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(54) **Device at threads.**

(57) Thread joint consisting of externally threaded bodies (34, 35) where one body has an axial recess (38) into which a pin (37) of another body can be pushed. On the bottom of the recess and furthest on the pin, respectively, a key handle (41) is arranged. When the pin is pushed into the recess with a correct position of the key handle the threads of the bodies enter into each other and the common device can be screwed through a nut.

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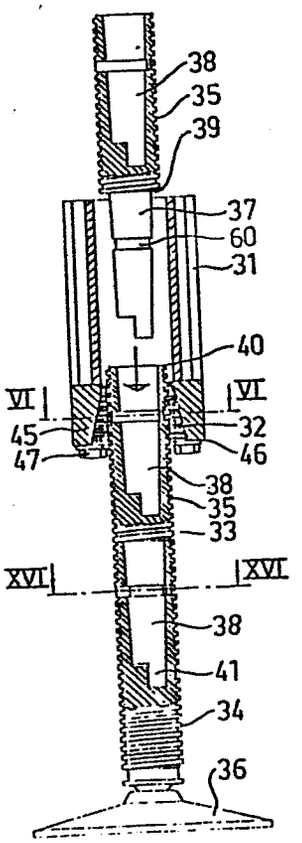
FIG.10



DEVICE AT THREADS

This invention concerns a device at threads, particularly in connection with adjustable legs or jacks for platforms for instance in the shape of floors in tents used together with caravans in order to increase the available protected area. A main problem in establishing a floor supported in many points which is to be adjustable to any surface is that the adjusting possibility preferably shall be great as compared to the thickness of the floor. Of course jacks of known type can be used but they have in common, firstly, that they are relatively complicated and, secondly, it is difficult to obtain sufficient adjustment in comparison with the floor thickness or, in other words, it is difficult to obtain a great relationship between the maximum and the minimum length of the jack or the leg. This is in practice particularly the case with floors under tents arranged in connection with caravans. The ground under the floor is mostly not prepared for the floor and the floor is necessary to enable the use of the tent in bad weather since the ground might become muddy and slippery. Today this need of a floor under caravan tents has been solved by using used wood in different shapes, for instance from loading pallets. Of course such a construction can be satisfactory for permanent arrangements but the construction is definitely not easy to move. Furthermore, the different legs of the floor may sink differently with time, resulting in an uneven surface of the floor and a corresponding time consuming work to regain the even surface. An uneven floor is not only aesthetically unpleasant but may be uncomfortable and dangerous.

In viewof the above it is the object of the invention to solve these problems and to provide a device for this. This is achieved by means of a thread joint

including at least two bodies, provided with threads, said bodies having means for angular fixing of the bodies to each other when a turning force is extended in at least one direction, means for relative fixing of the bodies axially when subjected to a force in at least one direction and that the threads of the bodies when forces are exerted in the said directions follow the same theoretical thread line.

The tread joint in accordance with the invention makes it possible to continuously lengthen for instance the screw part of a jack that can be inserted from above in the case with the floor until the sufficient length of a leg is obtained.

Further characteristics and advantages of the invention as well as its appliances are apparent from the following description of an embodiment of the invention shown in the drawings. In the drawings Fig 1 shows a lateral projection of a floor in accordance with the invention, Fig 2 the same floor as seen from above, Figs 3 and 4 show a tent floor module, Figs 5 and 6 a lateral and a top view, respectively, of a corner point in a tent floor module, Fig 7 a detail of how the floor plane is built, Fig 8 how the tent floor may be attached to the tent floor, Fig 9 a crossectional profile of one of the support beams included in the tent floor, Fig 10 a support leg of a tent floor in accordance with the invention, Fig 11 the same support leg as in Fig 10 but with means for the operation, Fig 12 details of Figs 11, 13 and 14 of alternative embodiments of the support leg as far its locking is concerned, Figs 15 and 16 a section of a reciprocal locking of the support leg parts and Fig 17 the thread profile.

As is apparent from Figs 1 and 2 the tent floor according to the invention comprises a plurality of square modules 1 which are connected at their corner

points by means of jacks or support legs 2 which will be described in greater detail below. The length of the support legs 2 is adjustable, which allows of adaptation to the ground. Moreover, as the lateral beams 3 framing the modules are restrictedly elastically attached to the support legs 2 the risk of no ground contact of a support leg, if this is carelessly adjusted with following great breaking risks is eliminated. In this way the adjustment of the support legs is also simplified so that the floor becomes even and all the support legs absorb the pressure. If the structure should be non-elastic it would be difficult to decide if the force absorption at each suport leg functions. By using the above-mentioned support leg it will, moreover, always be easy to adapt the level of the tent floor from the upper side to possible ground changes.

In Fig 3 it is shown how the floor plane of each module 1 consists of platform battens 4. These are attached by means of Pop rivets 5 to steel bands 6 to a module sized platform. The platform is divided into two halves and in the joint between these the steel bands are connected by means of hinges 7. This enables a double folding of each module platform which may be advantageous at transport. Moreover, as is apparent from Fig 7, the steel bands are folded at their ends to form a hook 8 which can grip a flange 9 on a lateral support beam 10. Mounting is carried out in the way shown in Fig 3 with a lightweight platform put down and flattened, the hooks 8 gripping the flanges 9. As is apparent from Fig 7 the profile of the lateral beams 19 is substantially I-shaped but their waist is extended upwards over the upper flanges corresponding to the thickness of the platform battens 4. The upper as well as the lower flange of the profile of the lateral beam 10 is hollow and as is shown in Figs 5 and 6 the legs 11, 12 of a

U-shaped locking clamp 13 are pushed into the ends of the beam. The intermediate portion of the clamp 13 is somewhat arched towards the two legs 11, 12 and made of an elastic resilient material, preferably spring steel which may be e. g. stainless. The clamp is narrower between the legs and the intermediate portion of the clamp while the intermediate portion and the legs have the same width. It is therefore possible to push down the intermediate portion of the clamp in the way shown in Figs 5 and 6 into undercut slots 14 in the support legs 2. The clamp will then abut against a bottom section of the relative support leg.

As the locking clamp 13 is elastic there will firstly be no problem in mounting the beams 10 despite the fact that these will then sit without play. Secondly, the elasticity required in order that the floor should not be quite unresilient but can spring at loading on one hand, and settling in the ground, on the other hand, is obtained. The locking clamp 11 is attached to the beam 10 by means of rivets 15.

