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

(11) Publication number: **0 421 947 A2**

(12) EUROPEAN PATENT APPLICATION

(21) Application number: **90830400.9**

(51) Int. Cl.5: **E04B 2/74**

(22) Date of filing: **12.09.90**

(30) Priority: **14.09.89 IT 2172289 U**

(43) Date of publication of application:
10.04.91 Bulletin 91/15

(84) Designated Contracting States:
AT BE CH DE ES FR GB GR LI NL

(71) Applicant: **SACEA S.p.A.**
Via Ca' Rossa, 7/9
Cerro Maggiore (Milano)(IT)

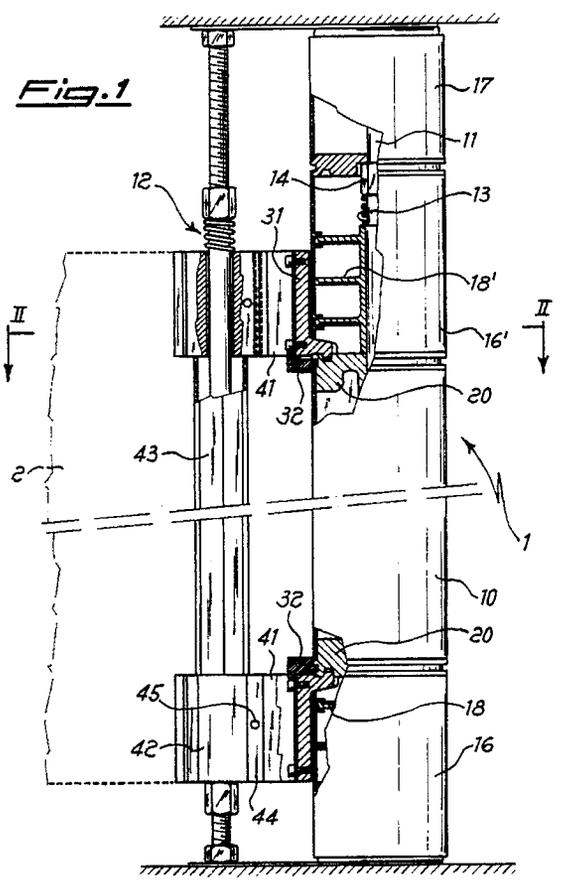
(72) Inventor: **Hosoe, Isao**
Via Voghera, 11
Milano(IT)

(74) Representative: **Adorno, Silvano et al**
c/o SOCIETA' ITALIANA BREVETTI S.p.A. Via Carducci, 8
I-20123 Milano(IT)

(54) Articulated joint forming a variable angle for mobile walls.

(57) An articulated joint (1) forms a variable angle (α) between mobile walls (2,2′...) by comprising a steel tube core (10) with inner tubes (11) for adjusting the distance from floor and ceiling, and two metal end members (20) forming head and bottom of tube (10) respectively. The outer free surface (24) and the periphery (23) of each member (20) are provided with grooves (25,26) and associate first and second engagement means (35,36) in an axial and transverse direction to the tube (10) are respectively provided. Each engagement means (35,36) is adapted to be fixed to the other and to a metal channel section (41) which in turn can be secured to an end upright (12) of each wall (2,2′...) in proximity of the joint.

Fig.1



EP 0 421 947 A2

ARTICULATED JOINT FORMING A VARIABLE ANGLE FOR MOBILE WALLS

The present invention relates to an articulated joint for mobile walls, which forms a variable angle, in particular suitable to angle variations in the range between about 90° and 270°.

It is known that mobile walls, which are designed to subdivide wide areas and define rooms of more limited size, comprise panels joined together by means of articulated joints or stanchion joints. The angles formed at each joint by two adiacent panels are fixed (more frequently 180° for aligned walls or 90° for walls at right angles to each other) and angle variations are not allowed. Therefore if the problem arises of disassembling and re-assembling the walls, so as to form different angles therebetween, it will be necessary to replace the joint itself, and possibly modify the couplings with the panels forming the walls. Another problem of these mobile walls is the continuity of the operative performances provided by them such as the possibility of being fitted with various facilities, the wiring passages, the acoustic insulation, the fire resistance, etc.

