Office de la Propriété Intellectuelle du Canada
Un organisme d'Industrie Canada

Canadian Intellectual Property Office
An agency of Industry Canada

CA 2237798 C 2002/04/16

(11)(21) 2 237 798

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 1998/05/15

(41) Mise à la disp. pub./Open to Public Insp.: 1999/11/15

(45) Date de délivrance/Issue Date: 2002/04/16

(51) Cl.Int.^{6}/Int.Cl.^{6} A01G 27/00, A01G 31/02

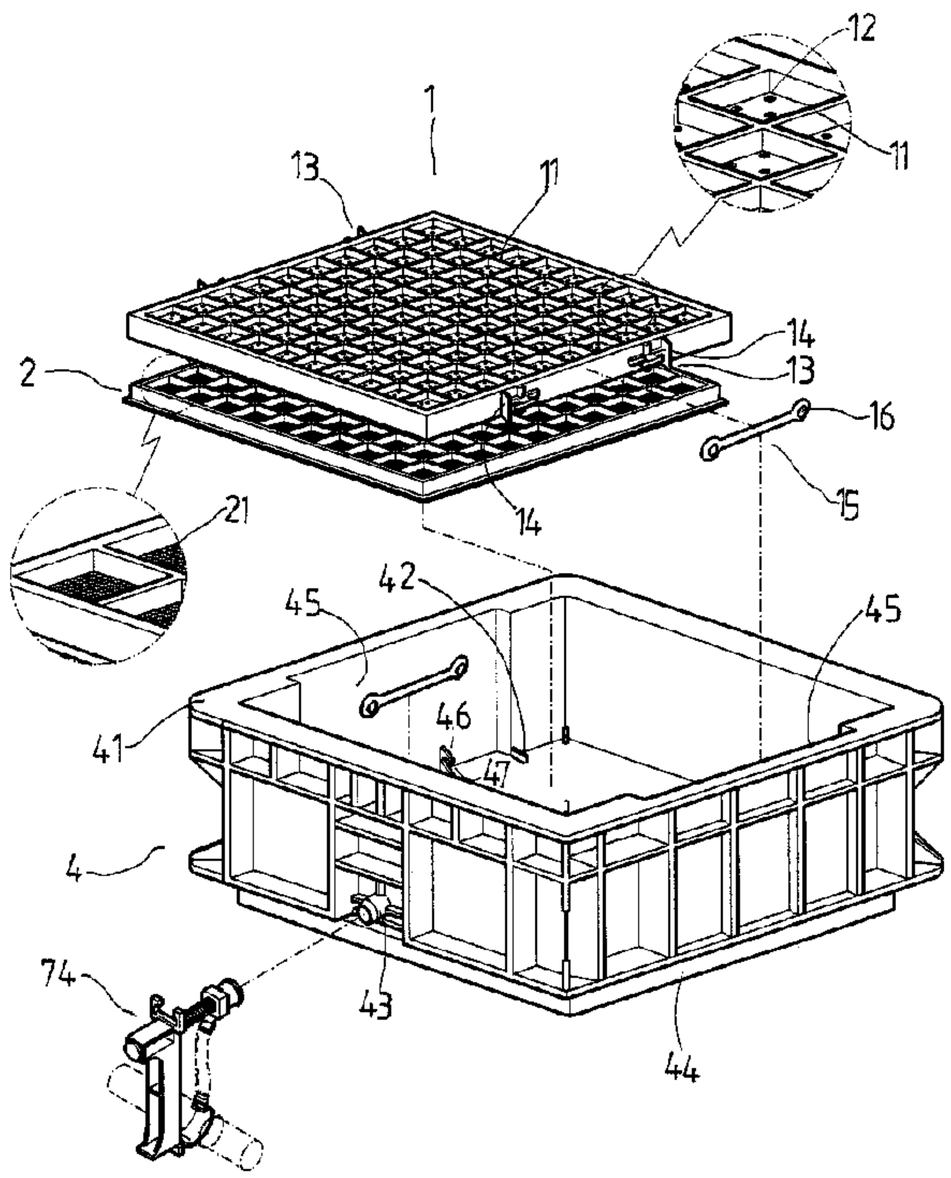
(72) Inventeurs/Inventors:
LO, Kung-Shen, CN;
PENG, Li-Tai, CN

(73) Propriétaires/Owners:
LO, Kung-Shen, CN;
PENG, Li-Tai, CN

(74) Agent: SMART & BIGGAR

(54) Titre : BOITE DE CULTURE POUR POUSSE AVEC UN REGULATEUR AUTOMATIQUE D'EAU ET D'UN DISPOSITIF D'EQUILIBRAGE

(54) Title: SPROUT CULTIVATION BOX WITH AN AUTOMATIC WATER REGULATING AND BALANCING DEVICE



(57) Abrégé/Abstract:
A sprout cultivation box with an automatic water regulating and balancing device provides a precise-controlled, automatic, and complete cultivation environment for performing continually the soakage, sprouting, and cultivating processes of beans or seeds within the box, and for saving the water resources as well as the cost at no price of the quality and production. The present invention comprise a reinforce box capable for duplicate piling, a permeable elastic cover, a carrier plate with a plurality of tiny compartments for anchoring beans, an elastic engaging means for rapidly connecting and dis-connecting the permeable elastic cover from the box, and the water-feeding device for precisely and automatically regulating the water circulation inside the sprout cultivation box.

SPROUT CULTIVATION BOX WITH AN AUTOMATIC WATER REGULATING AND BALANCING DEVICE

ABSTRACT

A sprout cultivation box with an automatic water regulating and balancing device provides a precise-controlled, automatic, and complete cultivation environment for performing continually the soakage, sprouting, and cultivating processes of beans or seeds within the box, and for saving the water resources as well as the cost at no price of the quality and production. The present invention comprise a reinforce box capable for duplicate piling, a permeable elastic cover, a carrier plate with a plurality of tiny compartments for anchoring beans, an elastic engaging means for rapidly connecting and dis-connecting the permeable elastic cover from the box, and the water-feeding device for precisely and automatically regulating the water circulation inside the sprout cultivation box.

SPROUT CULTIVATION BOX WITH AN AUTOMATIC WATER REGULATING AND BALANCING DEVICE

BACKGROUND OF THE INVENTION

(1) Field of the Invention

The invention relates to a sprout cultivation box with an automatic water regulating and balancing device, and more particularly to which can carry out intensive sprout cultivation, precise water irritation, and growth control of the sprout, for promoting the production and the quality of sprout cultivation.

(2) Description of the Prior Art

Conventionally, three types of water feeding in sprout cultivating agriculture are usually seen; they are showering, spraying, and soaking. For mass production requirement, well controlled water feeding is necessary to ensure the product quality. In this case, the showering and the spraying are usually not pertinent to satisfy a well water feeding control. However, though the soaking for sprout cultivation could provide better production quality, yet the disadvantages in huge water consumption, temperature gradient of the circulating water, and the timing for water feeding are sometimes hart to handle well. As a result, heterogeneous sprout production and bacteria contamination can be expected.

Furthermore, in response to various beans (such as green bean, soybean, small red bean, pea, ... and so on) application, various water consumption and the feeding timing in a unique cultivation container for soakage, sprouting, and growing are sometimes hard to achieve. Frequently the container change is the resort to guarantee the sprout quality.

Therefore, an invention devoting to resolving aforesaid disadvantages of current cultivation practice in automatic water feeding and for saving in labor, time, and water is necessary, definitely.

SUMMARY OF THE INVENTION

Accordingly, it is a primary object of the present invention to provide a sprout cultivation box with an automatic water regulating and balancing device for precisely controlling the water feeding, balancing the circulating water, and lowering down the water consumption.

The sprout cultivation box with an automatic water regulating and balancing device in accordance with the present invention provides an elastic cover with concave bottom surface for forming a well cultivation space in between with the chocolate board-shaped carrier plate and for preventing from arbitrary movement of the beans inside. While the sprout growing, the elastic cover on top will be lift but increase the restraint atop to the sprout by a well-designed spring belt to thus enhance the self-generating of a special natural chemical for improving the growth quality of the cultivated sprout. Also, the spring belt can provide a preferred constraint for inhibiting the shaking of a cultivation unit in the cultivation box.

It is another object of the present invention to provide a sprout cultivation box with an automatic water regulating and balancing device, which comprises a water-feeding device for precisely and automatically regulating the water circulation inside the sprout cultivation box in all three stages of soaking, sprouting, and cultivating. By providing the well designed the water-feeding device and the elastic cover, the sprout growth can be prospective and mass improvement in quality and production.

It is a further object of the present invention to provide a sprout cultivation box with an automatic water regulating and balancing device,

which the water-feeding device can be optimally arranged via various stacking methods in a plural usage of the cultivation boxes to meet any application field situation.

It is one more object of the present invention to provide a sprout cultivation box with an automatic water regulating and balancing device which comprises an elastic engaging means for rapidly connecting and disconnecting the spring belts.

It is another object of the present invention to provide a sprout cultivation box with an automatic water regulating and balancing device, in which the elastic cover further includes pairs of hook sets along opposing lateral sides thereof and corresponding reinforce protective plates facing outward from each hook housing, for preventing the elastic cover from colliding while in transportation or handling and for increasing the lifetime of the cultivation boxes.

According to a broad aspect of the present invention, a sprout cultivation box with an automatic water regulating and balancing device is provided, comprising:

a cultivation box, which is a reinforced box that can be used for duplicate stacking, said cultivation box having an extruding external water adapter located on a side of said cultivation box, a lower flange located exterior a bottom of said cultivation box for duplicate stacking, an upper flange located exterior a top of said cultivation box, a plurality of equal-height spacing bumps located interior and along the bottom of said cultivation box, a pair of shallow square

valleys located on interior opposing side walls of said cultivation box, and at least an anchoring set with a hooking end located along an interior side edge of said cultivation box;

a permeable elastic cover with a plurality of integrally formed inter-cross interior reinforce ribs and a plurality of holes for permeation, said permeable elastic cover further having a pair of hook sets each of which is located at an opposing lateral side for firm connection with spring belts;

a carrier plate with a plurality of tiny compartments for anchoring beans, said plurality of tiny compartments corresponding to said inter-cross interior of said permeable elastic cover, each of said plurality of tiny compartments having a height sufficient to accomodate expansion of said beans after soakage;

an elastic engaging means for rapidly connecting and disassembling said spring belts, said elastic engaging means having a maneuvering bar extending downward and separating to form a pair of spaced plates, each of said spaced plates further comprising a locating cut and an extruding release tip at a bottom end; and

a water-feeding device for precisely and automatically regulating the water circulation inside said sprout cultivation box.

All these objects are achieved by the sprout cultivation box with an automatic water regulating and balancing device described below.

BRIEF DESCRIPTION OF THE DRAWINGS

The present invention will now be specified with reference to its. preferred embodiments illustrated in the drawings, in which

FIG. 1 is an exploded perspective view of the preferred cultivation box and a water feeding connector in accordance with the present invention.

FIG. 2 is a perspective view of the preferred elastic engaging means according to the present invention.

FIG. 3A is a cross section view of a portion of the preferred cultivation box according to the present invention with beans inside, showing the elastic engaging means engaging.

FIG. 3B is a cross section view of a portion of the preferred cultivation

box according to the present invention with beans insides, showing the elastic engaging means engaged.

FIG.4 is a cross section view of the preferred cultivation box according to the present invention with beans insides, viewing at an angle 90 degree to one shown in FIG.3.

FIG.5 is a cross section view of the preferred cultivation box according to the present invention with fully growing sprouts.

FIG.6A is a cross section view of potion of the preferred cultivation box according to the present invention with fully growing sprouts, showing the spring belt still engaged inside the cultivation box.

FIG.6B is a cross section view of potion of the preferred cultivation box according to the present invention with fully growing sprouts, showing the elastic engaging means engaging for dis-assembling the spring belt.

FIG.7A is a cross section view of potion of the preferred cultivation box according to the present invention, showing the preferred extruding external water adopter with a filtering screen installed.

FIG.7B is a schematic view of the preferred filtering screen according to the present invention.

FIG.8 is a schematic view of the preferred embodiment of piling a plurality of the cultivation boxes according to the present invention.

FIG.9 is an enlarged view of portion A in FIG.8.

FIG.10 is a side view of the preferred embodiment shown in FIG.8.

FIG.11 is an exploded perspective view of the preferred water feeding connector according to the present invention.

FIG.12 is a schematic view showing the preferred water feeding connector and the relative piping in accordance with the present invention.

FIG.13 is a schematic view showing the engagement of two water feeding connectors in accordance with the present invention.

FIG.14 is a cross section view showing the connection between the preferred dual connector of the water feeding connector and the extruding external water adopter of the cultivation box in accordance with the present invention.

FIG.15 is a schematic view of another embodiment of piling a plurality of the cultivation boxes according to the present invention.