As is apparent especially from Fig 4 the floor plane of each module is supported on the flanges 9 of the lateral beams 10 and another two support profiles 16 arranged perpendicularly to the battens 4 in the walking plane. These support profiles 16 are laterally arranged so that they divide the module length into three equal parts to achieve such an even absorption of forces as possible. These support profiles 16 have the appearance shown in Fig 9 i.e. an I-profile. The support profiles 16 engage slots 17 formed in the waists 10 of the lateral beams. It is especially apparent from Fig 7 how the support beams 16 are bevelled at their ends to engage the slots 17 of the lateral beams with a projection 18. The upper flange of the I-shaped beam 17 agress in respect of its position with the upper edges of the flanges 9 of the

lateral beams 10. The support profiles 16 can be mounted very well after all the lateral beams have been mounted in position by hooking one end with the support profile a little inclined, after which the support profile is pressed laterally, the lateral beam springing away and the projection 18 of the support profile hooking into the slot 17 of the lateral beam.

As is apparent from Fig 4 one of the steel bands 6 will be located between each support profile 16 and between these and the lateral beams 10, respectively. The steel bands do not function only to keep the battens 4 in the floor plane in their position but will also at a point load of a batten transfer the load to the adjacent battens via the steel band and the rivets with the result that the battens can be dimensioned to be more thin than should otherwise be the case with the relative graduation space, and in this way the weight of the tent floor can be maintained.

In Fig 7 it is shown how an ornamental ledge 19 has been hooked over the outer lateral beams of the tent floor and snapped into position. In Fig 8, finally, it is shown how a clamp 20 engaging the lower lange 21 of the lateral beam 10 is arranged as an attachment of the very tent 22.

In each corner of the walking plane recesses for the adaptation to the support legs are arranged in the outer battens. A horizontal slot is arranged in the support legs on a level with the bottom of the battens and plate sections 23 are arranged as milled and riveted in the corners. When the walking plane is positioned in the way described above the plate sections will engage these slots and lock the lateral beams 10 against motion upwards from the undercut slits 14 in the support legs.

It should be mentioned that the invention is of course not restricted to the embodiment shown above,

but it is very well possible to make the modules triangular. Moreover, the use of the floor need of course not be restricted to tent floors but it can certainly appear that the low weight and good adjustability of the floor can be used also on other occasions where permanent or temporary floors are to be achieved.

In Fig 10 a support leg in the form of a support leg housing 31 is shown, in the bottom of which a nut 32 is arranged nonrotatably. The threaded support leg 33 extends through this nut 32. The support leg consists of a lower portion 34 and an upper joint portion 35. Moreover, such a joint portion is shown freely above the very support leg. The support leg is terminated at its bottom portion by a foot member 36. Each support leg portion 34, 35 encludes a cylindrical, lightly tapered hole into which a corresponding projecting pin 37 on the portions 35 of the support leg portions 35 can be pushed. When the tapered pins 37 are pushed into the tapered holes 38 the shoulder portion 39 between pins and thread will abut against the upper end 40 of the support leg portion located below. Moreover, a key handle is arranged in the bottom of each tapered recess 38 at the very front or down on the pin, respectively, which key handle is quite simply semi-circular in this case. In the position defined by this key handle 41 the threads agree for the consecutive support leg portions. In this way it will be possible to fill up with support leg portions 35 as desired when the support leg 33 is threaded downwards until it gets into contact with the ground and has lifted the support leg housing 31 to the desired height. For screwing down the support leg the key or the crank 42 shown in Fig 11 is used. This crank is also provided with a key handle corresponding to the key handle 41 furthest below. However, as distinguished from the key handle between the different portions the lower end of

the key or crank is bevelled, see Fig 33, which bevelling has been designated 43. The crank 42 is further provided with a stop means 44 which will abut the upper end of the support leg housing 31 because there is a need of a new support leg portion when the support leg has been screwed down enough. Therefore the key handle of the crank 42 and the support leg portion 43 will slide apart until the bevelling 43 makes the key 42 be pressed upwards. As the crank is bevelled the driving ability is only lost in one direction while it is maintained in the other direction, and therefore the support leg can always be screwed up again if desired.

In order to reduce the risk of vibrations or the like the support leg 33 is slowly turning the nut 32, this has outer conical surfaces with the cone tip upwards in the bottom 45 of the support leg housing 31. The nut 32 is held on its place axially by a washer 46 which is held fast in turn by means of nuts 47 which also holds the bottom 45 of the support leg housing 31 to the support leg housing 31. As the nut 32 has a sligth axial play and is for instance provided with a slot or is lightly elastic a compression of the nut 32 against the parts 34 or 35 of the support leg is obtained, as soon as there is a load on the support leg, which prevents thread wandering.

The support legs can also be locked in the way shown in Fig 13 where the support leg 50 is directly threaded in the bottom 49 of a support leg housing 48. However, a threaded washer 51 is arranged beneath the bottom 49 with a slight axial play, which washer is also threaded onto the support leg 50. The axial play of the washer and its turning stop, respectively, are so arranged that the thread in the bottom and the wahser 51, respectively, agree at downward turning while at upward threading the washer must in a way not shown be retained in

this position (e.g. by pushing down a rod or the like through a hole arranged in the housing) in order to prevent the washer from accompanying the turning of the support leg so much that the threads are wedged reciprocally.

Fig 14 shows a further way of locking the support leg in a definite position. In this case the bottom 53 of the support leg housing 52 is provided with a horizontal slot 54. In the portion 55 beneath the slot a screw 50 is threaded which can be actuated from above and clamps the slot 24 together and locks the threading in this way.

