(19) Europäisches Patentamt
European Patent Office
Office européen des brevets

(11) Publication number: **0 363 036 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **89309451.6**

(51) Int. Cl.5: **A47F 5/10 , A47B 91/00**

(22) Date of filing: **18.09.89**

(30) Priority: **04.10.88 GB 8823287**

(43) Date of publication of application:
11.04.90 Bulletin 90/15

(84) Designated Contracting States:
BE DE ES FR IT

(71) Applicant: **BAXTER FELL NORTHFLEET LIMITED**
Tower Works Lower Road
Gravesend Kent DA11 9BE(GB)

(72) Inventor: **Smyth-Tyrell, Anthony J.**
The Olde House North Street
Tillingham Essex CM0 7ST(GB)
Inventor: **Barnes, Paul**
33 Concord Avenue
Davis Estate Chatham Kent ME5 9TR(GB)

(74) Representative: **Geldard, David Guthrie et al**
URQUHART-DYKES AND LORD Tower House
Merrion Way
Leeds West Yorkshire LS2 8PA(GB)

(54) Support means for use in a display system.

(57) Support means for use in a display system comprises a hollow upright (1) having a substantially planar face (4) in which longitudinally aligned locating holes (6) are formed at substantially identical spacing along the length of the face, each pair of adjacent holes being separated by a web (8) of the material from which the upright is formed. A foot (2) engages the lower part of the upright to extend transversely thereto, the foot having at one end thereof a series of spaced lugs (10) which are engaged with locating holes (6) on the upright and which have regions that are locked behind parts of the webs of the upright to hold the foot in position relative to the upright. An insert (3) is located in that end of the upright with which the foot is engaged. The insert has a height at least substantially equal to the height of the foot, and has upper and lower sections (14, 15) that are of complementary cross-section to, and a close fit within, the interior of the upright. The insert also has a body extending between the upper and lower sections, the body being shaped so as to locate behind and to provide support to, at least some of those webs against which the foot is located.

EP 0 363 036 A2

SUPPORT MEANS FOR USE IN A DISPLAY SYSTEM

This invention relates to a support means for use in a display system.

Display systems are known which incorporate spaced tubular steel uprights, each fitted with a foot. Each upright has a series of locating holes formed therein, into which cantilever brackets may be engaged, shelves then being supported on the brackets. Back sheets to the shelves, together with other items of trim may also be secured to the upright.

In such display systems the feet are critical in giving stability to the system, and they are typically either manufactured from tubular steel sections or from two appropriately shaped steel plates. When the system is to be heavily loaded, the feet are generally welded to their respective uprights, while for lighter loadings they can be mechanically fixed to the uprights by any suitable engagement system.

The use of welded feet carries with it the disadvantage that the upright and foot combination must be manufactured and supplied as a unit to the point of installation. Thus, at the point of installation there is no mechanism by which the height or length of the foot may be varied. If such variation is required then it can only be achieved by supplying to the site a range of feet of different height, selecting the appropriate foot and then mechanically engaging it with the upright. This versatility is, however, only achieved at the expense of forfeiting the strength of a welded joint.

The invention has for its object to provide a support means for use in a display system, which support means provides a mechanical connection between a foot and an upright that it very much stronger than existing mechanical connections, and that can approach structural performance equivalent to that of a welded connection.

According to the invention, support means for use in a display system comprises a hollow upright having a substantially planar face in which longitudinally aligned locating holes are formed at substantially identical spacing along the length of the face, each pair of adjacent holes being separated by a web of the material from which the upright is formed; a foot engaged with the lower part of the upright to extend transversely thereto, the foot having at one end thereof a series of spaced lugs which are engaged with locating holes on the upright and which have regions that are locked behind parts of the webs of the upright to hold the foot in position relative to the upright; and an insert located in that end of the upright with which the foot is engaged, the insert having a height at least substantially equal to the height of the foot, and the insert having upper and lower sections that are of complementary cross-section to, and a close fit within the interior of the upright, and having a body extending between the upper and lower sections, the body being shaped so as to locate behind, and to provide support to, at least some of those webs against which the foot is located.

