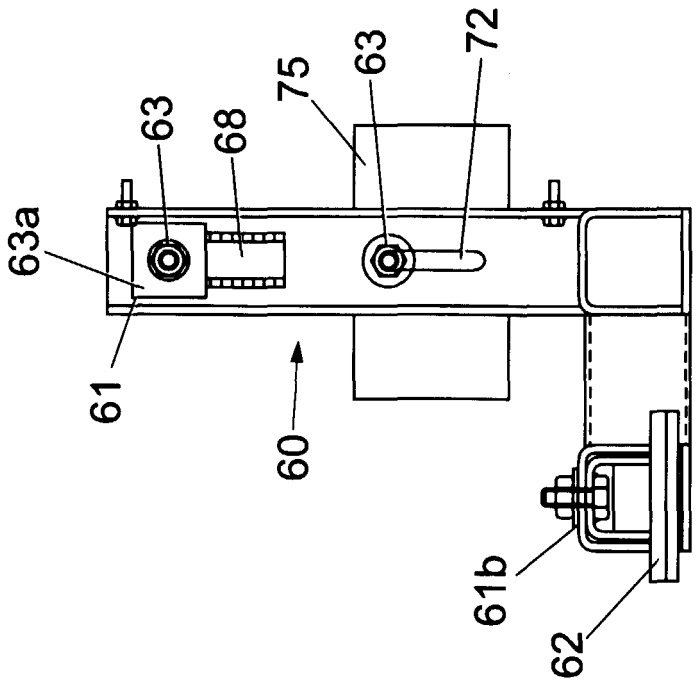

Fig. 16