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(54) Improvements in or relating to flats for carding machines.

(57) A flat for use in a carding machine is intended to be of a disposable nature, and this is achieved by making the flat as an extruded support (1), the card clothing top (2) or other operative element (such as a trash knife) being made integral with the extrusion by being fixed permanently to it. The ends of the extrusion are adapted to receive permanently fixed or detachable end pieces (11) which provide the means for mounting the flat on the carding machine.

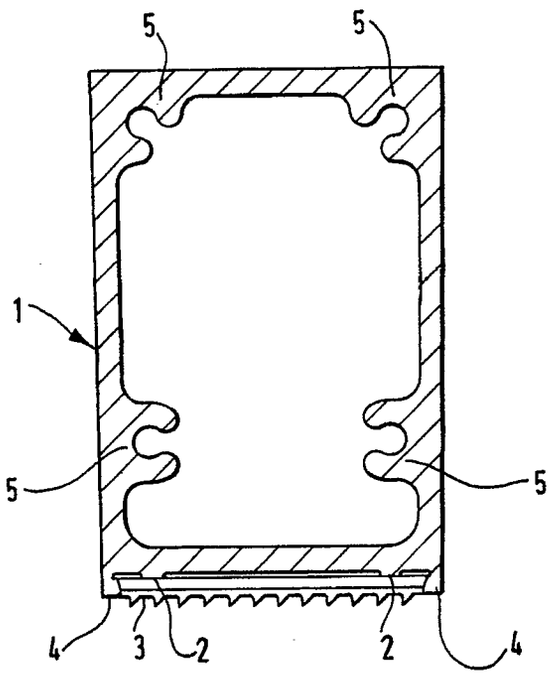

Fig.1.

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IMPROVEMENTS IN OR RELATING TO FLATS FOR CARDING MACHINES

The flats as used on the flat type carding machine designed for processing cotton and fibres of similar staple length to cotton may be fixed in relation to the carding cylinder or part of a chain of revolving flats which move around part of the circumference of the carding cylinder.

Conventionally, the revolving flat is T-shaped and made of cast-iron, machined to accept a top of card-clothing attached to its flange by steel clips, each end of the flat being machined for correct location of the flat in close proximity to the carding cylinder, against which the card-clothing top has to operate. The rib of the flat is designed to provide the necessary stiffness to enable the flat to span the width of the carding machine and ensure that an equal setting of the card-clothing on the flat to that on the carding cylinder is sustainable over the working width of the cylinder.

Stationary flats can be used in addition to revolving flats or can be entirely substituted for revolving flats, such stationary flats being conventionally also T-shaped in the form of an iron casting or an aluminium extrusion. The flange carries a card-clothing top or other operative element such as a trash extracting knife which is clipped or attached by screws to the surface of the flat, and the rib is designed to support the flat correctly across the width of the carding cylinder. The ends of the flat are machined to accept the setting and securing arrangements for fixing the flat to the carding machine frame in its required relationship to the carding cylinder.

With both stationary and revolving flats, when the card-clothing top or other operative element becomes worn out or damaged, it is removed from the flat and a new top or other element is clipped or screwed to the flat in replacement. Replacement of the card-clothing top which is conventionally clipped or bonded to the revolving flat involves the use of specialised machinery which adds to the cost of the replacement. Replacement of the top which is screwed to the flat requires investment in the specially designed flat adapted to receive a screw-on type of top.

It is the object of the invention to provide a carding machine flat which will avoid or mitigate the above-mentioned disadvantages.

According to the invention, a flat for use in a carding machine comprises an extruded support for carrying a card-clothing top or other operative element which is made integral with the extrusion by being fixed permanently to it, the ends of the extrusion being adapted to receive permanently fixed or detachable end pieces which provide means for mounting the flat on the carding machine.

