

(19)



Europäisches Patentamt

European Patent Office

Office européen des brevets



(11)

EP 0 885 341 B1

(12)

EUROPEAN PATENT SPECIFICATION

(45) Date of publication and mention
of the grant of the patent:
21.06.2000 Bulletin 2000/25

(51) Int Cl.7: **E05F 15/04**, E05F 15/20,
E05C 17/14

(21) Application number: **97906162.9**

(86) International application number:
PCT/EP97/01091

(22) Date of filing: **05.03.1997**

(87) International publication number:
WO 97/33062 (12.09.1997 Gazette 1997/39)

(54) **APPARATUS FOR SMOKE EVACUATION**

RAUCHABZUGSEINRICHTUNG

DISPOSITIF D'EVACUATION DE FUMEE

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

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(30) Priority: **05.03.1996 IT VI960029**

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(43) Date of publication of application:
23.12.1998 Bulletin 1998/52

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Description

[0001] The invention concerns an apparatus for smoke evacuation to be used for the scavenging of smoke and heating from rooms of a building in case of fire.

[0002] It is known that the present safety rules prescribe that the building must be provided of a suitable apparatus for smoke and heating evacuation which in case of fire automatically starts so to convey outside, the products of combustion avoiding that these could expand inside the building.

[0003] Such apparatus for smoke evacuation consists substantially of a cover that through one or more hinges is connected to a base which defines an opening made in the building structure, that connect one or more rooms with the external environment.

[0004] The cover is mechanically connected with moving means suited to opening and closing it by rotation around said one or more hinges that connect it to the frame. In particular said moving means consist of a linkwork and of a pneumatic cylinder that is fed by an inert gas, preferably CO₂, when proper sensors detect an increase of temperature over the prefixed limit or the presence of smokes in the environment.

[0005] Said safety rules define even that the apparatus for smoke evacuation has to be provided with hooking elements that lock the cover in a firm way when it arrives at the maximum opening position, to avoid that it could be accidentally closed again.

[0006] DE-U-83.02.361 discloses an apparatus belonging to the known technique, which is provided with mechanical means that prevent the closure of the cover acting on the pneumatic cylinder. Such executive systems, even if are substantially of effective functioning, are not, by the way, approved by the present rules which at all exclude that safety means, such the one avoiding the accidental closure of the cover, act on the pneumatic cylinder responsible of the functioning of the system. Consequently such apparatus for smoke evacuation, having such devices, are not to be considered within the rules.

[0007] Other apparatus are provided with mechanical means which firmly block the cover when is at the maximum opening position, constraining it to the base or to the building structure.

[0008] Such apparatus for smoke evacuation results according to law because the possibility of an accidental closure of the cover is excluded being necessary that an operator physically intervenes to close it, as to remove the mechanical means that block it.

[0009] It is evident that, according to what it has been said, the apparatus for smoke evacuation belonging to the known technique not being opened and closed in an easy and rapid way by a remote control, cannot be used as aerator.

[0010] In order that an apparatus for smoke evacuation can be remote opened and closed, it is mandatory

that it has to be provided of suitable means that before the starting of the closure of the cover, provide of remote removal of the mechanical lock that block the cover in the maximum opening position.

[0011] The purpose of the present invention is to realize an apparatus for smoke evacuation which is provided of devices for the remote removal of the mechanical lock which avoid the accidental closure of the cover when it is at the maximum opening position.

[0012] Said purpose is obtained with the realization of an apparatus for smoke evacuation which according to the main claim comprises:

- a base which defines an opening made in the building structure, suited to connect one or more rooms with the external environment.
- a cover co-operating with said base through one or more hinges, during the opening and the closing;
- moving means suited to realize the rotation of said cover around said one or more hinges to obtain the opening and the closing of said apparatus;
- hooking means suited to block said cover in the closing position with reference to said base;
- at least one mechanical lock suited to block said cover when reaches the maximum opening position,

and it is characterized in that comprises at least one release device suited to remove said mechanical lock with which co-operates, before that said moving means, begins the closure of said cover, being provided with remote control means suited to act said at least one release device and said moving means.

[0013] According to a preferred embodiment, the cover of the apparatus consists of a metallic frame, jointed to a counter-frame secured to said base, which supports a small transparent cupola suited to allow the radiance inside the room.