FIG.16 is a top view of the embodiment illustrated in FIG.15.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The invention disclosed herein is directed to a sprout cultivation box with an automatic water regulating and balancing device. In the following description, numerous details are set forth in order to provide a thorough understanding of the present invention. It will be appreciated by one skilled in the art that variations of these specific details are possible while still achieving the results of the present invention. In other instance, well-known components are not described in detail in order not to unnecessarily obscure the present invention.

The sprout cultivation box with an automatic water regulating and balancing device in accordance with the present invention is the work designed by well-performing automatic planning and proved to be outstanding by undergoing intensive field testing. The engagement of a cultivation box 4 with a water-feeding device 8 is through the connection of a air-powering water feeding connector 84 with an extruding external water adopter 43 of the cultivation box 4, for providing a superior cultivating environment for rapid sprout growing without any intermediate place change.

Referring now to FIG.1, the cultivation box 4 has a permeable elastic cover 1 on top. The permeable elastic cover 1 for providing elastic restraint atop to enhance the sprout growth via self-inducing interior

helpful chemicals further has a plurality of inter-cross and equal-spaced interior reinforce ribs 11 integrated as a whole and a plurality of air holes 12 on the bottom of the elastic cover 1 for permeation of air as well as water. In addition, the elastic cover 1 further comprises a pair of hook sets 13 located each thereof at an opposing lateral side for firmly connection with spring belts 15 through its aperture at the ring end 16. Each hook set 13 further comprises a wider, stronger, and extruding protective plate 14 for preventing the elastic cover 1 from exterior collision. According to the present invention, the spring belt 15 can be made of rubber, plastic, a tensile spring with both ring ends, or any the like.

According to the present invention, the cultivation box 4 further comprises a carrier plate 2, which is like a containing dish and has an extruding step-shaped edge to engage with the elastic cover 1 on top. The carrier plate 2 further has a plurality of tiny compartments 21 at each corresponding position to the inter-cross interior ribs 11 of the engaging permeable elastic cover 1 for anchoring beans in the tiny enclosed space formed in between the engaging carrier plate 2 and the elastic cover 1. The height of the compartment 21 can be about the thickness of the cultivating bean after soakage. Such an arrangement of the elastic cover 1 and the carrier plate 2 inhibits beans in the compartments 21 from arbitrary motion and overlapping, which will be helpful to bean's rooting or its cutoff of the roots.

The cultivation box 4, which is essential a weight-saving and reinforce box with one side open, has an upper flange 41 located atop and a lower flange 44 located exterior to the bottom edge for duplicate piling on top of another cultivation box 4. At one external side of the cultivation box 4, an extruding external water adopter 43 (also as shown in FIG.7A) is located at a height over the interior bottom surface of the cultivation box 4. The external water adopter 43 further has a filtering screen 431 with an integrated filtering hole 432 for restraining the bean shells staying within the cultivation box 4 without obstacle the water circulation. At the

interior bottom edge of the cultivation box 4, a plurality of equal-height spacing bumps 42 are located for providing a substantial spacing between the bottom surface with the carrier plate 2 atop to accommodate sufficient amount of water for the downward extruding root of the bean in the compartment 21. In addition, the cultivation box 4 further comprises a pair of swallow square valleys 45 located interior on opposing side wall for providing enough space to accommodate the hook sets 13 of the elastic cover 1. Preferably, the square valley 45 further provides at least an anchoring set 46 with a hooking end 47 between the valley wall and the hook set 13 after installation, for positioning the spring belt 15.

Referring now to FIG.3 and FIG.4, while after the placement of beans in the cultivation box 4, an elastic engaging means 3 (as shown in FIG.2) can be used to perform the firm engagement of cultivation unit (including the elastic cover 1 and the carrier plate 2) and the anchoring sets 46, in order to resolve the floating problem after water feeding and the resistance from the sprout growth. In accordance with the present invention, the elastic engaging means 3 for rapidly connecting and dis-connecting the spring belts 15, comprises a maneuvering bar 31 extending downward and separating to form a pair of across plates 32, and each of the across plate 32 further comprises a locating cut 33 and an extruding release tip 34 at the bottom end. The locating cut 33 is used to press down one end of the spring belt 15 fastened to the hook set 13 of the elastic cover 1 at another end, and to slip the end into the hooking end 47 of the anchoring set 46 for anchoring the cultivation unit (as illustrated in FIG.3A and FIG.3B). Preferably in a automation application, the maneuvering bar 31 of the elastic engaging means 3 can be operated by a robot with proper rotational capability.

Referring now to FIG.5, after the sprout grows to a substantial height, the elastic engaging means 3 can be rotated 180 degree to release the spring belt 15 from the anchoring set 46 as illustrated in FIG.6A and FIG.6B. The cultivation unit, then, can be transported to another station

for de-rooting.

FIG.8 and FIG.10 show the preferred engagement of the cultivation box 4 on a mobile platoon 9 with a water-feeding device 8. The piling arrangement of cultivation boxes 4 can be optimal organized in accordance with the application field and the on-site transportation system. The water-feeding device 8 comprises a square locating frame 81 as a installation frame for the water-feeding device 8, which has substantial height and width for accommodating multiple cultivation boxes 4. The locating frame 81 further has a plurality of adjustable leg sets 812 at the bottom side of the locating frame 81 for standing, pairs of short cylinders 811 located symmetrically at proper locations with each piston bar engaging with the reinforce plate 822 of every suspending distribution frame 82 inside the locating frame 81. The locating frame 81 further has a air-pressed top cover 87 located on top of the locating frame 81. The air-pressed top cover 87 further has a plurality of short cylinders 811 equal-spaced installed beneath a transverse beam 871 above top edge of the locating frame 81, and has a top cover plate 872 engaged with the piston bars of the short cylinders 811. While the cultivation boxes 4 are located inside the locating frame 81, the top cover plate 872 will be pushed down by short cylinders 811 to firmly anchor the cultivation boxes 4 for ensuring the engagement of the distribution frames 82, the water-feeding connecting piping 83, and the water-feeding connectors 84. The distribution frame 82 further has a plurality of parallel and equal-spaced locating strips 821 for fastening a pair of water feeding connectors 84. Preferably, the locating strip 821 can be H-shaped and be made of FRP, aluminum alloy, or any the like.

Referring now to FIG.11, the water-feeding connector 84 in accordance with the present invention comprises a T-shaped main body 841, a T-shaped pivot shaft 842, a spring 843, and a dual connector 844. The main body 841 further has an extruding U shaped engagement groove 8411 on top edge, a through hole 8412 for receiving the pivot shaft 842 located close to one side of the bottom edge, a locating pipe 8413

extruding from another side of the bottom edge, a symmetric engagement portion 8414 extruding from the bottom edges of opposing to the engagement grooves 8411 for engaging with the engagement groove 8411 of another water-feeding connector 84 (as shown in FIG.13), and a hanger plate 8415 extruding from the side surface for horizontally locating the sub-supply pipe 832 of the water-feeding connecting piping 83 (as shown in FIG.12). On the end of the dual connector 844 engaging the spring 843 is an extruding pipe 8441 for pipe-connection with one end of the spring 843. The pivot shaft 842 is connected to the extruding pipe 8441 after penetrating the through hole 8412 (as shown in FIG.11). The dual connector 844 has a hollow connecting end 8442 having a rubber-made anti-leak sleeve 845 inside. For smooth water feeding after connecting the water-feeding connector 84 with the extruding external adopter 43 of the cultivation box 4, the dual connector 844 further comprises an oblique feeding head 8442 for connecting the hose 837 extended from the sub-supply pipe 832.

The water-feeding connecting piping 83 comprises a main supply pipe 831 at one end for connecting with the connecting hose pipe 85 to feed the water. The main supply pipe 831 further connects extended with a plurality of equal-spaced vertical sub-supply pipes 832 with individual water feeding control unit 833 and water leading control unit 834 for properly controlling the water circulation inside the cultivation box 4 within a default by air-pressure regulators, electromagnetic valves, or any the like. The sub-supply pipes 832 is connected to the body 841 of the water-feeding connector 84 by a triad connector 835 for providing a third extruding head 836 to connect with portion of the feeding hose pipe 837. Another head of the triad connector 835 is then connected with the connecting head 8442 of the dual connector 844 of the water-feeding connector 84. Preferably, the water from the sub-supply pipe 838 of the water-feeding connecting piping 83 can be recycled after a simple filtration process.

Referring now to FIG.10, right after two stacks of piling cultivation boxes 4 on mobile platoons 9 are positioned inside the locating frame 81 for automatic water feeding by the water-feeding device 8, the computer controlled short cylinders 811 and the air-pressed top cover 87 will be activated to push downwards the top cover plate 872 upon the top cultivation boxes 4 and to push, as well, inwards the distribution frames 82 upon side of the cultivation boxes 4 for firmly anchoring the whole assembly. At the same time, each connecting end 8443 of the dual connector 843 of the water-feeding connector 84 will engage closely with a corresponding extruding external water adopter 85 of a cultivation box 4 (as shown in FIG.14) and the water will be continuously fed through the connecting hose pipe 85. The layer-wise water-feeding management in accordance with the present invention has the water feeding control unit 833 and the water leading control unit 834 normally at close status. While water-feeding is necessary, the water feeding control unit 833 located at top sub-supply pipe 832 will be ordered to open and supply the water at fix flow rate to the cultivation box 4 through the feeding hose 837 and the extruding external water connector 43. After supplying a substantial amount of water into the cultivation box 4, the water feeding control unit 833 will shut the water flow and the water in the cultivation boxes 4 of the same layer will be automatically balanced. After a proper duration, the water leading control unit 834 will be open and the water inside the cultivation box 4 will be led out through the sub-leading pipe 838, and further via the leading connection hose pipe 86 to a simple filtration apparatus for recycling the water. Similarly, the aforesaid water circulation management at the top layer is applied to other layers of the cultivation boxes assembly.

As long as the sprout is fully growing, the short cylinders 811 will pull back the piston bars to their origins for releasing the connection between the extruding external water connector 43 and the water-feeding connector 84. Then, the cultivation boxes 4 can be moved with the mobile platoons 9 to the following process stations.

FIG.15 illustrates another embodiment of piling a plurality of the cultivation boxes according to the present invention, where another water-feeding device 7 is applied. This water-feeding device 7 is applied to cultivation boxes 4 cultivating different kinds of beans at the same time. In this embodiment, cultivation boxes 4 are placed on a flat base 6. The water supply is mainly from the main water supply pipe 71, to the sub-water supply pipe 72, and finally to the horizontal supply pipes 73. The spacing between two adjacent horizontal supply pipes is equal to the height of the cultivation box 4. At proper locations close to both ends of the horizontal supply pipes 73, independent water-feeding control units 74 and water-leading control units 75 are located for precisely controlling the timing and amount of the water feeding. The water out of the cultivation boxes is led by the leading sub-pipes 77, and finally into a reservoir. Each horizontal supply pipe 73 further comprises a plurality of equal-spaced rapid connectors 78 for pipe-connecting with the rapid head 76 of the water-feeding hose pipe 79 at one end, and further at another end of the hose pipe 79 connected to the extruding external water connector 43, for supplying water into the cultivation boxes 4. In addition, the water led out of the cultivation boxes 4 is conducted to the leading sub-pipes 77 via the sub-supply pipes 73. Similar to the previous embodiment, mass production of sprouts with high quality can be achieved.

Referring now to FIG.16, top view of the embodiment shown in FIG.15 is illustrated. By providing the water-feeding device 7, the intensive sprout cultivation can be achieved.

According to the present invention, external piping is constructed to provide and lead-out the water in time for sprout cultivation boxes, by computer controlling the water feeding control units and the water leading control units. By providing the cultivation box capable of piling application and the 3-D piping network, a 3-D sprout cultivation is then achieved.

As the sprout cultivation industry in Japan, no chemical except

artificial C_2H_4 and N_2 can be added to promote the cultivating. As a matter of fact, a complete cultivation needs 7-8 days in summer and 10-12 days in winter to obtain the sprout 9-10 times weight of the origin bean. However, about 30% of the sprouts will be infertile or bacteria-contaminated. The finished sprouts can only be stored in a freezer for 3-4 days without rotten.

On the other hand, in accordance with the present invention, the application of elastic physical pressure over the growing sprouts by the elastic covers over the cultivation boxes will force the sprout to generate mass amount of stress ethylene to self-promote the growth. Moreover, the oxidation of the stress ethylene (known as oxide ethylene) will inhibit the bacteria growth, and thus better sprout yield and quality can be rendered. By applying the present invention, about 3.5-4 days are needed to have a complete sprout cultivation with the sprout 13-14 times weight of the origin bean, no matter in winter or in summer. Due to lack of bacteria, the sprouts obtained by applying the present invention can be stored in a freezer for about 2 weeks. Obviously, the present invention is superior to any work in the art.

While the present invention has been particularly shown and described with reference to preferred embodiments, it will be understood by those skilled in the art that various changes in form and detail may be without departing from the spirit and scope of the present invention.