When the top becomes worn or damaged, the whole flat, together with its card-clothing is discarded and replaced with a new one, or the flat end pieces are detached and the top, complete with its extruded aluminium support are discarded as a unit, and a replacement top with its extruded aluminium support is fitted, by re-attaching the same detachable end pieces to the new support.

Preferably, the extruded support is essentially of box-section shape, designed to combine maximum stiffness with minimum wall thickness, which provides the necessary straightness and stability at minimum cost. It is preferred that the support is made of aluminium or aluminium alloy.

The working face of the extruded support is preferably adapted to receive a flexible-type or metallic-type card-clothing top or any other purpose designed operative element for cooperation with the carding cylinder. In the preferred construction, the card-clothing top or other operative element is permanently fixed to the extrusion by peening along each of its longitudinal edges. Other permanent securing means may be employed.

According to a preferred feature of the invention, the interior shape of the box-shaped extruded support may be designed to provide means by which detachable ends can be readily secured to and detached from the support. In the preferred construction, two or more socket formations are provided inside the support. Preferably, each socket formation provides a location for an end securing male member such as a screw or dowel.

It is a feature of the invention that difference designs of flat ends can be applied to the basic extruded section support and top according to the purpose to which the flat is to be applied on the carding machine.

One such flat end would be adapted to render the extruded section support and top useable as a revolving flat.

Another flat end would adapt the extruded section support and top to function as a single stationary flat, with or without the facility for individual flat adjustment.

Yet another flat end would accept a multiplicity of extruded section supports and tops to form an arcuate carding plate to supplement a set of revolving flats, or to replace the revolving flats.

The flat ends can be made of metal or plastics and machined from solid, cast, forged, sintered or injection moulded preforms according to the purpose for which they are to be used.

Various flat assemblies constructed in accordance with the invention will now be described by

way of examples only, with reference to the accompanying drawings, in which:-

Figure 1 is a cross-section of the basic extruded support with a card-clothed top secured to it,

Figure 2 is a perspective view of the basic extruded support and top, adapted to become a stationary flat with individual adjustment,

Figure 2A is a detail section of the flat end design,

Figure 3 is a perspective view of a multiplicity of basic extruded supports and tops adapted to become an arcuate carding plate,

Figure 4 is a view showing carding plates constructed according to the invention applied to form the underscreen area of a carding machine, and

Figure 5 is a detail end view, showing the mounting of an underscreen of the type shown in Figure 4.

Referring to Figures 1, 2 and 2A, there is illustrated a basic aluminium extrusion 1 which provides a top support, and which in effect replaces the conventional T-shaped carding machine flat. The extrusion is generally of rectangular box shape, although it will be noted from Figure 1, that it tapers slightly from top to bottom, so that it is somewhat wider at the top than at the bottom. The extrusion is made in aluminium, and the design of the extrusion is such that it provides the necessary stiffness and rigidity which would normally be provided by the T-shaped cast-iron flat, but at the same time, its wall thickness is reduced to the minimum which is consistent with this stiffness and rigidity, so as to use a minimum quantity of material in the construction of the support. In this way, the support can be regarded as disposable, in that it may be cheaper to discard it and replace it with a fresh aluminium extruded support, when the card-clothed top becomes so worn that it requires replacement.

Internally, the extruded support 1 is formed with four special lugs 5, each of which besides providing a reinforcing for the box section itself, also provides a socket which is adapted to receive the shank of a screw (not shown in Figure 1).

The bottom edge of the extruded support 1 is formed with a recess of dovetail-shaped cross-section, there being two parallel longitudinally extending ribs 2 protruding from the face of the recess. This recess is adapted to receive a card-clothed top 3, comprising an array of strips of metallic-wire type card-clothing held together, as described in the specification of British Patent No. 2 100 303.