When a load is applied to a cantilever bracket engaged with an upright provided with a foot, then the effect of that load is to produce a twisting moment between the upright and the foot, producing a compressive load on that web of the upright adjacent to the upper part of the foot and a tensile load on that web of the upright adjacent to the lower part of the foot. In the construction according to the invention, the location of parts of the insert body immediately behind these webs, coupled with the close engagement of the upper and lower sections of the insert with the interior of the upright have the effect of speading these loads around the full cross-section of the upright. As a result, a very strong joint is effected between the foot and the upright and localised damage to the webs of the upright or elements of the foot is substantially reduced, or even eliminated.

The insert may take many different forms. The upper and lower sections that are of complementary cross-section to the interior of the upright may be provided at the upper and lower extremities of the insert or spaced some distance from those extremities. The height of these sections is not critical, but they should not present significant obstructions to the locating holes in the uprights. Furthermore, the upper section should ideally be at a height no lower than the upper part of the foot. If desired, the insert may have one or more additional sections that are complementary to the interior of the upright, and these may be located as required on the insert. Between the upper and lower sections the shape of the insert is such that it must provide the necessary support to some, and preferably to all, of the webs against which the foot is located, and it should also be shaped so that it does not hinder insertion and locking of the lugs of the foot into the locating holes of the upright.

It is preferred that the body of the insert, in those regions where it provides support to the webs, has a shape such that insert material extends completely across the interior of the upright to that interior surface of the upright opposite to the webs. This assists the load transference effect to which reference has already been made.

Conveniently the body of the insert may be an elongate plate having a width substantially equal to the distance between the interior surface of a web

and the opposite interior surface of the upright. The plate desirably has a thickness that is less than the width of a locating hole measured transversely of the upright, such reduced width allowing engagement of the lugs of the foot into the locating holes. The plate may be formed with cutouts lying immediately behind the locating holes in the upright, further to facilitate engagement of the lugs of the foot into the locating holes.

Despite the strength of the joint that is achieved in accordance with the invention, there remains the possibility that the bottom lug of the foot can twist relative to the upright under the applied forces. This can be overcome by constructing a very heavy bottom lug, or by using additional fixing means in this region. Preferably, however, the insert, desirably adjacent to the shaped lower section thereof, has a tongue projecting through the lowermost locating hole of the upright, the tongue carrying a formation that is engageable with a complementary formation on part of the foot spaced away from the upright This additional load bearing engagement between the upright and the foot effectively prevents the undesirable twisting, and also prevents any relative vertical movement between the foot and the upright.

The foot can take any one of a number of different forms, but preferably it comprises two side by side similar plates, each engaged with the lower part of the upright. Each plate has lugs, with one lug from each of the plates being engaged in a common one of the locating holes. If the body of the upright is of plate form then the lugs of the two plates of the foot will lie to opposite sides of that body. In order to facilitate insertion of the lugs of the foot into the locating holes, these lugs may be bent slightly out of the plane of the respective plate the lugs of one plate diverging from those of the other.

In the double plate foot construction, when the insert is provided with a tongue as already described, the plates may lie to opposite sides of the tongue, the tongue carrying formations on each side thereof, each formation being engageable with a complementary formation on a respective one of the plates.

Although the foregoing description has been written in the context of locating holes formed in one substantially planar face of the upright, it will be appreciated that locating holes may be formed in more than one such face, and particularly in two opposite faces. The insert will then be shaped so as to provide support to the webs of each face in which locating holes are provided, and the insert may also have a projecting tongue associated with each of those faces.