Therefore it is the object of the present invention to provide a joint for mobile walls which more properly can be called "articulated" as it allows for a greater freedom of orientation of the walls joined therewith, thus rendering possible any angle size in the range between at least 90 and 270°, up to 85°-275°, as well as the relevant disassembly and re-assembly operations to form between the walls (even more than two) a different angle comprised in the above-mentioned range of sizes.

Another object of the present invention is that of providing a joint for mobile walls having the possibility of being fitted with various installations, which can ensure the continuity therethrough of the operative performances provided by the joined walls.

These objects are achieved by means of a joint comprising a pair of metal members to be fitted respectively as head and bottom at the upper and lower end of a tube adapted to form the core of said joint, each of said members showing, at the portion remaining outside of the tube, a first circular groove at some distance from its periphery and co-axial with the member itself, being formed at the outer surface of the head or bottom member, as well as a second annular groove formed circumferentially at the periphery of said head or bottom member at a small distance from said outer surface, there being provided first and second engaging means, respectively in an axial and a transverse direction to the tube, with said first and second groove, each of said engagement means being able to be fastened to the other and to a U-shaped metal bracket which in turn can be secured by known means to the end upright of a mobile wall.

According to a particular aspect of the invention an inner metal tube passes across at least part of the tube through holes provided in said head or bottom members, with adjustable studs at the outside of said tube for adaption to the floor and to the ceiling, said adjustable elements being provided with fairleads and possibly surrounded by removable, non-structural covering portions, respectively at the bottom and top side of the tube.

These and additional objects, advantages and features of the joint according to the invention will appear more clearly from the following description of a preferred embodiment, given by way of a non-limiting example with reference to the annexed drawings, in which:

FIGURE 1 shows an elevational view , partly in cross-section, of the joint according to the invention;

FIGURE 2 shows a sectional view taken along line II-II of Fig. 1, with also a schematic illustration, in broken lines, of the end portion of a second wall that branches off from the same joint;

FIGURE 3 shows a cross-section view of one of the two basic members for the joint according to the invention, namely the head for the upper end of the central tube of joint; and

FIGURE 4 shows an exploded view of the same member and some parts coupling it with one of the walls connected by the joint.

With reference to the drawings, an articulated joint 1 is shown, which is suitable to connect at least two mobile walls 2,2' (Fig.2) at an angle α in a range of values between at least 90° and 2700, with the maximum limits of 85-275°. In the embodiment shown, according to the particular slant angle of parts 2a, 2'a, 2b, 2'b which may result in contact therebetween, the range is of 87-273°. According to the invention the assembly can be easily disassembled and re-assembled, such as with a different angle α , still within the above-mentioned range of values.

Joint 1 comprises a steel tube 10 forming the joint core, at the ends of which two lighter metal members are fitted, e.g. of aluminum, preferably shaped as shown with reference numerals 20 in the drawings, i.e. with a portion having reinforcing radial fins 21 as a guide about a central tubular part or cylindrical sleeve 22 for fitting into the tube 10, and a portion 23 whose diameter is greater than the inner diameter of tube 20, substantially of the same size of the outer one, thus providing a head

or bottom member at either ends of the tube itself. A metal inner tube 11 passes throughout the hole in the cylindrical sleeve 22 and, fastened in a known manner at the end of the latter, may be adjusted by screw, such as like a turnbuckle, according to the distance between the tube end, or better the outer surface 24 of head or bottom member 20, and respectively ceiling and floor. Fig. 4 shows the upper head member 20 and the associate inner tube 11 (which could possibly pass throughout the whole length of tube 10) of adjustment with respect to the ceiling, with thrust bearing spring 13 and adjusting screw nut 14.