The top 3 is slid endwise into the dovetail-shaped recess in the bottom of the support 1, so that its base rests on the ribs 2, which provide location for the top, and then ribs 4, which provide the edge formations of the dovetail-shaped recess, are pushed hard against the edges of the metallic top 3, thus peening those ribs on to the edges of the top, and permanently securing the top 3 to the extruded support 1. The fact that the card-clothed top is permanently secured to the extruded support, so that it becomes integral with the support, is an important feature of the invention.

Figures 2 and 2A show the combined extruded support 1 and top 3 of Figure 1 adapted to provide for an individual setting adjustment on the carding machine. For this purpose, a separate end fitting 11 is provided at each end of the flat, which comprises a plate which is of dimensions such that it fits over the end of the support 1, there being self-tapping screws 7 which engage in the sockets provided in the lugs 5 of the extrusion, to secure the end fitting to the end of the extruded support. In addition, there are location tabs on the inside face of the plate 11 (not visible in Figure 2) which locate in the end of the extruded support 1. The end fitting also includes a lug 6, protruding from the plate, which provides a mounting for a fixing screw 8, on which there is a setting nut 9. Such an individual mounting is in itself of known construction, and is used with conventional flats, though of course the means of securing to the support 2 is different from that used with a conventional flat.

Besides providing means of mounting the flat on the carding machine, the end fitting 11 also provides end location for the card-clothing top 3. The end fittings may be colour coded, to indicate the type of card-clothing top 3.

The flat is completed by a box-type end cover 10, which is open on the underside, so that it can slide downwardly over the end plate of the end fitting in order to cover the individual setting adjustment mechanism. Internally, the end cover 10 is provided with means whereby it forms a snap-on fitting with the lug 6, when the end cover is fully in position. The end cover can, of course, be removed by disconnecting the snap-on fitting arrangement, and then sliding the cover upwardly off the end plate.

Turning now to Figure 3, there is illustrated a stationary arcuate carding plate which is formed from four extruded supports 1, each of which is provided with its integral card-clothing top. These four supports are placed in abutting relationship, as illustrated in Figure 3, and the slight taper of each support causes the assembly of the four supports to form a slightly arcuate configuration. In practice, the angle of taper is designed so that the arcuate form of the sections, when thus placed in abutting relationship with each other, will be concentric with the carding cylinder of the carding machine on which the flats are adapted to operate.

Also as shown in Figure 3, there is provided an

end plate 11, which in this particular instance is made of injection moulded reinforced plastics material The end plate 11 is of such dimensions that it is adapted to extend over the end of the assembly of four supports 1, and indeed, it is of slightly arcuate form, so that it follows the arcuate form of the assembly of supports. Furthermore, the end plate 11 is formed with a series of clearance holes 12, which can be aligned with the sockets formed in the lugs 5 of the four supports 1, so that fixing screws (not shown in Figure 3) can be employed to secure the end plate 11 to all four supports 1, thereby securing the supports to each other in an assembly. In addition, there are top and bottom locating tabs 13 and 14 provided on the inner face of the end plate 11, these locating tabs being designed for engagement with the inside walls of each of the supports 1, so as to locate the end plate relatively to the assembly of supports 1.

On the outer face of the end plate 11, there is moulded a fixing flange 15, by means of which the end plate can be secured to the side frame of the carding machine. It will be appreciated that there is an end plate at each end of the set of supports 1, so that when the assembly is complete, there is, in effect, a complete stationary carding plate, equipped on its underside with four metallic-wire type card-clothed tops. Such a stationary carding plate can be used to supplement the action of a set of revolving flats, or alternatively, the revolving flats can be completely substituted by a plurality of stationary carding plates formed in this way.