[0014] The release device and the means for the movement of the cover are both remote acting by control means.

[0015] Advantageously, as the mechanical lock of the cover in the maximum opening position is remote removable, the apparatus can be used even as aerator to provide the air changes.

[0016] The mentioned purposes and advantages will be better evidenced during the description of a preferred embodiment of the invention given as an indication but not as a restriction and represented in the enclosed drawings wherein:

- fig. 1 shows the axonometric view of the apparatus for smoke evacuation according to the invention placed in opening position;
- fig. 2 shows the apparatus for smoke evacuation according to the invention having the cover placed in closing position;
- figs 3 and 4 show the apparatus according to the

invention during the opening having the cover in two different positions;

- fig. 5 shows the apparatus according to the invention with the cover in a totally opening position;
- fig. 6 shows the details of the mechanical lock system of the cover in the position just before the complete opening of the cover;
- fig. 7 shows the details of the mechanical lock system when the cover is totally opened;
- fig. 8 shows the front views of the mechanical lock of the cover in the position of the fig. 7;
- fig. 9 shows the front view of the mechanical lock of the cover in the position of fig. 8;
- fig. 10 shows the front view of the mechanic lock of the cover represented in fig. 9 in the position which assumes as soon as removed by the release device;
- fig. 11 shows the details of the feeding lines for the pressurized fluid to the pneumatic cylinders for the moving of the cover and for the release of the mechanic lock;
- fig. 12 shows the axonometric view of the details of the hooking and release means of the cover with reference to the counter-frame;
- fig. 13 shows the lateral view of the detail of the hooking and release means of the cover represented in fig. 12;
- fig. 14 shows the lateral view of the cover hooked up to the counter-frame by said hooking and release means.

[0017] As it can be observed in fig. 1 the apparatus for smoke evacuation according to the invention, indicated as a whole with 1, comprises:

- a base 2 which defines an opening 3 made in the building structure, that connect one or more rooms with the external environment;
- a counter-frame 120 secured to said base 2 in correspondence of the perimeter;
- a cover, indicated as a whole with 4, delimited by a frame 140 connected around the perimeter with said counter-frame 120 through hinges 5;
- a moving means, indicated as a whole with 6, suited to realize the rotation of said cover 4 around said hinges 5 to obtain the opening and closing of said apparatus and so of the opening 3;
- hooking means, indicated as a whole with 7, some belonging to the frame 140 of the cover and some to the counter-frame 120 suited to block said cover 4 while closing, against said counter-frame 120. Particularly, it can be observed in figs from 6 to 10 that said apparatus 1 is provided with a mechanical lock, indicated as a whole with 8, included in the moving means 6, which is used to block the cover 4 when it reaches the maximum opening position, indicated in figs 5 and 7, avoiding that can be accidentally closed, as for example because of the

wind.

[0018] Concerning the movement for the opening and closing of said cover 4, the moving means, indicated as a whole with 6, comprise an articulate joint 160 composed by a plurality of pair of rods placed side by side, two by two and a pneumatic actuator, indicated as a whole with 260, where said articulate joint and said pneumatic actuator are connected one another and are located between said counter-frame 120, said base 2 and said cover 4. Particularly as it can be observed in figs from 2 to 5, said articulate joint 160 comprises:

- a first pair of rods 360 each one having a fulcrum connection on one extremity 361 with said base 2 and another corresponding fulcrum connection on the other extremity 362 with the body 261 of said actuator 260; the end 262 of the stem 263 of said actuator 260 having, instead, a fulcrum connection with a crosspiece 42 belonging to the frame 140 of said cover 4;
- a second pair of rods 460 each one having a fulcrum connection on one extremity 461 with said crosspiece 42 of said cover 4 and another fulcrum connection on the opposite extremity 462 with the corresponding extremity 561 of a corresponding rod belonging to a third pair of rods 560, each one having a fulcrum connection on the opposite extremity 562 with said base 2 in correspondence of the same position where the extremity 361 of corresponding rod of said first pair of rods 360 has a fulcrum connection;
- a fourth pair of rods 660 each of one having a fulcrum connection on one extremity 661 with an intermediate point of the corresponding rod of said second pair of rods 460 and the opposite extremity 662 having a fulcrum connection with an intermediate point of the corresponding rod of said first pair of rods 360.