76350-5

CLAIMS:

1. A sprout cultivation box with an automatic water regulating and balancing device which can be used to form a multiple-layer cultivation tower by stacking a plurality of said sprout cultivation boxes, comprising:

a cultivation box, which is a reinforced box that can be used for duplicate stacking, said cultivation box having an extruding external water adapter located on a side thereof, a lower flange located exterior at bottom of said cultivation box for duplicate stacking, an upper flange located exterior at top of said cultivation box, a plurality of equal-height spacing bumps located interior and along bottom of said cultivation box, a pair of shallow square valleys located interior on opposing side walls of said cultivation box, and at least an anchoring set with a hooking end located interior along a side edge of said cultivation box;

a permeable elastic cover with a plurality of inter-cross interior reinforce ribs integrated as a whole and a plurality of holes for permeation, said permeable elastic cover further having a pair of hook sets located each thereof at an opposing lateral side for firm connection with spring belts;

a carrier plate with a plurality of tiny compartments for anchoring beans, said plurality of tiny compartments corresponding to said inter-cross interior of said permeable elastic cover, each of said plurality of tiny compartments having a height sufficient to accomodate expansion of said beans after soakage;

an elastic engaging means for rapidly connecting and disassembling said spring belts, said elastic engaging means having a maneuvering bar extending downward and separating to

form a pair of across plates, each of said across plates further comprising a locating cut and an extruding release tip at the bottom thereof; and

a water-feeding device for precisely and automatically regulating the water circulation inside said sprout cultivation box.

2. The sprout cultivation box with an automatic water regulating and balancing device according to claim 1, wherein each hook set of said pair of hook sets of said permeable elastic cover further comprises a reinforce protective plate thereof facing outward.

3. The sprout cultivation box with an automatic water regulating and balancing device according to claim 1, wherein said spring belt of said permeable elastic cover is made of plastic material with substantial elasticity.

4. The sprout cultivation box with an automatic water regulating and balancing device according to claim 1, wherein said spring belt of said permeable elastic cover is a tensile spring with substantial spring stiffness.

5. The sprout cultivation box with an automatic water regulating and balancing device according to claim 1, wherein said elastic engaging means can be operated by a robot with proper rotational capability.

6. The sprout cultivation box with an automatic water regulating and balancing device according to claim 1, wherein said extruding external water adapter of said cultivation box further comprises an integrated filtering screen.

7. The sprout cultivation box with an automatic water regulating and balancing device according to claim 1, wherein said water-feeding device is installed externally close to said extruding external water adapter of said cultivation box; further comprising a locating frame with substantial height and width to accommodate multiple said cultivation boxes, a plurality of adjustable leg sets at the bottom side of said locating frame for standing, pairs of short cylinders located symmetrically at proper locations for anchoring suspending distribution frames inside said locating frame by cylinder bars thereof, and a air-pressed top cover located above top edge of said locating frame having a transverse beam to install thereon a plurality of downward short cylinders with cylinder bars connected with a top cover plate for pressing firmly said cultivation boxes piled inside said locating frame; herein said locating frame further including a plurality of parallel and equal-spaced locating strips for fastening a pair of water feeding connectors, and a water feeding piping hose-connected with a main supply pipe, and said main supply pipe herein further comprising a plurality of parallel and equal-spaced sub-supply pipes connected with each said cultivation box and with individual water feeding control units and water leading control units for properly controlling the water circulation inside said cultivation box.

8. The sprout cultivation box with an automatic water regulating and balancing device according to claim 7, wherein said water feeding control unit and said water leading control unit are regulated by air-pressure regulators for accurately monitoring the water-feeding of said sub-supply pipes.

9. The sprout cultivation box with an automatic water regulating and balancing device according to claim 7, wherein

said water feeding connector further comprises a main body, a pivot shaft, a spring, and a dual connector; wherein said main body has an extruding U shaped engagement groove located on a top edge thereof, a through hole for receiving said pivot shaft located close to one side of a bottom edge of said engagement groove, a locating pipe extruding from another side of the bottom edge of said engagement groove, a symmetric engagement portion opposing said engagement groove and extruding from a bottom edge of the main body, and a hanger plate extruding from the bottom edge of the main body; wherein said pivot shaft is connected with said dual connector at one end after penetrating said main body and said spring; and the end of said dual connector connected with said spring further connected to overlap with said locating pipe, and the other end of said dual connector having a waterproof sleeve located inside and said dual connector having an oblique feeding head located beneath and hose-connected with said sub-supply pipe.

10. The sprout cultivation box with an automatic water regulating and balancing device according to claim 7, wherein said locating strip is H-shaped and is made of aluminum alloy material.

11. The sprout cultivation box with an automatic water regulating and balancing device according to claim 7, wherein said water feeding control unit and said water leading control unit are regulated by electromagnetic valves for accurately monitoring the water-feeding of said sub-supply pipes.

