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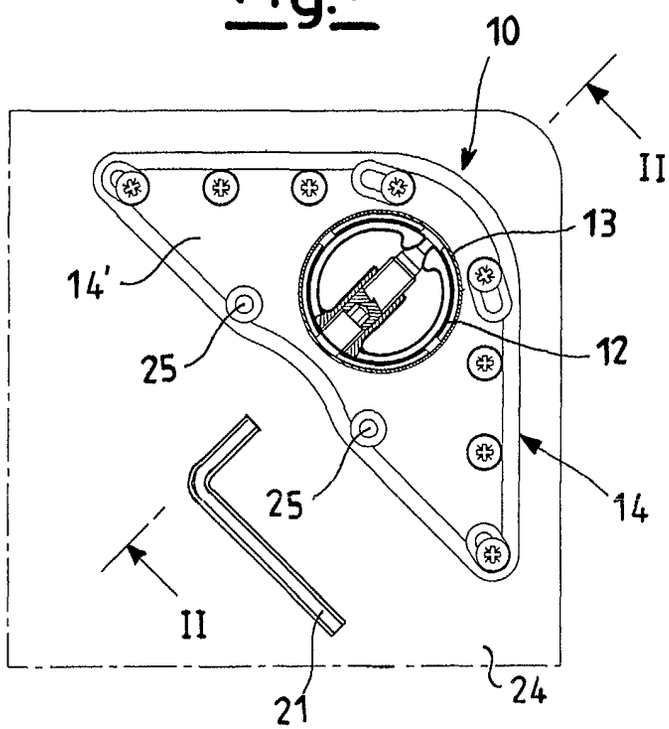
(54) Expandable connector for a leg with an adaptable attachment to a work surface

(57) An expandable connector for a leg (10) with an adaptable attachment (14) to a work surface (24), comprises: an expandable body (15) capable of being inserted into a hollow top of a leg (13) or into a sleeve (12) which can be inserted into each other in a coupling, where said sleeve (12) extends from said attachment (14) in a perpendicular or oblique direction with respect to said attachment (14).

Fig.1



EP 1 279 353 A1

Description

[0001] The present invention refers to an expandable connector for a leg with an adaptable attachment to a work surface, particularly but not exclusively for table production.

[0002] As is well known to experts of the sector, to reduce encumbrance and the risk of damage during storage and transportation, legs are preferably assembled to the work surface at the time of final installation where the user wants it.

[0003] Moreover, in the sector of table production there is a strong need to realise the surfaces themselves so that they can be disassembled into many distinct parts which can be connected together at a later point in time in a stable and practical manner.

[0004] For example, the realisation of tables for workplaces in particular requires a high flexibility of configurations of the work surface, to combine maximum functionality with the aesthetic aspect.

[0005] The need to cut production costs, whilst still offering the client a vast range of solutions has led to the development of modular structures, which foresee the variable combination of surfaces with a determined number of standardised shapes.

[0006] To standardise the assembly instruments and the tools needed to put together tables or support structures, to benefit both producers and users, multifunctional connectors have also been developed. Multifunctional connectors can be used both to connect the legs of tables to surfaces or to structures and to join two surfaces together.

[0007] Connectors can possibly be dismountable to allow the at least partial reuse of the individual elements in the realisation of new configurations of tables or of support structures, or more simply to allow the subsequent storage thereof.

[0008] Connectors for legs must first of all guarantee a connection which is stable through time to obtain a table or a structure which is solid without the risk of deterioration of the materials used.

[0009] Indeed, resistance to stresses, for example deriving from lifting or sliding, must be guaranteed.

[0010] Moreover, it is desirable that connectors for legs also allow end users to rapidly carry out connections with the help of common tools, such as a screwdriver or an Allen key.

[0011] Dismountable connectors which are currently available do not allow all of the listed factors to be optimised. Above all they have great difficulty in combining simplicity of construction and use with the requirements of strength, in any case losing out on the aesthetic aspect.

[0012] The general purpose of the present invention is that of overcoming the aforementioned drawbacks of the prior art in an extremely cost-effective, simple and particularly functional manner.

[0013] Another purpose is that of realising an expandable connector for a leg with an adaptable attachment to a work surface which achieves an excellent aesthetic result.

[0014] In view of the aforementioned purposes, according to the present invention, it has been thought of to realise an expandable connector for a leg with an adaptable attachment to a work surface, having the characteristics outlined in the attached claims.

[0015] The structural and functional characteristics of the present invention and its advantages compared to the prior art shall become even clearer from an examination of the following description, referring to the attached drawings, which show an expandable connector for a leg with an adaptable attachment to a work surface, realised according to the innovative principles of the invention itself.