Still with reference to Figs. 3 and 4, the member portion 23 designed to be kept at the outside of tube 10 has on its outer surface 24 a circunferential groove 25 at some distance from its periphery, which extends parallel to the joint axis, as well as a second annular groove 26, on the periphery of portion 23, being in a radial direction. A L-shaped bracket member 31 has the longer leg 31a of said L directed longitudinally, to the opposite side with respect to the direction of sleeve 22, and fits at the inside of said groove 25 with a tooth 35 formed on the shorter leg 31b of L shape. A block 32, to be fixed to bracket 31 by means of screws 37, has in turn a radial tooth 36 for fitting into the annular groove 26. Both teeth 35, 36 extend along a substantial arc length, thus increasing the surface of contact with the associate groove. Member 31 and block 32 associated thereto form therefore two hooks being able to slide in the respective grooves 25,26 until the tightening of screws 37 not only locks the two members to each other, but gives rise to a moment at fixed end due to the action of two mutually perpendicular forces, whereby their fastening to head or bottom member 20 is complete. The assembly of members 31 and 32, and hence of the associate end member 20 (head or bottom), is in turn caused to be fixed to the end upright 12 of wall 2 in any known way. For example, with reference to the drawings, the upright 12, which is also adjustable by screws at the ends, passes through a tubular element 42 fixable to a pair of mutually facing C-shaped sections, thus forming a box-type section 43 embedded in the panel of wall 2. At the height of head and bottom members 20 the box section 43 is secured by means of opposed clamps 44 to both free legs of a channel section 41 which in turn is fastened to bracket 31 by screws 38. The clamps 44 can be tightened onto the section 41 by means of a through screw 45.

It should also be noted that preferably the block 32 will engage section 41 not only through the bracket 31, but e.g. directly by means of a lug 33 abutting against a side of said section. At an angle from the axis of wall 2 on the head and bottom members 20 there can be similarly mounted a fastening device for a second mobile wall 2′, as shown in broken lines in Fig. 2. It will be noted that the limits of angle are dictated by the angle formed by adjusting members 2a, 2b for finishing wall 2 up to joint 1 and the corresponding members 2'a, 2'b of wall 2′. The range thus defined is usually of not less than between limits of 90-270° and, in the embodiment shown, it reaches limits of 87-273°.

Of course more than two walls adjoining at the same joint 1 could be provided, up to a maximum of four, as the angles between the walls cannot be much less than 90°.

With reference in particular to Fig. 1 the end portions of joint 1, being comprised between the lower and upper ends of tube 10, i.e. the outer surfaces 24 of bottom and head members 20, and respectively floor and ceiling, are completed with non-structural cover elements 16, 16′ of synthetic material like ABS, removable for inspecting. Their function, in addition to be of aesthetical nature, is that of protecting fairlead supports 18,18′ which are provided in that zone, as they are mounted to the inner tube 11. The whole assembly is further completed by an upper finishing element 17, which may be again formed of a steel or ABS tube, cut at the desired length.

Thus not only the aesthetical aspect ot the joint is ensured, by providing e.g. parts 16, 16′ and 17 of the same diameter of tube 10, but also the continuity of facilities passing theretrough from a wall 2 to that adjoining 2′, whereby the functions provided by them are not subject to interruptions when passing from a wall to another, even in case of three or four walls branched off from the same point. Also the continuity of possible (thermal and/or acoustic) insulating materials can be guaranteed across the joint.

Claims

1. An articulated joint (1) forming a variable angle (α) for mobile walls (2,2′) which comprise, in the proximity of the joint, an end upright (12) being adjustable as to the height, characterized by the fact of comprising a steel tube (10) kept at a position with respect to floor and ceiling by adjustable inner tubes (11), there being provided two metal end members (20), each of which can be fitted at an end of the tube (10) so as to leave outside a circular surface (24) and a peripheral portion (23) with a first annular groove 25 co-axially formed on said outer surface (24) and a second groove (26) circularly formed on the periphery (23) of said end member (20), there being provided first and second engagement means (35,36), respec-

tively in an axial and transverse direction to the tube (10), with said first and second groove (25, 26), said engagement means (35-36) being adapted to be fixed to each other and to a metal channel section (41) which in turn can be secured to said upright (12) by known means.

