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(71) Applicant:
Purssord, Reginald george
Christchurch, Dorset BH23 5RB (GB)

(72) Inventor:
Purssord, Reginald george
Christchurch, Dorset BH23 5RB (GB)

(74) Representative:
Purvis, William Michael Cameron
D. Young & Co.,
21 New Fetter Lane
London EC4A 1DA (GB)

(54) Portable structure

(57) A portable structure having no central pole or shaft is provided in which umbrella ribs (4, 28, 30) are pivotally mounted to a central hub (10). A canopy (14) is fastened to the ribs (4, 28, 30) and has a radial slit therein between one pair (28, 30) of adjacent ribs. Means, such as a zip fastener (20) is provided for releasably joining together the edges of the slit. With the radial slit unjoined the ribs (4, 28, 30), with the canopy (14) attached thereto, may be swung about their pivots between a gathered together for storage and carrying position and a pivoted outwardly to an "umbrella erected" position.

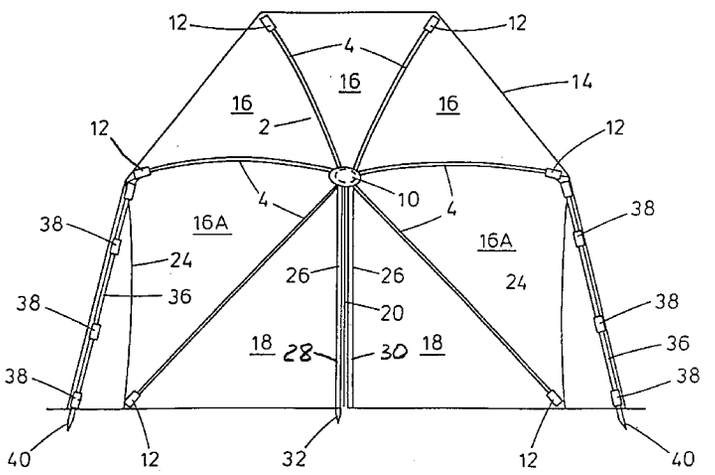


FIG. 2

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Description

This invention relates to portable structures intended to provide shelter from the weather elements.

Structures of this type are well-known for use by riverside fishermen to protect the users from exposure to wind, rain, snow and generally they take the form of a large umbrella. More recently, developments have taken place in the design of such umbrella whereby it has been possible to eliminate the need for a central pole or shaft whereby the user has been unimpeded by such a shaft in pursuit of his fishing activities.

Similar types of structure have also found uses as garden or beach shelters both for protection from the elements and for the provision of some degree of privacy.

One such arrangement disclosed in Patent Specification GB-A-2 237 193 is an umbrella-like structure provided with a number of canopy-supporting ribs pivotally mounted on a hub member. A pressure plate is located onto a threaded stud and caused to apply pressure to the ribs in order to maintain the umbrella in opened operative position, by means of a nut which is normally tightened on to the stud. The pressure plate replaces the conventional rib-supporting struts which depend outwardly from a sleeve slidable along the central shaft.

In the above known structure, erection is difficult as the user needs to hold the canopy in is opened condition whilst threading first, the pressure plate, and then the nut onto the threaded stud in order to hold the ribs in their erected positions. At the same time the canopy has to be stretched and the ends of at least two of the ribs placed into retaining pockets on the inner face of the canopy. When dismantling the canopy the pressure plate cannot be released until at least two ribs have been disengaged from their retaining pockets. All of the above actions add to the difficulty of erection and dismantling.

According to the invention there is provided a portable structure having no central pole or shaft and comprising a canopy and a plurality of umbrella ribs pivotally mounted to a central hub and pivotable between a storage position and a canopy tensioning position, wherein the canopy is fastened to the ribs, has a radial slit provided between one pair of adjacent ribs and includes means for releasably joining together the edges of the slit.

The means for joining together the edges of the slits may comprise a slide fastener, or alternatively hook and loop type fastening means or hook and eye type fastening elements may be provided.

With the radial slit unjoined the ribs, with the canopy attached thereto may be swung about their pivots to either be gathered together for storage and carrying purposes, or to be pivoted outwardly to an erected position and the edges of the radial slit closed by its joining means in order to tension the canopy.

The central hub is preferably formed with a profile against which selected ribs are held in tension when the canopy is in its erected condition.