It will be appreciated that the carding plate illustrated in Figure 3 is of relatively cheap construction. With conventional flats, once the card-clothing has worn, it is necessary to remove and discard the tops themselves. Sometimes, the card-clothing tops are secured to a removable carrier, but in any event, the conventional flats themselves are retained, because they are relatively expensive, and fresh tops have to be fitted to the flats. With the present arrangement, however, once the card-clothed tops become worn, the entire assembly of extruded section supports with their integral card-clothed tops is discarded. This may be done by disconnecting the end plates 11, so that the same end plates can be used with a fresh set of extruded supports with integral tops, or alternatively, since the end plates themselves are of very cheap construction, the end plates may be discarded with the extruded supports and integral tops, the entire assembly including the end plates being then replaced by a fresh assembly. It is this ability to discard of the extruded support - which replaces the conventional flat -which is the principal advantage of the invention.

In Figure 4, there is illustrated part of a cylinder 20 and a doffer 22 of a carding machine. In this arrangement, a complete assembly of extruded supports 1, each equipped with its card-clothing top 3 is fitted to the underside of the carding cylinder, in place of the conventional sheet metal underscreen. The method of securing each of the supports 1 is illustrated in Figure 5. An end plate 24 is attached to each end of each support 1 by self-tapping screws 7, as previously described. The end plate 24 includes a boss 26 received between a pair of spherical bearing washers 28 and 30 on a mounting stud 32. The mounting stud itself is anchored in part of the carding machine side frame 34.

It is to be understood that the uses of the combined extruded box section support with its integral card-clothing top are not limited to those illustrated in the drawings. For example, the fixing means illustrated in Figures 2 and 2A could be replaced by an end fitting providing the conventional nug arrangement, whereby the flat could form part of a set of revolving flats. Also, the invention is not restricted to the use of metallic-wire type card-clothing, since flexible type card-clothing could be used to provide this top, so long as it is permanently secured to the extruded support 1, as by peening over the ribs 4.

Claims

1. A flat for use in a carding machine comprising an extruded support for carrying a card-clothing top or other operative element which is made integral with the extrusion by being fixed permanently to it, the ends of the extrusion being adapted to receive permanently fixed or detachable end pieces which provide means for mounting the flat on the carding machine.

2. A flat for use in a carding machine as claimed in Claim 1, in which the extruded support is essentially of box-section shape, designed to combine maximum stiffness with minimum wall thickness, which provides the necessary straightness and stability at minimum cost.

3. A flat for use in a carding machine as claimed in Claim 1 or Claim 2, in which the support is made of aluminium or aluminium alloy.

4. A flat for use in a carding machine as claimed in any one of Claims 1 to 3, in which the working face of the extruded support is adapted to receive a flexible-type or metallic-type card-clothing top or any other purpose designed operative element for cooperation with the carding cylinder.

5. A flat for use in a carding machine as claimed in any one of Claims 1 to 4, in which the card-clothing top or other operative element is permanently fixed to the extrusion by peening along each of its longitudinal edges.

6. A flat for use in a carding machine as claimed in any one of Claims 1 to 5, in which the interior shape of the box-shaped extruded support is designed to provide means by which detachable ends can be readily secured to and detached from the support.

7. A flat for use in a carding machine as claimed in Claim 6, in which two or more socket formations are provided inside the support.

8. A flat for use in a carding machine as claimed in Claim 7, in which each socket formation provides a location for an end securing male member such as a screw or dowel.