[0019] As it can be observed in fig. 2, when the cover is closed, it is locked on the base 2 through the already mentioned hooking means 7 which, as it can be observed in figs 12, 13 and 14, comprise a pair of beaks 71 connected to the extremities of a rod 72 positioned in transversal way on the cover 4, each of them hooks a reference striker 78 which belongs to the counter-frame 140. The rod 72 is supported by a pair of supports having extremity 73 and is provided of a protruding element 74 displaced in a substantially central position. Said protruding element 74, through a tie rod 75, is connected with a lever 76 having a fulcrum connection with a support 77 secured to the crosspiece 42 of the cover and also is connected with the extremity 262 of the stem 263 of the actuator 260.

[0020] Concerning the pneumatic cylinder 260, by observing fig. 1 and 8 it can be noticed that the feeding way 461 of its positive chamber is connected through a

first piping 269 to a first manifold 264 while the feeding way 561 of its negative chamber is connected through a second piping 369 to a second manifold 364. Said manifolds 264 and 364 through fast connections, respectively 268 and 368 are connected to a distribution center, not represented in the drawings, that through first distribution means, which are not represented in the drawings is fed with CO₂ under pressure.

[0021] In case of fire, special sensors displaced in the rooms intervene on said distribution means to permit the CO₂ flow in the first distributor 269 that through said first piping 264 and through the way 461, feed the positive chamber of the pneumatic cylinder 260 causing the exit of the stem 263 and so the opening of the cover 4. In fact, as soon as the stem begin moving, its end 262 through the lever 76, the tie rod 75 and the rod 72, release the beaks 71 from the reference striker 78 and begins the lifting of the cover 4 supported by the thrust of the articulate joint 160.

[0022] The thrust of the pneumatic cylinder and the anti-clockwise rotation 161 of the articulate joint 160, brings the cover to assume all the positions represented in figs 2, 3 and 4 till reaching the maximum opening position, represented in fig. 5, where the mechanical lock intervenes, as indicated as a whole with 8, which blocks the cover in the reached position.

[0023] In particular, it can be observed in figs 7, 8 and 9 that such a mechanical lock 8 comprises a rod 81 having a connection fulcrum in correspondence to the extremity 83 with the crosspiece 42 of the cover through a pin 82. The opposite extremity 84 of the rod 81, on the contrary, is free and when the cover is in the total opening position, as it can be observed in fig. 7, it goes in contrast by dropping against a stopping element 85 secured to the base 2. More precisely, said stopping element is the fork 85 to which it is secured the extremity 91 of a shock absorber 9 which opposite extremity 92 has a fulcrum connection with said first rods 360 through a pin 93.

[0024] It is to be understood that the mechanical lock 8 avoids the cover rotation 4 around the hinges 5 and so it avoids its accidental closing as foreseen by the safety rules.

[0025] In order to be able to open and close repeatedly the apparatus from a remote side with the aim to use it as common aerator, it is necessary that the mechanic lock 8 can be remote removed and the pneumatic cylinder 260 can be even fed by compressed air as well as CO₂.

[0026] For such purpose the same distribution system to which said manifolds 264 and 364 are connected through second distribution means not represented in the drawings, is fed even by a distribution system of compressed air.

[0027] The extremity 84 of the rod 81 presents an appendix 86, having a L shape and visible with more details in figs 8, 9 and 10, against which at least one locking device 150 co-operates and which comprises an actu-

ator 100, secured to the base 2, provided of a stem 101 which co-operates with said appendix 86. More precisely said actuator 100, as it can be observed, is fed by a piping 102 derived by a manifold 364 which feeds the actuator 260.

[0028] When an operator wants to open the cover of the apparatus, he acts on a control device, for example a switch, which is turned off. In such a way he acts said second distribution means which feed with compressed air the feeding circuit of the pneumatic cylinder 260 allowing the exit of the stem 263 which causes the cover opening 4.