In order to prevent the support leg portions from falling apart when no axial compressive load is present a device such as is exemplified in Figs 10, 15 and 16 can be used. Two recesses 57 and 58, respectively, are arranged straight in front of each other in the cylindrical upper portion of each support leg section. The recess 58 is relatively small while the recess 57 is relatively broad and a circlip 59 is arranged in these. The circlip has axially a height corresponding to abut the pitch as apparent from Fig 10. In unactuated state the spring ring 59 is in the position shown in Fig 16, i.e. it extends to the thread tops. However, when the circlip and the recesses, respectively, are screwed into the thread of the nut 32 the circlip 59 is pressed by the nut inwards in radial direction. The circlip will then expand in the portions being within the tapered recess of the support leg portion where, moreover, a recess is arranged to be able to absorb at least the width of the circlip so that it comes on a level with the cone surface at its lower edge. The circlip will then enter the position shown in Fig 15. In the position shown in Fig 15 the circlip 59 will release the groove 60 running all around on the support leg portion 35 and this can

be removed out of the lower support leg portion. In other words, support leg portions can always be inserted and taken out of support leg portions located below when the circlip section 53 is in the nut 32. The internal groove running all around in the cylindrical portion of the support leg section 35 need not be undercut as the lower edge of the circlip 59 need only be pressed in to the level of the conical surface therein and consequently it is possible to manufacture the support leg pieces by die casting in e.g. aluminum. By the relatively great overlapping between the support leg portions obtained in that the tapered pin extends almost up to the next tapered pin a joint very resistant to buckling is obtained.

In order to ensure that the different portions are not wedged reciprocally, when the very joint passes through the thread in the nut 32, the axial play of the thread in the nut 32 are preferably a little greater than the turning play of the reciprocal key handles. After adjustment of the support leg this is upwardly sealed by a cover.

It is not only apparent from Fig 17 that the reciprocal axial play of the threads but also the thread stops 61 of the screw thread 60 are lower than those 62 of the nut 63. Moreover, the edges 64 of the tops 61 of the screw thread are bevelled. This has the advantage that even if the portions are handled so carelessly that damages arise the risk of these influencing the function is inconsiderable.

CLAIMS

1. Thread joint, characterized in that it comprises at least two threaded bodies which are provided with means for reciprocal turning fixation at influence by forces in at least one direction, means for reciprocal axial fixation of position at influence by forces in at least one direction and that the threads of the bodies follow the same thought screw line at influence by forces in the direction of fixation.

2. Thread joint as claimed in claim 1, characterized in that the bodies have an external screw joint.

3. Thread joint as claimed in claim 2, characterized in that the reciprocal fixation of axial position and turning of the bodies included in the thread joint is carried out by means of an axial pin on one body extending into a corresponding recess on the other.

4. Thread joint as claimed in claim 3, characterized in that a key handle is arranged in the bottom of the recess and the top of the pin, respectively, and that the threads connect to each other when the key handle is in position.

5. Thread joint as claimed in any one of claims 1-4, characterized in that the thread play is greater than the reciprocal turning play.

6. Thread joint as claimed in any one of the foregoing claims, characterized in that the axial positions of the threaded bodies are lockable reciprocally in two directions.

7. Thread joint as claimed in any one of claims 2-5, characterized in that the included bodies are locked reciprocally axially by means of an oval circlip arranged in a milled-out section in the wall of the recess extending to the pins of the thread so that when the thread is screwed home the oval circlip is

compressed to release the recess.

8. Thread joint as claimed in any one of the foregoing claims, characterized in that the nut comprises locking means for fixing the position.

9. Thread joint as claimed in any one of the foregoing claims, characterized in that the thread of the screw thread has a side decrease in the nut thread.

10. A tool for a thread joint according to any of the foregoing claims, characterized in that it comprises a bevelled key handle corresponding to that of the thread bodies and contact means which will abut the nut through which the thread bodies are screwed when it is time to joint in a new thread body so that the key handle releases by means of the bevelling while a turning back is always possible.

11. A tent floor, characterized in that it is divided into modules, in the corners of which adjustable jacks or support legs are arranged and that the lateral beams forming the lateral edges of the modules are arranged elastically in the support legs allowing of a certain movement in a vertical plane.

12. Tent floor as claimed in claim 1, characterized in that the elastic attachment is provided in that U-shaped locking clamps are arranged in the ends of the lateral beams with their legs attached to the lateral beam and with a broadened intermediate portion of the locking clamp arched and engaging an undercut groove in the respective support leg.

13. Tent floor as claimed in any one of the foregoing claims, characterized in that support profiles are inserted between lateral beams on two sides of the floor module with projections engaging recesses or slots in the lateral beams, the elasticity of the included members being such that the support profiles can be pushed into position laterally after being

hooked in one end, and snapping into the respective slot.

14. Tent floor as claimed in any one of the foregoing claims, characterized in that the battens of the floor plane are riveted to steel bands between the supports in the form of lateral beams and support profiles, respectively.

15. Tent floor as claimed in any one of the foregoing claims, characterized in that the lateral beams and support profiles, respectively, have an I-profile to enable a certain elasticity in turning direction.

16.Tent floor as claimed in claim 4, characterized in that the steel bands are articulated in the middle and bent out in their outer ends to hooks so that the hooks can engage beneath the supporting flanges of the lateral beams by mounting with a slightly folded floor plane.

17. Tent floor as claimed in claim 6, characterized in that plate corners are riveted in the corners of the foldable floor plane which corners engage in bevels in the support legs at mounting so that the support legs and the lateral beams are reciprocally locked.