2. A joint according to claim 1, characterized by the fact that said first engagement means (35) is formed as a tooth projecting in the longitudinal direction of tube (10) from the shorth leg (31b) of a L-shaped bracket member (31), the longer leg (31a) of which extends itself in a longitudinal direction from opposite side to the tooth (35) for the connection with said section (41) , and said second engagement means (36) is formed as a tooth projecting in a radial or transverse direction from a block (32) suitable to be fixed to said bracket (31) near to the periphery (23) of member (20) so as to enclose a length thereof.

3. A joint according to claim 2, characterized by the fact that said block (32) directly engages the section (41) by means of a protruding lug (33), perpendicular to the tooth (36), such as to abut against the bottom of the channel section (41) through which screws (38) are caused to pass for fastening to said leg (31a).

4. A joint according to the preceding claims, characterized by the fact that said upright (12) is connected to the section (41) through a tubular element (42) with tabs engaging a box-type section (43) embedded in the wall (2), said section (43) being crossed by two clamp means (44) for engagement, upon tightening a screw (45), of the free ends of said channel section (41) in order to secure the latter to said element (42) and the upright (12).

5. A joint according to one or more of the preceding claims, characterized by the fact that on at least a length of tubular element (11) there are fairleads (18,18′) for passing therethrough various wires and distribution system facilities from a wall to the other.

6. A joint according to claim 5, characterized by the fact of providing in the space comprised between the lower end of tube (10) and the floor, and respectively the upper end of tube (10) and the ceiling, non-structural covering tubular elements (16,16′), removable for inspection of the inner facilities, with the possible remaining space between the upper covering element (16′) and the ceiling being completed by an additional finishing element (17).

7. A joint according to claim 1, characterized by the fact that the angle (α) between the walls (2,2′..) meeting at the joint itself is comprised in a range of between a minimum of 85° and a maximum of 275°, whereby on the same joint (1) up to four walls can be mounted.

