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Fixings and methods of assembly

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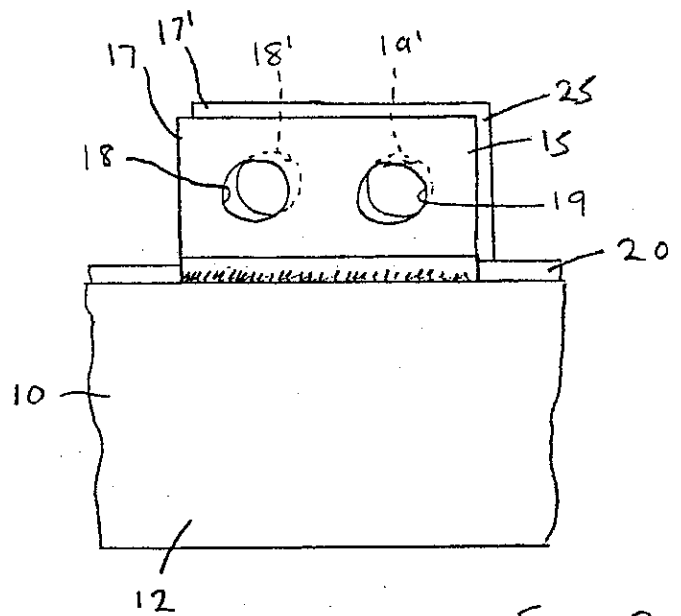