The invention will be better understood from the following description of a specific embodiment thereof, given with reference to the accompanying drawings in which:-

Figure 1 is a schematic part side elevation, part section of support means according to the invention;

Figure 2 is a cross-section on the line II of figure 1,

Figure 3 is an isometric view of an insert used in the construction;

Figure 4 is a side elevation of a foot; and

Figure 5 is a plan view of the foot of figure 4.

Referring now to figures 1 and 2 these show a support system comprising an upright 1, a foot 2 and an insert 3. The upright extends upwardly to any suitable height and is designed to be positioned so that it is spaced transversely from a further upright, the two uprights then supporting shelves fixed to cantilever brackets extending from the uprights above their respective feet 2. Opposite faces 4, 5 of the upright are formed with a regularly spaced series of rectangular locating holes 6, 7, with immediately adjacent locating holes being separated by webs 8, 9 respectively of upright material.

The brackets that support the shelves have lugs at their inner end which may be engaged into locating holes 6, the bracket then being pushed downwardly so that regions of those lugs are locked behind webs associated with those holes. A similar system of engagement is used for the foot as shown in figure 1, the inner end of the footplate having three spaced lugs 10, which can be inserted into three adjacent locating holes and then locked in position by being pushed downwardly so that regions of those lugs engages behind the webs associated with the holes. As thus far described, the construction and its method of assembly is familar to those skilled in this field.

The invention resides in the provision of the insert 3 and its interaction with the upright and foot. One form of insert is shown in detail in figure 3. As shown, the insert is formed from two similar parts 11, 12 secured back to back by a fastening means passed through holes 13, by adhesive, by welding or by any other means. In an alternative arrangement the insert may be cast or moulded as an integral assembly.

The insert has an upper section 14 and a lower section 15, each of these sections being of complementary cross-section to, and a close fit within, the interior of the upright, as will be seen from figure 2. Between these upper and lower sections, the insert has a body in the form of an elongate plate 16 formed with a series of spaced cutouts 17, 18 lying to opposite sides of the centre of the plate. The cutouts define plate projections 19, 20, and the distance between the extremities of opposite projections 19, 20, i.e. the width of the plate,

is substantially equal to the distance between the interior surfaces of opposed webs 8, 9 of the upright.

A lower part of the insert, immediately above and adjacent to the lower section 15, has tongues 21, 22, the ends of which are provided with formations in the form of upper and lower outwardly projecting tags, 23, 24 for tongue 21 and 25, 26 for tongue 22.

The insert is formed with an elongate, circular section opening 27 and associated openings 28, 29 designed to accommodate the bolt and nut of an adjustment means forming part of an adjustable support secured to the bottom of the upright in known fashion.

Referring now to figures 4 and 5, the foot is formed of two side by side similar plates 40, 41. As already mentioned, the inner end of each plate is provided with three lugs 10, which, as will be seen from figure 5 are bent out of the plane of the respective plate and which diverge slightly from the lugs of the adjacent plate. The angle α of bend is preferably made as small as possible while being consistent with easy insert of the lugs into the locating holes on the upright as will later be described. The upper edges of the plates 40, 41 are formed with locating notches such as 43 to enable a shelf to be located and supported thereon. The plates are provided with localised deformations that provide an opening for a pin, deformations 44 on plate 40 being in vertical alignment with, but vertically spaced from, similar deformations 45 on plate 41. The plates also have cutouts, cutouts 46 on plate 41 being located and shaped so as to be engageable with the tags 23 on tongue 21, and similar cutouts on plate 40 being engageable with the tags 24 on tongue 21.

In order to assemble the support means, the insert of figure 3 is inserted into the bottom end of the upright as shown in figure 1 until the lower section 15 of the insert lies within the interior of the upright, and the parts 19 and 20 of the insert body lie respectively behind webs 8 and 9 of the upright. It is important that the upper and lower sections 14 and 15 be a close fit within the interior of the upright, and desirably this fit should be as tight as possible while being consistent with reasonably easy insertion and removal of the insert.