[0029] Therefore, the operator carries out, through a manual remote control and using pressurized air, the same opening control of the cover which in the case of fire is performed automatically feeding the pneumatic cylinder 260 with CO₂. For the closure of the cover 4, the operator turn on the switch which is the control device and in this way the first manifold 264 is in discharge position and in the same time the second manifold 364 is fed with pressurized air. The compressed air which flows in the second manifold 364, feeds first the actuator 100 because it is disposed in a position very near to the manifold 364. Furthermore, as said actuator 100 presents a very lower volume than the actuator 260 which moves the cover, the compressed air, before feeding the negative chamber of the pneumatic cylinder 260, instantaneously fills the cylinder 100 and this causes the coming out of the stem 101. The last one contrasts against the appendix 86 of the lever 81 and, as it can be observed in fig 10, turn it round a pin 82 so to release it from the contrasting mean 85 before the pneumatic cylinder 260 begins the closing action of the cover 4. Therefore, the compressed air feeds the pneumatic cylinder 260 and begins the driving action on the stem 263 causing the clockwise rotation 162 of the cover 4, supported by the action of the articulate joint 160, till to a total closing of the cover which returns in the position, visible in fig. 2, with the beaks 71 hooking the reference striker 78. During the closing, the rotation of the cover is slowed down by the shock absorber 9.

[0030] Considering what has been said, it is easy to understand that the apparatus of the invention reaches the prefixed purpose.

[0031] It has been examined in particular that the mechanical lock which blocks the cover in the maximum opening position can be removed by a manual remote control under the action of an operator. With a similar remote control, the same cover can be even opened again and such operations can be repeatedly performed.

[0032] Therefore such manual operations of opening and closing are supplementary to the peculiar capacities of the apparatus, as to say, to open automatically the cover in case of fire and so the apparatus according to the invention can be also used as aerator in addition to the use as an apparatus for smoke and heat evacuation in case of fire. Advantageously, the possibility of using

the apparatus even as an aerator and so opening and closing it frequently, allows to discover irregular functioning. In this way, it is possible to avoid that hidden breaking, not revealable unless the cover is opened and closed, prevent the opening of the cover when it should request the automatic opening in case of fire.

[0033] Advantageously a transparent cupola 45 which allows the entrance of the light in the room is applied to the frame 140 of the cover 4. It can be observed that the articulate joint 160, differently from the articulate joints present in the known apparatus which substantially consist of an articulate triangle, consists of a plurality of rods connected among them which are co-opering among the cover, the frame and the base to which they are connected. This enables to realize on the cover more powerful actions than those of known apparatus having equal dimensions.

[0034] It is evident that during the manufacturing the apparatus according to the invention can be realized with whichever shape and dimension and can be even equipped with transparent cupola having whichever form.

[0035] A further embodiment could consist of the cover being provided with a flat and not transparent closing surface.

[0036] In different embodiments the apparatus for smoke evacuation can present more than one actuator which perform the opening and closing of the cover or it can be provided with moving means of the cover which even realizing the same constructive geometry consist of a different number of rods.

[0037] Furthermore, in different embodiments, different hinges and hooking means which block the cover in a closing position can be variously performed.

[0038] Concerning the pneumatic circuit and so the piping, the unions and in general all the connections of the pneumatic cylinder to the CO₂ system and to the compressed air system, belonging to the known technique, will be performed according to ideas and shapes different from the ones described.

[0039] Even the mechanical lock which blocks the cover in the maximum opening position can be realized in a different way from the one described.

Claims

1. An apparatus for smoke evacuation (1) comprising:

- a base (2) which defines an opening (3) made in the structure of a building, suited to connect the interior of one or more rooms with the external environment;
- a cover (4) co-operating during the opening and closing with said base (2) through one or more hinges (5);
- moving means (6) suited to realize the rotation of said cover (4) around said one or more hing-

es (5) to obtain the opening and the closing of said apparatus;

- hooking means (7) suited to block said cover (4) in the closing position with reference to said base (2);
- at least one mechanical lock (8) suited to block said cover (4) when the latter reaches the maximum opening position,

said apparatus comprising at least one release device (150), suited to move said mechanical lock (8) with which co-operates, before that said moving means (6) begin the closing of said cover (4),

characterized in that said at least one mechanical lock (8) is interposed between the cover (4) and said base (2) with which it cooperates, control means being provided suited to act said at least one release device (150) and said moving means (6).