[0016] In the drawings:

- figure 1 shows a plan view of a first embodiment of an expandable connector for a leg with an adaptable attachment to a work surface, object of the present invention, mounted at a corner of a surface;
- figure 2 is a section view of figure 1, according to the line II-II;
- figure 3 is a plan view of the connector of figure 1 shown with the expandable body removed and mounted as a joint between two surfaces;
- figure 4 is a section view of the connector of figure 3 realised at the middle point;
- figure 5 is a perspective view of an expandable body equipped with a manoeuvring pin
- figure 6 is a plan view of the expandable body of figure 5, partially sectioned to show a threaded seat of the manoeuvring pin;
- figure 7 is a section view of figure 6 according to the line VII-VII;
- figures 8 and 9 schematically show the deformation action caused by the manoeuvring pin on the expandable body;
- figures 10 and 11 are, respectively, plan and section views of a second embodiment of an expandable connector for a leg mounted built into the surface and shown with the expandable body removed;
- figure 12 is a plan view of a further embodiment of an expandable connector for a leg with a sleeve having a squared section shown with the expandable body removed;
- figures 13-16 are, respectively, perspective and section views of an expandable connector for a leg with an adaptable attachment for mounting to structures of tubular profiles;
- figure 17 is a section view of a last embodiment of a connector into which the end of the leg containing the expandable body is inserted;
- figure 18 is a perspective view of the hollow tubular leg of figure 17;
- figure 19 is a section view which schematically shows the deformation action caused by the ex-

pandable body on the leg in the connector according to the embodiment of figure 17;

[0017] With reference to the drawings, an expandable connector for a leg with an adaptable attachment to a work surface, and in particular to a table surface in object is wholly indicated with 10. In the illustrated examples, according to the present invention, the expandable connector 10 comprises a sleeve 12 for interaction with a leg 13,which extends from an attachment 14 in a perpendicular direction with respect to the attachment itself and into which an expandable body 15 is inserted.

[0018] The expandable body 15, shown in detail in figures 5-9 comprises an outer wall 16, for example cylindrical, equipped with a portion which is easy to deform, which in the figures consists of a notch 17 extending for the whole height of said outer wall 16. Such a notch 17 can be realised in the outer wall 16 according to generic inclinations or can be replaced by another element which gives the wall elasticity.

[0019] The expandable body 15 is moreover equipped with a threaded seat 18 for a manoeuvring pin 19 through which the expansion is realised, according to that which is shown schematically in figures 8 and 9.

[0020] The manoeuvring pin 19 at one end has a hexagonal seat 20 for the intervention of a tool 21 and at the point terminates with a frustum-of-cone guide surface 22.

[0021] Near to the notch the expandable body has guide surfaces 23 of the deformation to a shape which matches the frustum-of-cone surface 22 of the manoeuvring pin 19.

[0022] The expandable body 15, in the proposed embodiments can be used in combination with connectors 10 of different types and characteristics, some embodiments of which shall be described hereafter.

[0023] The sleeve 12 and the leg 13 can in turn be inserted into each other in a coupling, according to two different ways of operating.

[0024] In figures 1-4 an expandable connector 10 is shown which can be used only for the connection of the leg 13 to a work surface 24 or else also as a joint between individual parts 24a and 24b of the surface.

[0025] Indeed, in such expandable connectors 10 the adaptable attachment to a work surface 14 consists of a triangular-shaped plate 14', upon the sides of which holes 25 are realised, according to a design which allows it to be used in both of the represented assembly situations, given that the work surfaces 24 are equipped at the corners with multifunctional standard prepunching.

[0026] The sleeve 12 has a substantially cylindrical inner surface 26 for coupling with the expandable body 15 and an outer surface 27, also substantially cylindrical and which can be coupled with tubular legs 13 having a matching cross-section.

[0027] The sleeve 12 is also equipped with notches 28 parallel to an axis 29 of the sleeve 12 itself, and more precisely two partial notches 28' and two notches extending for the whole height of the sleeve 28'', arranged facing one another in pairs in diametrically opposite positions.

[0028] The extended notches 28'' give the sleeve 12 the necessary elasticity to be forced against the inner surface of the leg 13, as shown for example in figure 2. The partial notches 28' as well as contributing to giving elasticity, above all allow the tool 21 to access the manoeuvring pin 19. For aesthetic reasons access to the pin 19 is always carried out from a zone hidden from view when the table is assembled, as shown in figures 1 and 3.

[0029] The tubular leg 13, having an inner diameter such as to fitted onto the sleeve 12, is equipped with a hole, not shown, for the intervention of the tool 21 from the outside.