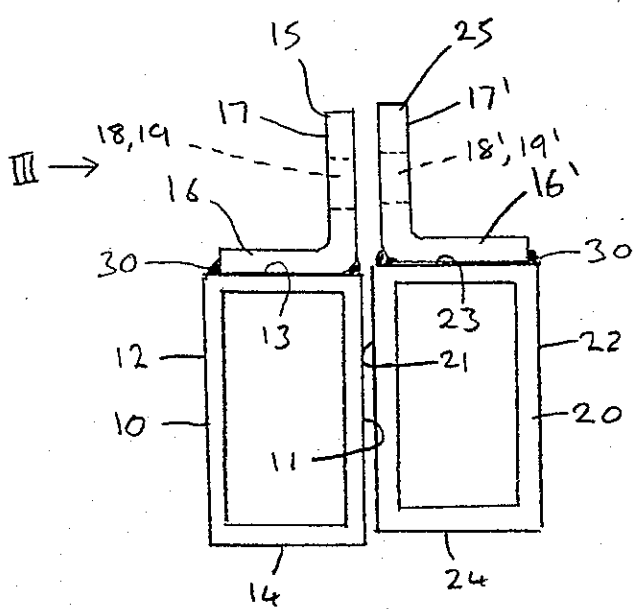
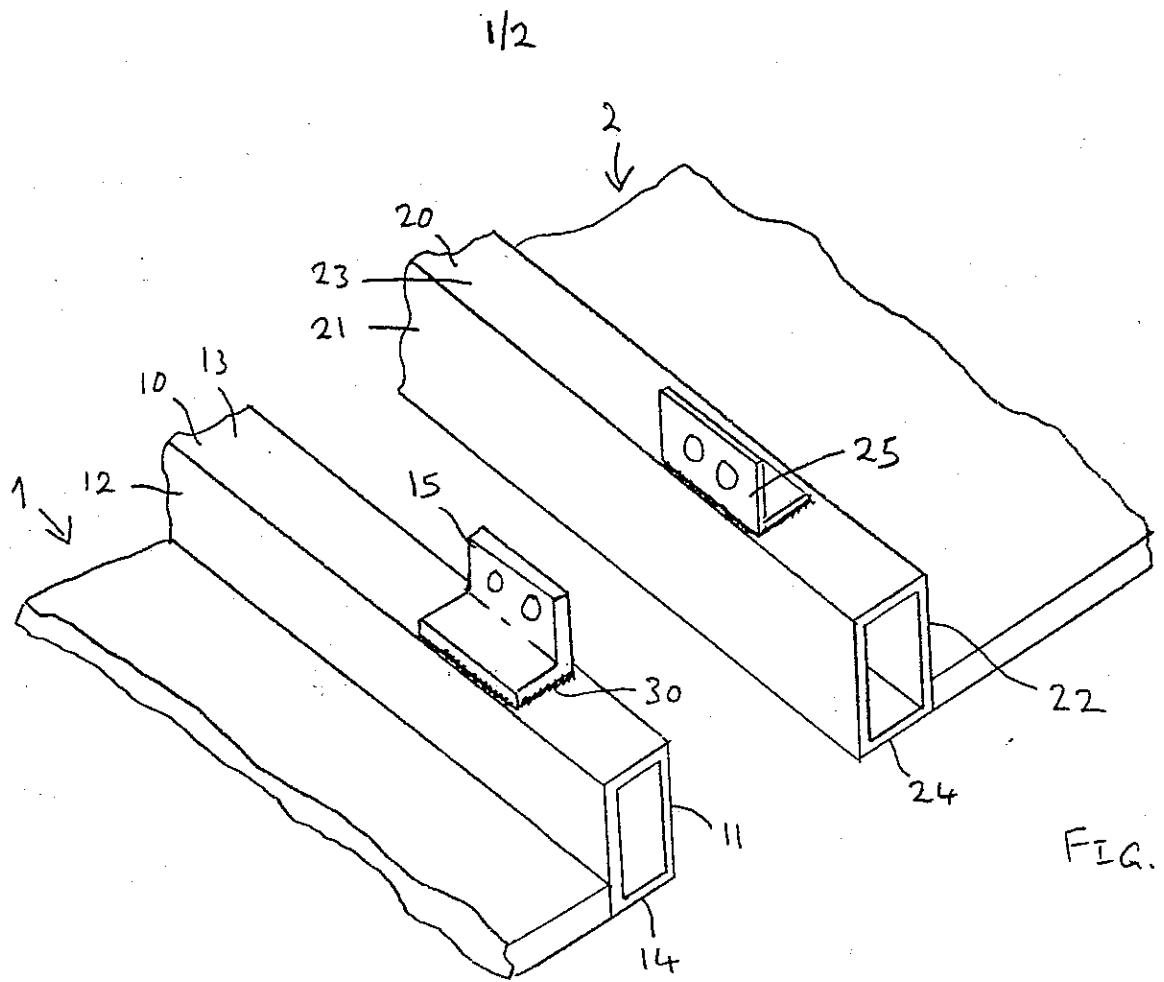
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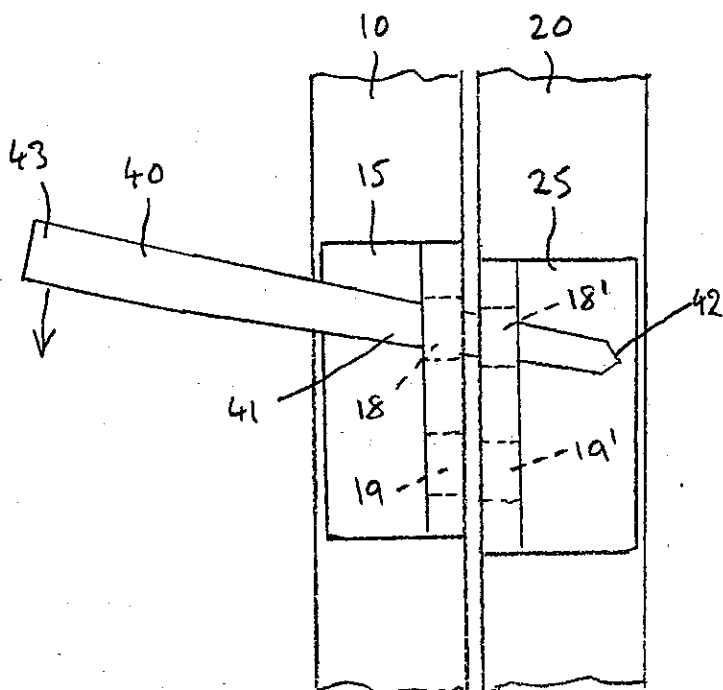