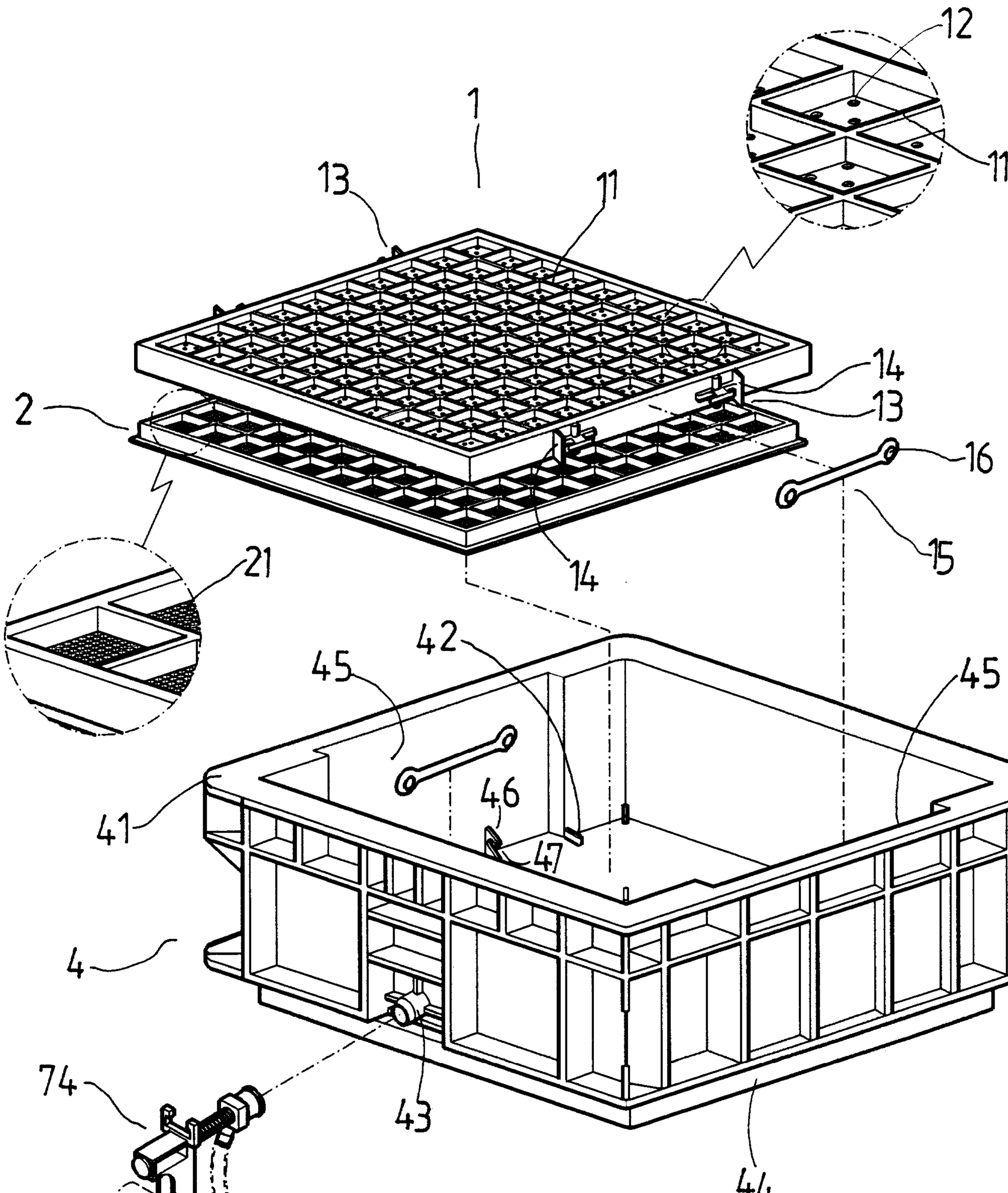


FIG. 1

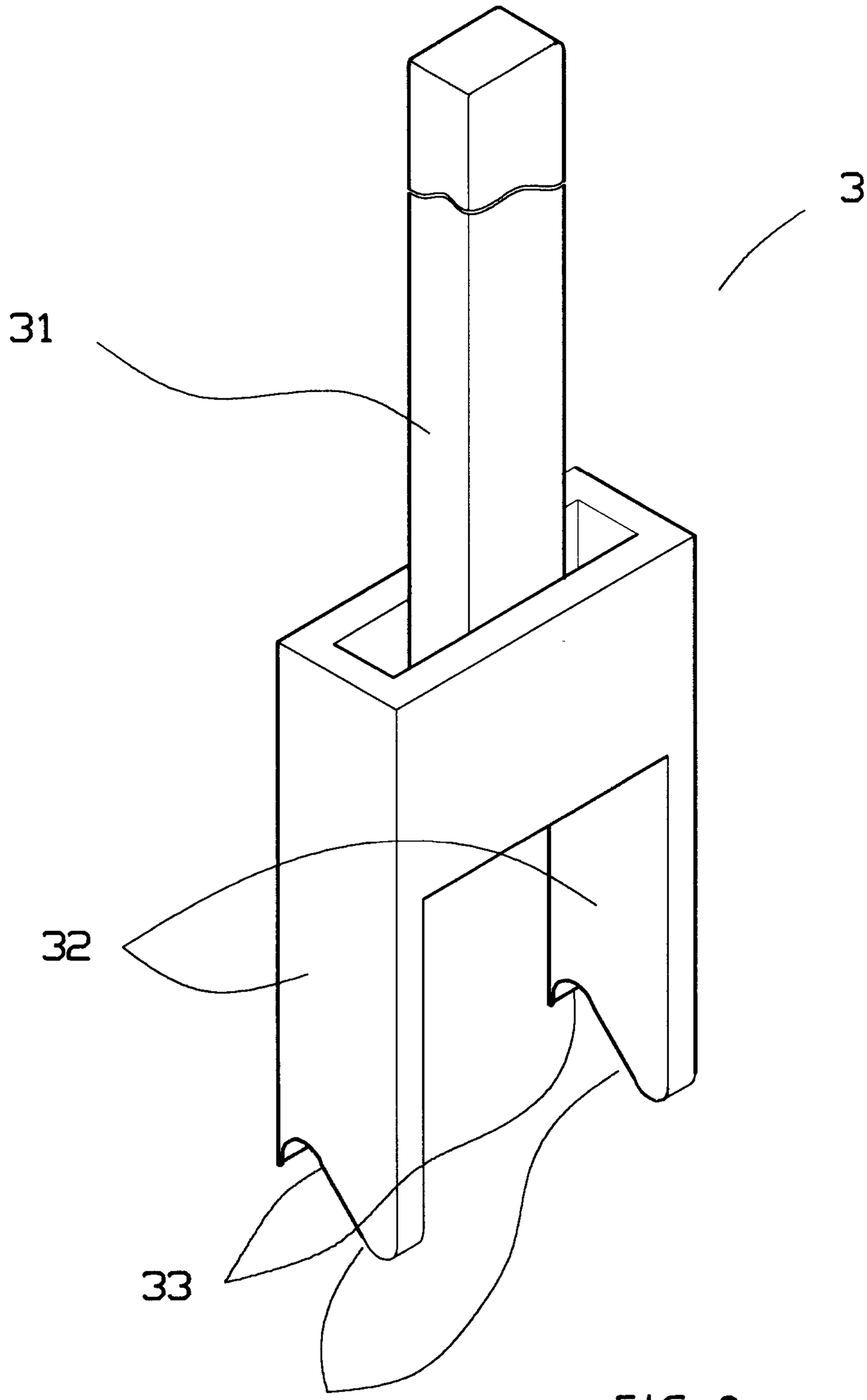


FIG. 2

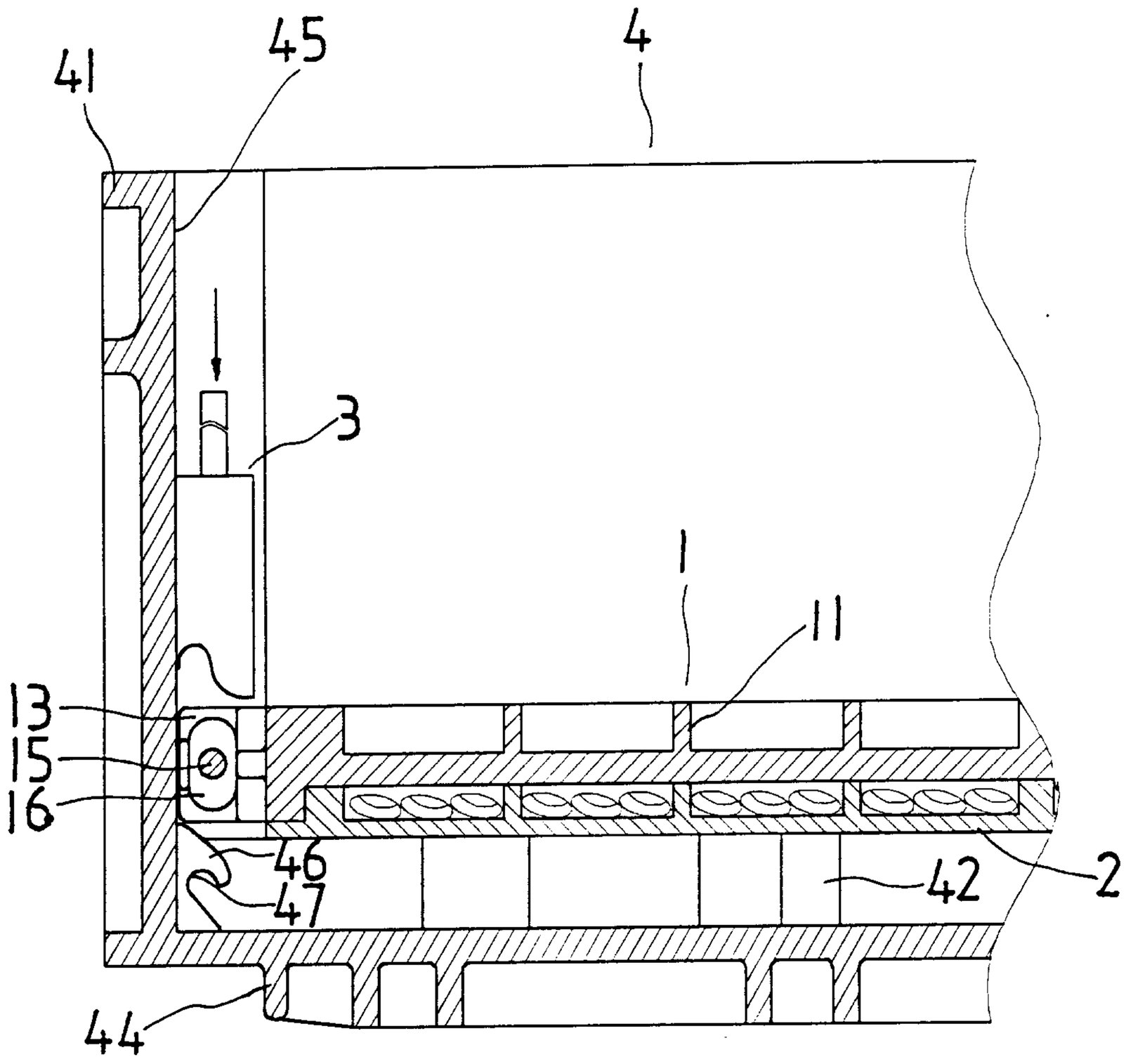


FIG. 3A

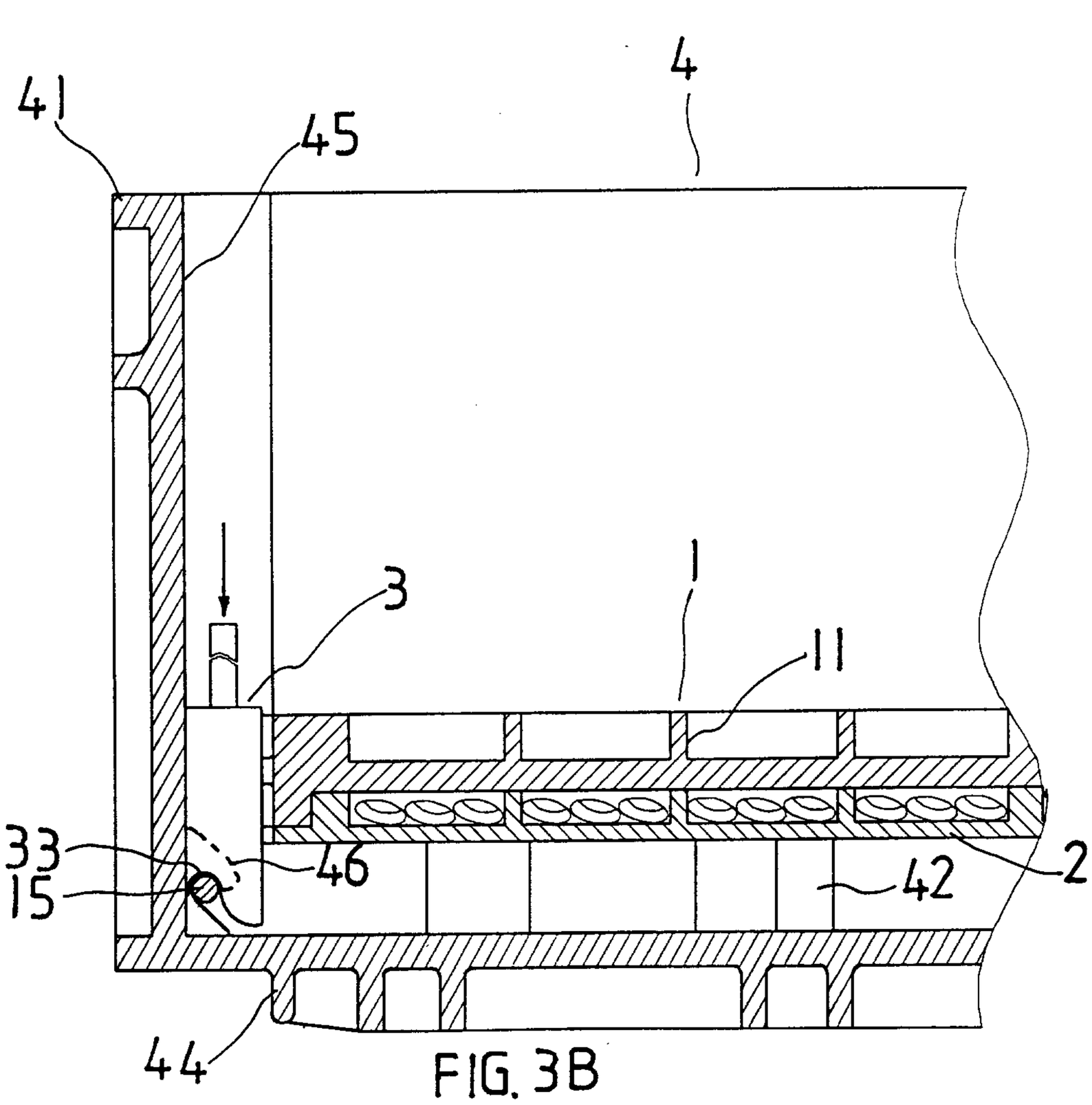


FIG. 3B

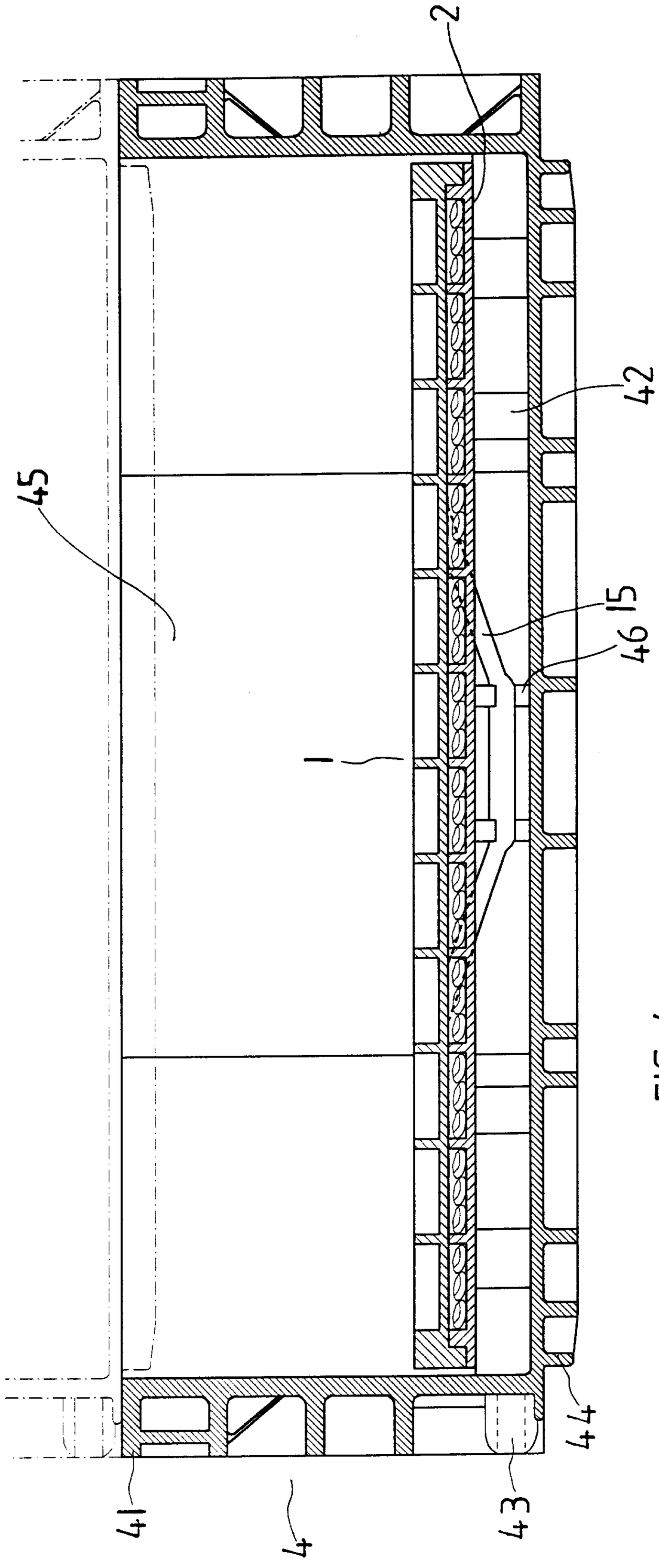