Fig.1

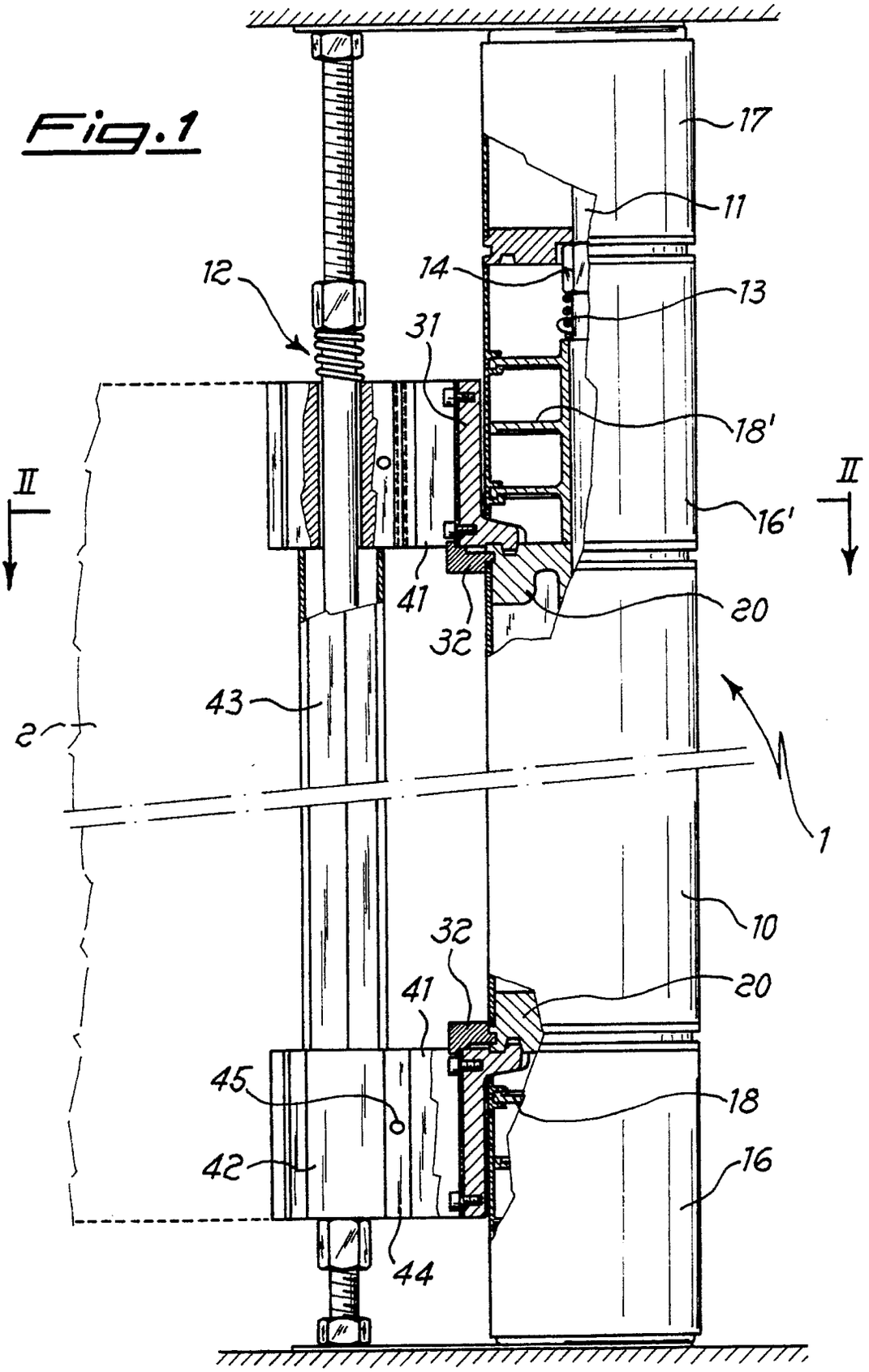
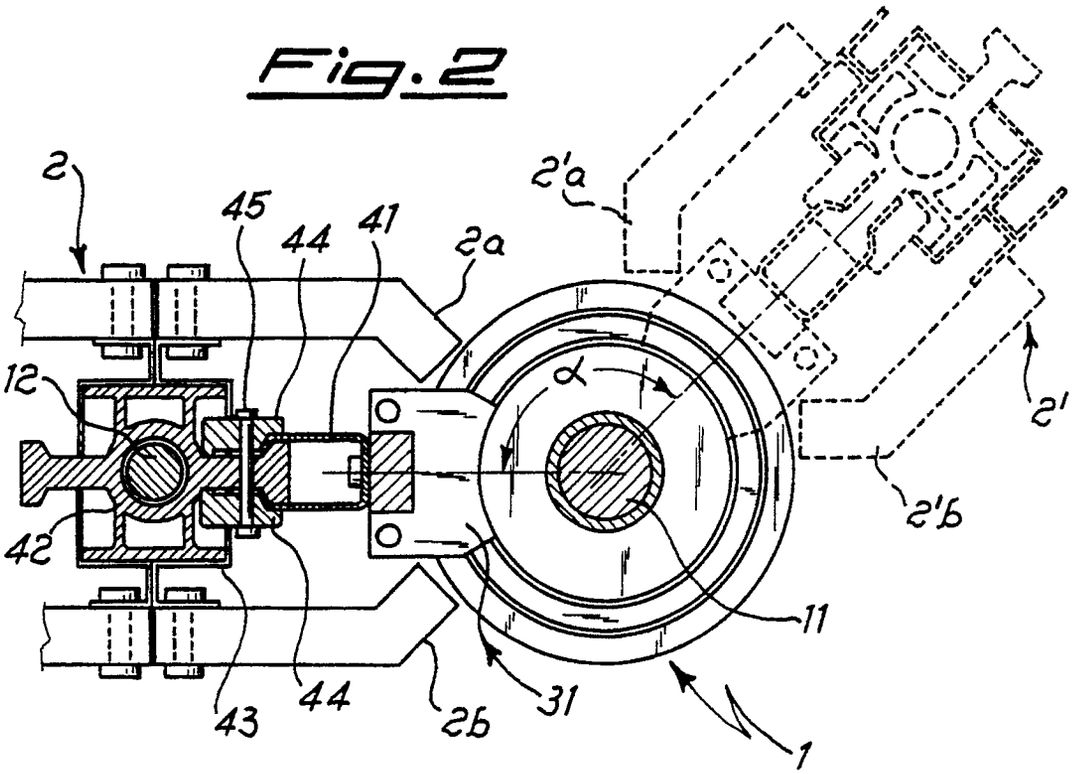