2. An apparatus for smoke evacuation (1) according to claim 1) **characterized in that** said at least one mechanic lock (8) comprises a rod (81) having a fulcrum connection on an extremity (83) by a pin (82) with said cover (4) and the opposite extremity (84) being free and suited to contrast against stopping means (85) secured to said base (2) when said cover (4) is completely opened, the same free extremity (84) of said rod (81) being provided with an appendix (86) with which said at least one release device (150) co-operates, suited to rotate said rod (81) around said pin (82) to release it from the interference against said stopping means (85) before that said moving means (6) realize the rotation of said cover (4) to obtain its closure with reference to said base (2).

3. An apparatus for smoke evacuation (1) according to claim 1) **characterized in that** said release device (150) consists of a pneumatic cylinder (100) secured to said base (2) having a stem (101) which is in contrast with said appendix (86) of said rod (81) of said mechanical lock (8).

4. An apparatus for smoke evacuation (1) according to claim 1) **characterized in that** is provided by locking means of the rotation of the cover (4) during the closing, consisting of at least one telescopic shock absorber (9) with an extremity (92) connected by a fulcrum to said moving means (6) of said cover (4) and the opposite extremity (91) connected by a fulcrum with said base (2).

5. An apparatus for smoke evacuation (1) according to claim 1) **characterized in that** said moving means (6) comprise an articulate joint (160) and a pneumatic actuator (260), mechanically connected one another and interposed between said base (2) and said cover (4), said articulate joint (160) com-

prising a plurality of pair of rods placed two by two, side by side and subdivided as follows:

- a first pair of rods (360) each one having a fulcrum connection on one extremity (361) with said base (2) and in correspondence on the opposite extremity (362) with the body (261) of said actuator (260) which the extremity (262) of the stem (263) of the last one is secured to said cover (4);
 - a second pair of rods (460) each one having a fulcrum connection on one extremity (461) with said cover (4) nearby said hinges (5) and a fulcrum connection on the opposite extremity (462) with a corresponding extremity (561) of a corresponding rod belonging to a third pair of rods (560), each one having a fulcrum connection on the opposite extremity (562) with said base (2) on the same point in which the extremity (361) of the corresponding rod of said first pair of rods (360) has a fulcrum connection;
 - a fourth pair of rods (660) each one having a fulcrum connection on one extremity (661) with an intermediate point of the corresponding rod of said second pair of rods (460) and a fulcrum connection on the opposite extremity (662) with an intermediate point of said first pair of rods (360).
6. An apparatus for smoke evacuation (1) according to claim 1) **characterized in that** said hooking means (7) comprise:
- a rod (72) positioned in transversal way on the cover (4) and supported on the extremities by a pair of supports (73) in which is turning connected;
 - a pair of beaks (71) each one connected in correspondence of one extremity of said rod (72);
 - a protruding element (74) secured to said rod (72) in correspondence of own middle part, said protruding element (74) being connected through a tie rod (75) with a lever (76) having a fulcrum connection with a support (77) secured to said cover (4) and connected with the extremity (262) of the stem (263) of said actuator (260);
 - a pair of reference striker (78) belonging to said base (2), each one is suited to receive one of said beaks (7) when said cover (4) is positioned in closing way with reference to said base (2).
7. An apparatus for smoke evacuation (1) according to claim 1) **characterized in that** said cover (4) cooperates while closing with said base (2), said cover and said base being reciprocally and turning connected through one or more hinges each one belonging to said cover (4), being secured to a frame

(140) which is, in turns, secured to the cover (4) itself, and to the base (2), being secured to the counter-frame (120) secured, in turns, to the base itself, said frame (140) supporting in the middle position a crosspiece (42) to which are mechanically connected mechanical elements (262; 461) belonging to said moving means (6);

8. An apparatus for smoke evacuation (1) according to claim 1) **characterized in that** said moving means (6) and said at least one release device (150) consist of at least one pneumatic cylinder (260; 100) connected to a circuit which is fed by CO₂, in automatic way to obtain the opening of the cover (4) in case of fire and is fed alternatively by compressed air, hand-operating, when an operator intervenes to open and close the cover (4) to obtain the aeration of the room.