FIG. 4

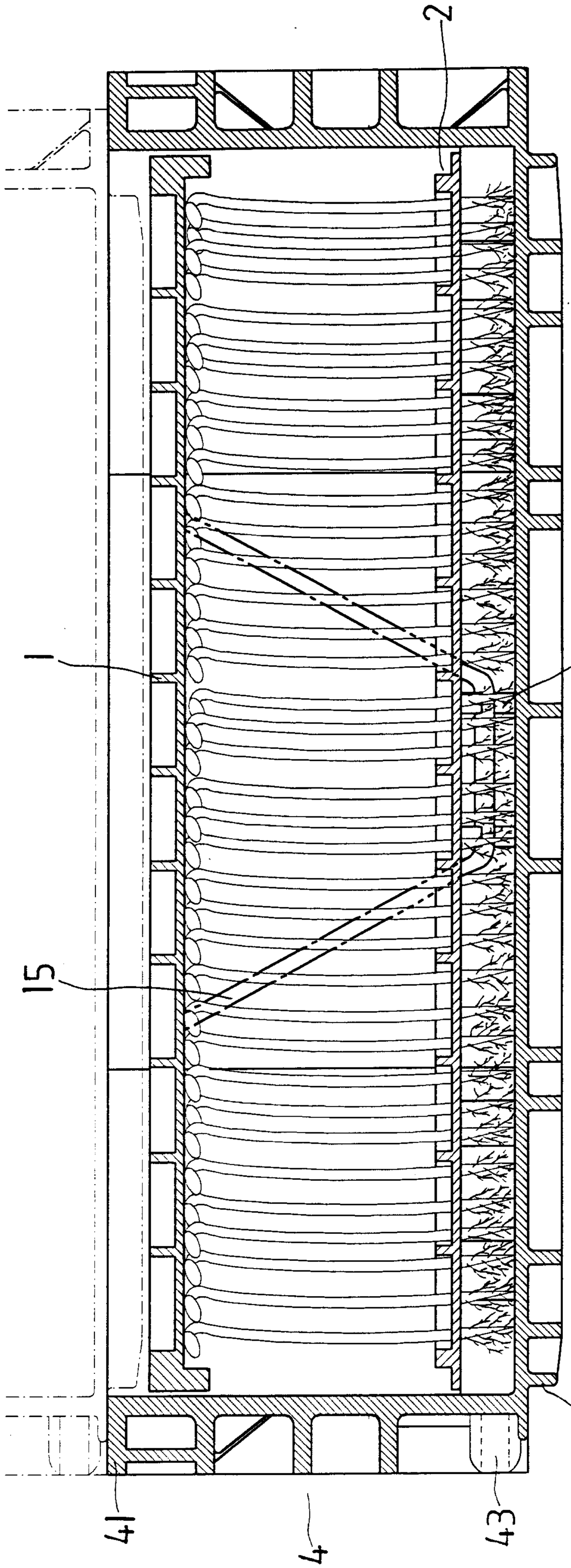


FIG. 5

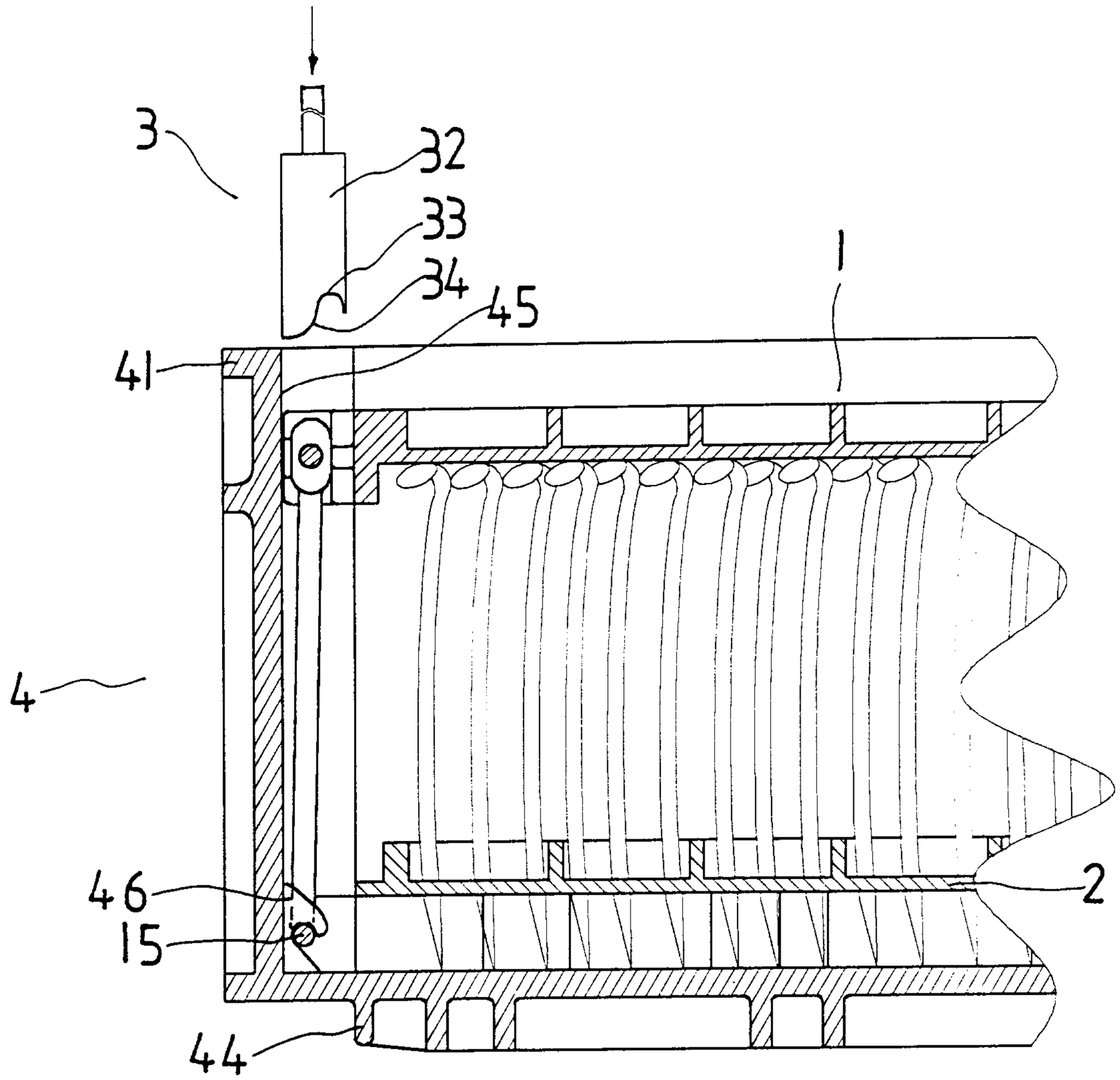


FIG. 6A

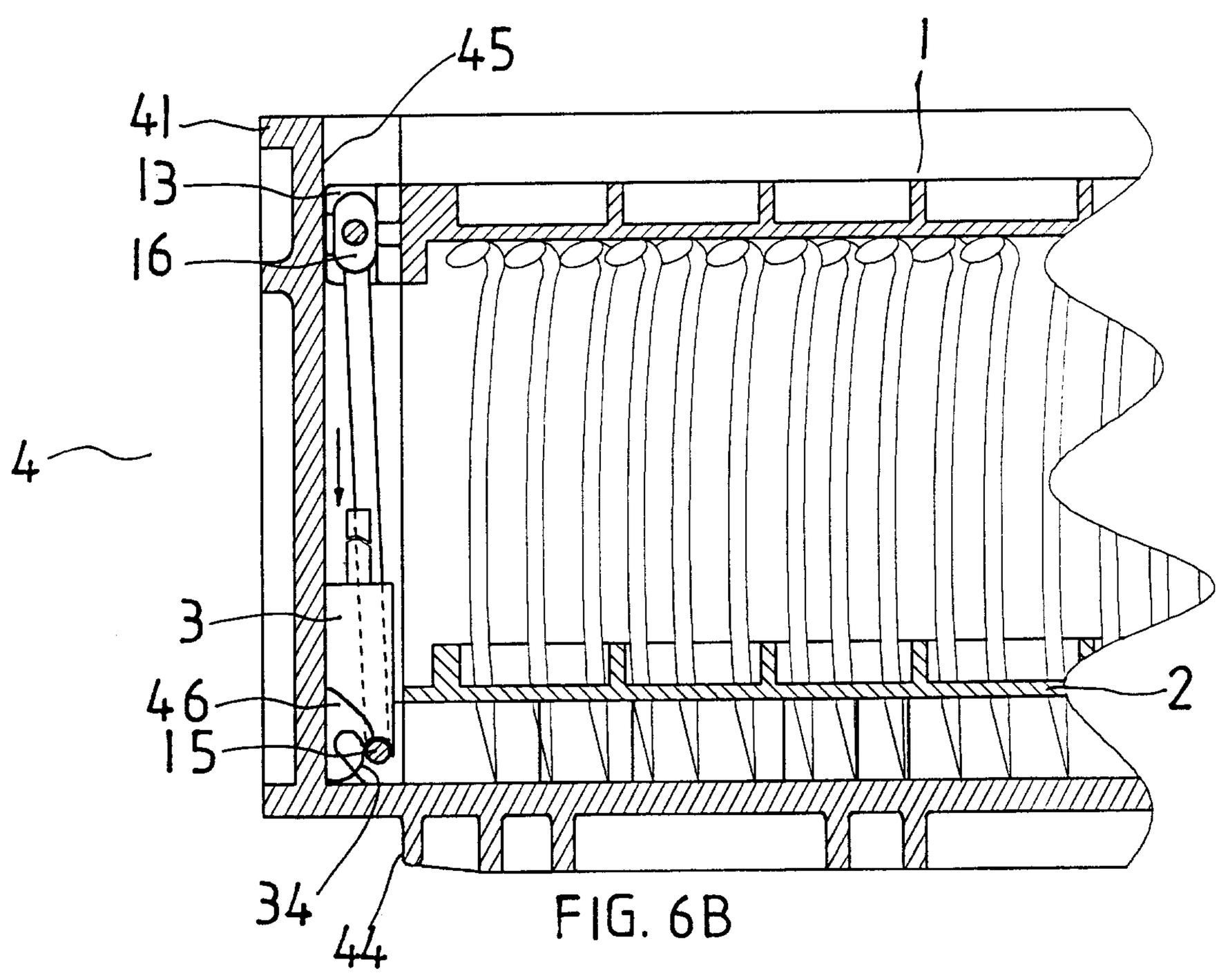


FIG. 6B

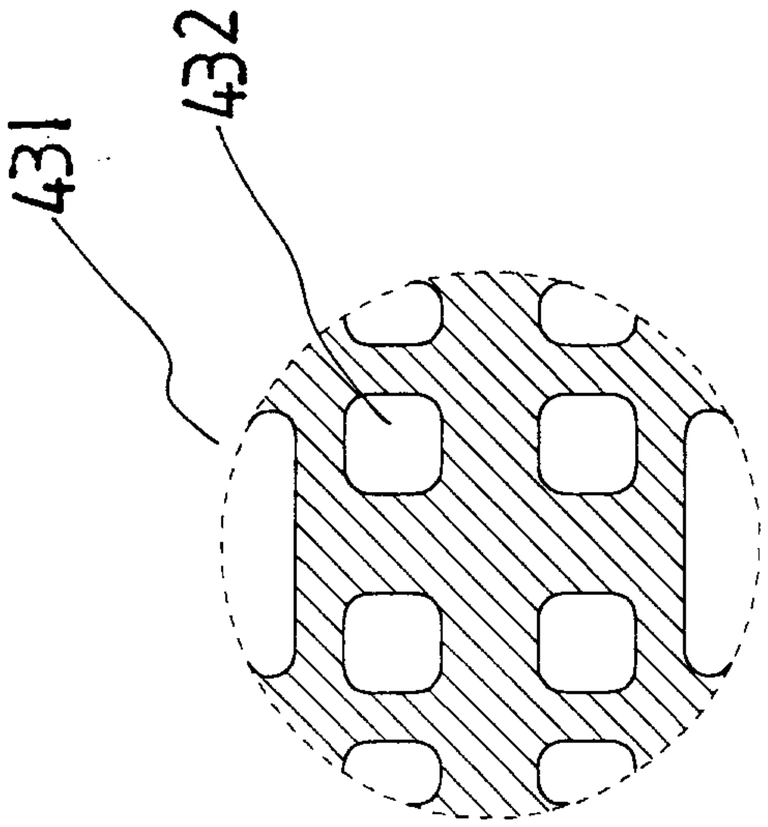


FIG.7B