Fig.2


2
45
44
41
2a
2'a
12
α
2'
42
2'b
11
43
44
2b
31
1

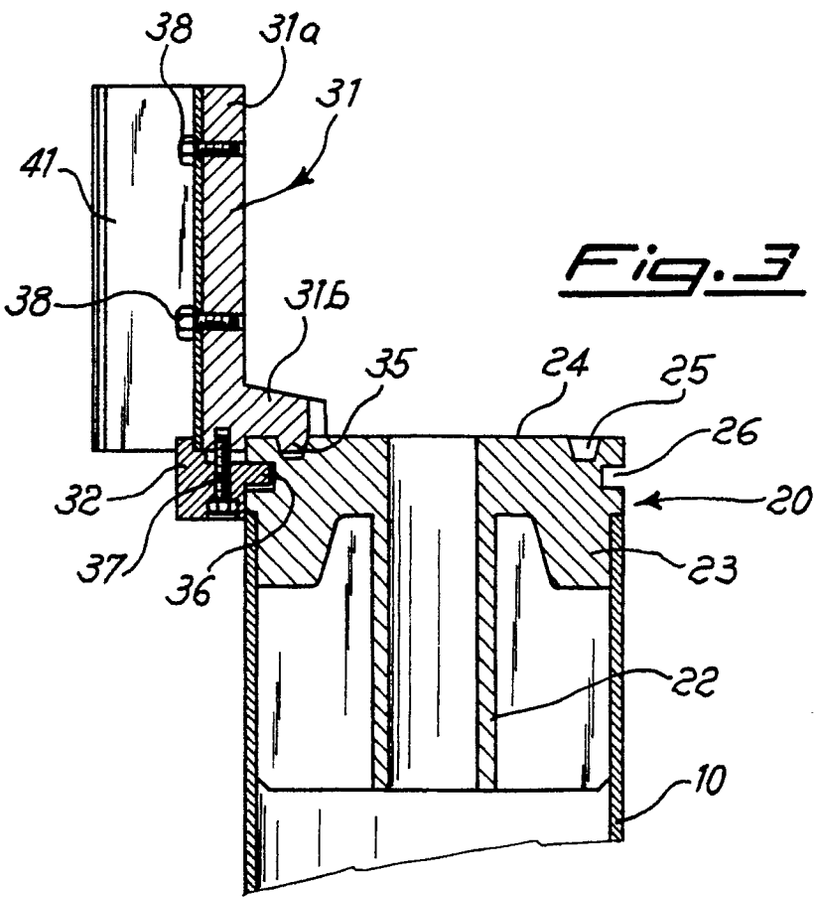

38
31a
31
41
38
31b
35
24
25
26
32
20
37
36
23