[0030] In figures 10-12 expandable connectors 10 for mounting a tubular leg to a work surface are shown, where the adaptable attachment to the surface consists of a punched plate 14'' of a small size, for example L-shaped, which can be mounted flush with the surface in a seat 31 formed here.

[0031] In these embodiments of the expandable connector 10 the sleeve 12 is preferably closed by a base wall 32 equipped with a plurality of holes 33 for attachment to the work surface 24 through screws.

[0032] The sleeves 12 can have a circular cross-section just as they can for example have a square section (figures 10 and 12).

[0033] Finally, the adaptable attachment 14 to a table surface can consist of an expansion tang 114 for jointing to tubular profiles 34, which constitute a frame support structure for the work surface 24. Figures 13-16 show expandable connectors 10 which form a terminal element of the frame support structure which can be of different shapes.

[0034] In figure 13 the attachment 14, partially in view, allows the attachment of the legs 13 in a protruding position with respect to the surface 24.

[0035] The described embodiments of the expandable connector 10, refer to sleeves 12 inserted and forced by expansion inside the hollow end of the tubular legs 13.

[0036] In other embodiments, only one example of which is shown in figure 17, it is the leg 13 which is forced by expansion inside the sleeve 12, according to that which is schematised in figure 19.

[0037] The tubular leg 13 is equipped with an elongated notch 35 which extends above and below with respect to the hole for the key to pass (figure 18). The notch 35 constitutes a zone which is easy to deform which favours the forcing of the leg 13 under the action of the expandable body 15, as schematised in figure 19.

[0038] The sleeve 12 against which the leg 13 is forced must be solely equipped with a hole 36 for the intervention of the tool 21.

[0039] The expandable connectors for a leg 10 with

an adaptable attachment to a work surface are preferably made out of die-cast aluminium.

[0040] To connect a leg 13 to a surface 24 for example of a table the expandable body 15 is inserted into the sleeve 12 (figure 2) or else into the leg 13 (figure 17), taking care to make the manoeuvring pin 19 fit into the notches 28 and the holes 36 arranged for intervention by the tool 21.

[0041] In rest position, shown in figure 8, the manoeuvring pin 28 is already positioned in the threaded seat 18 of the expandable body 15. By further screwing the pin 19 into the threaded seat 18 through the tool 21 the progressive engagement between the additional guide surfaces of the point of the pin 22 and of the wall 23 near to the notch 17 is caused. The outer wall 16 of the expandable body is therefore deformed until it reaches a circumferential size (figure 9) which takes it to couple by interference with the tubular element with a matching shape which receives the expandable body 15, in other words the sleeve 12 or the leg 13, according to the embodiments of the connector 10 described previously.

[0042] From that which is described above with reference to the figures, it is clear how an expandable connector for a leg with an adaptable attachment to a work surface, in particular to a table surface according to the invention is particularly useful and advantageous. The purpose mentioned in the preamble of the description is thus achieved.

[0043] An expandable connector for a leg, object of the present invention is indeed advantageously realised through simple shapes, which allow fast treatment cycles to be carried out.

[0044] An expandable connector, according to the preferred embodiment with a base wall, also ensures excellent rigidity which is particularly useful in jointing many pieces to form the work surface.

[0045] Moreover, the outer appearance is not at all penalised by the possible assembly configurations.

[0046] Of course, the forms of the expandable connector for a leg with an adaptable attachment to a table surface, object of the present invention, can be different from the one shown just as a non-limiting example in the drawings, just as the materials can also be different.

[0047] The scope of protection of the invention is therefore defined by the attached claims.

Claims

1. Expandable connector for a leg (10) with an adaptable attachment (14) to a work surface (24), **characterised in that** it comprises an expandable body (15) capable of being inserted into a hollow top of a leg (13) or into a sleeve (12) which can be inserted into each other in a coupling, where said sleeve (12) extends from said attachment (14) in a perpendicular or oblique direction with respect to said attachment (14).

2. Expandable connector for a leg (10) according to claim 1, **characterised in that** said expandable body (15) comprises an outer wall (16), equipped with at least one portion which is easy to deform (17) and with a threaded seat (18) for a manoeuvring pin (19) of the expansion.

3. Expandable connector for a leg (10) according to claim 2, **characterised in that** said at least one portion which is easy to deform consists of a notch (17) of said wall (16) extending for the whole height of said outer wall (16).

4. Expandable connector for a leg (10) according to claim 2, **characterised in that** said expandable body (15) has guide surfaces (23) of the deformation which engage with said manoeuvring pin (19).

5. Expandable connector for a leg (10) according to claim 2, **characterised in that** said outer wall (16) of said expandable body (15) has a substantially cylindrical generatrix.