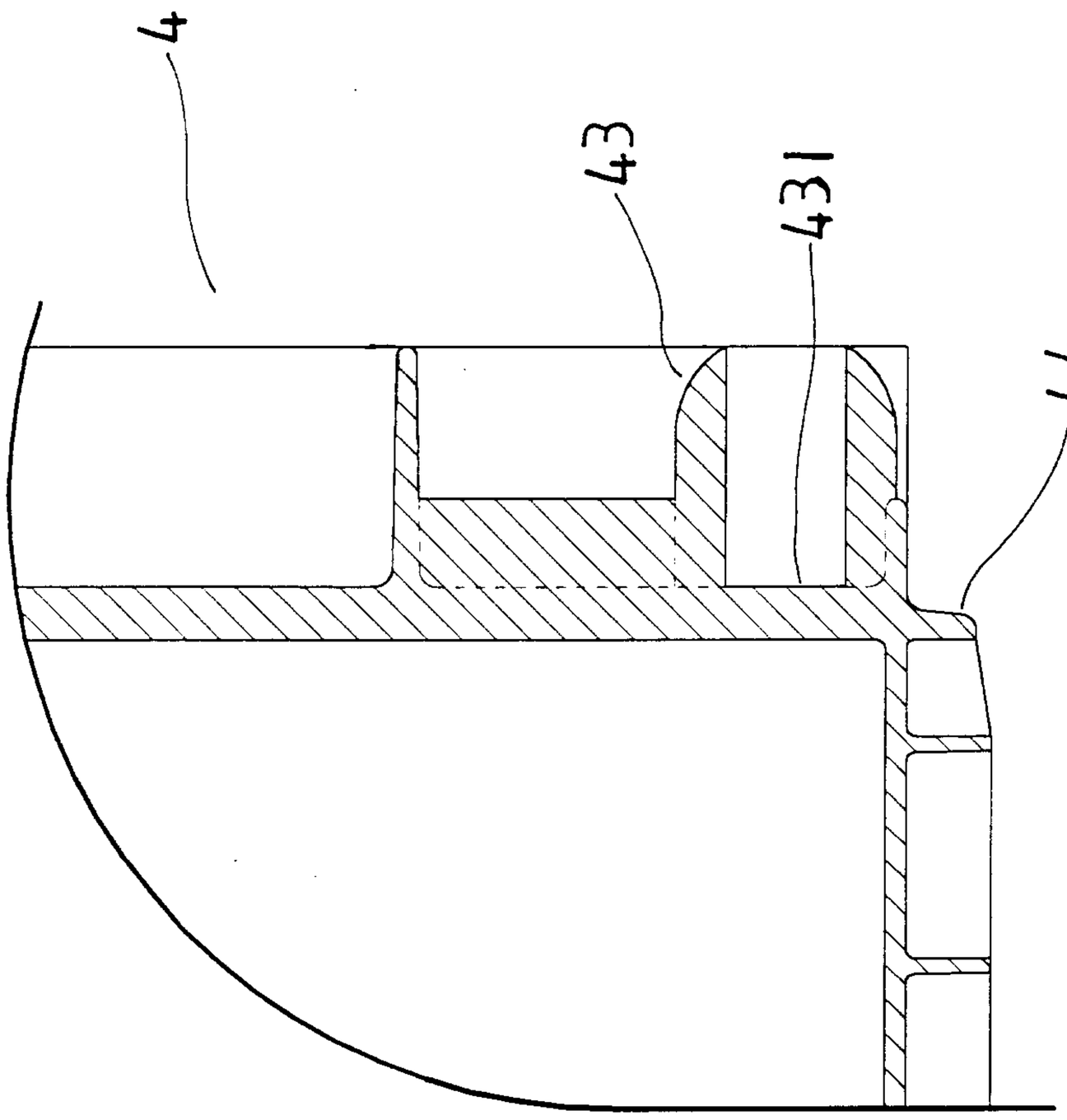


FIG.7A

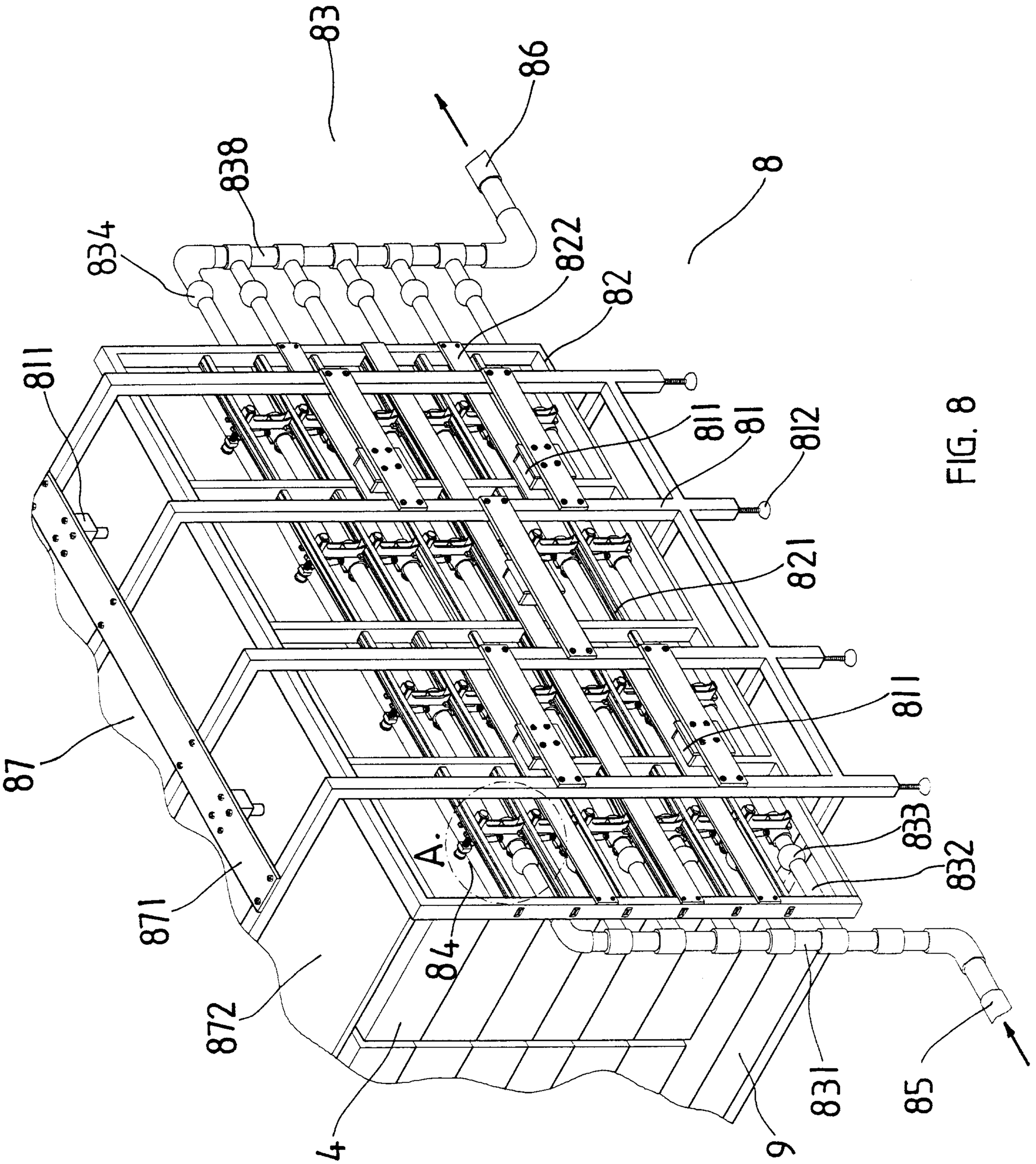

83
86
838
8
834
822
82
811
811
81
812
821
87
811
833
832
871
A
84
872
831
85
4
9

FIG. 8

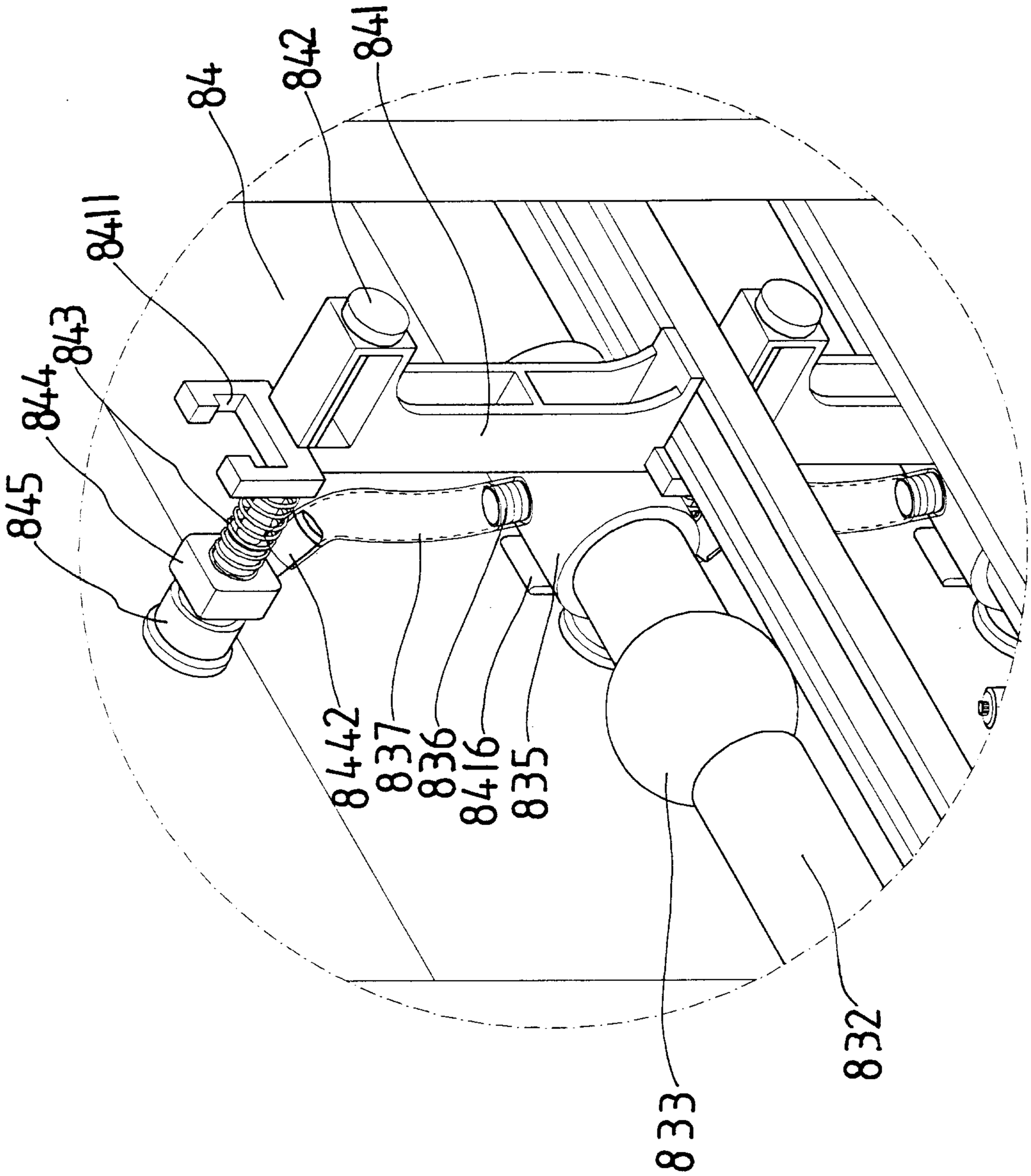