Patentansprüche

1. Ein Apparat zur Rauchabfuhr (1), folgendes umfassend:

- eine Basis (2), die eine Öffnung (3) in der Struktur eines Gebäudes abgrenzt, welche das Innere eines oder mehrerer Räume mit der externen Umgebung verbindet;
- einen Deckel (4), der während der Öffnung und Schließung über ein oder mehrere Scharniere (5) mit der Basis (2) zusammenwirkt;
- Bewegungsmittel (6), das die Drehung des Deckels (4) um besagte(s), eine oder mehrere Scharnier(e) (5) bewirkt, um die Öffnung und Schließung des Apparats zu erzielen;
- Einhakmittel (7) zur Blockierung des Deckels (4) in der Schließposition bezüglich der Basis (2);
- wenigstens eine mechanische Blockierung (8), die den Deckel (4) blockiert, wenn dieser die Position maximaler Öffnung erreicht;

wobei dieser Apparat wenigstens eine Lösevorrichtung (150) aufweist, welche die mechanische Blockierung, mit der sie zusammenwirkt, bewegt, bevor das Bewegungsmittel (6) die Schließung des Deckels (4) beginnt;

dadurch gekennzeichnet, daß wenigstens eine mechanische Blockierung (8) zwischen dem Deckel (4) und der Basis (2), mit der sie zusammenwirkt, positioniert ist, und daß Steuermittel vorhanden sind, die geeignet sind, auf die wenigstens eine Lösevorrichtung (150) und das Bewegungsmittel (6) zu wirken.

2. Ein Apparat zur Rauchabfuhr (1) gemäß Patentanspruch 1), **dadurch gekennzeichnet, daß** wenig-

stens eine mechanische Blockierung (8) einen Stab (81) mit einer durch einen Bolzen (82) gebildeten Gelenkverbindung (83) an einem Ende umfaßt, wobei der Deckel (4) und das entgegengesetzte Ende (84) frei sind und gegen ein Anschlagmittel (85) an-
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 schlagen, das an der Basis (2) befestigt ist, wenn der Deckel (4) vollständig geöffnet ist, wobei dieses freie Ende (84) des Stabs (81) mit einem Ansatz (86) versehen ist, mit dem wenigstens eine Löse-
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 vorrichtung (150) zusammenwirkt, um diesen Stab (81) um den Bolzen (82) zu drehen, um es aus der Interferenz gegen das Anschlagmittel (85) zu lösen, bevor das Bewegungsmittel (6) die Drehung des Deckels (4) bewirkt, um seine Schließung bezüglich der Basis (2) zu erzielen.

3. Ein Apparat zur Rauchabfuhr (1) gemäß Patentanspruch 1), **dadurch gekennzeichnet, daß** die Lösevorrichtung (150) aus einem pneumatischen Zylinder (100) besteht, der an der Basis (2) befestigt ist und einen Schaft (101) aufweist, der gegen den Ansatz (86) des Stabs (81) der mechanischen Blockierung (8) wirkt.
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4. Ein Apparat zur Rauchabfuhr (1) gemäß Patentanspruch 1), **dadurch gekennzeichnet, daß** er mit Mitteln zur Blockierung der Drehung des Deckels (4) während der Schließung versehen ist, die aus wenigstens einem ausziehbaren Stoßdämpfer (9) bestehen, der an einem Ende (92) über ein Gelenk mit dem Bewegungsmittel (6) des Deckels (4) und am entgegengesetzten Ende ((91) über ein Gelenk mit der Basis verbunden ist.
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5. Ein Apparat zur Rauchabfuhr (1) gemäß Patentanspruch 1), **dadurch gekennzeichnet, daß** das Bewegungsmittel (6) eine Gelenkverbindung (160) und einen pneumatischen Antrieb (260) umfaßt, die mechanisch miteinander verbunden und zwischen der Basis (2) und dem Deckel (4) positioniert sind, wobei diese Gelenkverbindung (160) eine Vielzahl von zu zweit paarweise nebeneinander platzierten Stäben umfaßt, die folgendermaßen angeordnet sind:
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 - ein erstes Stabpaar (360), wobei jeder Stab an einem Ende (361) eine Gelenkverbindung mit der Basis (2) aufweist und am entgegengesetzten Ende (362) mit dem Körper (261) des Antriebs (260), wobei dieser Antrieb mit dem Ende (262) des Schafts (263) am Deckel (4) befestigt ist;
 - ein zweites Stabpaar (460), wobei jeder Stab an einem Ende (461) eine Gelenkverbindung mit dem Deckel (4) in der Nähe der Gelenke (5) aufweist sowie eine Gelenkverbindung am anderen Ende (462) mit einem entsprechenden Ende (561) eines entsprechenden Stabs, der