22
10

Fig.3

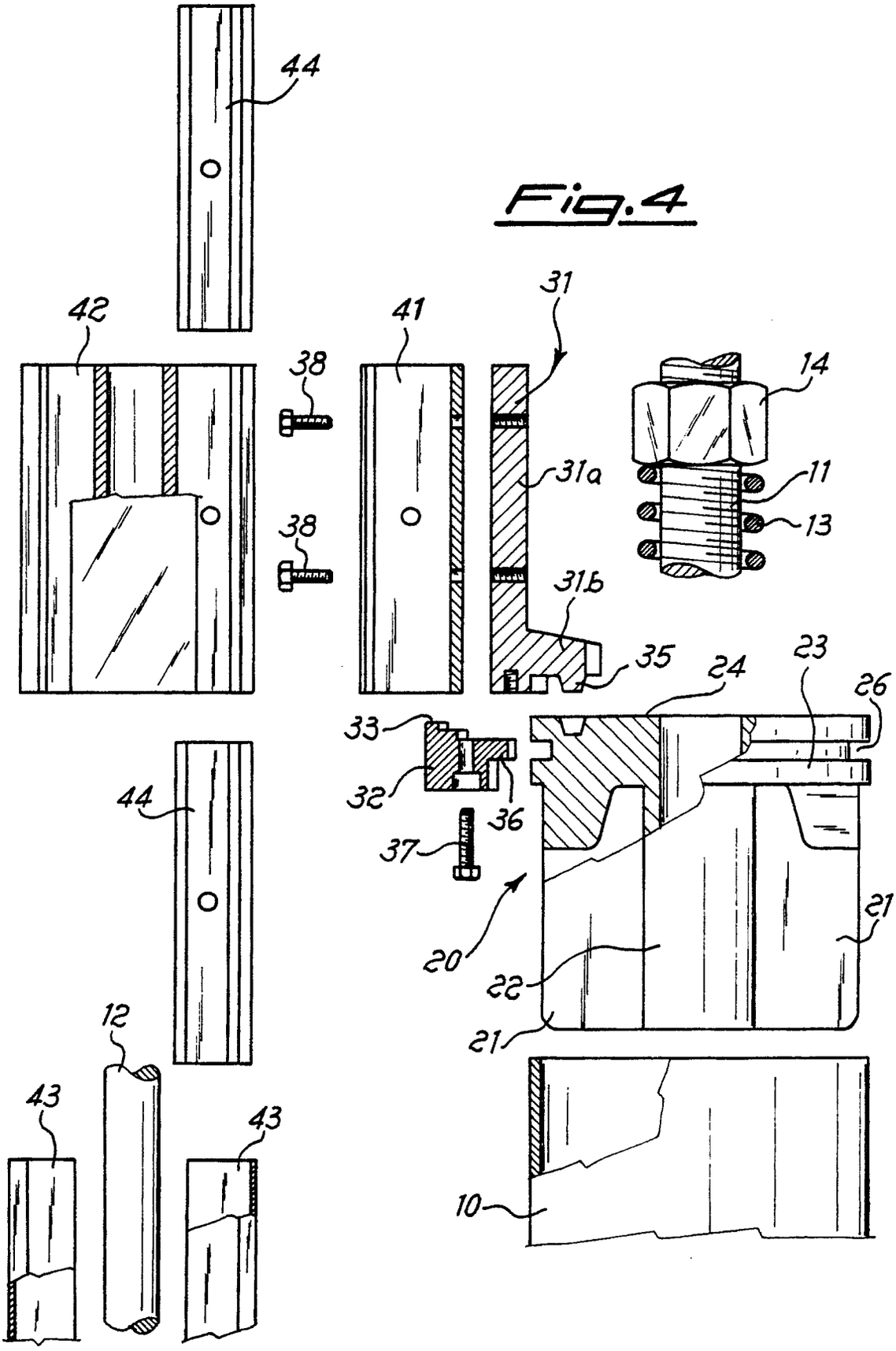

44
42
41
31
38
14
31a
11
13
38
31b
35
24
23
26
33
32
36
37
20
21
22
21
44
12
43
43
10

Fig.4