Once the insert is in position then the foot can be secured to the upright. A first one of the plates 40, 41 that make up the foot has its lugs 10 inserted into openings of the upright, the cutouts 17 of the insert facilitating this insertion, and the insertion being further facilitated by the angle of the lugs to the main body of the plate. After insertion, the plate is pushed downwardly so that regions of the lugs engage behind respective webs 8 of the upright as shown in figure 1. The other place is then inserted with the lugs diverging from the lugs of the first plate and is similarly pushed downwards into appropriate engagement. The two plates are then pulled together as indicated by the arrow A from the broken to the solid lines in figure 2. During such pulling together, the openings 46 on the plates move into engagement with their respective tags 23, 24. The formations 44, 45 also move into vertical alignment, and pins can then be inserted downwardly into those formations in order to hold the plates in their side by side location as shown in figures 2 and 5.

When brackets are secured to the upright above the foot, shelves are placed on those brackets and loadings are applied to the shelves, then the effect is to give a twisting moment in the direction of arrow B between the upright and the foot. This translates into a compressive force on the web 8a at the upper part of the footplates, and a tensile force on the web 8b at the lower part of the footplates. The presence of the tongue 21 and the tag formations interengaging with the footplates converts this tensile force from a pull on web 8b and a twisting of the lowermost lugs of the footplates into a straight tensile force within the tongue 21. This is then transmitted by the insert, through its upper and lower sections 14, 15, to be distributed around the full interior of the upright. Similarly, the compressive force on the uppermost web 8a is transmitted through the uppermost projection 19 of the upright, and compressive forces on the intermediate webs 8 are also transmitted by the intermediate projections 19 into the insert. These forces are similarly distributed around the whole of the upright. The result is a very strong mechanical joint with excellent stress distribution, yet a joint which can readily be effected on site utilising separate parts as necessary.

The engagement of the tags 23, 24 in the cutouts such as 46 has the further function of preventing relative vertical movement between the plates and the upright, and thus prevents inadvertent release of the footplate lugs from the upright.

It will be appreciated that there are many modifications that can be made to the arrangement particularly shown in the drawings.

The upright shown has locating holes in two opposed faces 4, 5, and the longitudinal centre line of the holes in face 4 is slightly offset from the longitudinal centre line of the holes in face 5. It will be seen from figure 2 that, as a result of this affect, the plate 16 forming the body of the insert makes an angle other than a right angle with the faces 4, 5. This angle can be changed to accommodate any given offset.

The foot need not be formed of footplates, and feet of tubular or other construction can be used. The feet may be of any required height, and have

any appropriate number of lugs; the three lugs shown in the drawings is only exemplary.

If footplates are provided only on one face of the upright then only one of the tongues 21, 22 need be provided. Indeed, even that tongue could be omitted and replaced by some other interengagement between the lower part of the footplate and the insert and upright. It is preferred the insert extend across the full width of the upright behind the webs that it is supporting, although this is not essential. Thus, if footplates are to be supported only from the face 4 of the upright then the parts 20 of the plate could be omitted, and advantage would still be gained. However, even in this context, the parts 20 are preferred as they assist stress distribution. Although the cutouts 17 in the insert factilitate the insertion of the footplate lugs, and of lugs on brackets supported in the upper regions of the upright, they may not be essential if the thickness of the plates and lug and the width of the openings in the upright are designed accordingly. The dual footplate arrangement described is also not essential and different footplate arrangements can be used.

Claims

1. Support means for use in a display system, comprising a hollow upright having a substantially planar face in which longitudinally aligned locating holes are formed at sustantially identical spacing along the length of the face, each pair of adjacent holes being separated by a web of the material from which the upright is formed; a foot engaged with the lower part of the upright to extend transversely thereto, the foot having at one end thereof a series of spaced lugs which are engaged with locating holes on the upright and which have regions that are locked behind parts of the webs of the upright to hold the foot in position relative to the upright; and an insert located in that end of the upright with which the foot is engaged, the insert having a height at least substantially equal to the height of the foot, and the insert having upper and lower sections that are of complementary cross-section to, and a close fit within the interior of the upright, and having a body extending between the upper and lower sections, the body being shaped so as to locate behind, and to provide support to, at least some of those webs against which the foot is located.

