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(54) Container and container panels

(57) A container (2) having a rectangular base (4) and side walls (6) upstanding from the edges of the base. The base and side walls are formed by a plurality of rectangular wall panels (8,10,12,14) joined to one another at respective pairs of mating sides (24), each mating side having one or more integral connection formations (16) thereon cooperating with one or more complimentary connection formations (16) on the respective mating side of the adjacent wall panel to form a channel (30) extending along the mating sides (24). An elongate locking member (8) is engaged in the channel (30) to secure the mating sides (24) together.

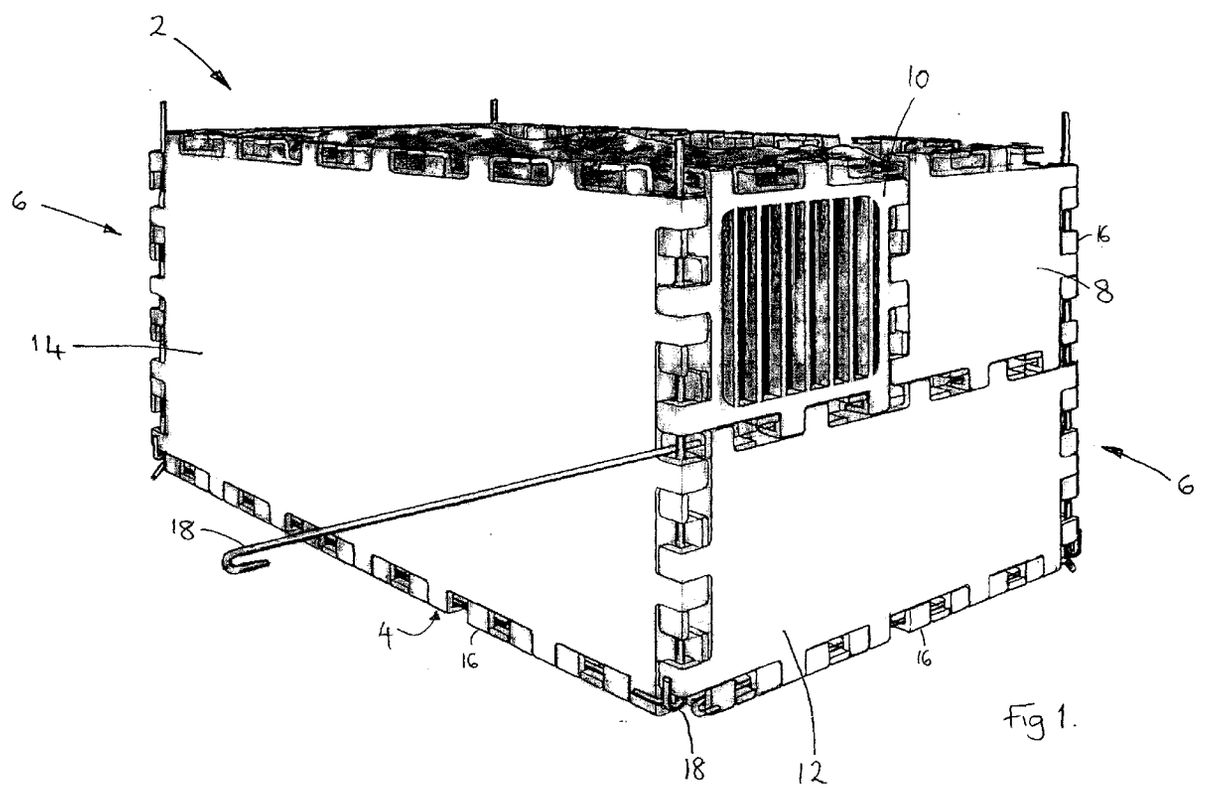

Fig 1.

EP 0 947 434 A2

Description

[0001] The present invention relates to a container and panels from which the container can be constructed. The invention is particularly, although not necessarily exclusively, concerned with containers which are suitable as packaging for articles in transit.

[0002] Containers are widely used to accommodate and protect goods in transit by land, sea and air. Some such containers are intended to be single use containers, which are disposed of once the goods they contain are unpacked at their destination. For example, corrugated card is a popular material for containers of horticultural products but such containers are not usually reusable or returnable. These corrugated card containers also suffer from the disadvantage that they tend to be suitable only for relatively light-weight freight.

[0003] It is also known to make use of containers that can be reused, although these reusable containers are not without their disadvantages. For example, there can be significant expense involved in the storage of empty containers and in the return of the empty containers to their origin where they can be reused. This is a particular problem where the containers are of large bulk and weight.

[0004] In one aspect, the present invention provides a container having a rectangular base and side walls upstanding from the sides of the base, the base and side walls being formed by a plurality of rectangular wall panels joined to one another at respective pairs of mating sides, each mating side having one or more integral connection formations thereon cooperating with one or more complimentary connection formations on the respective mating side of the adjacent wall panel to form a channel extending along the mating sides, an elongate locking member, for example a rod, wire or peg, being engaged in the channel to secure the mating sides together.

[0005] The mating pairs of panel sides are preferably profiled to provide complimentary series of connecting formations spaced along the sides, arranged to interlace with one another to form the channel.

[0006] In one form, each connecting formation is a generally L-shape finger projecting outwardly from the panel side. A first limb of the finger preferably projects, generally in the plane of the panel, from an edge of the panel side where it meets one of the major faces of the panel, and a second limb extends perpendicularly from the outer end of the first limb to face the side of the panel from which the finger projects. A series of such L-shape fingers can be spaced along the sides of each panel, fingers on the respective mating sides of adjacent panels being interlaced, these interlaced fingers and the sides of the panels defining the channel for the locking member. Alternate fingers on each panel may project from respective inner and outer edges of the panel side, the second limbs projecting in opposite directions, to ensure that the channel is bounded on all sides at least intermittently along its length, irrespective of the angle formed between adjacent wall panels.

[0007] Other forms of connecting formation are possible, for example a hinge type formation may be appropriate in some circumstances.

[0008] Advantageously, the wall panels are formed with like connecting formations along each side, so that each of the four sides of a panel can be joined to any one of the four sides of any other panel, whereby the panels can be connected in any of a number of configurations.

[0009] The main bodies of the panels may have any appropriate form. Advantageously they may have one or more, preferably a series of reinforcing ribs extending across one or both surfaces thereof. In this way the material required to form the panels can be minimised whilst maintaining adequate strength and rigidity.