zu einem dritten Stabpaar (560) gehört, wobei jeder Stab eine Gelenkverbindung am entgegengesetzten Ende (562) mit der Basis (2) aufweist, und zwar am selben Punkt, an dem das Ende (361) des entsprechenden Stabs des ersten Stabpaars (360) eine Gelenkverbindung hat;

- ein viertes Stabpaar (660), wobei jeder Stab an einem Ende (661) eine Gelenkverbindung mit einem Zwischenpunkt des entsprechenden Stabs des zweiten Stabpaars (460) und am entgegengesetzten Ende (662) eine Gelenkverbindung mit einem Zwischenpunkt des ersten Stabpaars (360) aufweist.
6. Ein Apparat zur Rauchabfuhr (1) gemäß Patentanspruch 1), **dadurch gekennzeichnet, daß** das Einhakmittel (7) folgendes umfaßt:
 - einen Stab (72), der quer auf dem Deckel (4) positioniert und an den Enden durch ein Paar Halterungen (73) gehalten ist, in denen er drehend verbunden ist;
 - ein Paar Haken (71), von denen jeder mit einem Ende des Stabs (72) verbunden ist;
 - ein herausragendes Element (74), das am mittleren Teil des Stabs (72) befestigt ist, wobei dieses herausragende Element (74) über eine Zugstange (75) mit einem Hebel (76) verbunden ist, der eine Gelenkverbindung mit einer Halterung (77) aufweist, welcher am Deckel (4) befestigt ist und mit dem Ende (262) des Schafts (263) des Antriebs (260) verbunden ist;
 - ein Paar Gegenhaken (78), die zur Basis (2) gehören, wobei jeder geeignet ist, einen der Haken (7) aufzunehmen, wenn der Deckel (4) schließend bezüglich der Basis (2) positioniert wird.
 7. Ein Apparat zur Rauchabfuhr (1) gemäß Patentanspruch 1), **dadurch gekennzeichnet, daß** der Deckel (4) während des Schließens mit der Basis (2) zusammenwirkt, wobei dieser Deckel und dieses Basis wechselseitig und drehend über ein oder mehrere Gelenke, die jeweils zum Deckel (4) gehören, verbunden sind, und befestigt sind an einem Rahmen (140), der seinerseits am Deckel (4) selbst befestigt ist sowie an der Basis (2), wobei diese am Gegenrahmen (120) befestigt ist, der seinerseits an der Basis selbst befestigt ist, wobei dieser Rahmen (140) in der mittleren Position ein Kreuzstück (42) trägt, an dem mechanische Elemente (262, 461), die zum Bewegungsmittel (6) gehören, mechanisch befestigt sind.
 8. Ein Apparat zur Rauchabfuhr (1) gemäß Patentanspruch 1), **dadurch gekennzeichnet, daß** das Bewegungsmittel (6) und die wenigstens eine Löse-

vorrichtung (150) aus wenigstens einem pneumatischen Zylinder (260, 100) bestehen, der an einen automatisch mit CO₂ gespeisten Kreislauf angeschlossen ist, um im Brandfall die Öffnung des Deckels (4) zu bewirken, bzw. alternativ von Hand mit Druckluft versorgt wird, wenn ein Bediener zur Belüftung des Raums den Deckel (4) öffnet und schließt.