6. Expandable connector for a leg (10) according to claim 1, **characterised in that** said sleeve (12) is equipped with at least one notch (28), parallel to its axis (29).

7. Expandable connector for a leg (10) according to claim 1, **characterised in that** said sleeve (12) is closed by a base wall (32) equipped with a plurality of holes (33) for attachment to the work surface (24).

8. Expandable connector for a leg (10) according to claim 1, **characterised in that** said adaptable attachment (14) to the work surface (24) consists of a punched plate (14', 14'').

9. Expandable connector for a leg (10) according to claim 1, **characterised in that** said adaptable attachment (14) to the work surface (24) consists of an expansion tang (114) for jointing to tubular profiles (34).

10. Expandable connector for a leg (10) according to claim 1, **characterised in that** said leg (13) is equipped with a zone which is easy to deform (35).

11. Expandable connector for a leg (10) according to claim 1, **characterised in that** it is made out of die-cast aluminium.

Fig.1

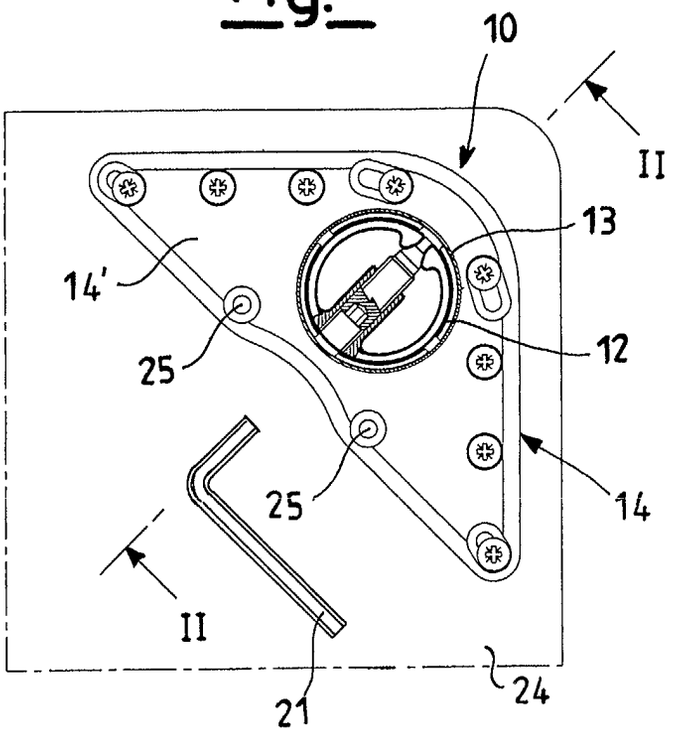


Fig.2

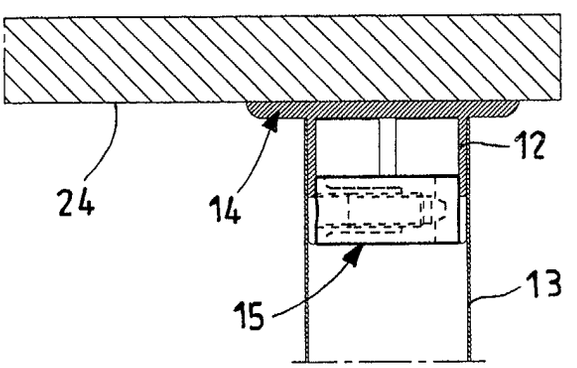


Fig.3

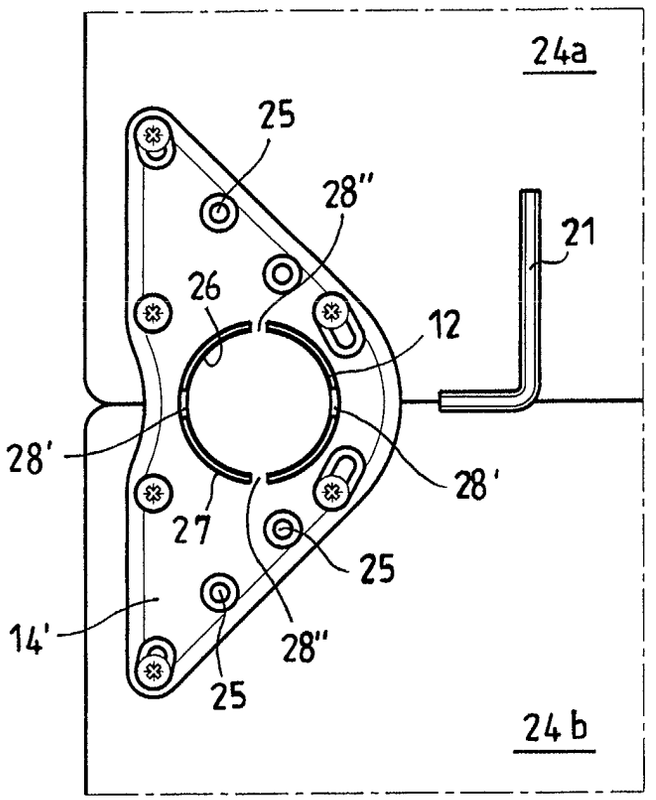


Fig.4

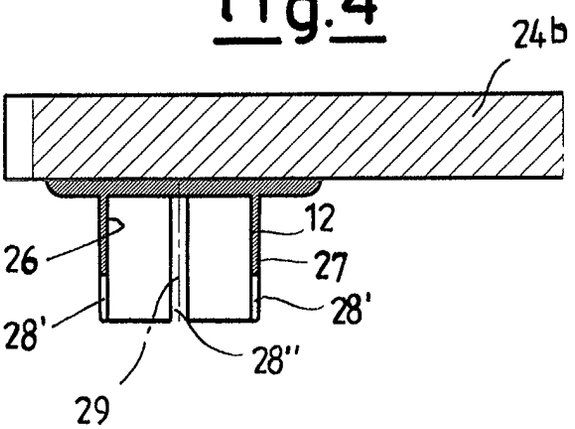


Fig.5

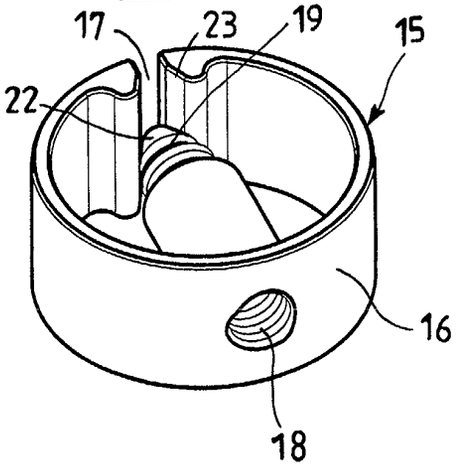


Fig.6

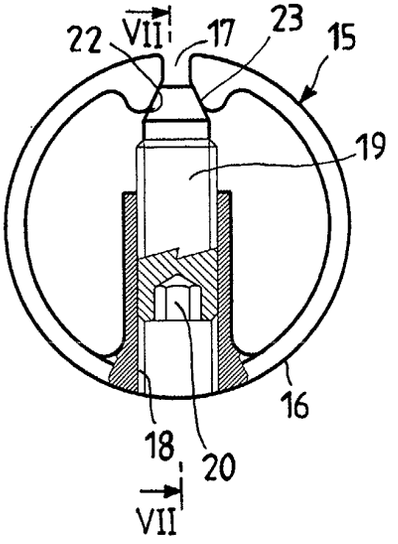


Fig.7