FIG. 4

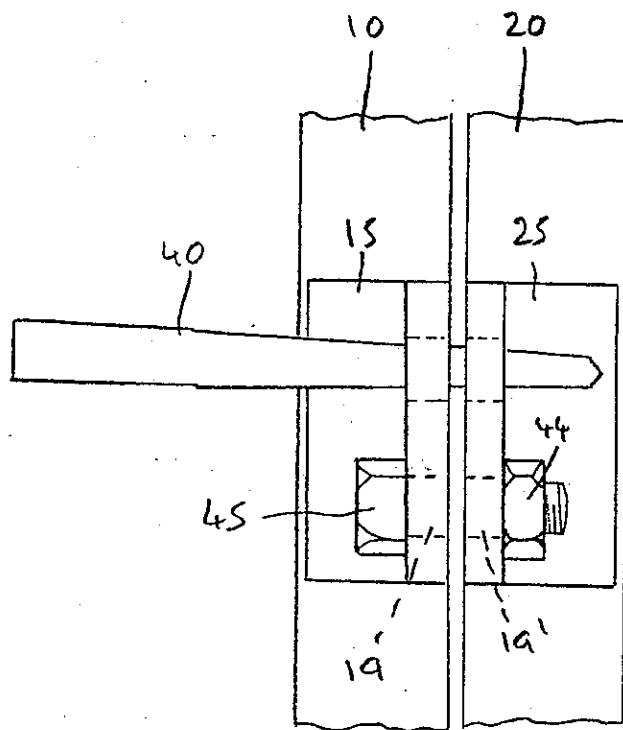


FIG. 5

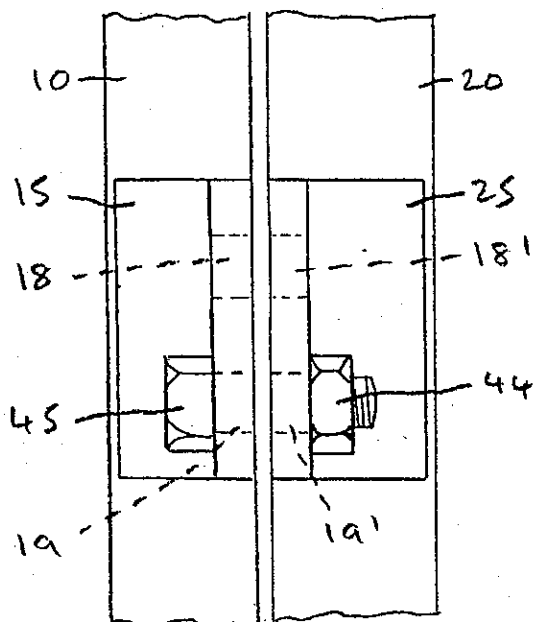


FIG. 6

FIXINGS AND METHODS OF ASSEMBLY

This invention relates to fixings and to methods of assembly.

Stage scenery and the like is often assembled from separate units. The different units each have lugs welded to a part of the unit, the lugs on the different units being secured with one another by means of a bolt passing through a single hole in the respective lugs. When the units are brought together for securing, there is often a small misalignment between the holes in the respective lugs, such as may be caused by an uneven floor surface on which the units rest, or by damage to one or other unit. The usual way of bringing the holes in the lugs into alignment is by using an alignment tool or "podger". This tool has a tapered metal prong, which is inserted through the hole in one lug and is angled such that it also passes through the hole in the other lug. The tool is then levered to a position where it extends perpendicularly to the lug, thereby moving one or both lugs and aligning their holes. The alignment tool is then removed and a bolt is inserted through the holes in the two lugs, to secure the two units together.

One problem with this arrangement is that, when the alignment tool is removed, the lugs may move out of alignment before the bolt can be inserted. This is a particular problem where several people are working on the units at the same time. Because scenery often has to be assembled very quickly, it is particularly important that the units can be bolted together without delays of the kind that this problem produces.