FIG.1

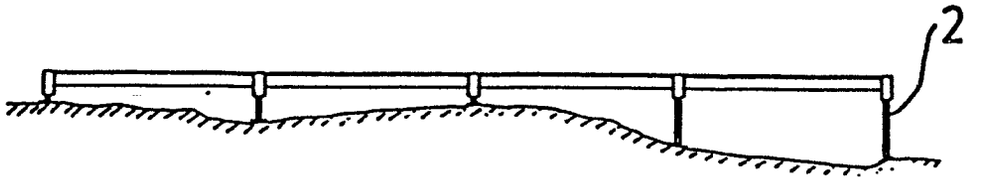


FIG.2

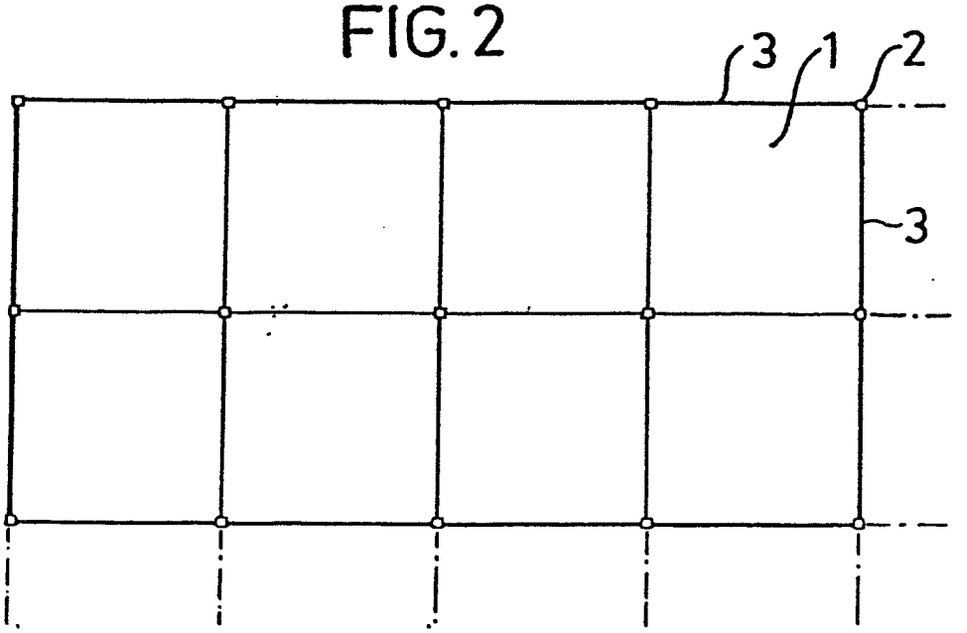


FIG.9

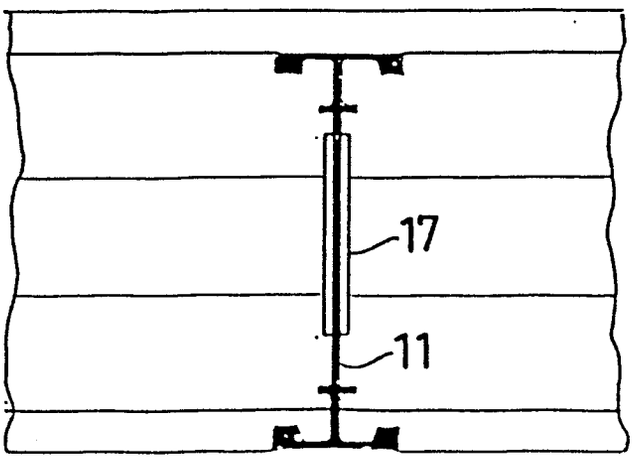