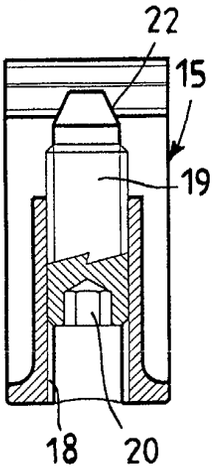


Fig.8

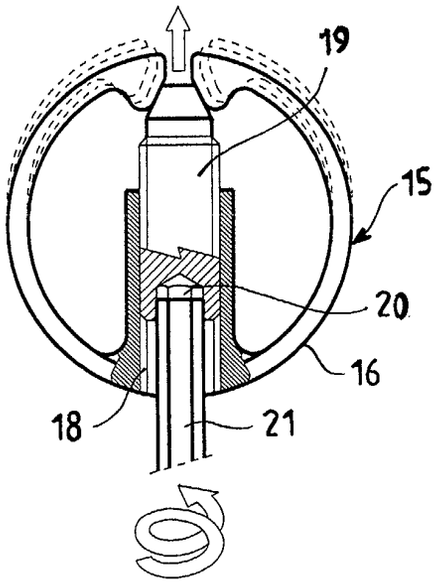


Fig.9

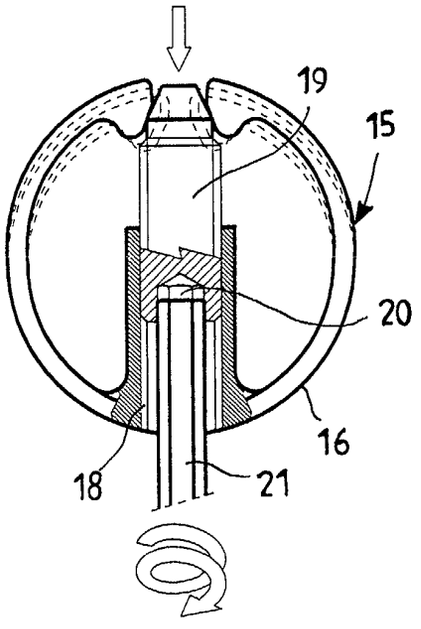


Fig.10

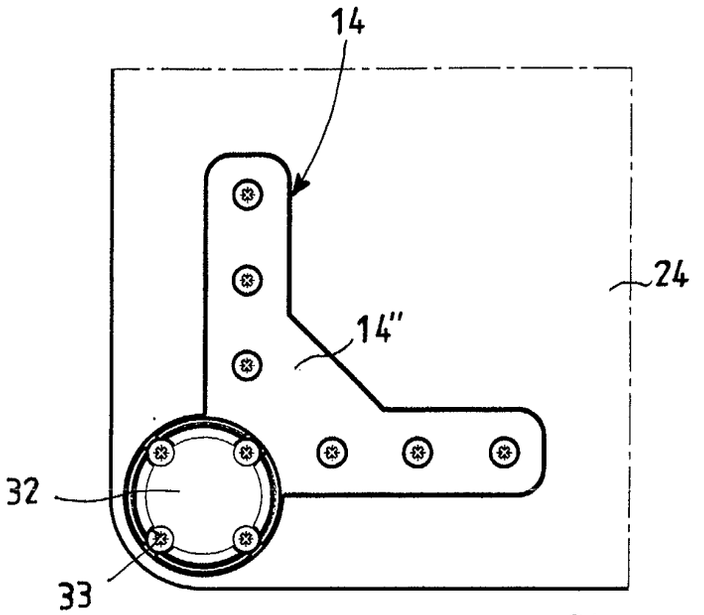


Fig.11

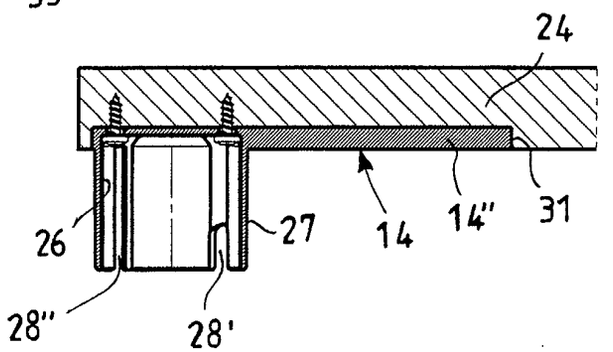


Fig.12

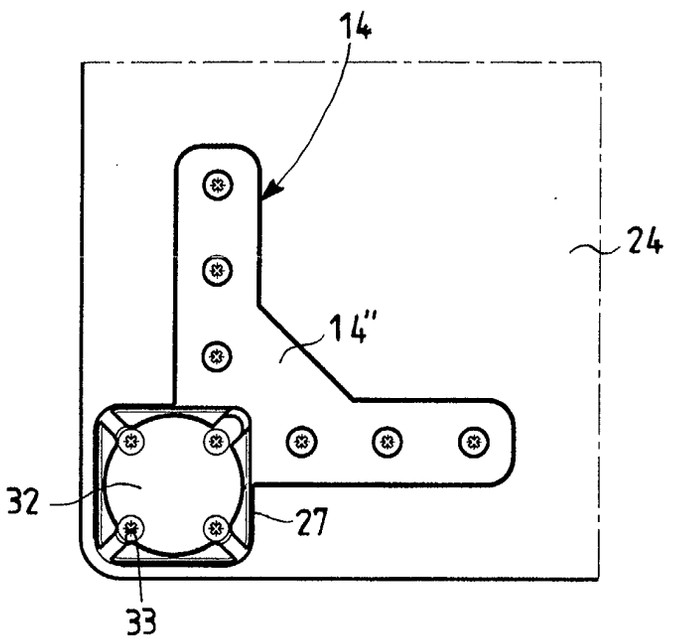


Fig.13

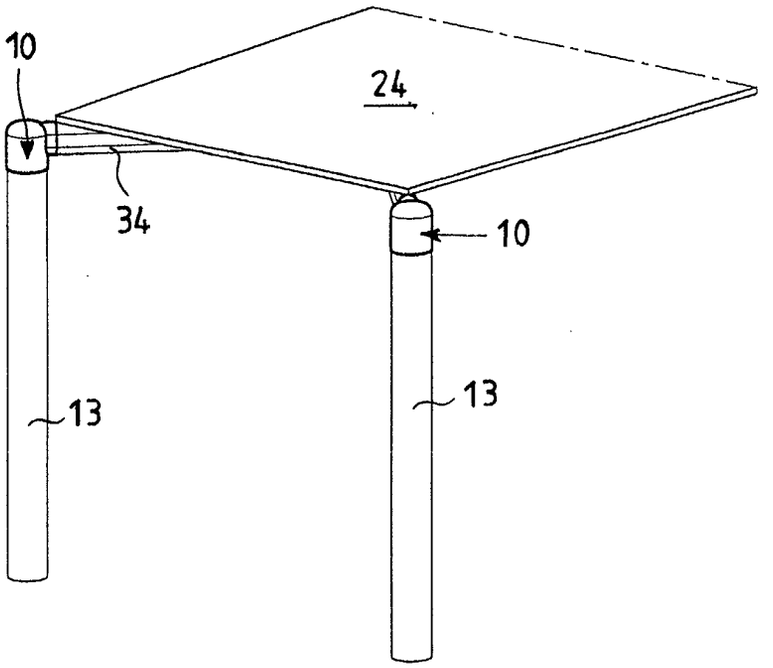


Fig.14

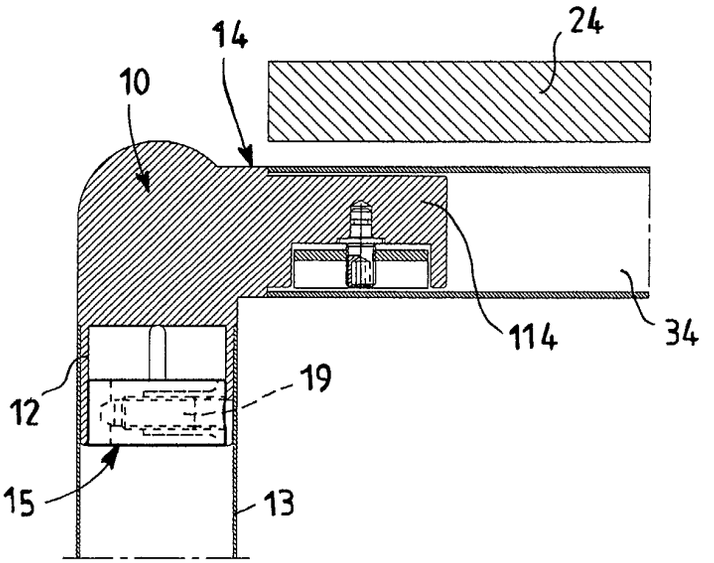


Fig.15

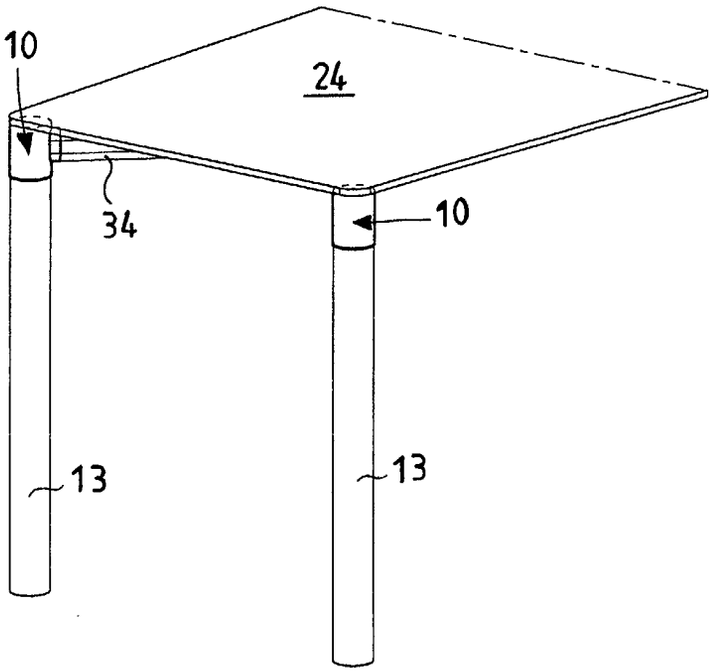
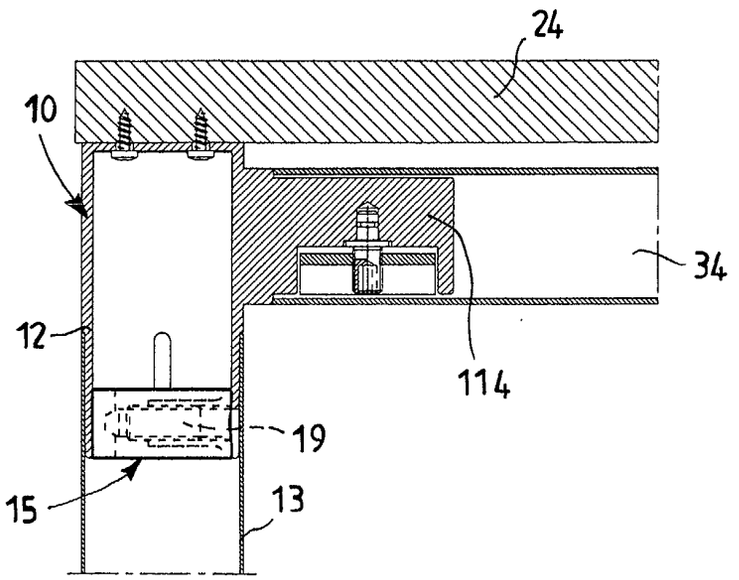