The ribs may vary in thickness along their length in order to allow of varying degrees of bending of the ribs as the canopy is placed under tension. They may taper from a thicker dimension adjacent the hub to a narrow dimension adjacent the periphery of the canopy. Alternatively, the ribs may comprise two or more axially aligned components, jointed together and of differing thicknesses.

Thus the structure may comprise a series of umbrella ribs pivoted to the central hub so as to be able to be gathered together centrally for storage and carrying purposes. To erect the canopy the ribs are pivoted outwards from their stowed position to beyond the conventional "umbrella erected" position. As a result, effectively, the umbrella reverses or inverts.

The arrangement whereby the ribs are pivoted to the central hub should permit such inversion. Moreover, the hub should be constructed so that the ribs can pivot beyond their mid-point position to an inclined position suitable for the erected form of the umbrella or canopy. The hub may have suitably profiled surfaces for this purpose.

Sheet material of which the canopy is made should permit the inversion movement, being attached to the ribs but having the radial slit between said pair of ribs, the slit being openable and closable by closure means such as a zip.

To open and close the canopy the ribs are moved between the positions discussed above. In the open position of the canopy, the assembly is effectively retained in this configuration by the tension in the canopy itself which has been set up when the zip is zipped up, and this tension holds the ribs against the profiled surfaces of the hub.

The structure is preferably capable of single-handed erection and collapsing. Moreover, the reverse arrangement of ribs and canopy have the result that the collapsed configuration of the ribs and their erected configuration are effectively on opposite sides of the central mean plane. Additionally, the use of the slit and fastener enables not only securing but also tensioning of the canopy.

An embodiment of the invention will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a perspective view of a portable structure according to the invention;

Figure 2 is a front view of the structure in its erected position;

Figure 3 is a view taken along the line of the axis of a hub member from the front of an assembled structure;

Figure 4 is a view from the front of a partly assembled structure;

Figure 5 is a plan view of the hub member showing

the system for pivotally mounting the ribs of the structure;

Figure 6 is a side view showing the ribs and a canopy in their folded condition for storage or carriage;

Figure 7 is a section view on the line VII-VII of Figure 5;

Figure 8 is a scrap view of parts of the canopy showing a closure member; and

Figure 9 is a detailed view of part of the canopy at which the closure member is provided.

As seen in the drawings a portable structure comprises a frame 2 including a number of ribs 4 pivotally mounted at their innermost ends on swivel pins 6 by means of ferrules 8 to a hub 10 as seen clearly in Figures 5 and 7. The outermost ends of the ribs 4 are located in pockets 12 sewn to a canopy 14.

The ferrules 8 are pivotable through approximately 90 degrees upwardly about pins 7 fast in the swivel pins 6 as seen in chain lines in Figure 7 and the swivel pins 6 are rotatable through approximately 180 degrees about their own axes. Thus, the ribs may pivot through about 180 degrees with respect to their mountings on the hub 10 and through about 90 degrees about their pins 7 to fold upwardly to the collapsed position illustrated in Figure 6.

The canopy 14 comprises a number of separate panels joined together by seams adjacent the ribs 4. As seen clearly from Figure 3, panels 16 and 16A are substantially identical in size and shape. Panels 18 are about one half size of the panels 16 and are provided on their innermost radial edges with a slide fastener 20 (eg a "zip" fastener). Alternatively a hook and loop fastener or hook and eye fasteners may be provided. With the fastener unconnected the canopy may adopt the configuration illustrated in Figure 4 whilst with the fastener connected, the configuration is as seen in Figure 3.

If desired, each pair of panels 16A and 18 may be formed as one complete panel, ie not joined by a seam.

As seen clearly in Figures 1 to 4, two further panels 22 are provided and are joined by seams 24 to the panel 16A.

Two adjacent ones of the ribs 4 are formed as poles 28 and 30 and the panels 18 are formed adjacent the slide fasteners 20 with hems 26 to receive the poles 28 and 30, see particularly Figures 8 and 9. The pole 28 is formed at its bottom end with a point 32 which may be pressed into the ground, and a wire loop 34 is provided to clip the outer ends of the poles 28 and 30 together when the structure is erected with the canopy in its tensioned condition. The wire loop relieves the fastener 20 of some of the possible strain.

