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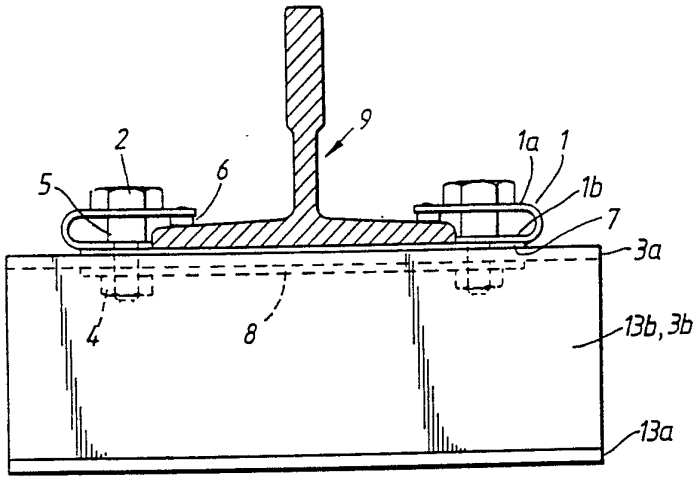

(57) Abstract

A lift guide rail mounting comprises a support bracket (3, 13) affixable to a lift shaft wall. A pair of U-shaped spring clips (1) are adapted to be so affixable to a face of said support bracket (3) that one arm of each clip (1) bears against the support bracket (3) to prevent lateral movement of the clips and the other arm of each clip (1) bears on a lateral flange of the guide rail urging it towards the support bracket. A respective pair of shoulder screws (2) affix the clips to the support bracket. Each shoulder screw passes through an aperture in both arms of the clip (1) and has a shoulder adapted to tighten against the arms of the clip (1) adjacent to the support bracket and a head spaced from the shoulder by such a distance that it does not bear on said other arm in normal use of the clip but does bear on other arm if the flange of the rail held by the arm is subjected to a force on an outward direction with respect to the support bracket means.

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GUIDE RAIL MOUNTING

The present invention relates to mountings for guide rails. More particularly, but not exclusively, it relates to an improved spring clip type of mounting for lift guide rails.

High speed lifts for use in tall buildings set demanding criteria on the design of a suitable guide rail mounting. It is important for comfort and safety in operation of such lifts that the mounting of the guide rail be laterally aligned accurately and securely to prevent wobbling or jolting of the lift in its journey. Also the guide rail must be able to slide to compensate for differential movement between the guide rail and lift shaft. This differential movement may be as a consequence of settlement of the building or as a consequence of thermal expansion or contraction of the guide rail or of the metal infrastructure of the building.

This possibility of differential movement means that solid guide rail clips cannot be used. Such solid clips are normally steel forgings which clamp the rail rigidly to the supporting structure and give high shear strength and safety. Instead, some form of sliding clip must be used, and hitherto there have been three major alternatives.

One is the use of spring clips, which are manufactured from spring steel in the form of a U-shape. One arm of the U is clamped solidly to the support bracket while the other arm bears on the rail and a clamping force is generated by the deflection of the clip as it is tightened to the support bracket. The clamping force depends on the spring characteristics, and the variability of this force will depend on manufacturing accuracies or inaccuracies of both the rail and clip. The stress levels induced at the bend may be high and this may require that the clip is hardened and/or tempered after forming. Thus, spring clips may be expensive but, in general, have good characteristics as mountings in that they are of reasonable strength, resilience and slidability and are extremely easy to use.

An alternative is use of pressed steel clips. These are cheap in that they require only one stamped part from the relatively cheap material, mild steel plate. However, as the bolt is tightened, the stress level in the bend of the clip will exceed the yield stress of the material, thereby forming a plastic hinge which generates a substantially constant clamping force. However, the clip has a limited recovery potential and therefore any rail movement after the clip has been fully tightened may cause the clip to take a further permanent set and allow loosening.