[0010] The base and/or each side wall may comprise a single wall panel, six panels being joined for example to form a closed, six-sided container. In this case, the wall panels need only be connectable to extend perpendicularly to one another, the desired shape and size of container being constructed by selecting appropriately sized and shaped wall panels.

[0011] Alternatively the base and/or one or more of the side walls of the container can each be formed from a plurality of wall panels, in which case the connection formations are arranged, as is preferred, to allow connection of the panels either perpendicularly to one another or in-line. Advantageously, this allows a great variety of size and shape of container without the need to provide a correspondingly large number of wall panels of different size and shape.

[0012] The container may comprise a lid to close the opening defined by the side walls. If desired, this lid may itself be formed of one or more wall panels having the same form as the other wall panels from which the container is constructed, and joined to the upper sides of the side walls in the same, interlocking manner.

[0013] Containers constructed in accordance with embodiments of the present invention have been found to be easy to assemble and may be assembled in as little time as it takes to assemble a corrugated cardboard container from its flat kit state. Dismantling can be an even quicker procedure and the wall panels may be stored in stacks, having relatively little bulk or weight. These stacks may be conveniently and economically returned to source for reuse.

[0014] In another aspect of the invention, there is provided a rectangular wall panel, each of the four panel sides having one or more integral connection formations thereon, the connection formations of respective pairs of sides of the panel having complimentary mating profiles, whereby a plurality of such wall panels can be connected to one another along respective mating sides, via their respective connection formations, to form a container.

[0015] A plurality of these wall panels may be provid-

ed, along with a plurality of locking members for securing the connection formations of the panels to one another, as a kit from which a container can be constructed by joining panels along their sides to provide the desired size and shape of container.

[0016] Embodiments of the invention are described below with reference to the accompanying drawings, in which:

Figure 1 shows an open-topped container according to an embodiment of the present invention;
Figure 2 shows, on an enlarged scale, a corner portion of one of the wall panels from which the container of Fig. 1 is constructed;
Figure 3 illustrates the manner in which three panels of the form seen in Fig. 2 can be connected to form a container corner;
Figure 4 shows the corner construction of a container according to a second embodiment of the invention; and
Figures 5, 6, 7, 8 and 9 illustrate alternative orientations for the connection of wall panels according to the second embodiment of the invention.

[0017] The container 2 illustrated in Fig. 1 has a rectangular base 4 and side walls 6 formed from a plurality of wall panels 8,10,12,14. The wall panels are joined at their sides by interlaced, L-shaped arms 16, locked in place by a rod 18 which extends through a channel formed by the arms 16. If desired, the container may be closed by a lid (not shown), also formed from one or more wall panels of this form, secured to the top of the side walls by rods in the same manner as the side walls are secured to each other and the base.

[0018] Each wall panel is rectangular, in this example two of the panels 8,10 being square, and the others 12,14 having respective long and short sides with lengths which are equal to or multiples of the length of the sides of the square panels.

[0019] The L-shaped arms 16, are formed integrally with the wall panels, these arms 16 being spaced at regular intervals along all four sides of each panel, the size of the arms and their spacing being the same for all panels.

[0020] As best seen in Fig. 2, the arms 16 project alternately from inner and outer edges 20,22 of the panel's side walls 24 in the plane of the adjacent major face 26 of the panel. The bases 28 of the L's are turned respectively outwardly and inwardly of the panel so that in both cases they are parallel to and face the panel side from which they project. In this way a channel 30 is defined by the arms 16 and the side of the panel, the channel being intermittently bounded on all sides by these elements.

[0021] Each pair of adjacent arms 16 are spaced apart along the side 24 of the panel by a distance slightly greater than the dimension d of each arm measured parallel to the panel side. This enables the arms 16 of adjacent panels to be interlaced, superimposing the channels 30 formed by the respective arms 16 and side walls 24. A rod 8 inserted into this channel secures the arms 16 in this interlaced configuration. In the example seen in Fig. 1 the end of each rod 8 is bent over to secure it in place, but other means may be used for this purpose, e.g. the rods can be provided lateral bores at their ends through which a wire can be passed to secure the rods in a known wired manner.

[0022] As seen in Fig. 3, three mutually perpendicular wall panels can be joined in this manner to for a corner of the container.

[0023] Optionally, the corners and edges of the container formed in this way can be sealed with suitable tape to improve waterproof and tamper proof qualities of the container.

[0024] The described form of connection between wall panels can also be used to connect the panels in-line with one another, rather than perpendicularly. For example, the two square panels 8,10 and the rectangular panel 12, which together form one end wall of the container, are connected to one another in this fashion.

[0025] Fig. 4 illustrates a second embodiment of the invention in which alternative form of panel, used in conjunction with an alternative form of locking member that can also replace the rods seen in the previous figures.

[0026] Considering the locking member first, which as seen in Fig. 4, takes the form of a locking peg 40 inserted into an end of the channel 30' formed by the L-shape arms 16' and, when pushed home, locked in place by a barb portion 42 of the peg 40 which engages one of the arms 16a. The head of the peg nests in a recess 43 formed at the mouth of the channel. Preferably a similar peg is also provided at the other end of the channel.

[0027] In this second embodiment, although the panels themselves are structurally similar to those seen in Figs. 1 to 3, there are some differences worthy of note.

[0028] First, rather than both major surfaces of the panel 50 being plane, one of these surfaces is formed with a series of parallel reinforcing ribs 46 extending from one side wall 24a to the opposite one 24b. This can provide a strong, rigid, yet light weight panel.

[0029] Second, the L-shape arms 16' of this second embodiment are each complimented by a raised step 44 on the side wall 24' from which it projects, these elements together forming a U-shape channel element projecting from the panel side 24' to define a smaller U-shape channel 30'.

[0030] As illustrated in Figs. 5 to 9, this form of connection member readilly allows for connection of adjacent panels in a number of different orientations, whilst still providing a channel 30' that is in-line along its entire length. Thus, Fig. 5 shows two such panels connected in-line with the ribbed surfaces facing in the same direction (it is also possible for one panel to be reversed). Fig. 6 shows two such panels connected perpendicularly to one another with their ribbed surfaces facing inwardly, Fig. 7 shows the reverse, with the plane surfaces

of each panel facing inwardly, and Figs. 8 and 9 show arrangements in which the ribbed surface of one panel faces inwardly and that of the other faces outwardly.