A pair of poles 36 are pivoted at each of their upper ends to those pockets 12 adjacent the joining seams of panels 16 and 16A, and pass downwardly through retaining loops 38 on the panels 22. The poles are formed with points 40 at their lower ends which may be pressed into the ground to maintain the panels 22 in position as seen particularly in Figure 1.

In order to cause the ribs 4 to flex to a greater degree towards their outermost ends than that adjacent the hub, they may be tapered, lessening in diameter towards their outermost extremities. Alternatively they may be formed from two separate rods joined approximately mid-way of their length, the innermost section being of greater diameter than the outermost section.

It is preferred that those ribs 4 which are adjacent the seams joining the panels 16A and 18, and the poles 28 and 30 are not flexed to the same extent as the other ribs 4. With this in view the hub 10 is formed with a flange 11 (see Figures 5 and 7). part of the flange has a level face 13 which restricts the downward component of pivotal movement of the ferrules 8 and the ribs 4 before bending of the ribs is effected. A different part of the flange is machined to provide an angled face 15 to allow a greater degree of pivotal movement of the ferrules connecting with the lower ribs 4 and the poles 28 and 30. Thus the ribs and poles located towards the lower part of the structure is erected, whilst the ribs located around the upper part of the structure are flexed against the face 13 of the hub to provide a curved format or "overhang" of the panels 16.

The ribs 4 may be of lightweight plastics or metal rod, or of fibre glass or carbon fibre.

Thus, in its carrying and storing condition the points 32 and 40 of the poles 28, 30 and 36 are withdrawn from the ground, the fastening means 20 is uncoupled an the wire loop 34 disconnected to release the tension in the canopy. The poles 36 are drawn out of their retaining loops 38 to be stored separately.

The ribs 4 and the poles 28, 30 are then swung upwardly about their swivel pins 6 to the position shown in Figure 6 and inserted, with the poles 36, axially into a convenient valise.

Erection of the structure is simply a reverse procedure of that above whereby the tension of the canopy 14, by closure of the fastening means 20 and engagement of the wire loop 34, causes the appropriate ribs to be placed in tension. The points 32 and 40 on the poles 28, 30 and 36 are pushed into the ground to stabilise the structure and to allow the panels 22 to provide protection from ingress of weather from the sides. Thus protection is afforded from three sides and from above.

It is found that the portable structure according to the invention can be erected speedily and simply, can provide a stable and efficient shelter having no restrictions caused by a central pole or shaft associated with other known arrangements and has few separate components.

The canopy shape, combined with the profile of the hub and the flexibility of the ribs determines the final shape of the structure and the essential feature which allows it to work and erect simply is the split in the cover which can be joined by the slide fastener. The fact that the ribs can freely swivel in two directions from the storage position seen in Figure 6 to the erected position

seen in Figures 1 and 2 alow it to be manipulated in one circular movement by the user.

Claims

1. A portable structure having no central pole or shaft and comprising a canopy (14) and a plurality of umbrella ribs (4, 28, 30) pivotally mounted to a central hub (10) and pivotable between a storage position and a canopy tensioning position, wherein the canopy (14) is fastened to the ribs (4, 28, 30), has a radial slit provided between one pair (28, 30) of adjacent ribs and includes means (20) for releasably joining together the edges of the slit.

2. A portable structure according to claim 1, wherein said means (20) comprises a slide fastener, or alteratively hook and loop type fastening means, or hook and eye type fastening elements.

3. A portable structure according to claim 1 or claim 2, wherein the central hub (10) is formed with a profile (13) against which selected ribs (4) are held in tension when the canopy (14) is in its tensioned position.

4. A portable structure according to any one of the preceding claims, wherein the ribs (4) vary in thickness along their length to allow for varying degrees of bending of the ribs (4) as the canopy (14) is placed under tension.

5. A portable structure according to claim 4, wherein the ribs (4) taper from a thicker dimension adjacent the hub (10) to a narrow dimension adjacent the periphery of the canopy (14).

6. A portable structure according to claim 4, wherein each of the ribs (4) comprises two or more axially aligned components, jointed together and the components of each rib (4) are of differing thicknesses.

7. A portable structure according to any one of the preceding claims, wherein the structure is erected by pivoting the ribs (4, 28, 30) outward from a stowed position to beyond the conventional erected position to invert, or reverse the canopy (14) to an erect position.