Fig.16



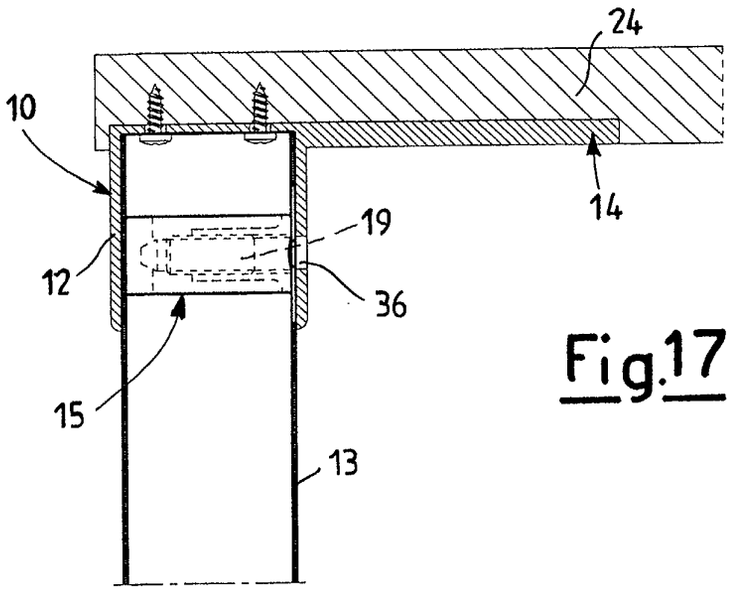


Fig.17

Fig.18

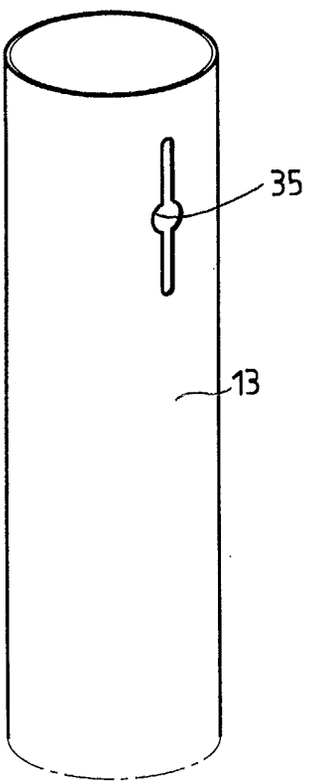
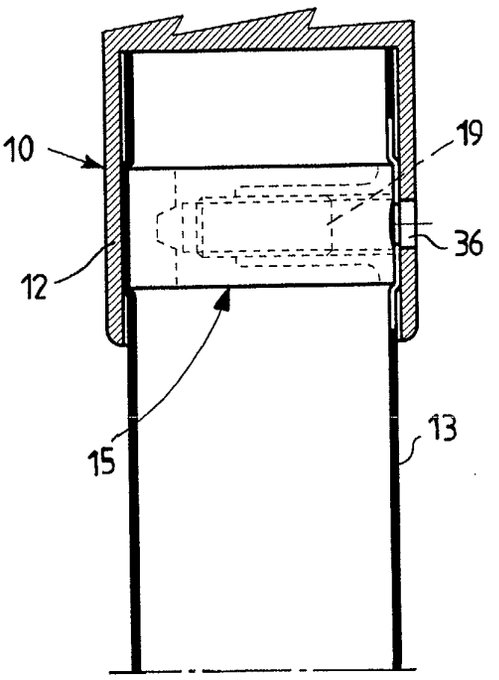


Fig.19



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EUROPEAN SEARCH REPORT

Application Number
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The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	15 November 2002	Ottesen, R

CATEGORY OF CITED DOCUMENTS

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