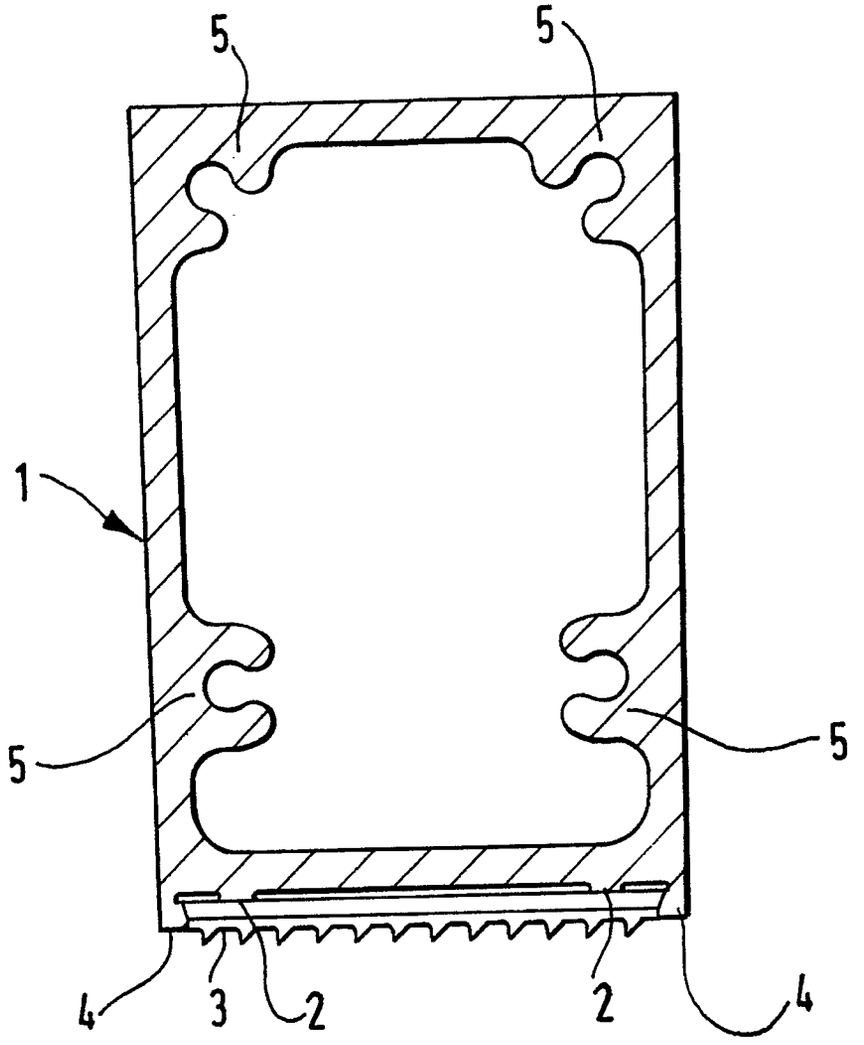

Fig.1.