A further alternative is use of constraining clips. These are designed to constrain and support the rail in a horizontal plane but to allow it to move freely in a vertical plane. Theoretically, the clamping force between rail and clip is nil, although this theoretical optimum is difficult to achieve as it relies on the skill and care of the installation personnel to ensure that the rail is constrained yet not actually clamped. Also, this type of clip has no effective ability to correct for guide

rail manufacturing errors since it is not intended to generate clamping forces. Furthermore, it is possible that if there is continual relative movement between the rail and the clip, there may be a loss of constraint due to brinelling of the parts and therefore the clip may need to be adjusted in service.

It is an object of the invention to provide a mounting for guide rails which overcomes or reduces the disadvantages of the above prior fastenings.

According to the present invention there is provided a lift guide rail mounting comprising support bracket means affixable to a lift shaft wall, a pair of U-shaped spring clips adapted to be so affixed to a face of said support bracket means that one arm of each clip bears against the support bracket means to prevent lateral movement of the clips and the other arm of each clip bears on a lateral flange of the guide rail urging it towards the support bracket means, and a respective pair of shoulder screw means to affix the clips to the support bracket means, each shoulder screw means passing through apertures in both arms of the clip and having a shoulder adapted to tighten against the arm of the clip adjacent to the support bracket means and a head spaced from the shoulder by such a distance that it does not bear on said other arm in normal use of the clip but does bear on said other arm if the flange of the rail held by the arm is subjected to a force in an outward direction with respect to the support bracket means.

The pair of shoulder screw means may comprise a pair of shouldered bolts cooperable with a respective pair of nuts, said nuts being spaced a predetermined distance apart by spacer means.

In such a case, the support bracket means may have transversely elongate apertures through which said shoulder screw means may be fixed, whereby the rail can be

aligned vertically with both shoulder screw means in place, and each shoulder screw means may then be tightened to hold the rail in place.

Preferably each clip comprises a bearing zone of comparatively lower frictional resistance, said zone being adapted to bear on the flange.

The zone may be a button or stud of material such as stainless steel.

Additionally or alternatively, a bearing area of comparatively lower frictional resistance may be interposed between the rail and the support bracket means.

The support bracket means may comprise first and second substantially right angled brackets, said first bracket being fixable to the wall of the lift shaft, the second bracket providing a surface against which the rail may be affixed, the first and second brackets being so connected that the distance between said face of said second bracket and the wall of the lift shaft is adjustable.

An embodiment of the present invention will now be more particularly described by way of example and with reference to the accompanying drawings, wherein:

FIGURE 1 is a perspective view of a guide rail mounting embodying the present invention; and

FIGURE 2 is a plan view of the guide rail mounting.

A lift guide rail 9 comprises a generally T-shaped section of which one arm comprises the guide rail itself, while the other two form a pair of flanges attached to the foot of the guide rail. As stated above, it must be free to move in a longitudinal direction to accommodate differential expansion between the guide rail and the building in which it is set or to accommodate settlement of the building. It must also be aligned transversely so that the entire guide rail is absolutely vertical or as near as

can be managed, so that the lift is not shaken or misaligned during its journey.

A support bracket for the guide rail comprises a pair of connected substantially right angled brackets 3,13. The first bracket 13 is fixed to the wall of the lift shaft by means of bolts or the like passing through apertures 12. The second bracket 3 is attached to the first bracket 13 by means of bolts 14 cooperating with nuts 16, a pair of nuts 16 being affixed to a spacer plate 15 to allow easier connection. A vertically disposed face 3a of the second bracket 3 can thus be arranged at a predetermined distance from the wall of the lift shaft. This face 3a is adapted to receive the guide rail 9.

The guide rail is held by a pair of spring clips 1, held to the face 3a of the bracket 3 by means of respective shoulder screws 2. The spring clips are each of U shape and preferably comprise hardened tempered steel. The U shape includes a first arm 1a and a second arm 1b, the latter of which is intended to abut the vertical face 3a of the support bracket. Each arm of the U is provided with an aperture to accommodate the shouldered screw 2.