[0031] The panels of the second embodiment could of course be used in conjunction with the rod-like locking members of the first embodiment, although the peg illustrated in Fig. 4 is preferred.

[0032] Whilst the wall panels of either embodiment may be of any dimensions, preferred embodiments of the invention provides panels dimensioned to a standard grid, such as 220cm X 220cm; 220cm X 418cm; 418cm X 616cm; 418cm X 914 cm; and so on. Preferably a variety of different sized panels, all based on a common grid, are provided in a kit from which containers can be formed.

[0033] A container may be constructed from 6 panels of similar dimensions, or of an aggregation of interconnected panels of differing sizes. It is also possible for the wall panels to vary in other ways. For example, for some applications it may be desirable to provide ventilation to the inside of the container, and one or more ventilation panels 50 (seen on an enlarged scale in Figure 5), having an array of through openings, may be provided for this purpose. The square panel 10 in Fig. 1 is an example of this.

[0034] Suitable materials for the wall panels include metals, cellulose materials and plastics, or combinations of these materials, the preferred materials being plastics. Use of recycled Polythene, for example, can result in a light and strong panel which is virtually crush-proof and puncture proof and is readily reusable.

[0035] The example panels shown may be produced in a two-cavity mould. A variety of profiles may be produced for the purpose by similar means. A useful variation would result from use of a more complicated mould to obtain one half of door hinge type profile on each connecting side in place of the L-shape arms.

[0036] Advantages of embodiments of the invention are numerous. The containers can be light, strong, relatively inexpensive, and reusable. The containers are also quickly assembled and dismantled and may be stored in kit form. A variety of sizes of container, e.g. to suit the dimensions of the goods to be freighted, can be constructed from like parts. For example, six wall panels of the same or different sizes may be interconnected to construct a closed container, or two or mqre panels, joined flat to make larger side panels may be used to make a larger container.

[0037] For these and other reasons, the container is suited to many uses including protection of goods in storage and cargo in transit; storage of documents; storage and removal of household effects; and shipping of goods from factory to retailer. The container is particularly appropriate for applications where the return or reuse of the container is practical and/or desired. Many other applications may be envisaged.

Claims

1. A container (2) having a rectangular base (4) and side walls (6) upstanding from the edges of the base, the base and side walls being formed by a plurality of rectangular wall panels (8,10,12,14) joined to one another at respective pairs of mating sides (24), each mating side (24) having one or more integral connection formations (16) thereon cooperating with one or more complimentary connection formations (16) on the respective mating side (24) of the adjacent wall panel to form a channel (30) extending along the mating sides (24), an elongate locking member (8) being engaged in the channel (30) to secure the mating sides (24) together.

2. A container according to claim 1, wherein the mating pairs of panel sides (24) are profiled to provide complimentary series of connecting formations (16) spaced along the sides (24), arranged to interlace with one another to form the channel (30).

3. A container according to claim 1 or 2, wherein each connecting formation is a generally L-shape finger (16) projecting outwardly from the panel side (24).

4. A container according to claim 3, wherein a series of such L-shape fingers (16) are spaced along the sides (24) of each panel, fingers (16) on the respective mating sides of adjacent panels being interlaced, these interlaced fingers (16) and the sides (24) of the panels defining the channel (30) for the locking member (8).

5. A container according to claim 3 or 4, wherein a first limb of the L-shape finger projects, generally in the plane of the panel, from an edge (20,22) of the panel side (24) where it meets one of the major faces (26) of the panel, and a second limb (28) extends perpendicularly from the outer end of the first limb to face the side (24) of the panel from which the finger (16) projects.

6. A container according to claim 5, wherein alternate fingers (16) on each panel project from respective inner and outer edges (20,22) of the panel side (24), the second limbs (28) projecting in respective opposite directions.

7. A container according to any one of the preceding claims, wherein the wall panels are formed with like connecting formations (16) along each side (24), so that each of the four sides of a panel can be joined to any one of the four sides of any other panel.

8. A container according to any one of the preceding claims, wherein the base (4) and/or one or more of

the side walls (6) of the container are each formed from a plurality of wall panels (8,10,12), the connection formations (16) being arranged to allow connection of the panels (8,10,12) either perpendicularly to one another or in-line.

9. A container according to any one of the preceding claims, comprising a lid to close the opening defined by the side walls (6), the lid being formed of one or more wall panels having the same form as the other wall panels from which the container is constructed, and joined to the upper sides of the side walls in the same, interlaced manner.

10. A rectangular wall panel (8,10,12,14), each of the four panel sides (24) having one or more integral connection formations (16) thereon, the connection formations (16) of respective pairs of sides (24) of the panel having complimentary mating profiles, whereby a plurality of such wall panels can be connected to one another along respective mating sides (24), via their respective connection formations, to form a container.