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FIG.3

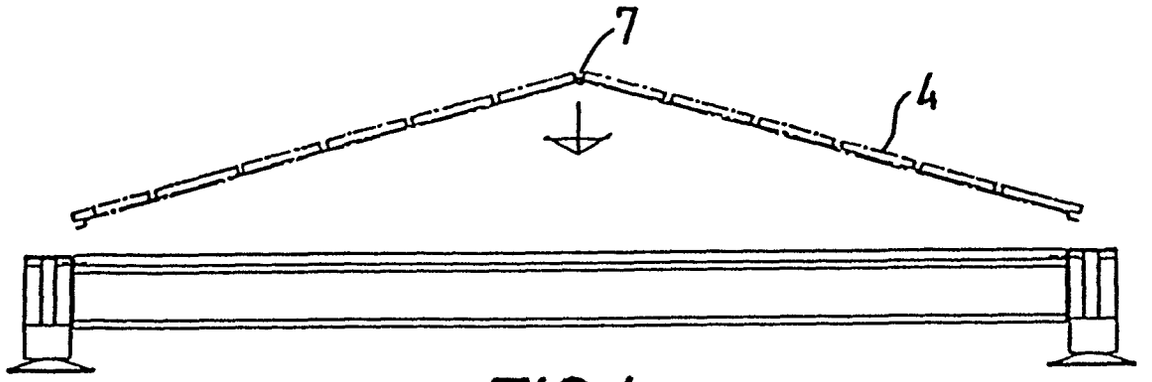

FIG.4

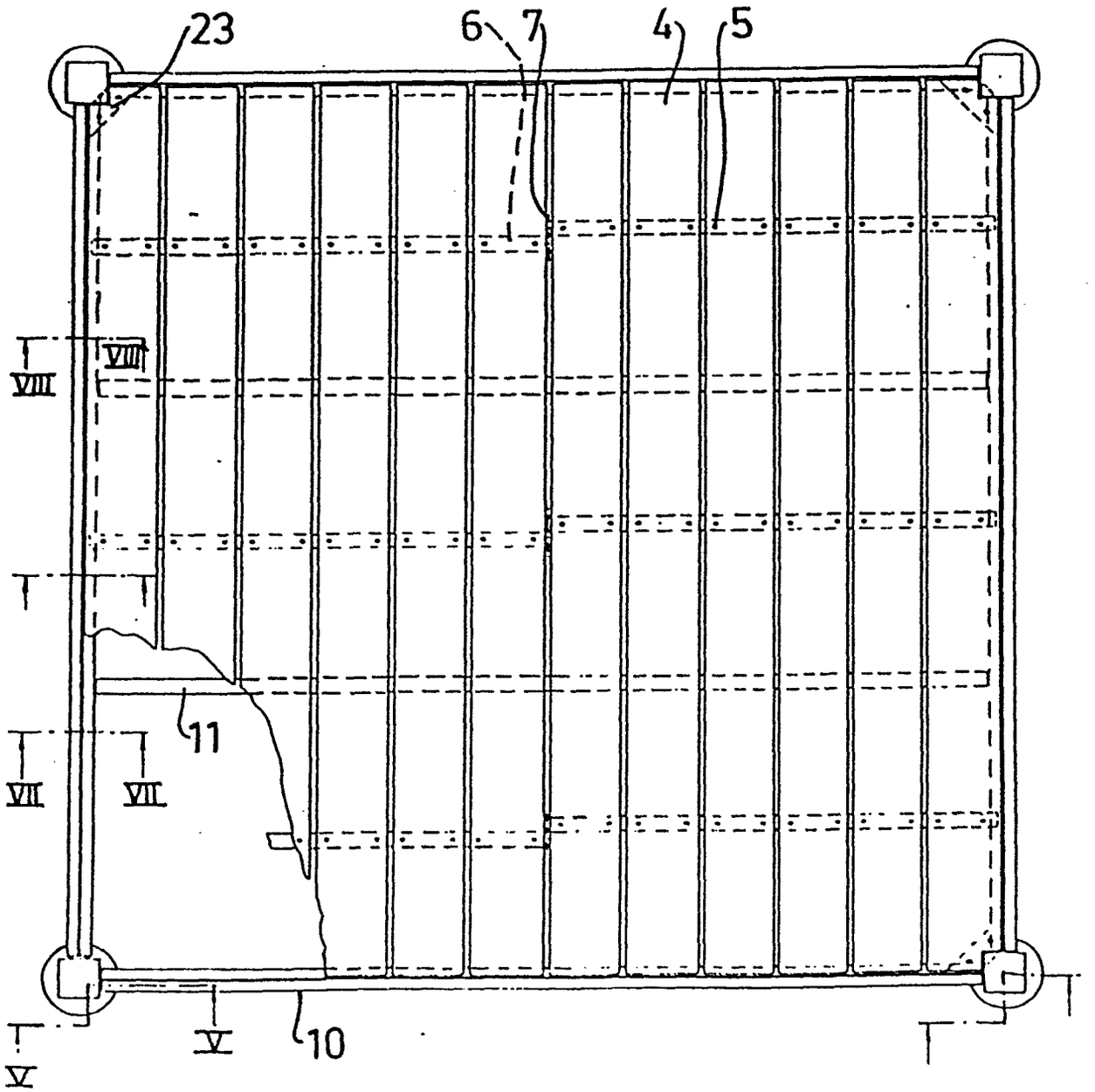

FIG.5