Each shouldered screw 2 has a hexagon head and a shoulder spaced longitudinally (in the direction of the screw thread) therefrom by such a distance that the shoulder contacts the inner arm 1b of the U while still allowing a distance of between 0.5 and 1.5 mm between the head of the screw and the outer arm 1a of the U-clip.

The pair of shouldered screws 2 each engage with nuts 4 affixed to a spacer plate 8 on the remote side of the face 3a.

The U-shaped spring clips operate in the manner of spring clips, holding flanges of the rail against the face 3a. The shouldered screws 2 may be almost tightened to hold the flanges of the rail 9 and then moved transversely as a pair, still holding the rail 9, in

transverse slots 10 of face 3a. The guide rail can thus be aligned to be vertical. The screws are then further tightened to hold the rail fixedly in such a predetermined disposition.

As can be seen, the bearing force on the rail is not unduly great and therefore the rail can slide vertically within the clips. In order to enhance this slidability, the clips are provided with buttons 6 of stainless steel which has a lower coefficient of friction than the material of the clip itself. It is also less prone to corrosion and thereby damage to its surface which might increase the coefficient of friction. Similarly, a slide plate 7 is provided between the rail 9 and the face 3a to allow easier movement between the rail 9 and the face 3a.

In order to install a guide rail, the support brackets are attached to the wall of the lift shaft and the guide rail or guide rail section is placed more or less in position. The clips 1 are then applied but the shouldered screws 2 are not fully tightened into their nuts 4. The guide rail 9 is then aligned vertically and at least one of the nuts 2 is tightened to hold the rail in place. The other clip will move, by virtue of the spacer plate 8, as the first mentioned screw moves. This second screw can be tightened later.

In normal circumstances, the clips 1 act as spring clips allowing vertical movement of the guide rail 9 but preventing movement of the guide rail flanges away from the face 3a. If the force on the guide rail 9 should be such as to cause some pivotal movement about an end edge of a flange of the guide rail, the clip against which the force is exerted will allow such movement until the outward face 1a of the clip contacts the head of the screw 2. At this point, the load is relieved from the bend of the U-clip and transferred to a point of the clip in contact with

the head of the screw 2. Thus the spring characteristics of the clip change markedly, strengthening perhaps by as much as three times. Accordingly, unless the force on the guide rail is extra-ordinarily excessive, the guide rail will still remain held within the clip 1.

Thus the mounting embodying the present invention will allow vertical movement of the guide rail 9 whilst still preventing such transverse movement as would cause a flange of the rail to distance itself from the face 3a by as little as 1 mm. Since both shoulder screws 2 are attached to a spacer plate 8, the final adjustment of both clips, and hence the rail 9 held by them, may be easily accomplished. Expected forces on the guide rail 9 are accommodated in the same manner as they would be for normal spring clips, but there is a measure of safety in that extraordinary deflections of the guide rail are prevented by virtue of the heads of the screws 2 contacting the outer arm 1a of the spring clips.

CLAIMS:

1. A lift guide rail mounting comprising support bracket means affixable to a lift shaft wall, a pair of U-shaped spring clips adapted to be so affixed to a face of said support bracket means that one arm of each clip bears against the support bracket means to prevent lateral movement of the clips and the other arm of each clip bears on a lateral flange of the guide rail urging it towards the support bracket means, and a respective pair of shoulder screw means to affix the clips to the support bracket means, each shoulder screw means passing through apertures in both arms of the clip and having a shoulder adapted to tighten against the arm of the clip adjacent to the support bracket means and a head spaced from the shoulder by such a distance that it does not bear on said other arm in normal use of the clip but does bear on said other arm if the flange of the rail held by the arm is subjected to a force in an outward direction with respect to the support bracket means.

2. A lift guide rail as claimed in claim 1, wherein the pair of shoulder screw means comprises a pair of shouldered bolts cooperable with a respective pair of nuts, said nuts being spaced a predetermined distance apart by spacer means.