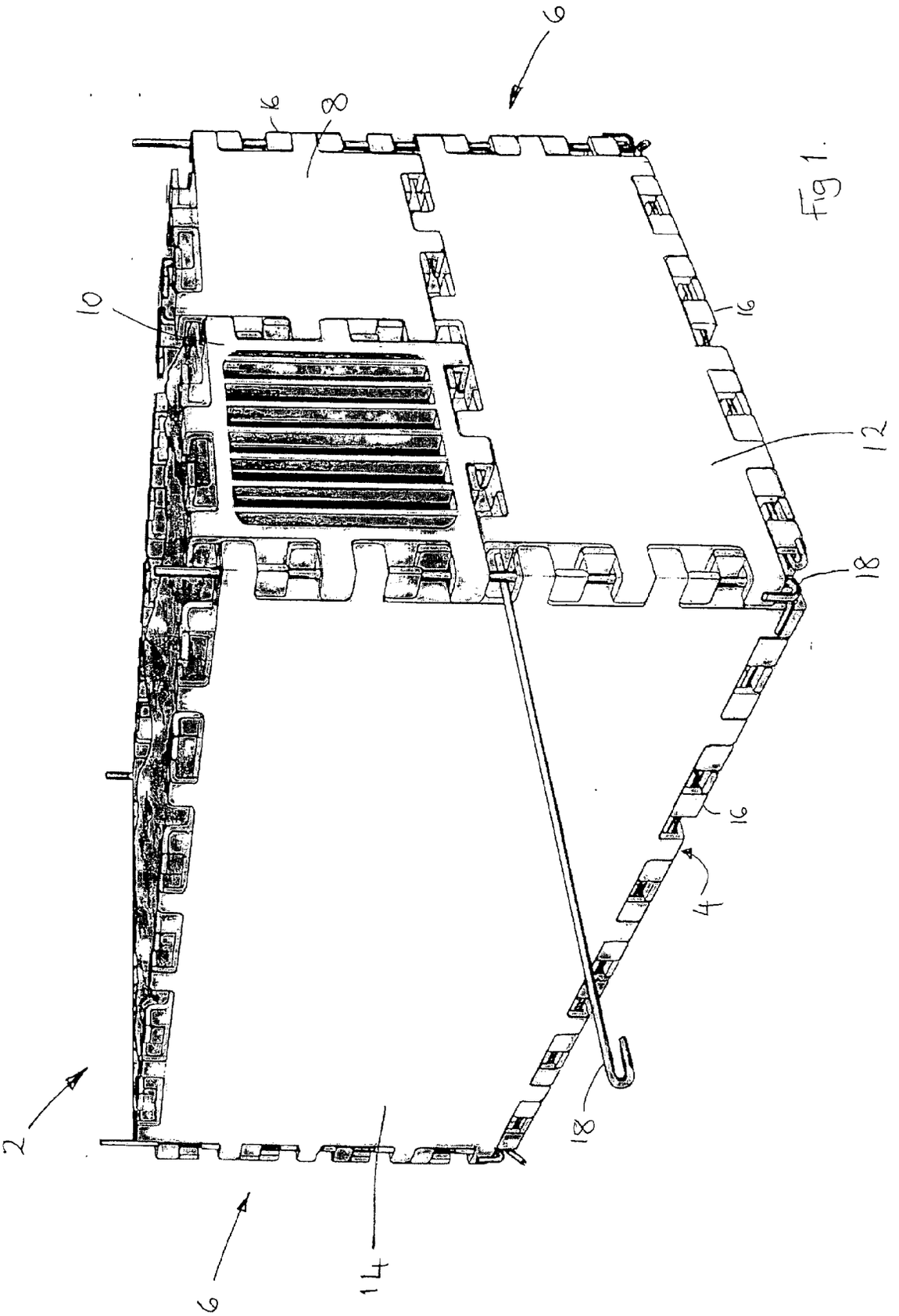

Fig 1.