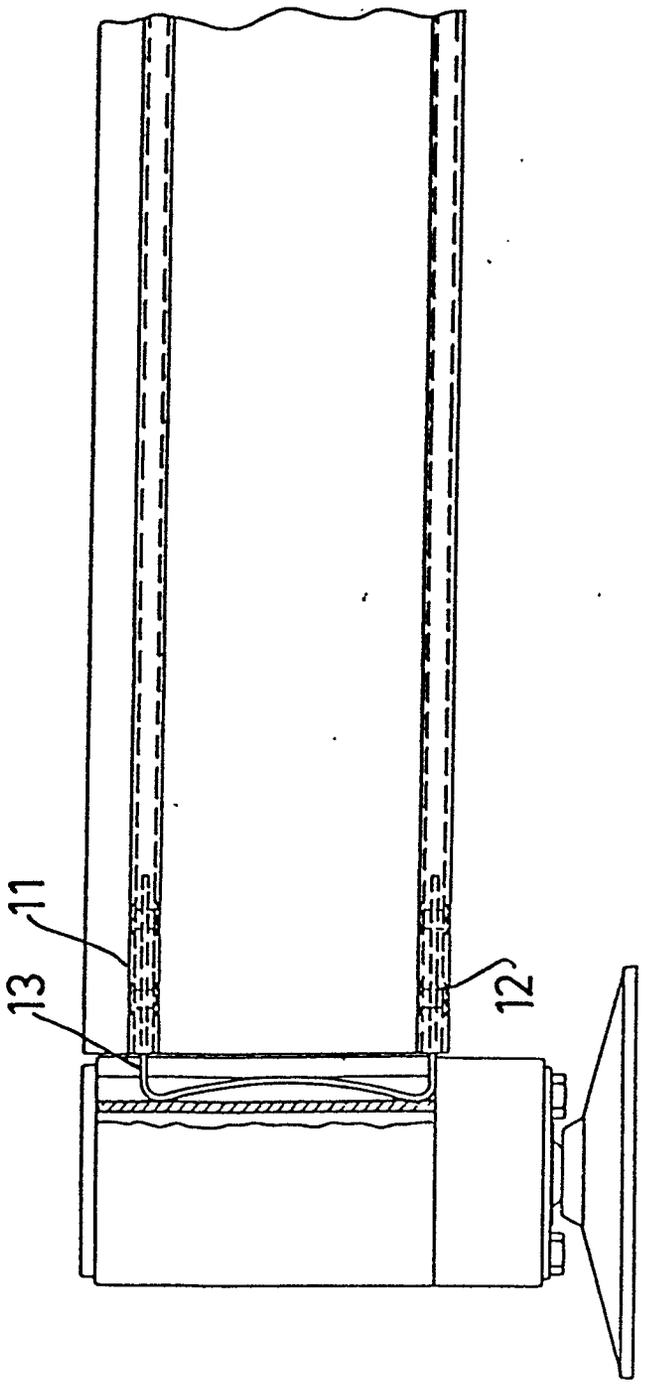

FIG.6

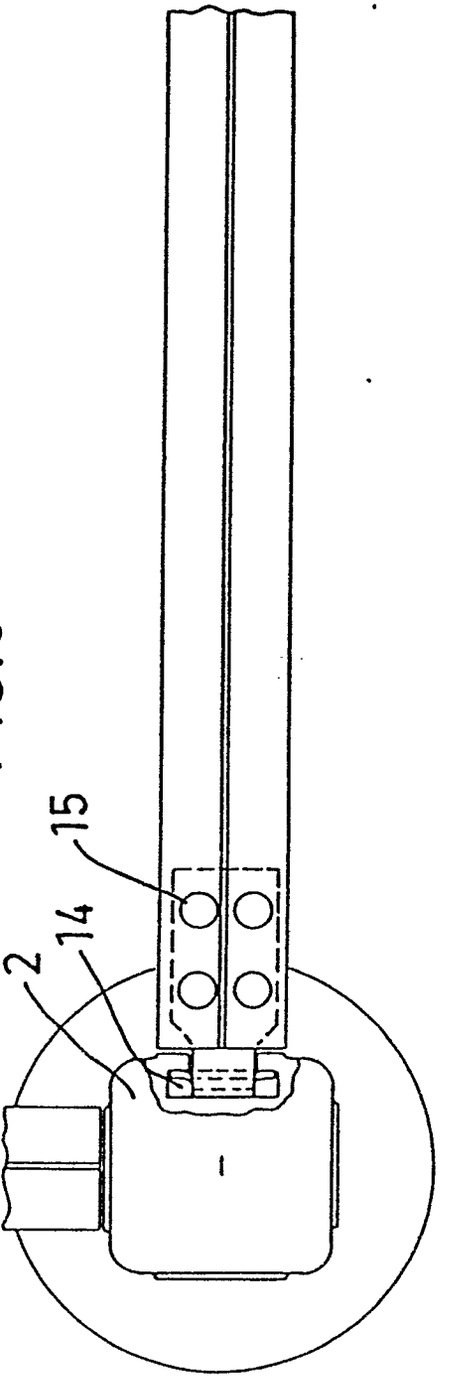

FIG.7

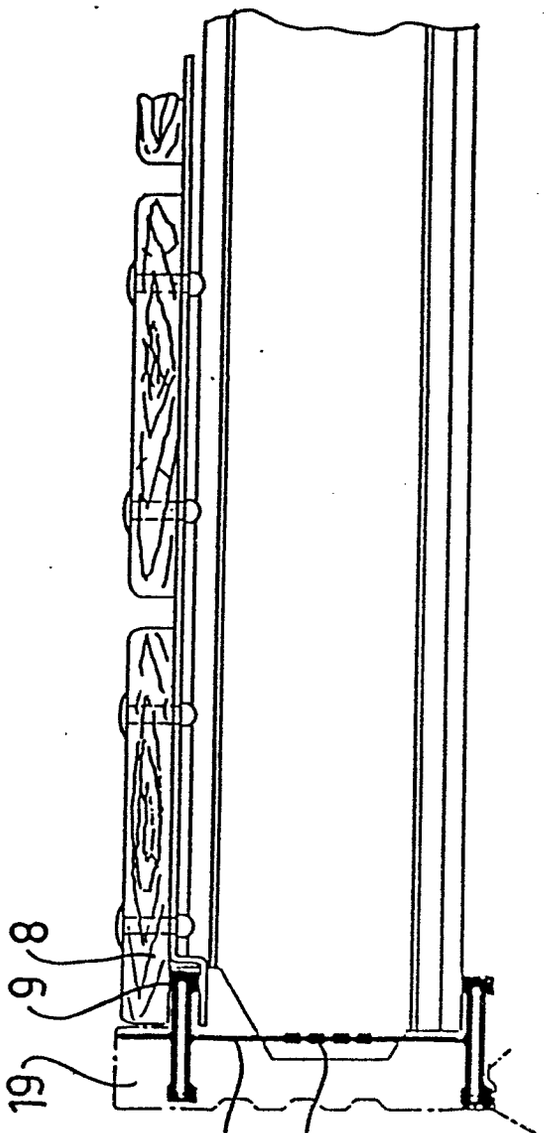

FIG.8

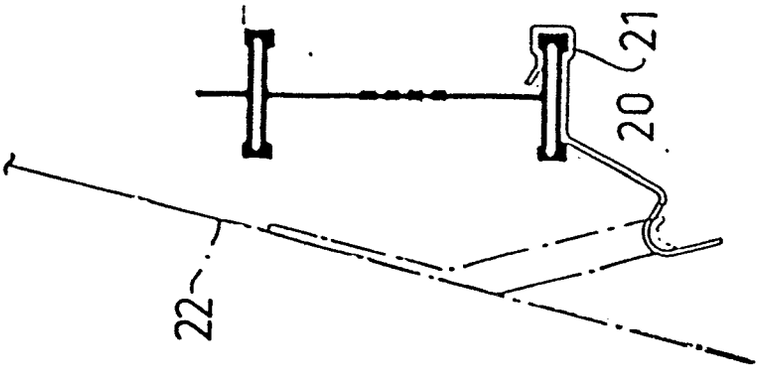