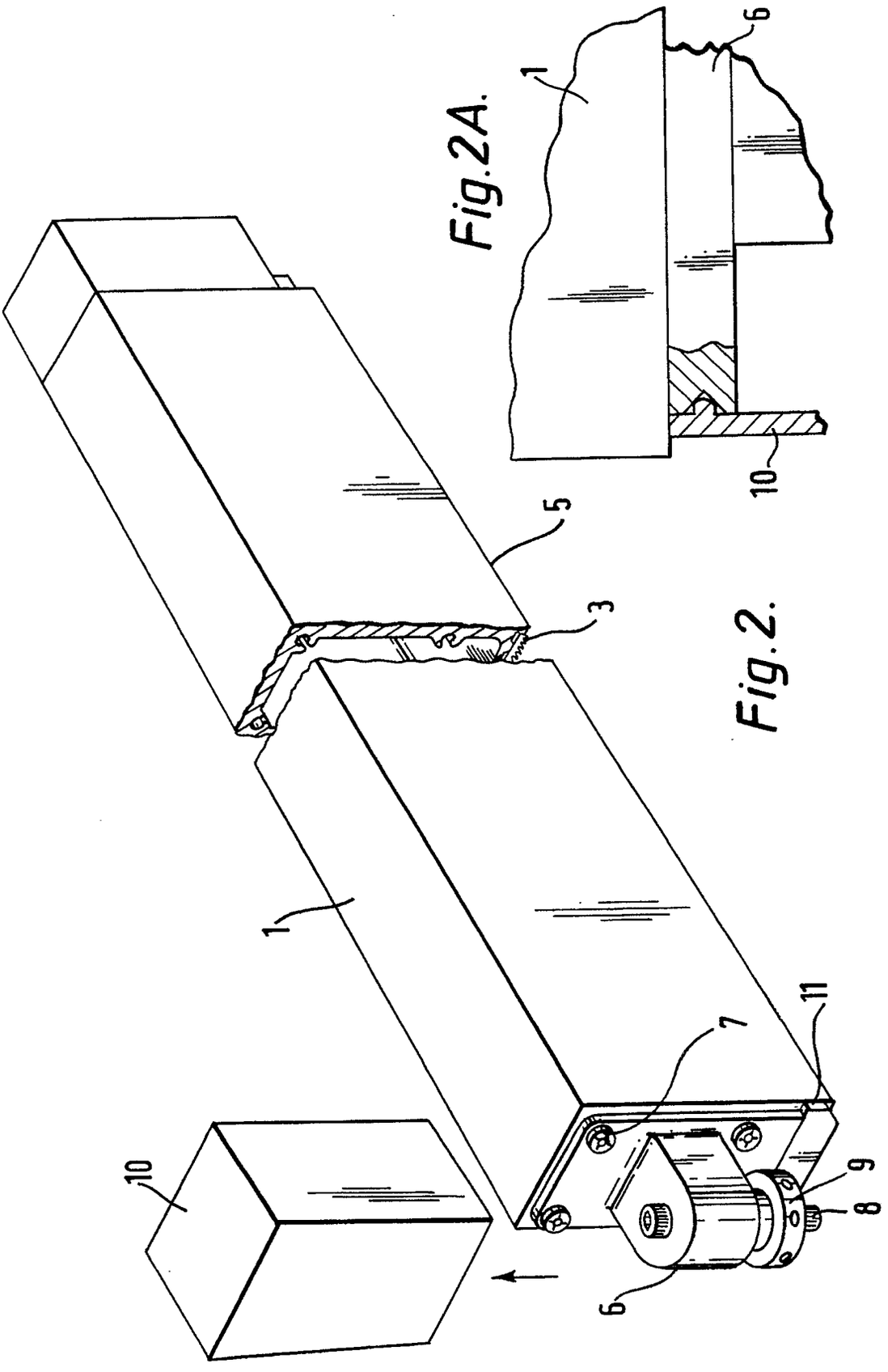

Fig.2A.

Fig.2.