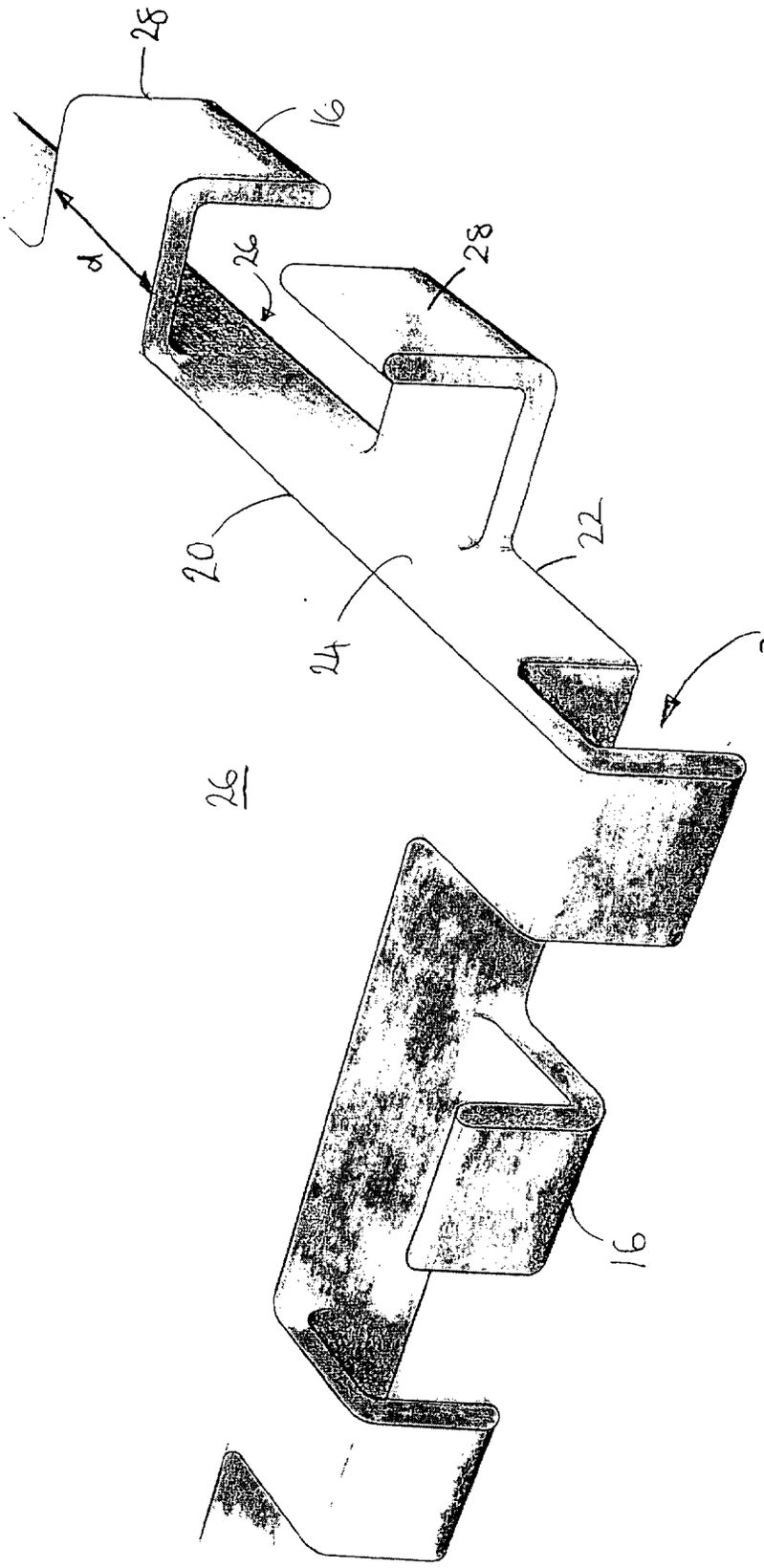

Fig. 2

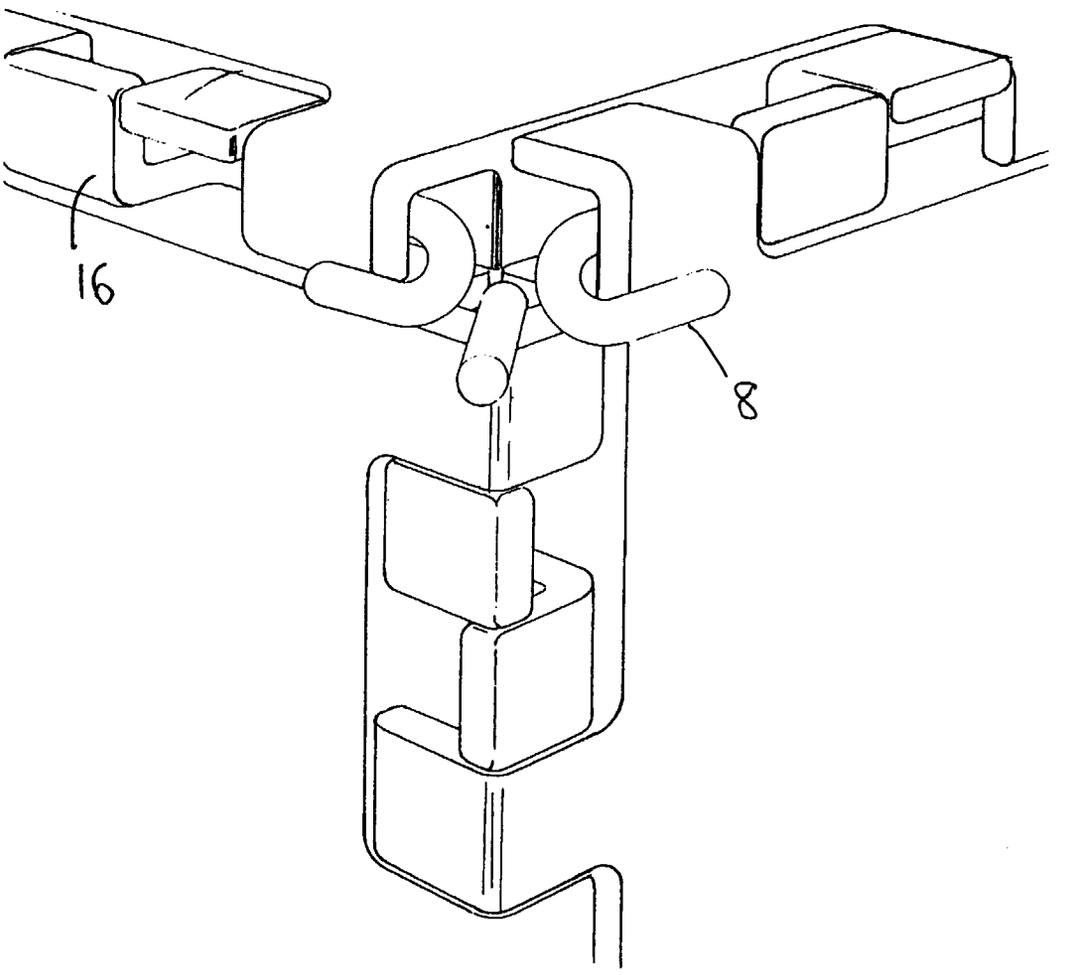