3. A lift guide rail as claimed in claim 2, wherein the support bracket means has transversely elongate apertures through which said shoulder screw means may be fixed, whereby the rail can be aligned vertically with both shoulder screw means in place, and each shoulder screw means may then be tightened to hold the rail in place.

4. A lift guide rail as claimed in any one of the preceding claims, wherein each clip comprises a bearing zone adapted to bear on the flange and of material having a comparatively lower frictional resistance than that of the clip.

5. A lift guide rail as claimed in claim 4, wherein said bearing zone is a button or stud of material such as stainless steel.

6. A lift guide rail as claimed in claim 4, wherein a bearing area of comparatively lower frictional resistance is interposed between the rail and the support bracket means.

7. A lift guide rail as claimed in any one of the preceding claims, wherein the support bracket means comprises first and second substantially right angled brackets, said first bracket being fixable to the wall of the lift shaft, the second bracket providing a surface against which the clip may bear, the first and second brackets being so connected that the distance between said surface of said second bracket and the wall of the lift shaft is adjustable.

8. A lift guide rail substantially as described herein with reference to the accompanying drawings.

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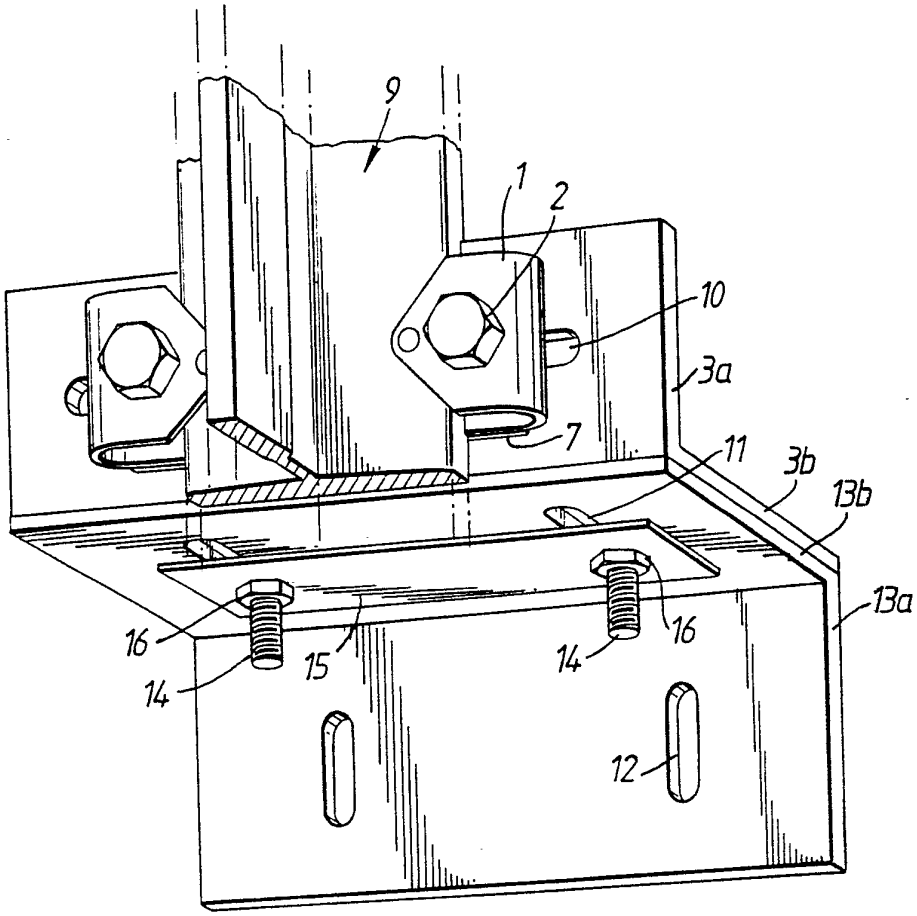
9
1
2
10
3a
7
11
3b
13b
13a
16
15
14
16
14
12

Fig.1.