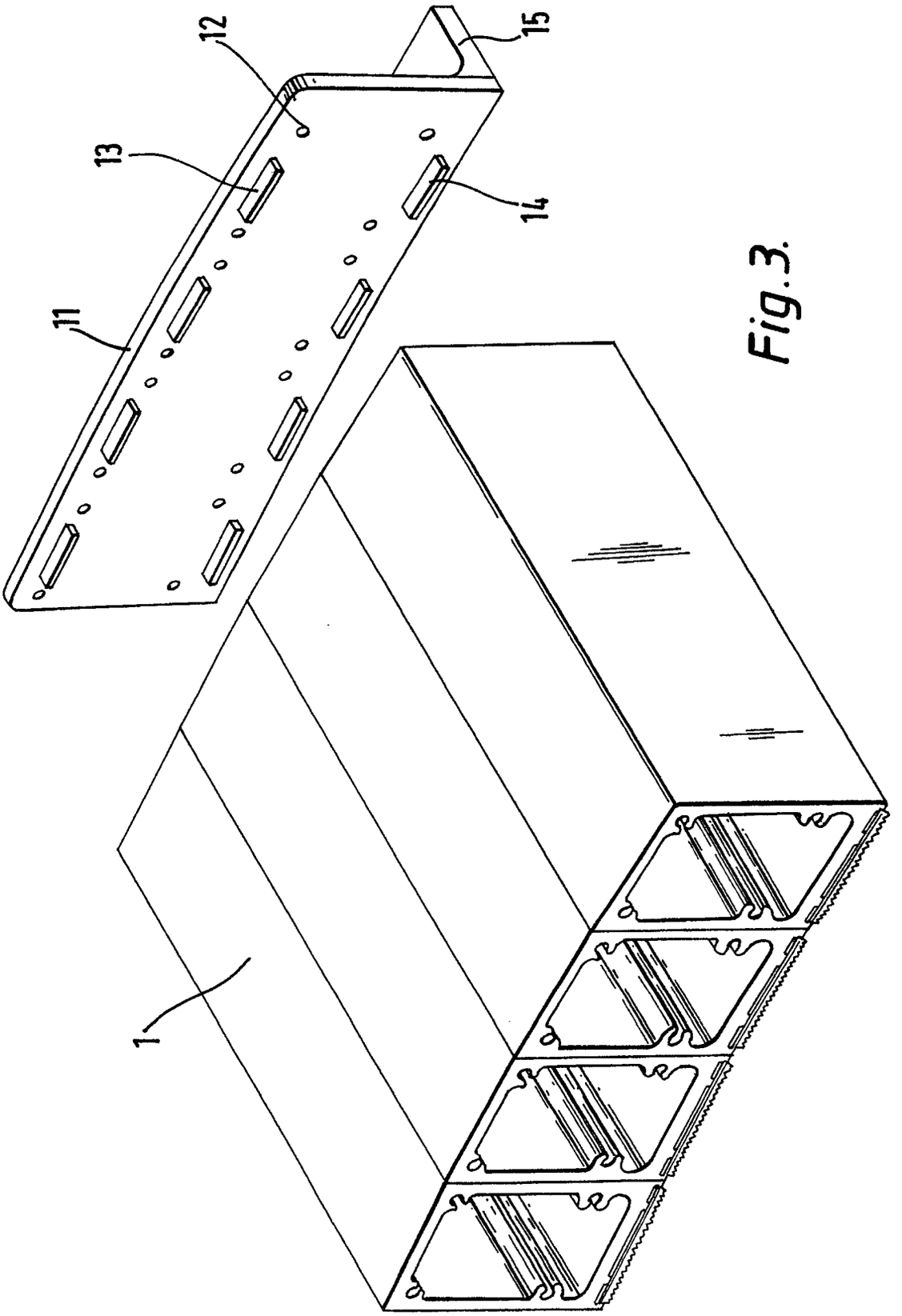

Fig.3.

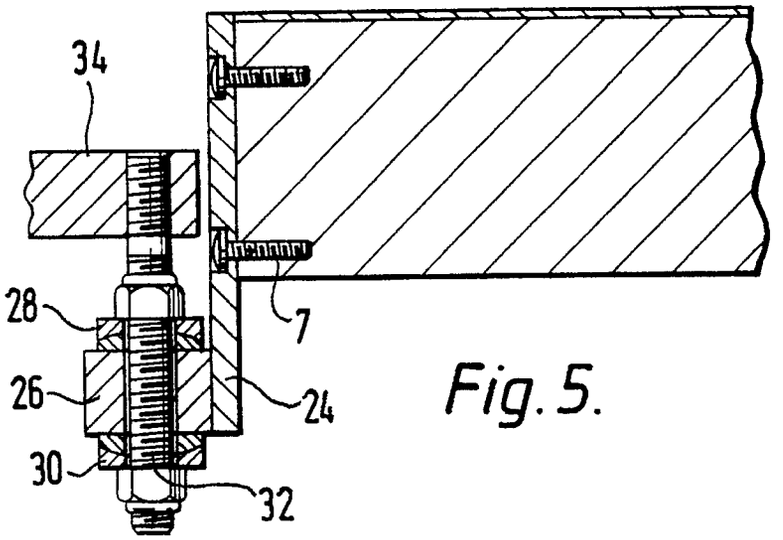

Fig. 5.