Fig. 3

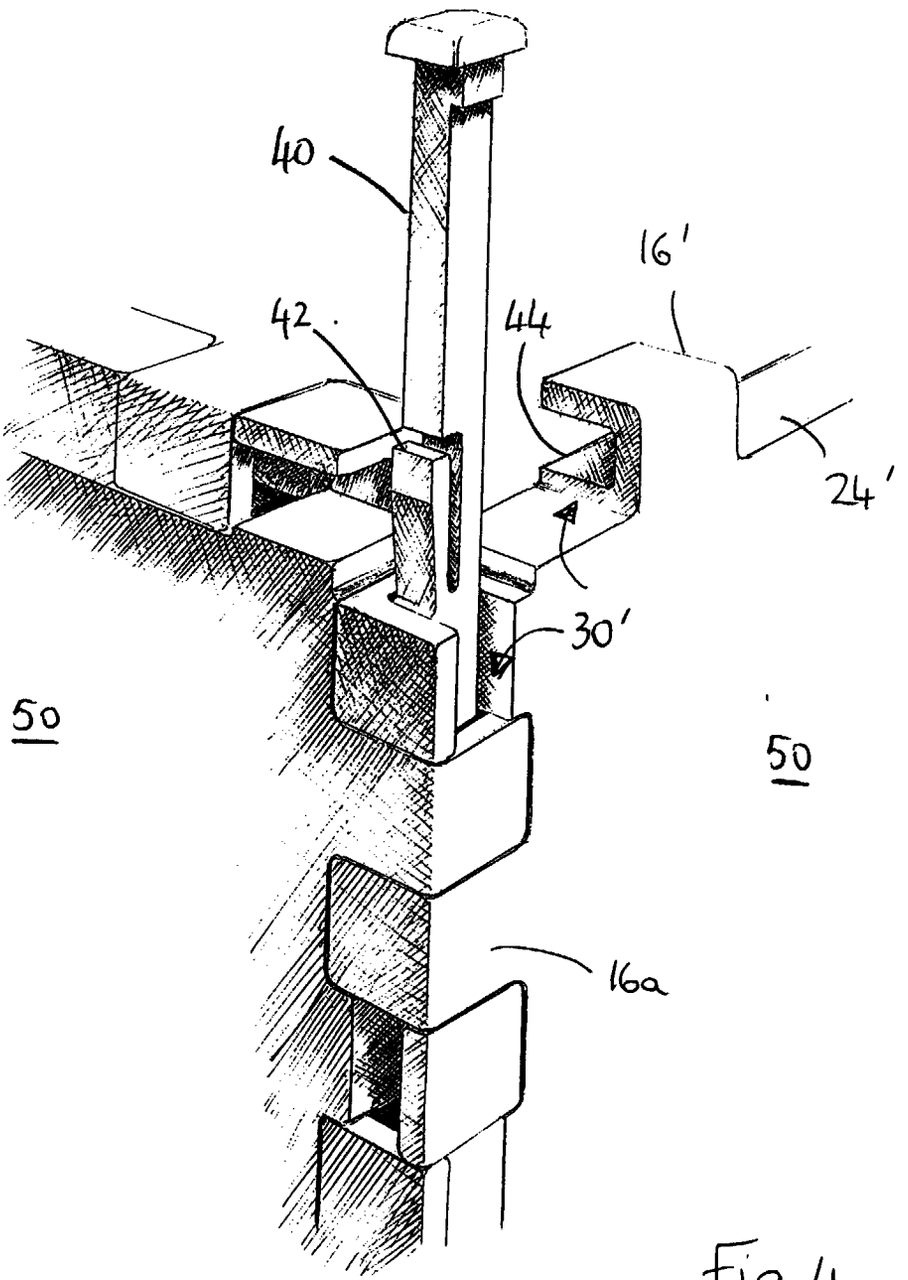

Fig. 4