FIG. 9

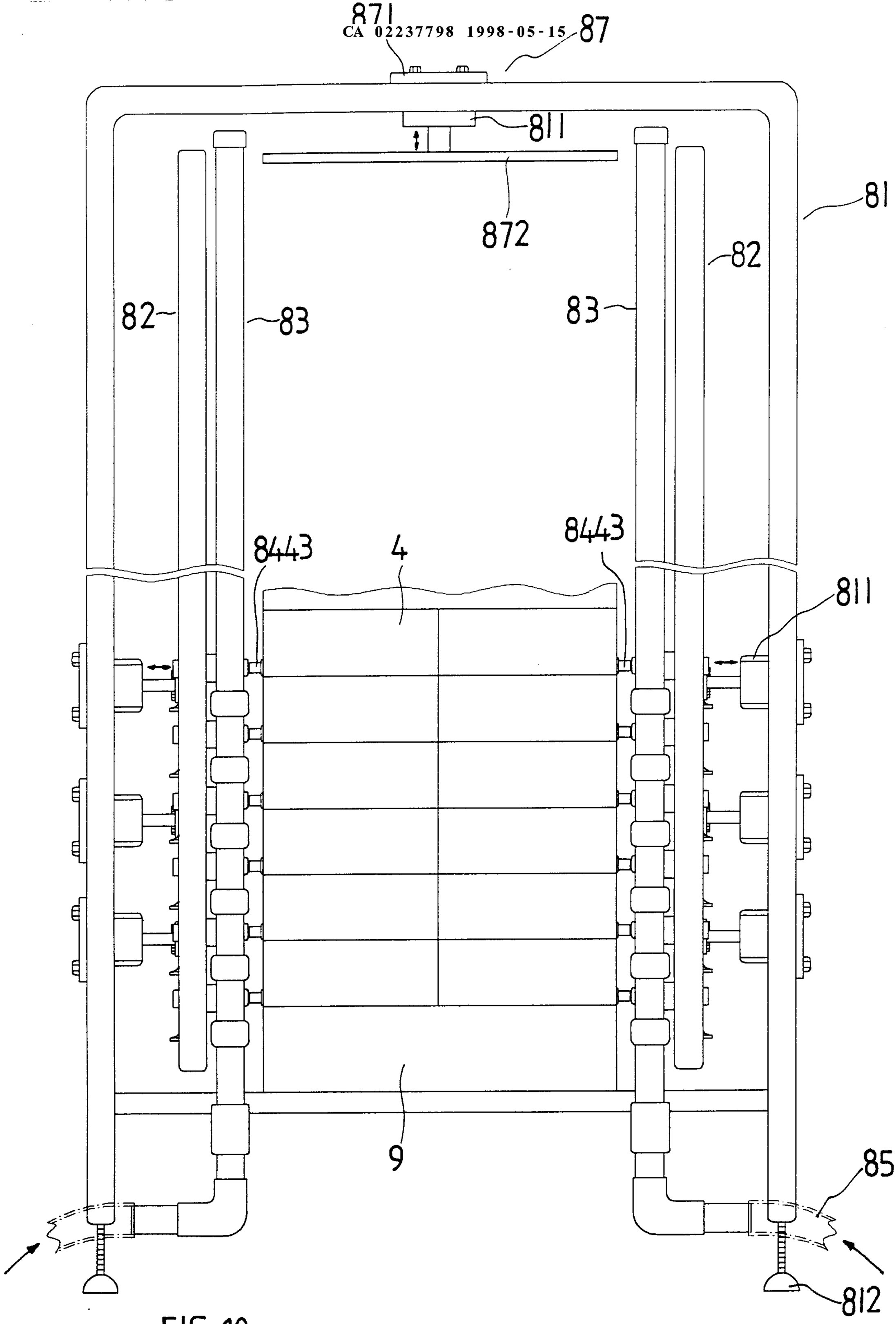


FIG. 10

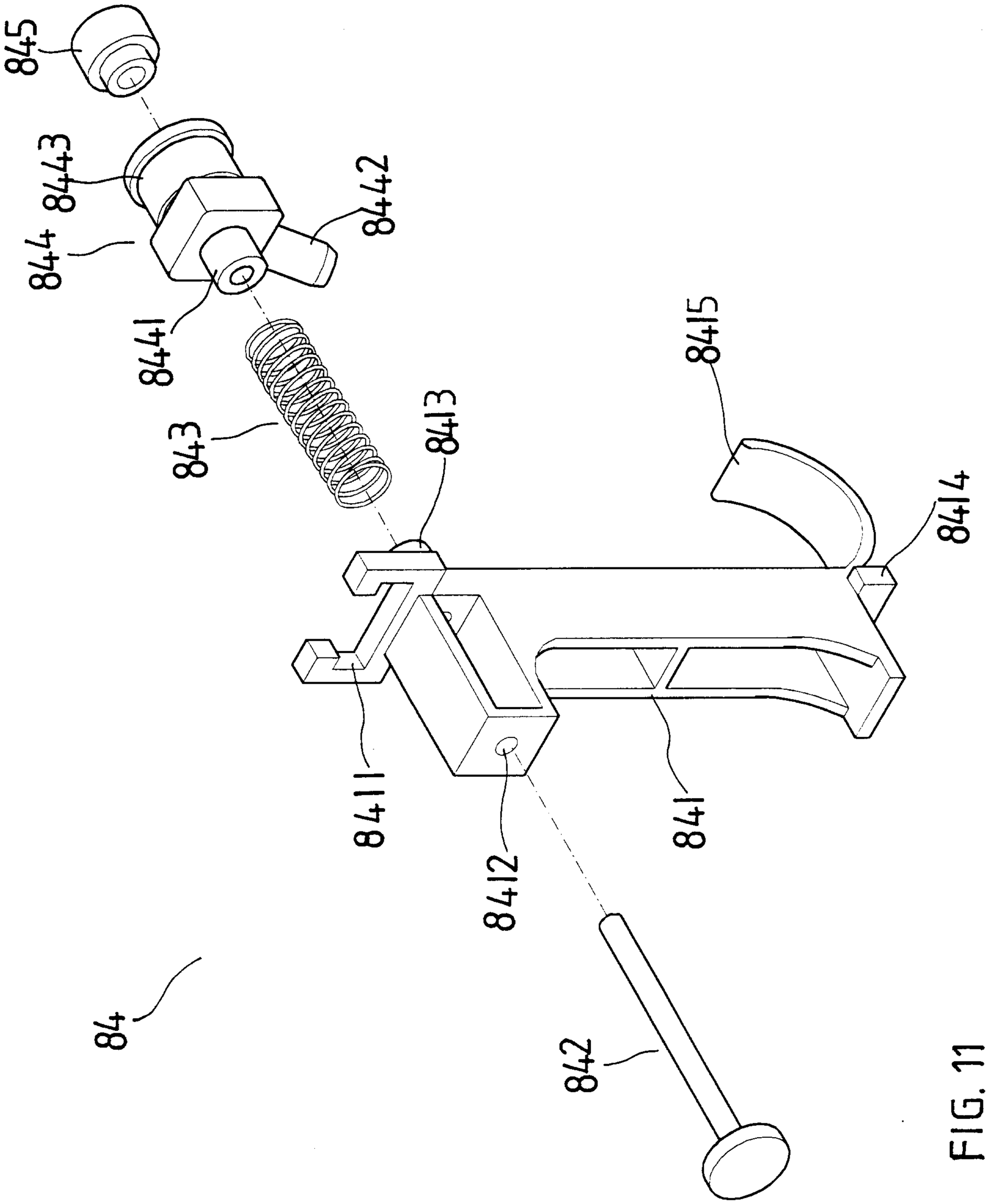


FIG. 11

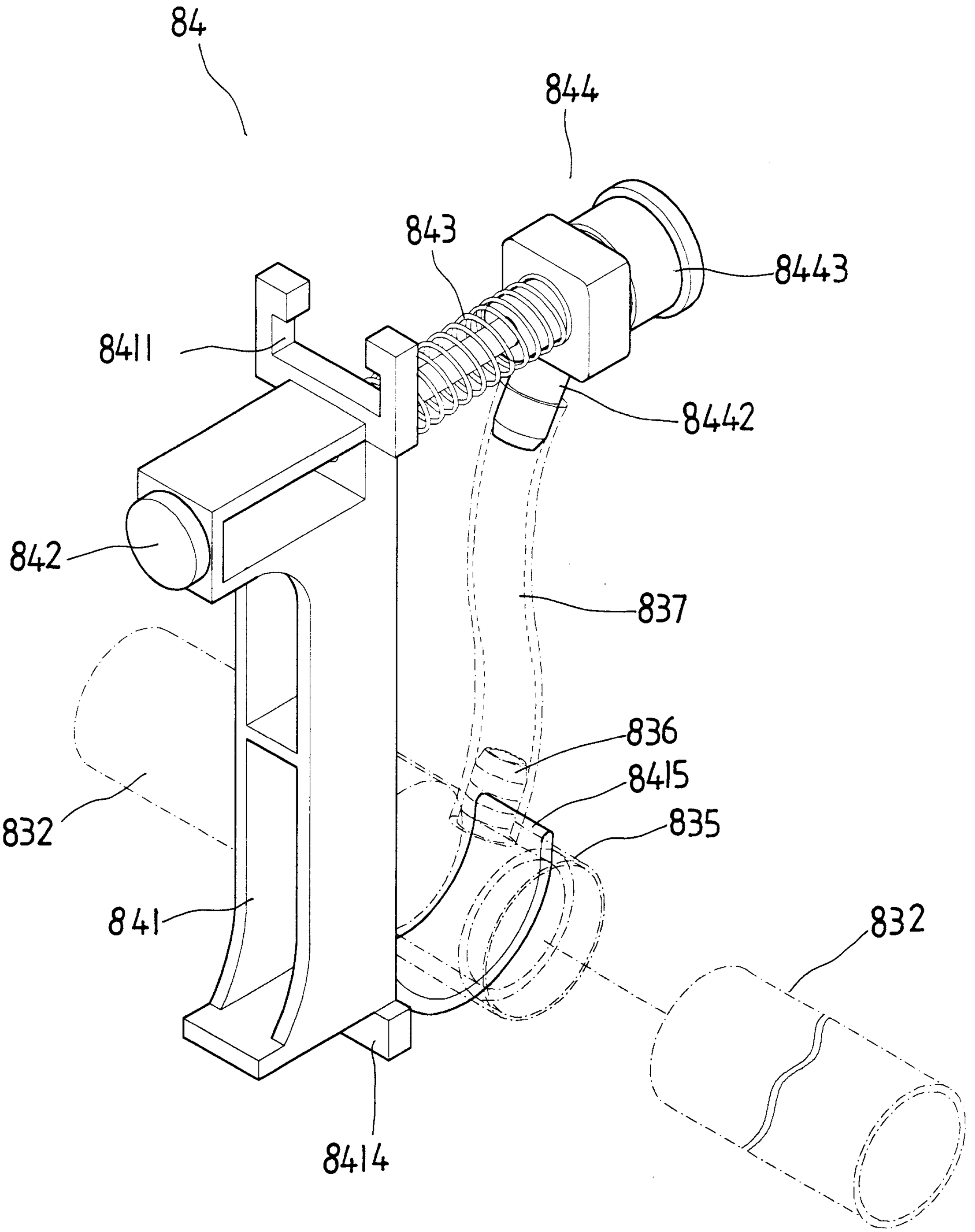


FIG. 12

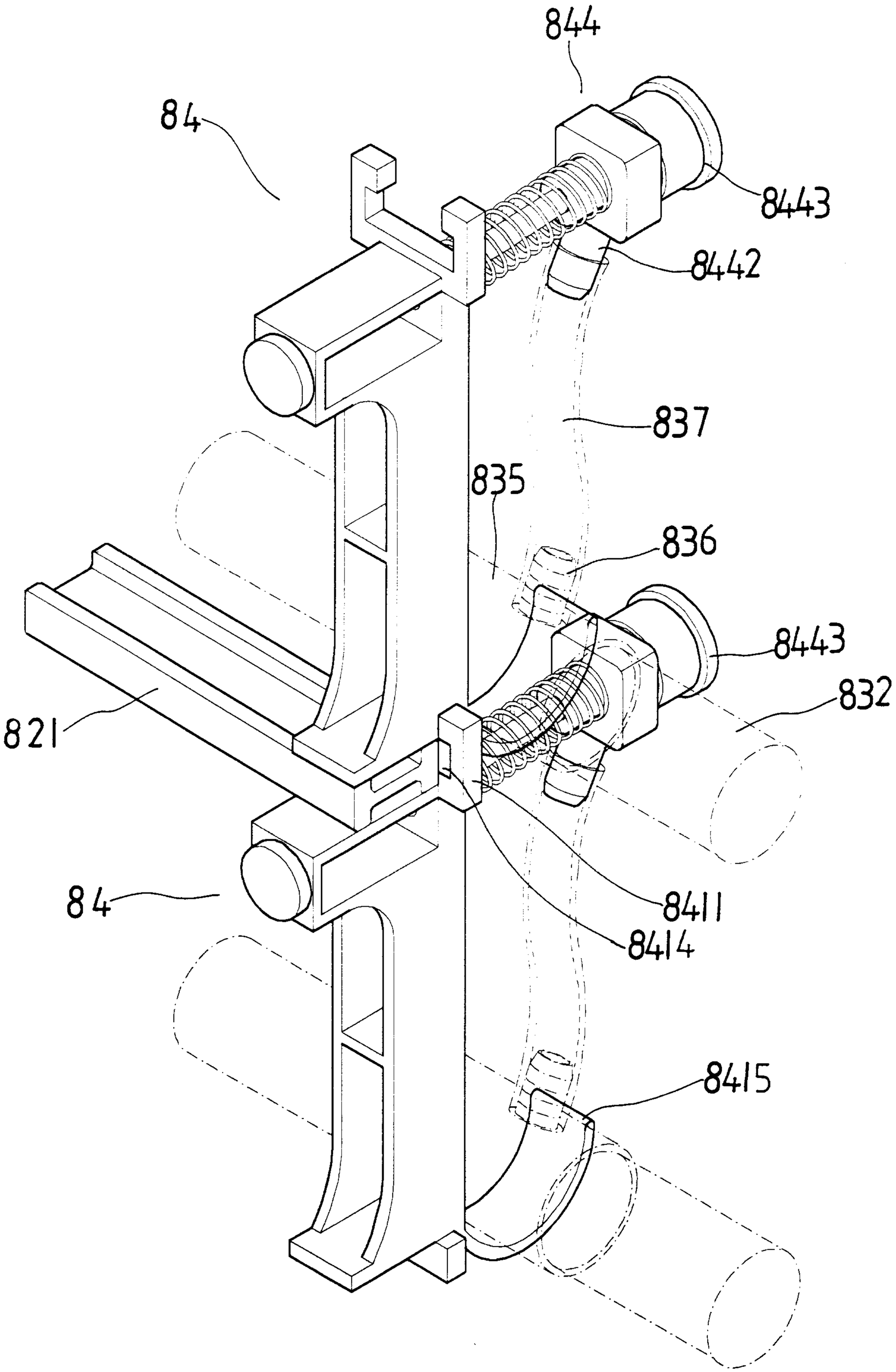


FIG. 13