FIG.10

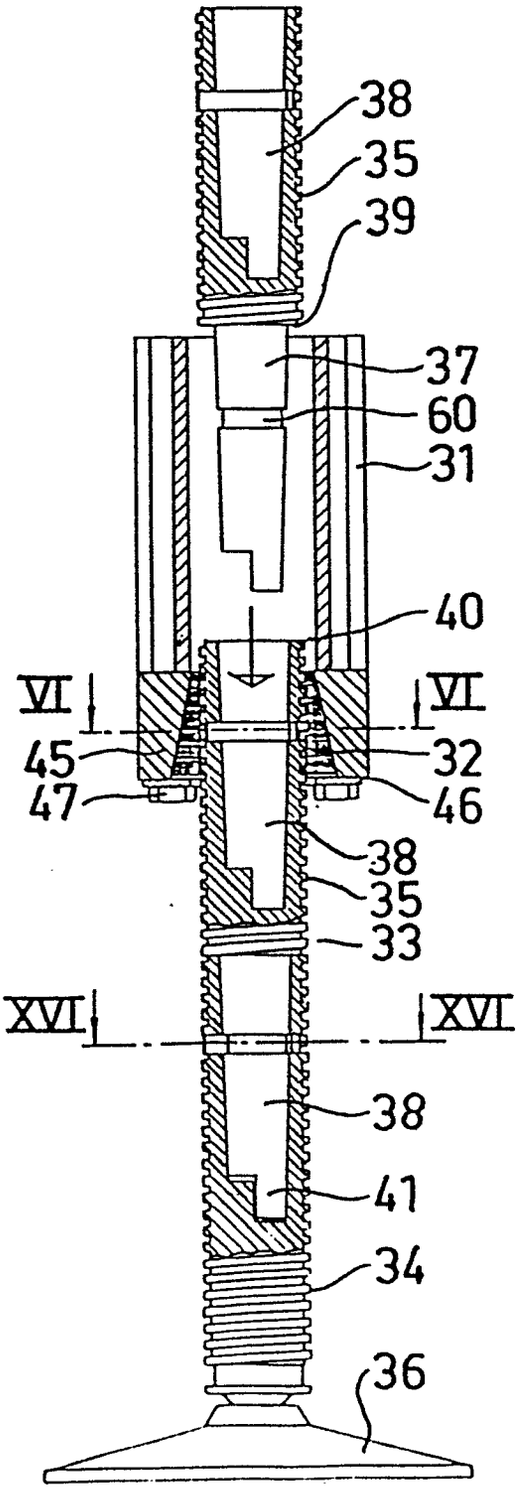

FIG.11

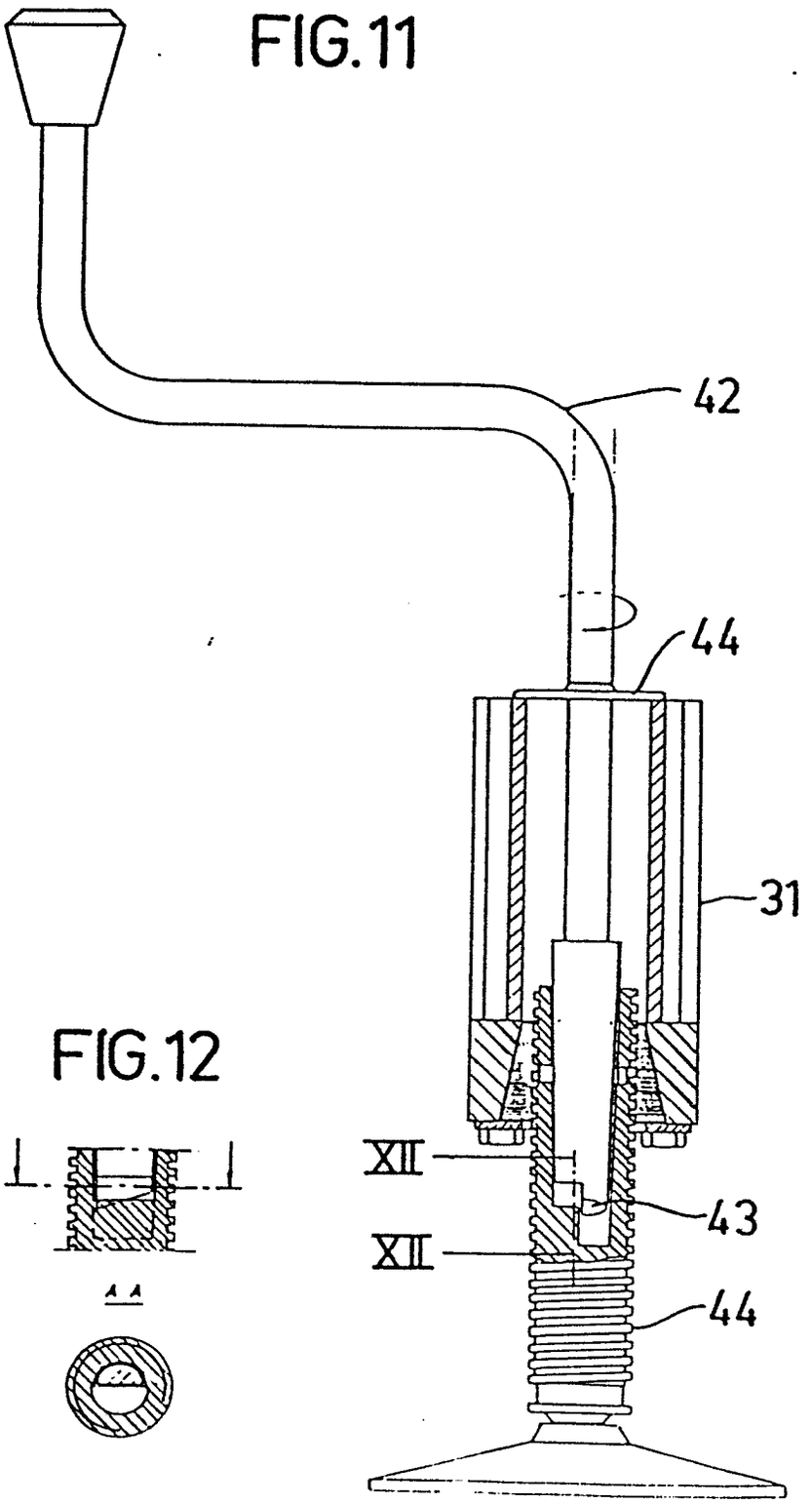

FIG.12

FIG.13

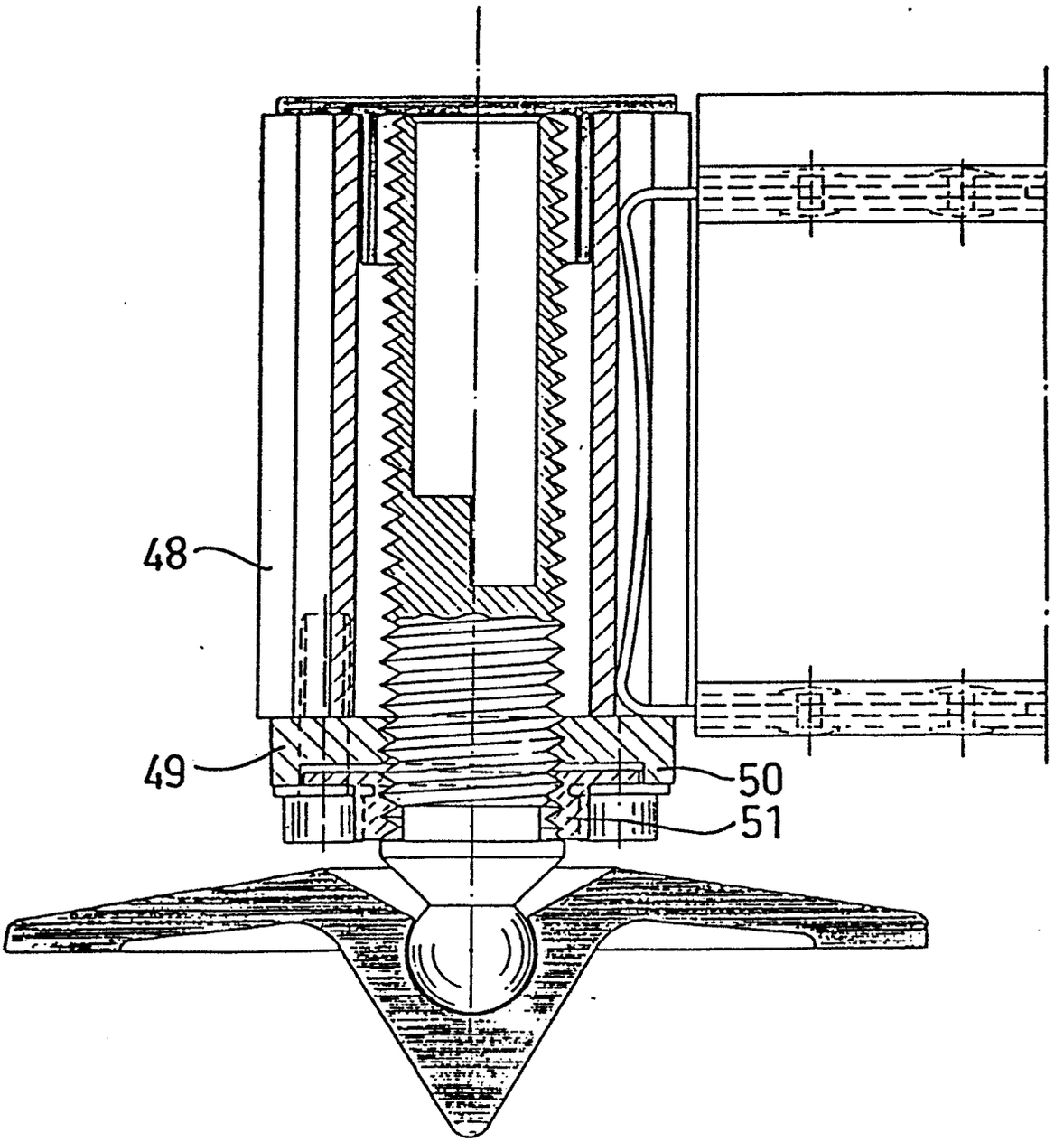