It is an object of the present invention to provide an improved fixing and method of assembly.

According to one aspect of the present invention there is provided a method of assembling together two units by means of two fixings and a single fixing member extending between the fixings, including the steps of attaching a fixing to each unit, bringing together the two units so as approximately to align respective fixings on the two units, inserting an alignment tool through a hole of the fixing on one unit and into a respective one hole of the fixing on the other unit, and levering the alignment tool to bring the respective fixings into full alignment, the improvement wherein the two fixings are each provided with an additional hole, wherein the fixing member is inserted through the said additional hole of each fixing while the alignment tool is in position in said one hole, and wherein the alignment tool is subsequently removed.

The fixing member is preferably a bolt. Each fixing may include a plate member extending parallel to an abutting surface of the respective unit, the holes being formed in the plate member. The fixings are preferably lugs of L-shape in section having two arms, the holes being formed in one arm and the other arm being attached with a respective one of the units. The fixings are preferably welded to respective units and may be of steel. The holes are preferably arranged along the length of each fixing. The alignment tool may be tapered and the units may be wheeled trucks.

According to another aspect of the present invention there is provided a fixing when used in a method according to the above one aspect of the invention.

The fixing may comprise a metal plate member having a first part secured with one of the units and a second part extending from the first part, the second part including an alignment hole within which the alignment tool is inserted and a further hole within which the fixing member is inserted.

According to yet another aspect of the present invention there is provided a scenery assembly assembled by a method according to the above one aspect of the invention.

According to a further aspect of the present invention there is provided a scenery assembly including a fixing according to the above other aspect of the present invention.

A scenery assembly including two units with fixings and a method of assembling the units, in accordance with the present invention, will now be described, by way of example, with reference to the accompanying drawings, in which:

Figure 1 is a perspective view of a part of the assembly with the units separated;

Figure 2 is a side elevation view of the assembly with the units brought together and before being secured together;

Figure 3 is a view along the arrow III of Figure 2; and

Figures 4 to 6 are plan views illustrating successive steps in the method of securing the units together.

With reference first to Figures 1 to 3, the assembly comprises two units 1 and 2 of stage scenery, which might, for example, be wheeled trucks. Each unit 1 and 2 includes a respective steel beam 10 and 20 of hollow rectangular section, shown here with their wider faces 11 and 12, and 21 and 22 extending vertically, and with their narrower faces 13 and 14, and 23 and 24 extending horizontally. Typically, the wider faces 11, 12, 21 and 22 of the beams 10 and 20 are about 80mm wide and the narrower faces 13, 14, 23 and 24 are about 40mm wide. The upper one of the narrower faces 13 and 23 each supports several fixings or lugs 15 and 25, only one of which is shown on each beam.

The lugs on the two beams 10 and 20 are identical so the construction of only one lug 15 will be described. Equivalent features on the other lug 25 are given the same reference number with the addition of a prime '. The lug 15 is about 70mm long and is formed from mild steel plate about 4-5mm thick bent at right angles to form an L-shape section with two

perpendicular parts or arms 16 and 17 each about 35mm wide across their outer, wider faces. One arm 16 is imperforate, without any holes; the other arm 17 has two circular holes 18 and 19 with a diameter of about 12mm, to receive 10mm bolts. The two holes 18 and 19 are equally spaced from one another along the length of the arm 17. The imperforate arm 16 lies flat against the upper face 13 of the beam 10 and is secured to the beam by a weld line 30 around its edge. The arm 17 with the two holes 18 and 19 projects vertically upwards from the beam 10 and is located on the side of the beam that will, in use, abut the other beam 20 substantially parallel with the abutting surface 11.

The two units 1 and 2 are brought together with the lugs 15 and 25 in alignment so that the vertical arms 17 and 17' of the lugs face one another and with their holes 18 and 18', and 19 and 19' as closely aligned as possible. It is often the case, however, that the holes in the two lugs are not accurately enough aligned to enable a bolt to pass through a hole in both lugs. This may be because the final positioning of the two units is difficult or because of imperfections in the units or unevenness in the floor or other support surface on which the units rest. Figures 2 and 3 illustrate such a situation where the lugs are slightly out of alignment.