8. A portable structure according to any one of the preceding claims, wherein the hub (10) is constructed so that the ribs (4) can pivot beyond their mid-point position to an inclined position suitable for the erected form of the canopy (14).

9. A portable structure according to claim 8, wherein the hub (10) is provided with profiled surfaces (13, 15).

10. A portable structure according to any one of claims 7 to 9, wherein sheet material of which the canopy (14) is formed permits inversion movements, being attached to the ribs (4, 28, 30) but having the radial slit between said pair of ribs (28, 30), said means (20) being able to open an close the slit and comprising a zip.

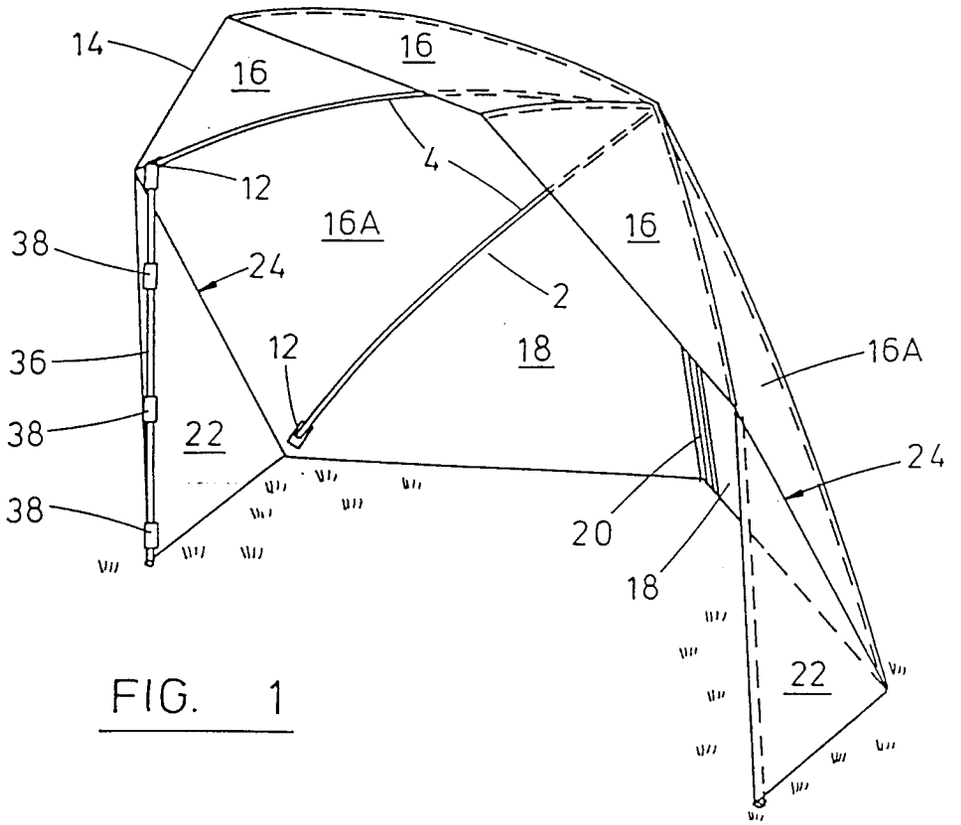

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16A
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FIG. 1