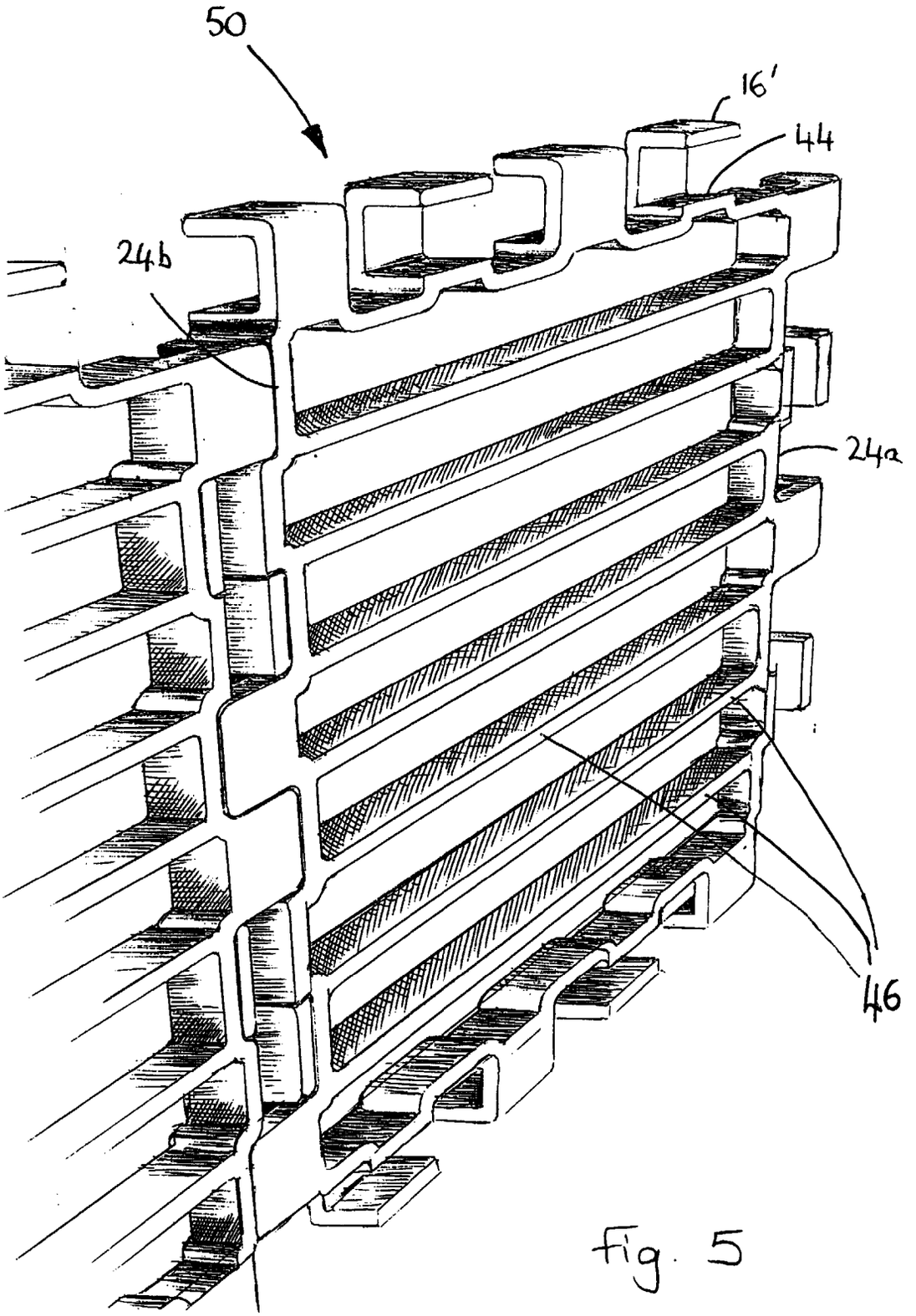

Fig. 5

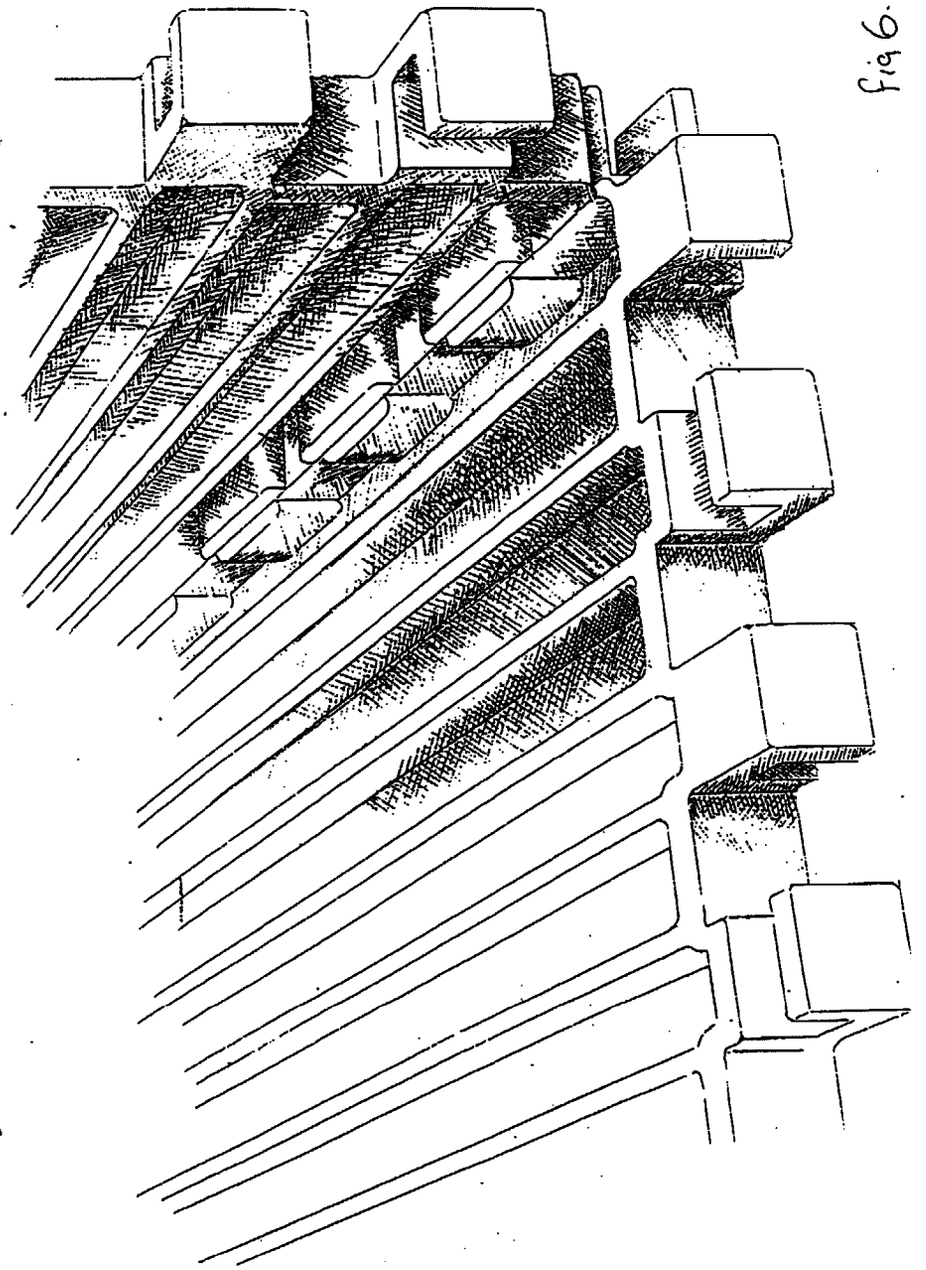

Fig 6.