The lugs 15 and 25 are brought into alignment and secured together in the manner shown in Figures 4 to 6 using a conventional alignment tool or podger 40. The alignment tool 40 is about 300mm long, of circular section and is made of steel, or a similar rigid material. The forward end 41 of the tool 40 is tapered along its length to its forward, pointed tip 42. The diameter of the forward end 41 is less than that of the holes 18 and 18' along a length of

about 40mm extending from the tip 42. At its rear end, the tool 40 has a handle portion 43 of enlarged diameter. The tool 40 is used by inserting its forward end 41 through a hole 18 in one lug 15 and angling the tool appropriately so that it also extends through the corresponding hole 18' in the other lug 25, as shown in Figure 4. The tool 40 is gripped by its handle 43 and is levered to a position where it extends perpendicularly to the lug 15, thereby bringing the two lugs into alignment. In this position, the other hole 19 and 19' in each lug 15 and 25 is brought into alignment. The next step is to secure a fixing member in the form of a nut 44 and bolt 45 in the other holes 19 and 19', without removing the tool 40, as shown in Figure 5. Once the two lugs 15 and 25 are secured with one another, the tool 40 is removed, as shown in Figure 6. Usually, a nut and bolt 44 and 45 is secured in only one of the holes 19, 19' although a bolt could be inserted in the other hole 18, 18', after removal of the tool 40, if a more permanent fixing is required.

Various modifications are possible. For example, instead of arranging the two holes side-by-side, they could be positioned one above the other. The lugs need not be attached to the units by welding but could be attached in some other way, such as, for example, by bolts, screws or adhesive. Alternatively, the lugs could be formed from a part of the units themselves. It will be appreciated that the invention is not confined to use with scenery but could be used in other applications where it is necessary to align units in a similar way.

CLAIMS

1. A method of assembling together two units by means of two fixings and a single fixing member extending between the fixings, including the steps of attaching a fixing to each unit, bringing together the two units so as approximately to align respective fixings on the two units, inserting an alignment tool through a hole of the fixing on one unit and into a respective one hole of the fixing on the other unit, and levering the alignment tool to bring the respective fixings into full alignment, the improvement wherein the two fixings are each provided with an additional hole, wherein the fixing member is inserted through the said additional hole of each fixing while the alignment tool is in position in said one hole, and wherein the alignment tool is subsequently removed.
2. A method according to Claim 1, wherein said fixing member is a bolt.
3. A method according to Claim 1 or 2, wherein each said fixing includes a plate member extending parallel to an abutting surface of the respective unit, and wherein said holes are formed in said plate member.
4. A method according to any one of the preceding claims, wherein said fixings are lugs of L-shape in section having two arms, wherein said holes are formed in one arm, and wherein the other arm is attached with a respective one of said units.

5. A method according to any one of the preceding claims, wherein said fixings are welded to respective units.
6. A method according to any one of the preceding claims, wherein said fixings are of steel.
7. A method according to any one of the preceding claims, wherein the said two holes are arranged along the length of each fixing.
8. A method according to any one of the preceding claims, wherein the alignment tool is tapered.
9. A method according to any one of the preceding claims, wherein said units are wheeled trucks.
10. A method of assembling together two units substantially as hereinbefore described with reference to the accompanying drawings.
11. A fixing when used in a method according to any one of Claims 1 to 10.
12. A fixing according to Claim 11, wherein the fixing comprises a metal plate member having a first part secured with one of said units and a second part extending from said first part, and wherein said second part includes an alignment hole within which

said alignment tool is inserted and a further hole within which said fixing member is inserted.

13. A fixing substantially as hereinbefore described with reference to the accompanying drawings.
14. A scenery assembly assembled by a method according to any one of Claims 1 to 10.
15. A scenery assembly including a fixing according to any one of Claims 11 to 13.
16. A scenery assembly assembled substantially as hereinbefore described with reference to the accompanying drawings.