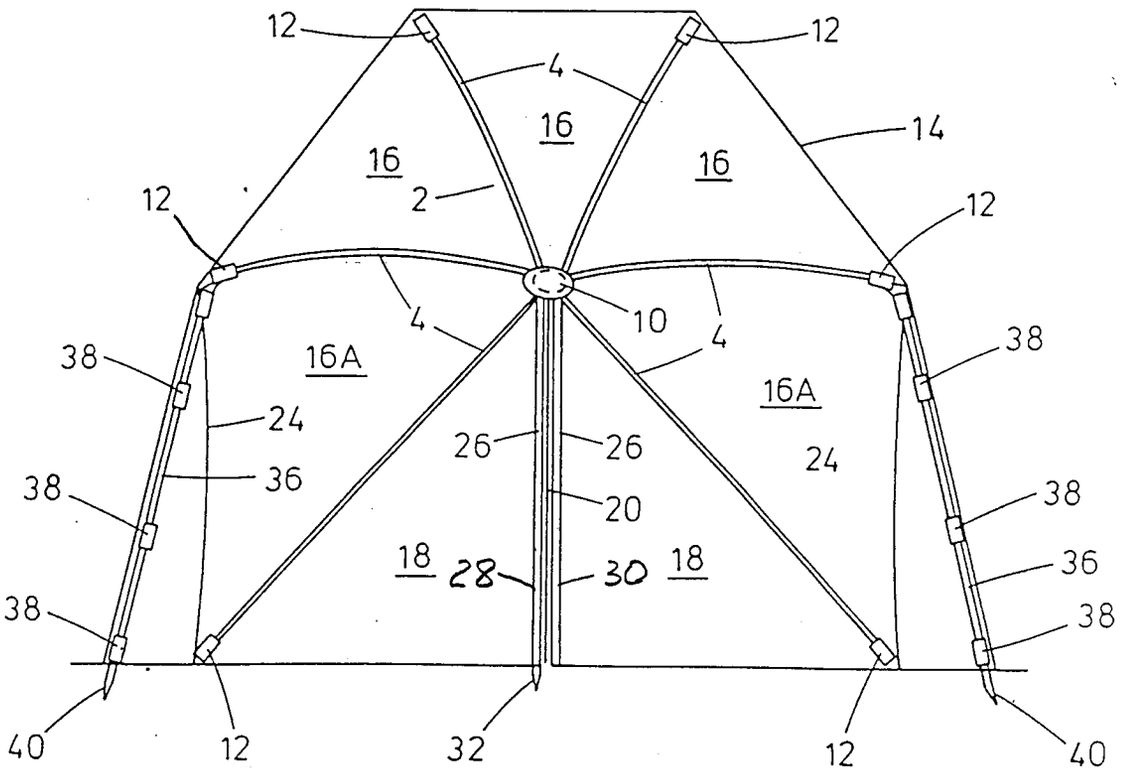

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FIG. 2

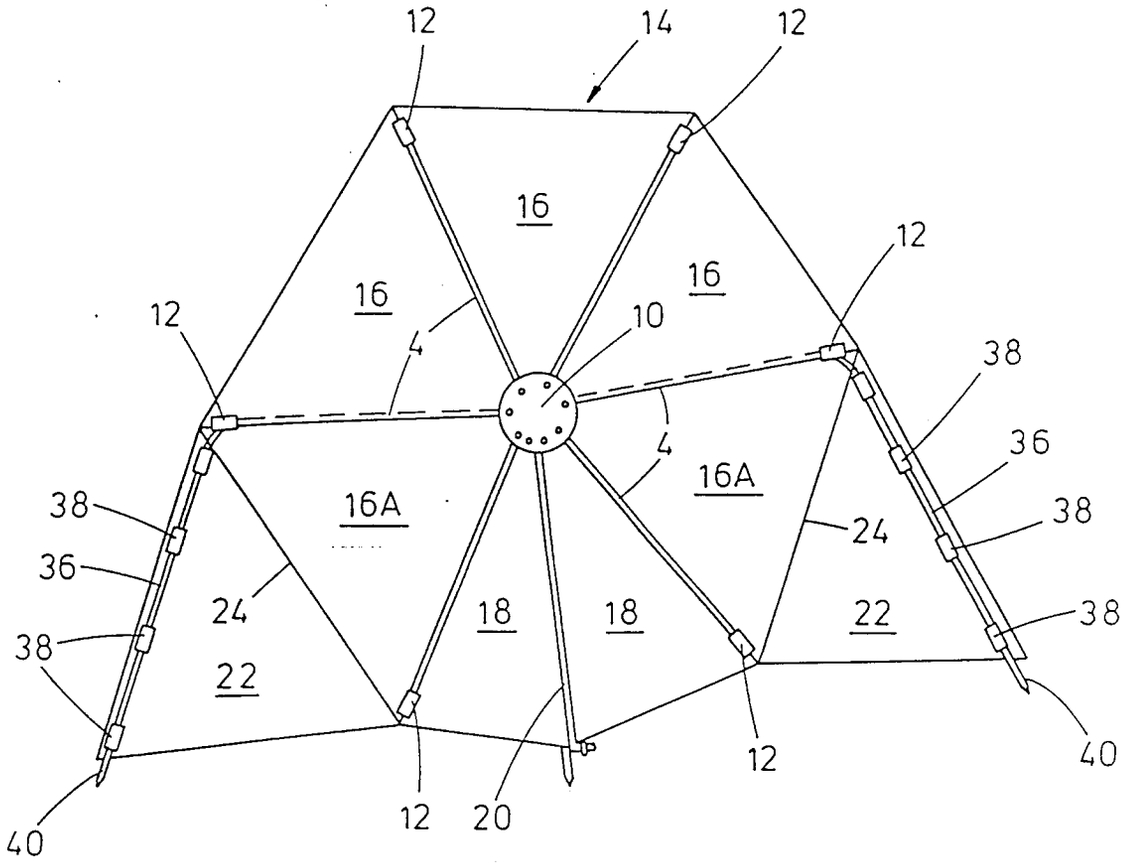

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FIG. 3

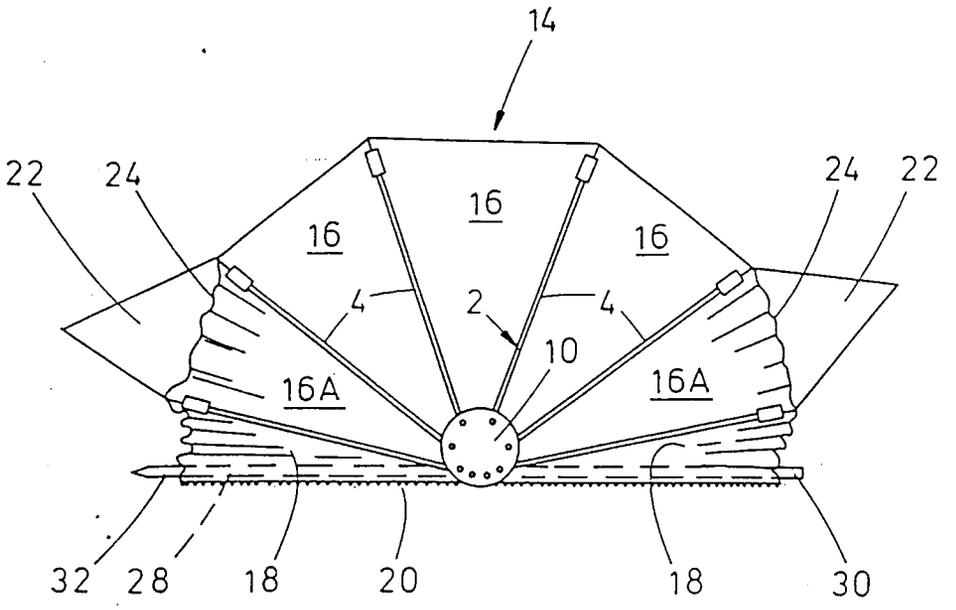

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18
30

FIG. 4

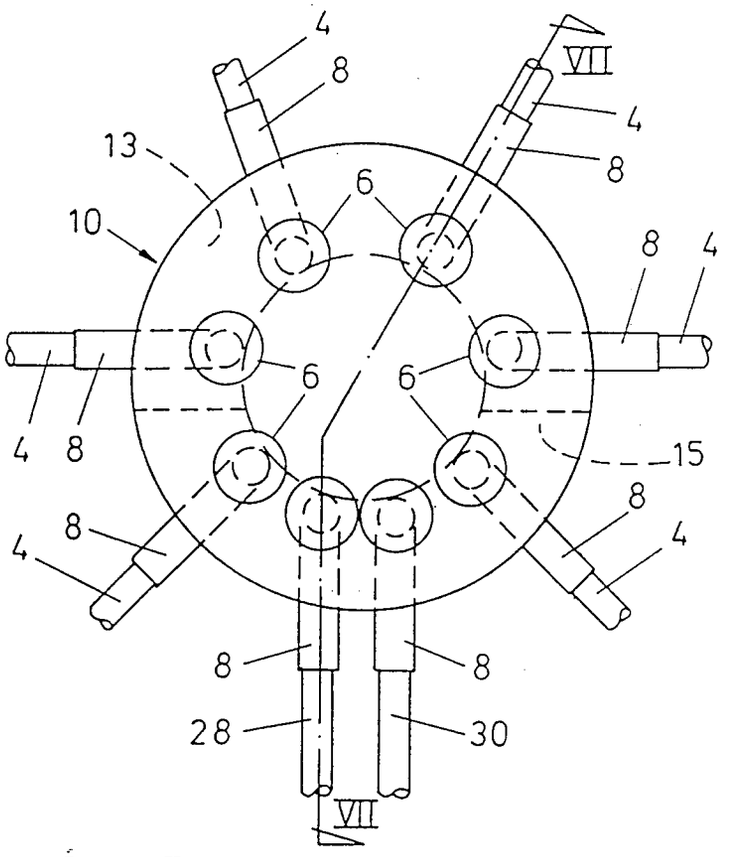


FIG. 5

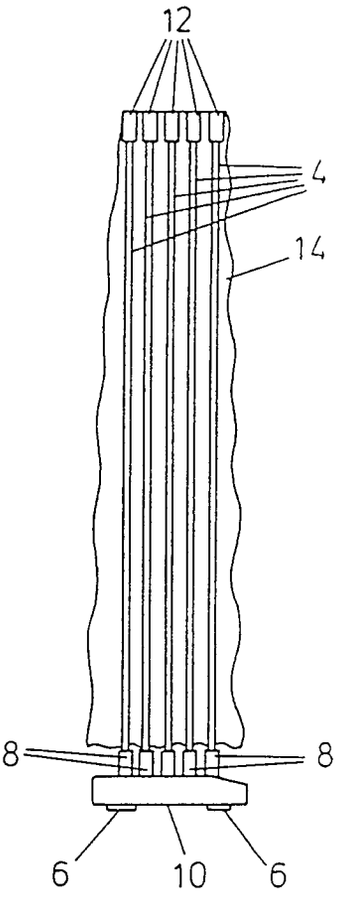


FIG. 6

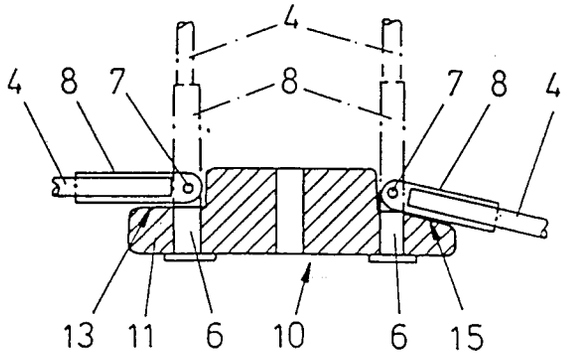


FIG. 7

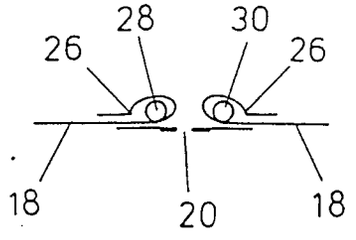