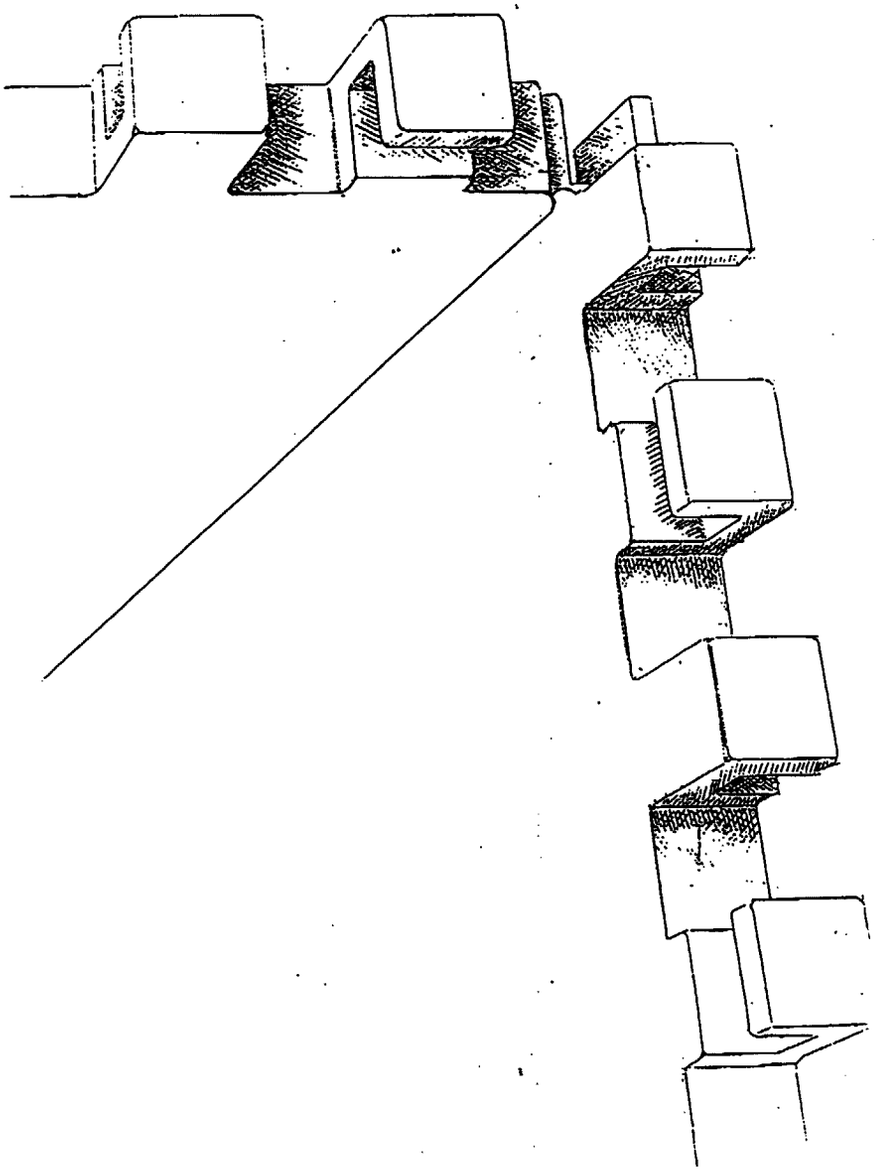

Fig 7

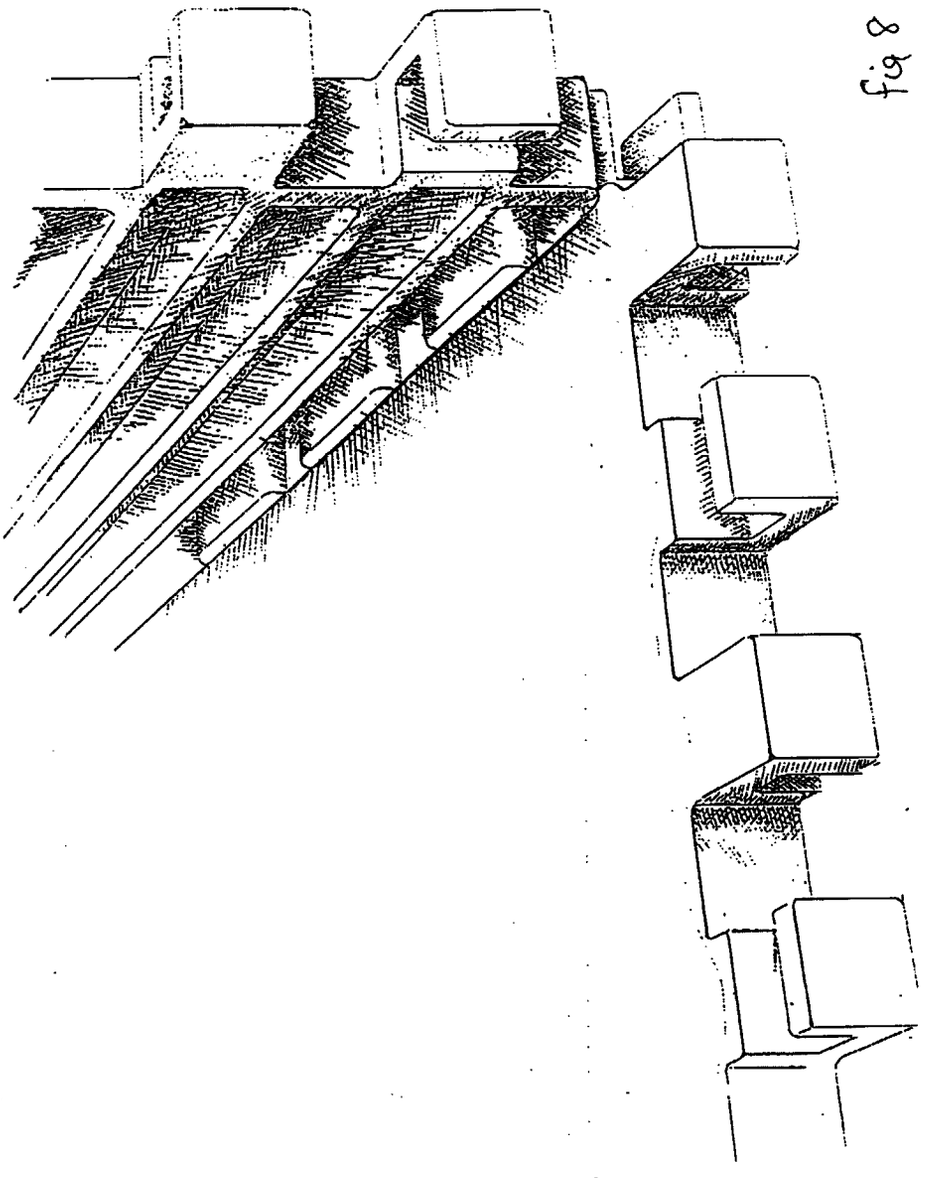

fig 8

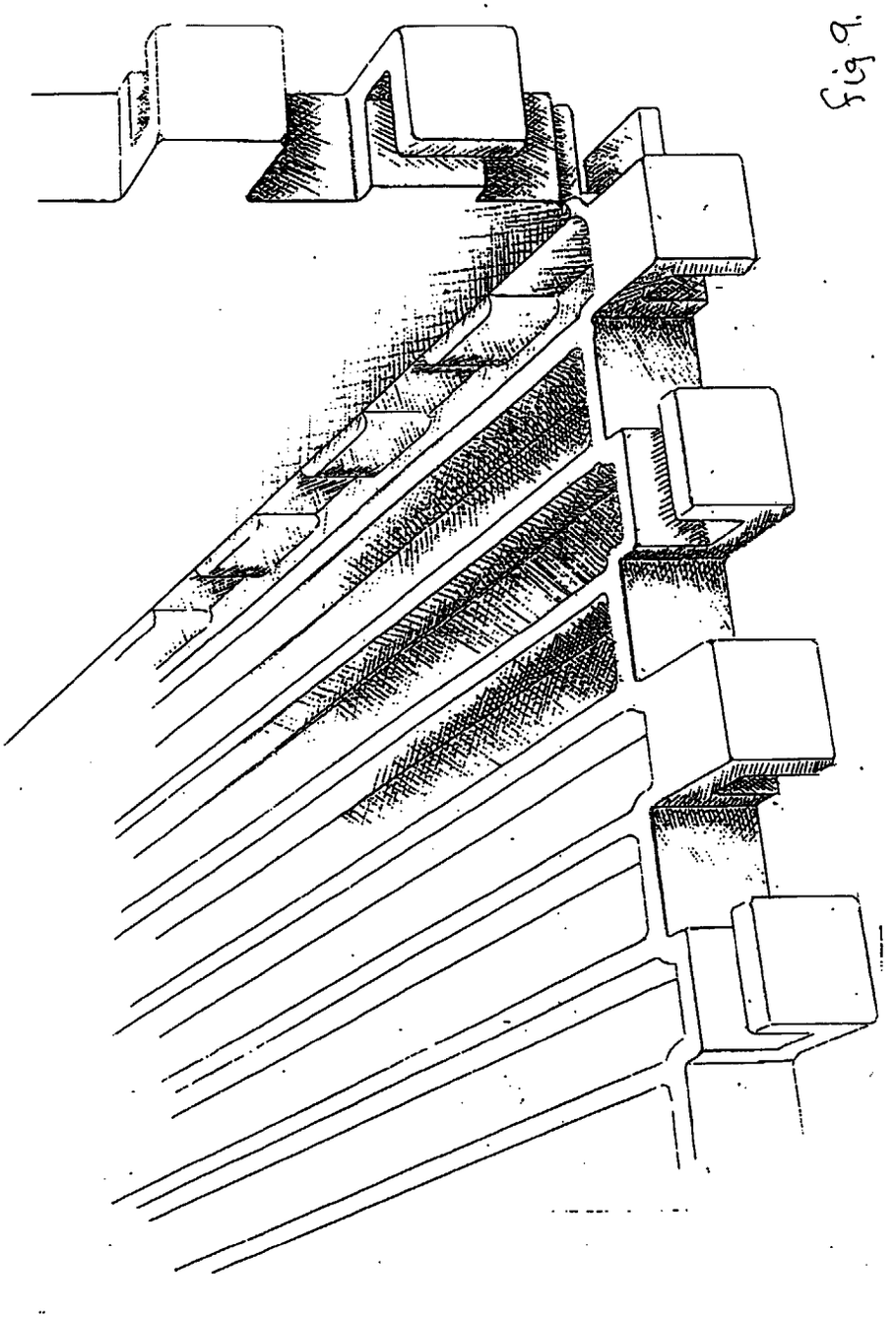

Fig 9.