2. Support means according to Claim 1, in which the upper section of the insert lies at a height no lower than the upper part of the foot.

3. Support means, according to Claim 1 or Claim 2 in which, between the upper and lower sections, the shape of the insert is such that it provides support to all of those webs against which the foot is located, and that it does not hinder insertion and locking of the lugs of the foot into the locating holes of the upright.

4. Support means according to any one of the preceding claims in which the insert, in those regions where it provides support to the webs, has a shape such that insert material extends completely across the interior of the upright to that interior surface of the upright opposite to the webs.

5. Support means according to any one of the preceding claims in which the body of the insert is an elongate plate having a width substantially equal to the distance between the interior surface of a web and the opposite interior surface of the upright.

6. Support means, according to Claim 5 in which the plate has a thickness that is less than the width of a locating hole measured transversely of the upright.

7. Support means according to Claim 5 and Claim 6 in which the plate is formed with cutouts lying immediately behind the locating holes in the upright.

8. Support means according to any of the preceding claims in which the insert has a tongue projecting through the lowermost locating hole of the upright, the tongue carrying a formation that is engageable with a complementary formation on part of the foot spaced away from the upright.

9. Support means according to Claim 8 in which the tongue is located adjacent to the lower section of the upright.

10. Support means according to any one of the preceding claims in which the foot comprises two side by side similar plates, each engaged with the lower part of the upright, each plate having lugs, with one lug from each of the plates being engaged in a common one of the locating holes.

11. Support means, according to Claim 10 in which the lugs are each bent out of the plane of the respective plate, the lugs of one plate diverging from those of the other.

12. Support means, according to Claim 10 or Claim 11, insofar as dependent on Claim 8, in which the plates lie to opposite sides of the tongue, the tongue carrying formations on each side thereof, each formation being engageable with a complementary formation on a respective one of the plates.