FIG.14

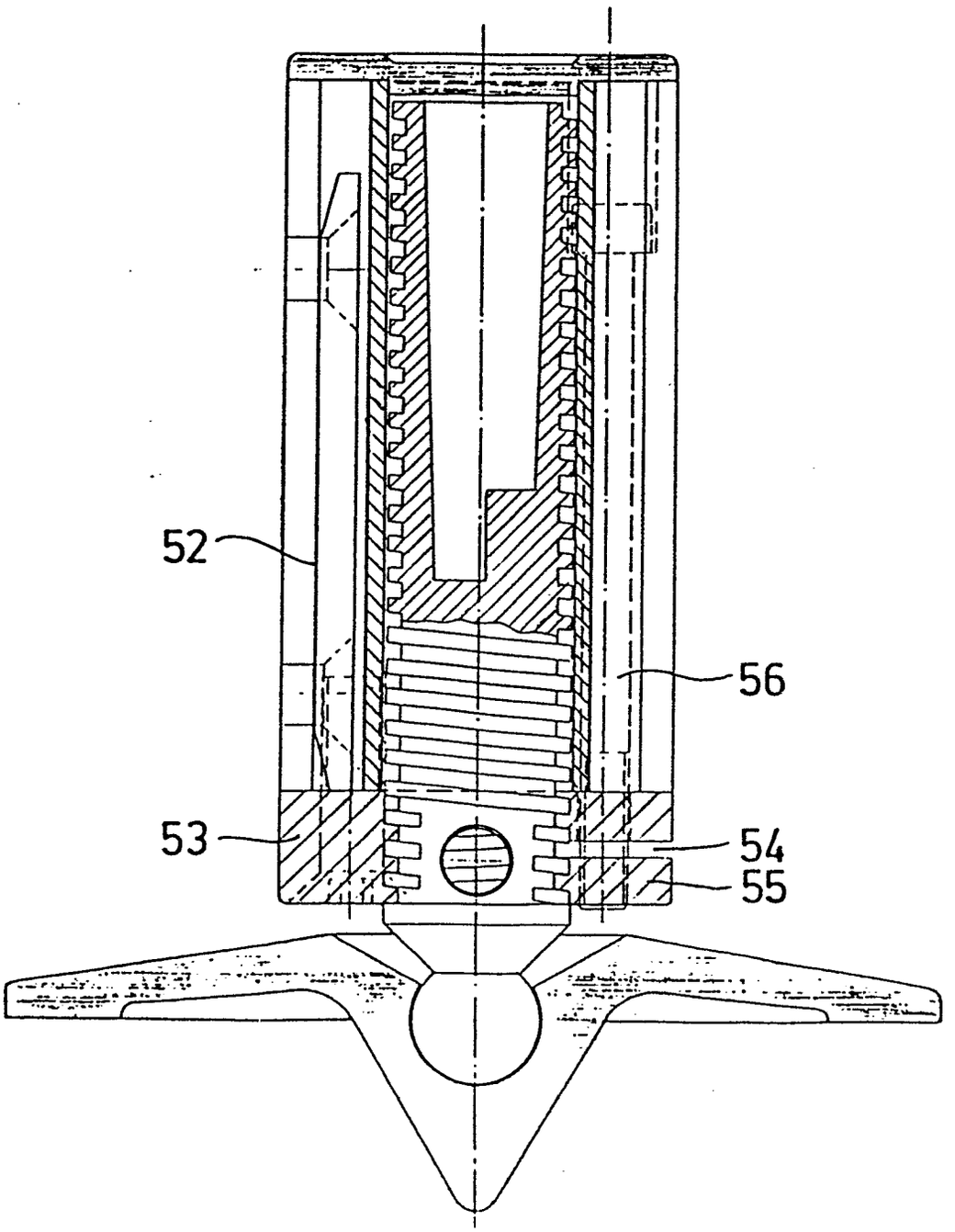

FIG.15

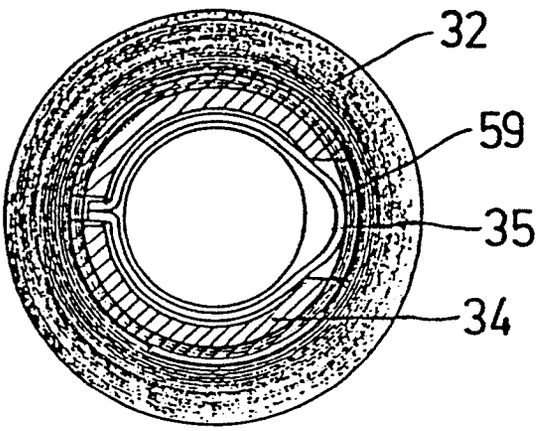

FIG.16

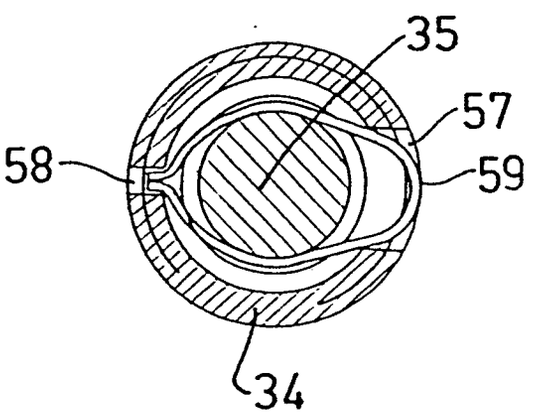

FIG.17