FIG. 8

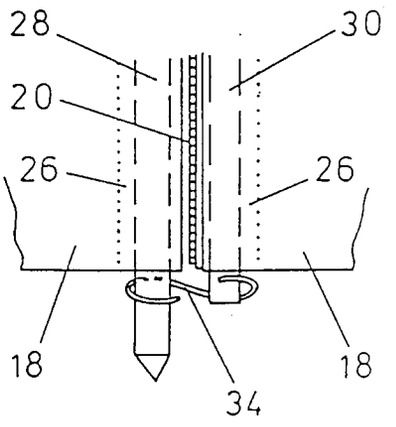


FIG. 9

European Patent Office

EUROPEAN SEARCH REPORT

Application Number
EP 96 30 5272

DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.6)
X Y A	US-A-3 037 517 (ZENT) * column 1, line 48 - column 3, line 8; figures 1-10 *	1,2 4-6 3	E04H15/28 A45B25/02
X A	US-A-2 113 118 (PYATT) * page 1, left-hand column, line 47 - page 2, right-hand column, line 72; figures 1-7 *	1,8-10 7	
Y	US-A-4 474 201 (KIDA) * column 3, line 11-20; figures 1,2 *	4-6	
A	US-A-4 711 260 (WIENS) * figures 1,2 *	7,10	
A	US-A-4 458 707 (LINDAMAN)		
A	US-A-2 948 287 (RUPERT)		
A	US-A-5 429 147 (BARRINGTON)		

TECHNICAL FIELDS SEARCHED (Int.Cl.6)

E04H
A45B

The present search report has been drawn up for all claims

Place of search	Date of completion of the search	Examiner
THE HAGUE	18 September 1996	Kergueno, J

CATEGORY OF CITED DOCUMENTS

X : particularly relevant if taken alone
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