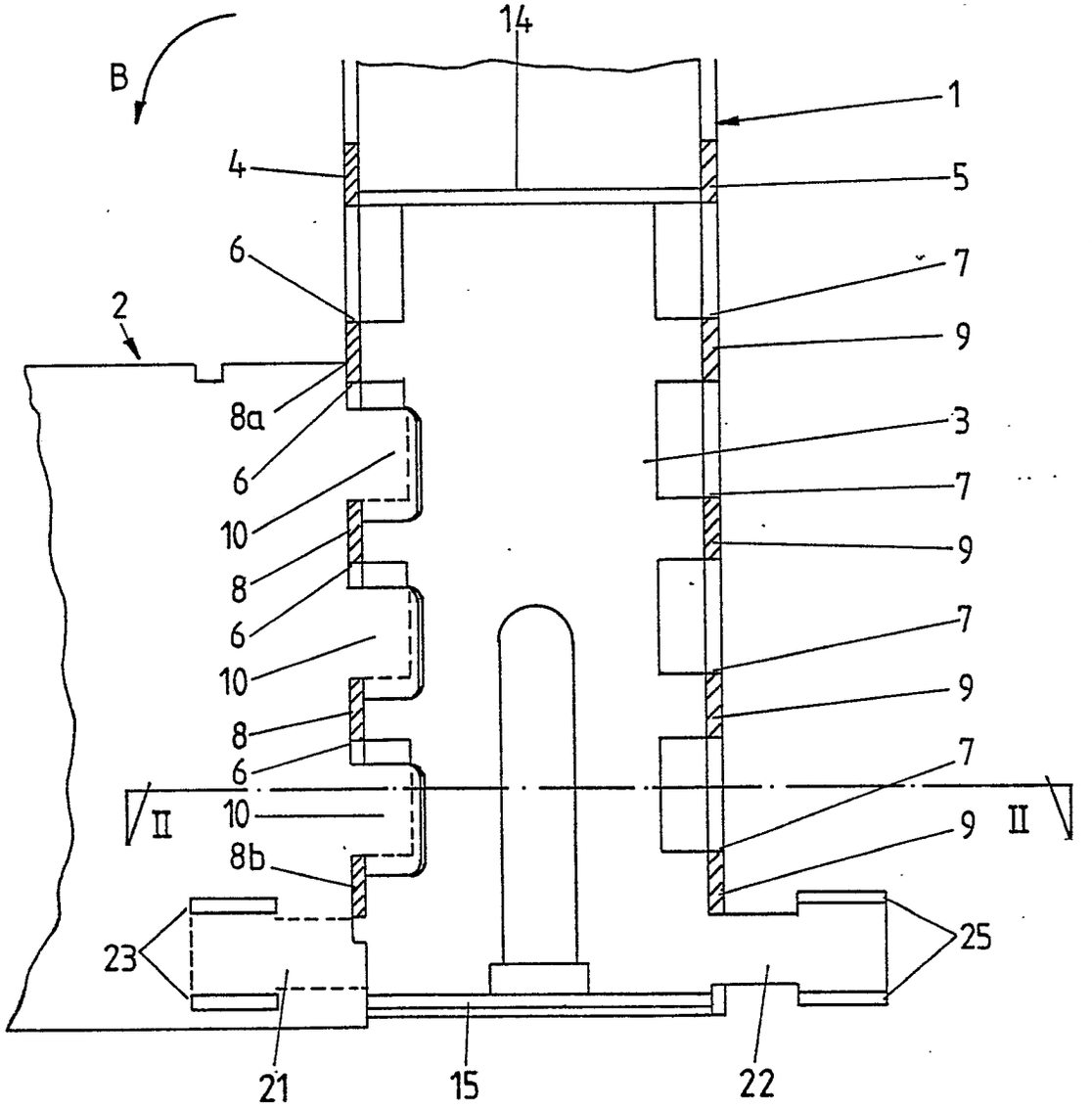
14
B
1
4
5
6
7
2
9
8a
3
6
7
10
9
8
6
7
10
9
8
6
7
10
II
II
8b
9
25
23
21
15
22