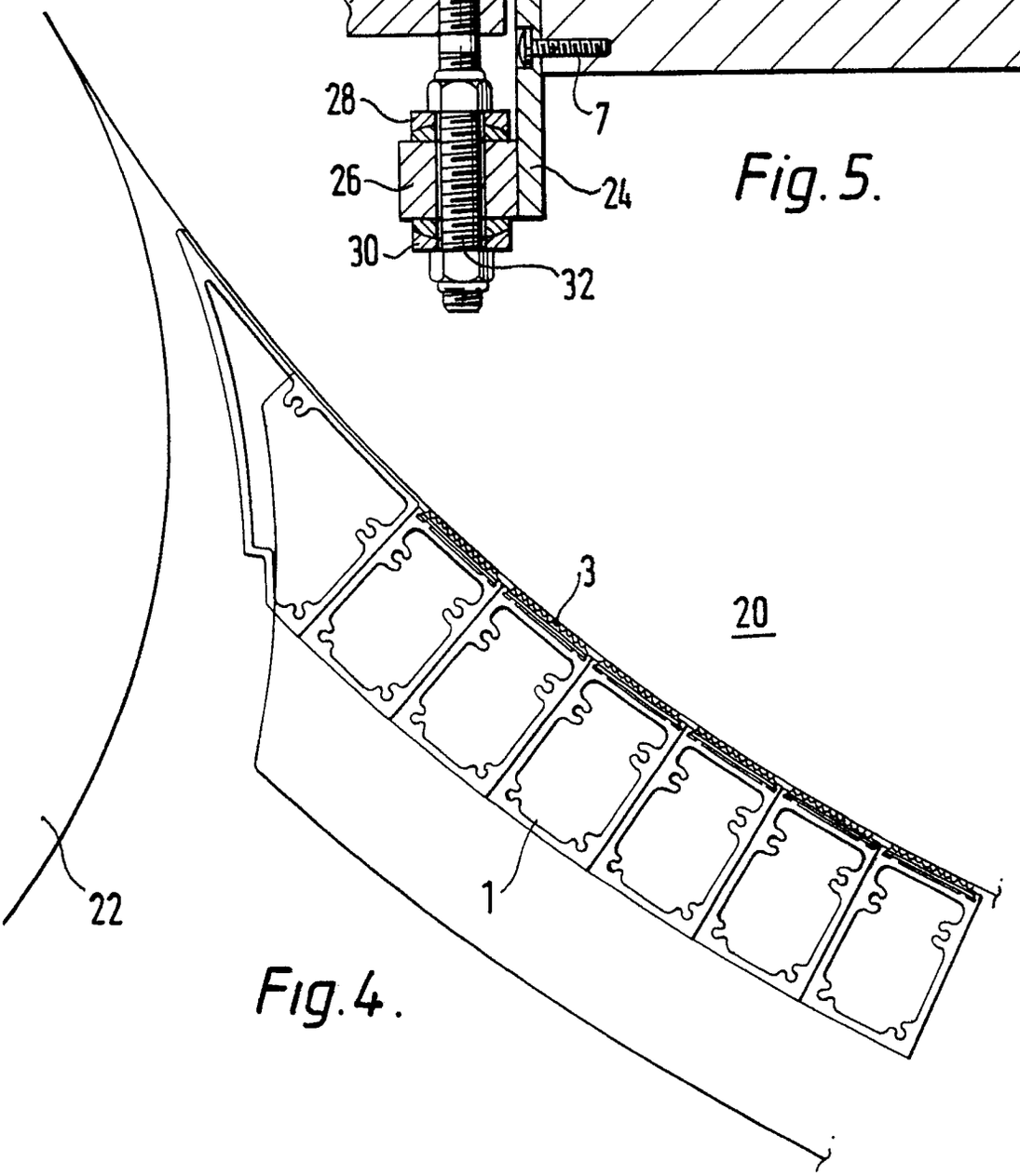

Fig. 4.