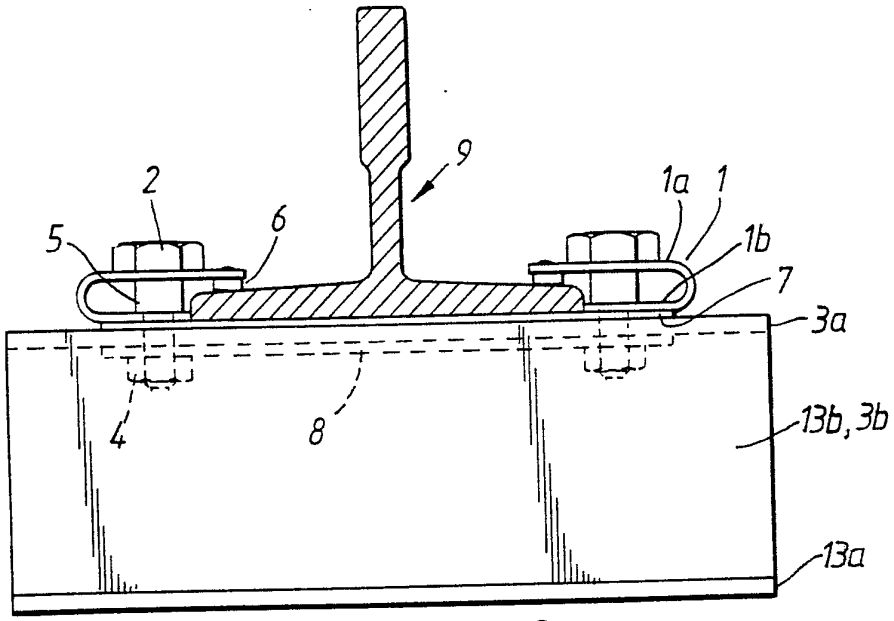
9
2
1a
1
5
6
1b
7
3a
4
8
13b, 3b
13a

Fig.2.

INTERNATIONAL SEARCH REPORT

International Application No PCT/GB 90/00846

I. CLASSIFICATION OF SUBJECT MATTER (if several classification symbols apply, indicate all)[6]

According to International Patent Classification (IPC) or to both National Classification and IPC

Int.Cl. 5 B66B7/02

II. FIELDS SEARCHED

Minimum Documentation Searched[7]

Classification System	Classification Symbols
Int.Cl. 5	B66B

Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched[8]

III. DOCUMENTS CONSIDERED TO BE RELEVANT[9]

Category °	Citation of Document,[11] with indication, where appropriate, of the relevant passages[12]	Relevant to Claim No.[13]
X	US,A,1925867 (DUNLOP) 5 September 1933 see page 2, line 122 - page 3, line 43; figures 8-12	1-8
X	US,A,3982692 (FEYRER ET AL) 28 September 1976 see column 4, line 15 - column 5, line 23; figures 1, 2	1, 4, 6, 8
A	US,A,3199642 (ANDERSON) 10 August 1965 see column 2, line 34 - column 3, line 19; figures 1-3	1-3
A	US,A,4431087 (KAROL) 14 February 1984 see column 5, lines 5 - 54; figures 1-4	1-3, 8
A	GB,A,2043590 (OTIS ELEVATOR COMPANY) 08 October 1980 see page 2, lines 11 - 78; figures 1-5	1-8

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IV. CERTIFICATION

Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report
29 AUGUST 1990	25.09.90
International Searching Authority	**Signature of Authorized Officer**
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ANNEX TO THE INTERNATIONAL SEARCH REPORT ON INTERNATIONAL PATENT APPLICATION NO.

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This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report. The members are as contained in the European Patent Office EDP file on
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Patent document cited in search report	Publication date	Patent family member(s)		Publication date
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		FR-A,B	2278975	13-02-76
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		AU-A-	5601380	11-09-80
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