FIG. 1

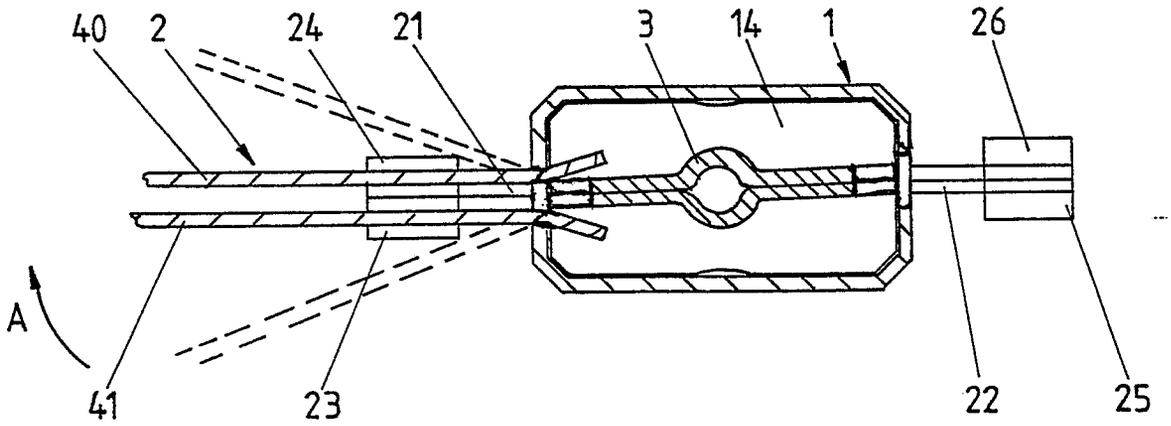
40
2
24
21
3
14
1
26
A
41
23
22
25

FIG. 2

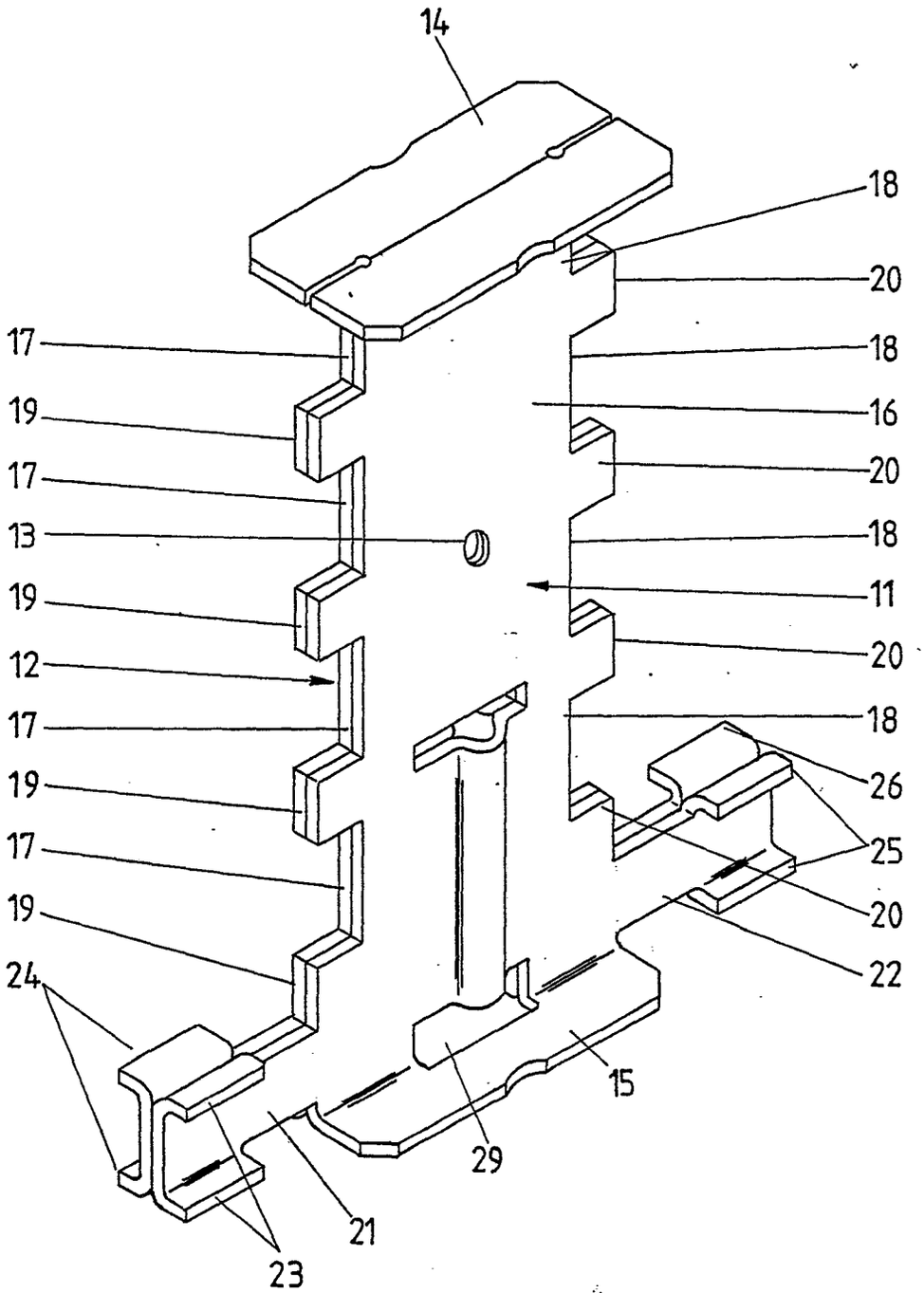
14
18
20
17
18
19
16
17
20
13
18
19
11
12
20
17
18
19
26
17
25
19
20
24
22
15
29
21
23