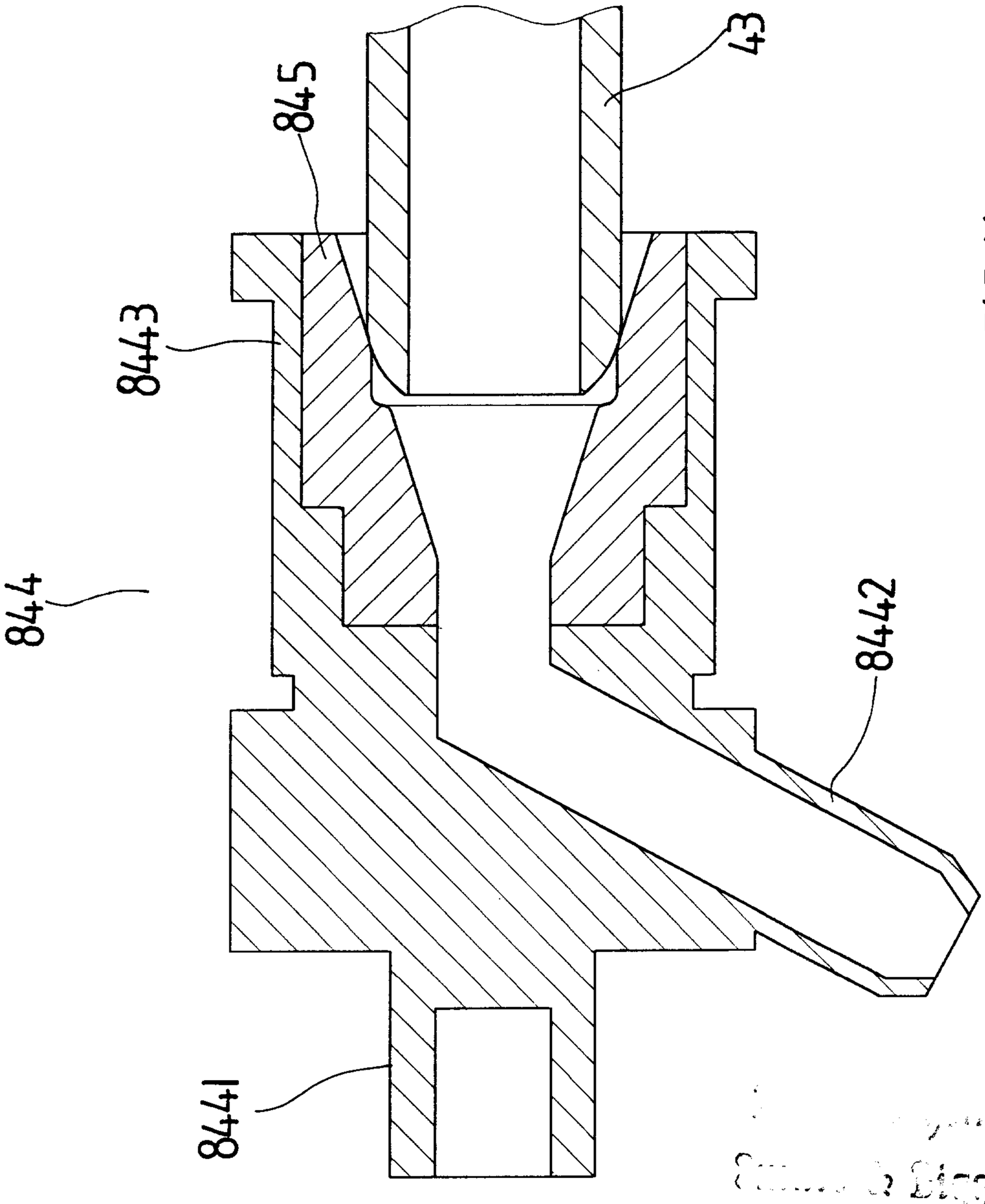
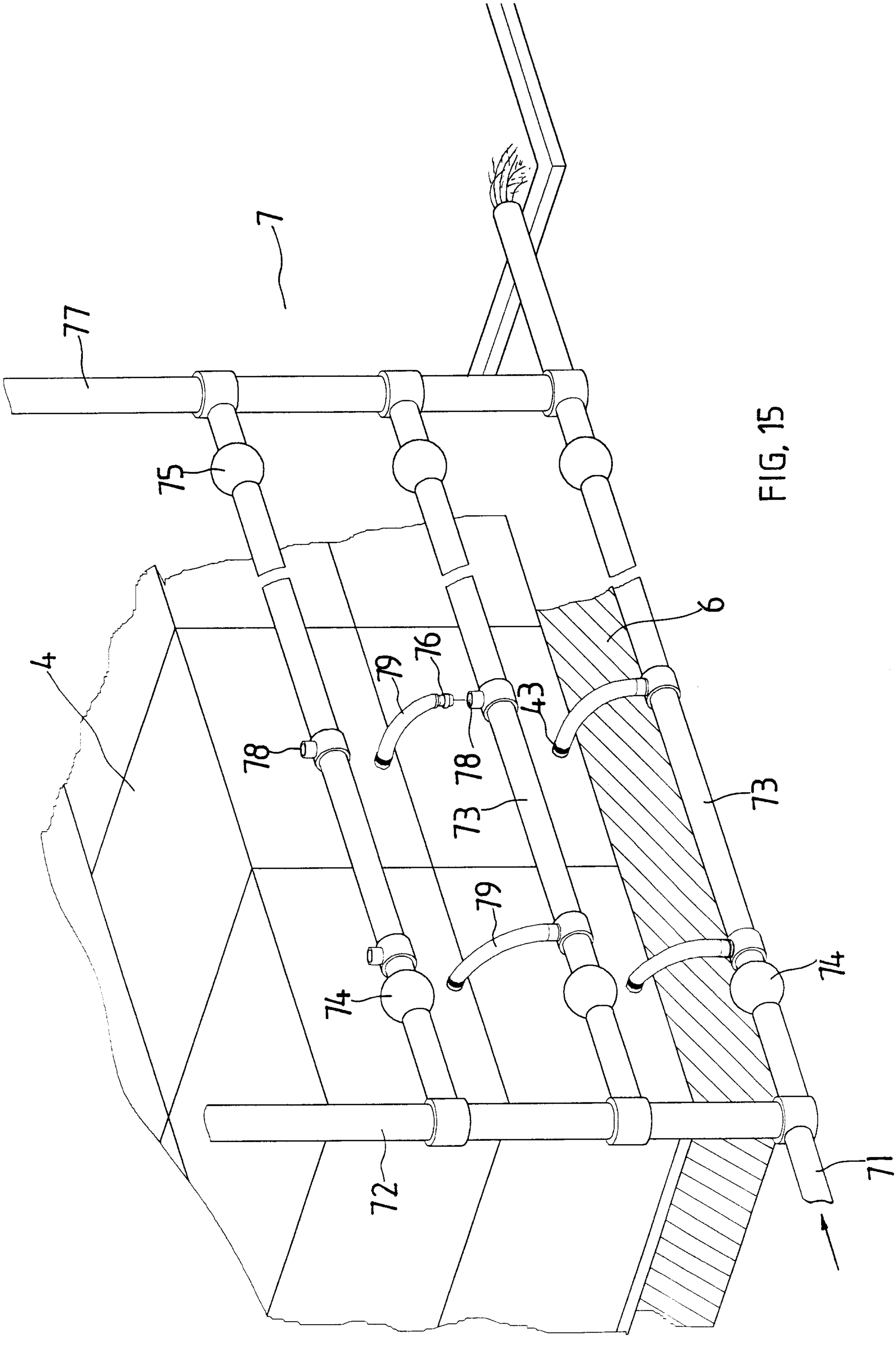


FIG.14



FIG, 15

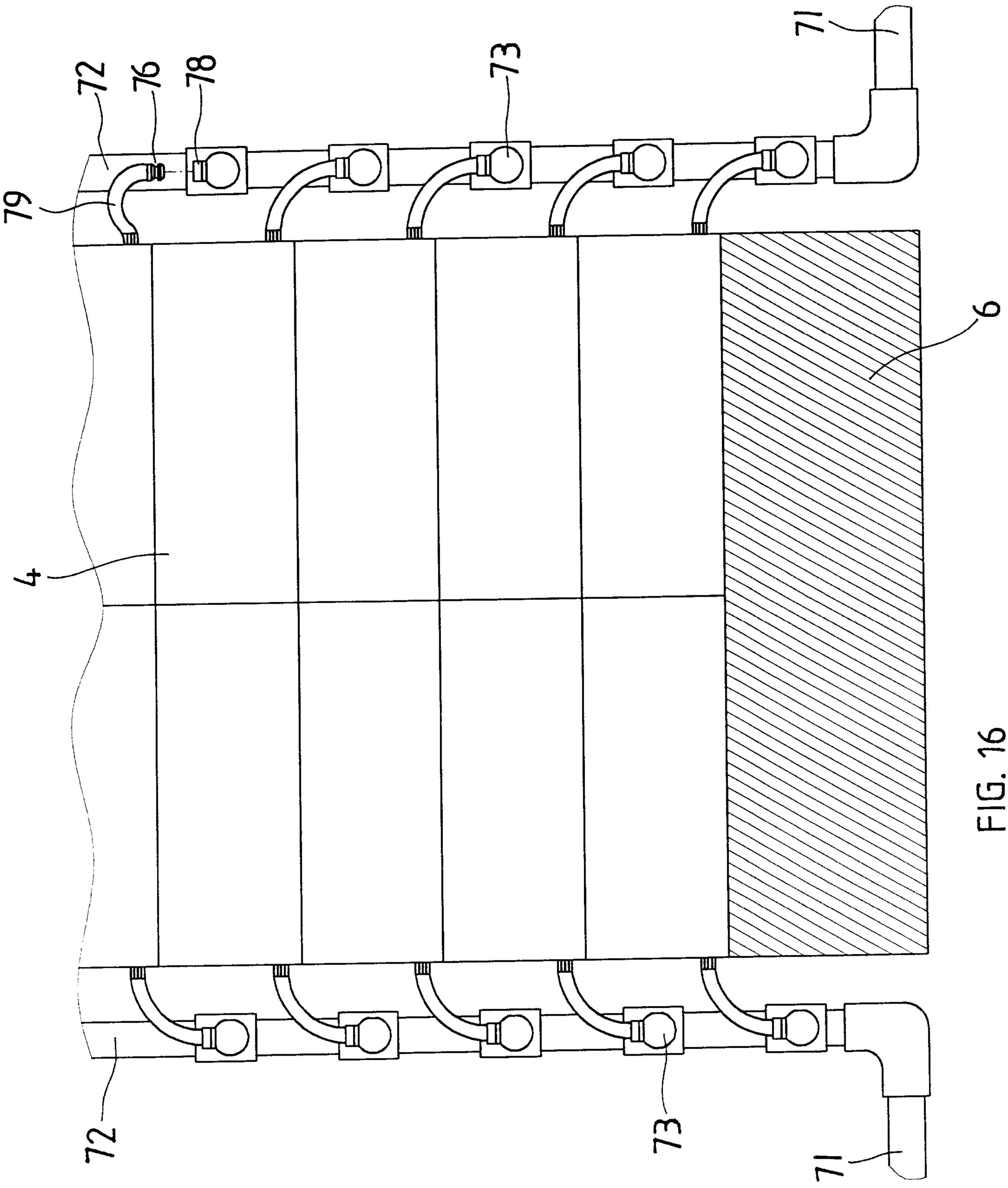
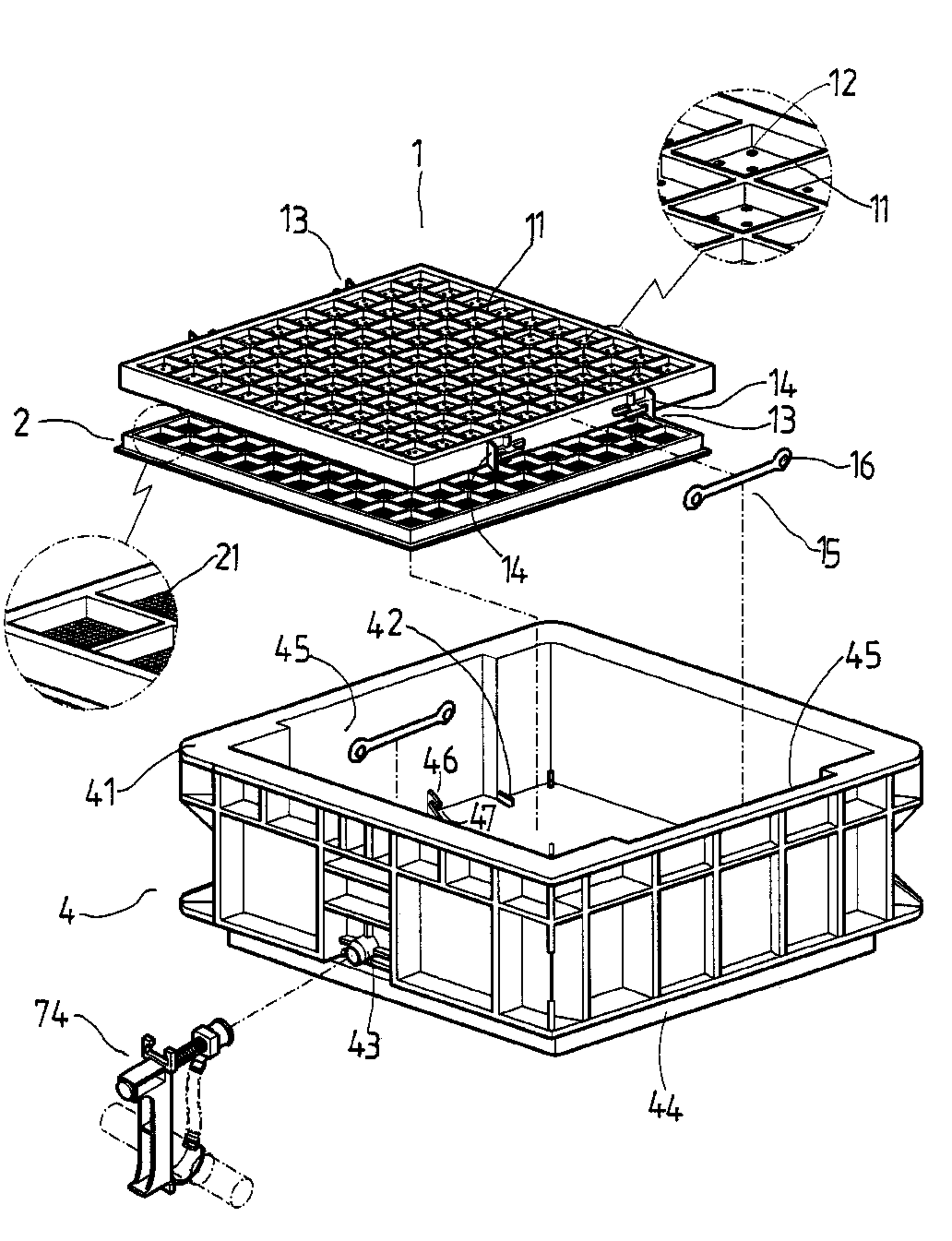


FIG. 16


1
2
4
11
12
13
14
15
16
21
41
42
43
44
45
46
47
74