FIG. 3

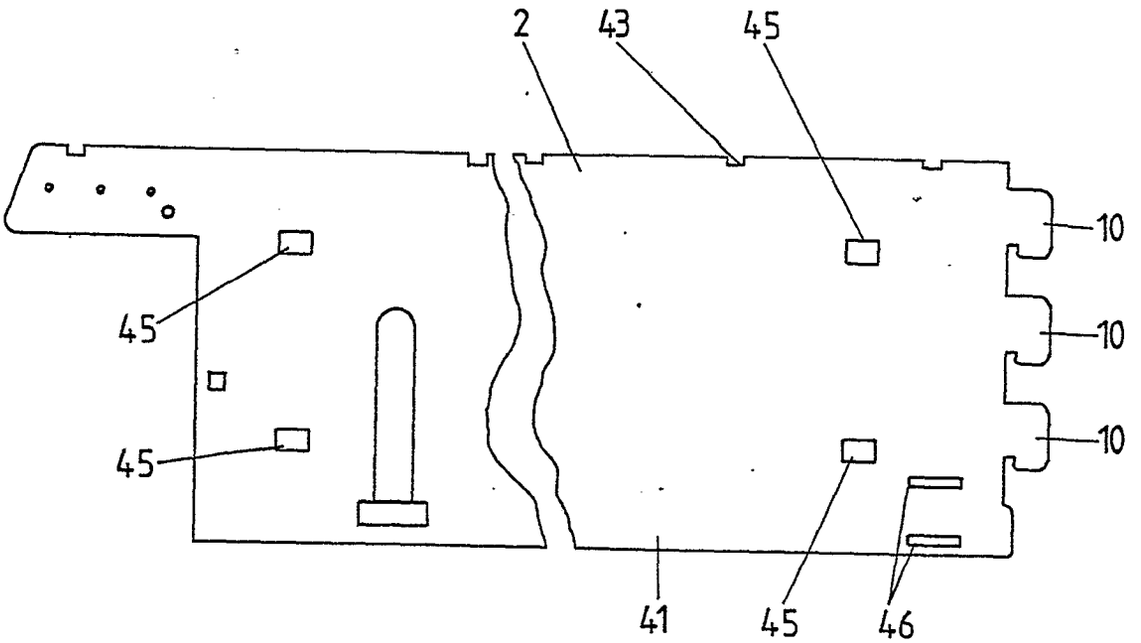

FIG. 4

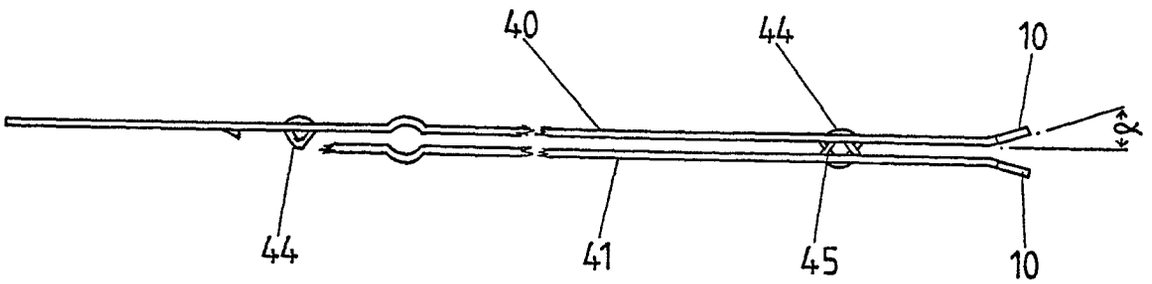

FIG. 5