Revendications

1. Un appareil pour l'évacuation de la fumée (1) comprenant :

- une base (2) qui définit une ouverture (3) réalisée sur la structure d'un bâtiment, indiquée pour relier l'intérieur d'une ou plusieurs chambres avec l'environnement à l'extérieur ;
- un couvercle (4) interagissant durant la phase d'ouverture et de fermeture avec ladite base (2) au moyen d'une ou plusieurs charnières (5) ;
- un moyen de mouvement (6) indiqué pour créer la rotation dudit couvercle (4) autour desdits une ou plusieurs charnières (5) afin d'obtenir l'ouverture et la fermeture dudit appareil ;
- des moyens d'accrochage (7) indiqués pour bloquer ledit couvercle (4) en position de fermeture par rapport à ladite base (2) ;
- au moins un dispositif de blocage mécanique (8) indiqué pour bloquer ledit couvercle (4) quand celui-ci atteint la position d'ouverture maximale,

ledit appareil comprenant au moins un dispositif de relâchement (150), indiqué pour déplacer ledit dispositif de blocage mécanique (8) avec lequel il interagit, avant que ledit moyen de mouvement (6) commence la phase de fermeture dudit couvercle (4),

caractérisé en ce que ledit au moins un dispositif de blocage mécanique (8) est interposé entre le couvercle (4) et ladite base (2) avec laquelle il interagit, des moyens de contrôle étant fournis et indiqués pour actionner ledit au moins un dispositif de relâchement (150) et ledit moyen de mouvement (6).

2. Un appareil pour l'évacuation de la fumée (1) selon la revendication 1) **caractérisé en ce que** ledit au moins un dispositif de blocage mécanique (8) comprend une barre (81) ayant un raccordement de point d'appui sur une extrémité (83) à travers un pivot (82) avec ledit couvercle (4) et l'extrémité opposée (84) étant dégagée et indiquée pour s'opposer contre un moyen d'arrêt (85) fixé à ladite base (2) quand ledit couvercle (4) est totalement ouvert, la même extrémité dégagée (84) de ladite barre (81)

étant équipée d'une appendice (86) avec laquelle ledit au moins un dispositif de relâchement (150) interagit, indiquée pour faire pivoter ladite barre (81) autour dudit pivot (82) afin de la relâcher de l'interférence avec ledit moyen d'arrêt (85) avant que ledit moyen de mouvement (6) crée la rotation dudit couvercle (4) afin d'obtenir la fermeture de celui-ci par rapport à ladite base (2).

3. Un appareil pour l'évacuation de la fumée (1) selon la revendication 1) **caractérisé en ce que** ledit dispositif de relâchement (150) est composé d'un cylindre pneumatique (100) fixé à ladite base (2) ayant une tige (101) qui s'oppose à ladite appendice (86) de ladite barre (81) dudit dispositif de blocage mécanique (8).

4. Un appareil pour l'évacuation de la fumée (1) selon la revendication 1) **caractérisé en ce qu'il** est équipé de moyens pour le blocage de la rotation du couvercle (4) durant la phase de fermeture, se composant d'au moins un amortisseur télescopique (9) avec une extrémité (92) reliée au moyen d'un point d'appui audit moyen de mouvement (6) dudit couvercle (4) et l'extrémité opposée (91) reliée au moyen d'un point d'appui à ladite base (2).

5. Un appareil pour l'évacuation de la fumée (1) selon la revendication 1) **caractérisé en ce que** ledit moyen de mouvement (6) comprend un joint articulé (160) et un actuateur pneumatique (260), reliés mécaniquement entre eux et interposés entre ladite base (2) et ledit couvercle (4), ledit joint articulé (160) comprenant une pluralité de couples de barres positionnées deux par deux, l'une à côté de l'autre et subdivisées de la manière suivante :

- un premier couple de barres (360) chacun ayant un raccordement de point d'appui sur une extrémité (361) avec ladite base (2) et au niveau de l'extrémité opposée (362) avec le corps (261) dudit actuateur (260), ledit actuateur ayant l'extrémité (262) de la tige (263) fixée audit couvercle (4) ;
- un deuxième couple de barres (460) chacun ayant un raccordement de point d'appui sur une extrémité (461) avec ledit couvercle (4) près desdites charnières (5) et un raccordement de point d'appui sur l'extrémité opposée (462) avec une extrémité correspondante (561) d'une barre correspondante appartenant à un troisième couple de barres (560), chacun ayant un raccordement de point d'appui sur l'extrémité opposée (562) avec ladite base (2) sur le même point où l'extrémité (361) de la barre correspondante dudit premier couple de barres (360) a un raccordement de point d'appui ;
- un quatrième couple de barres (660) chacun

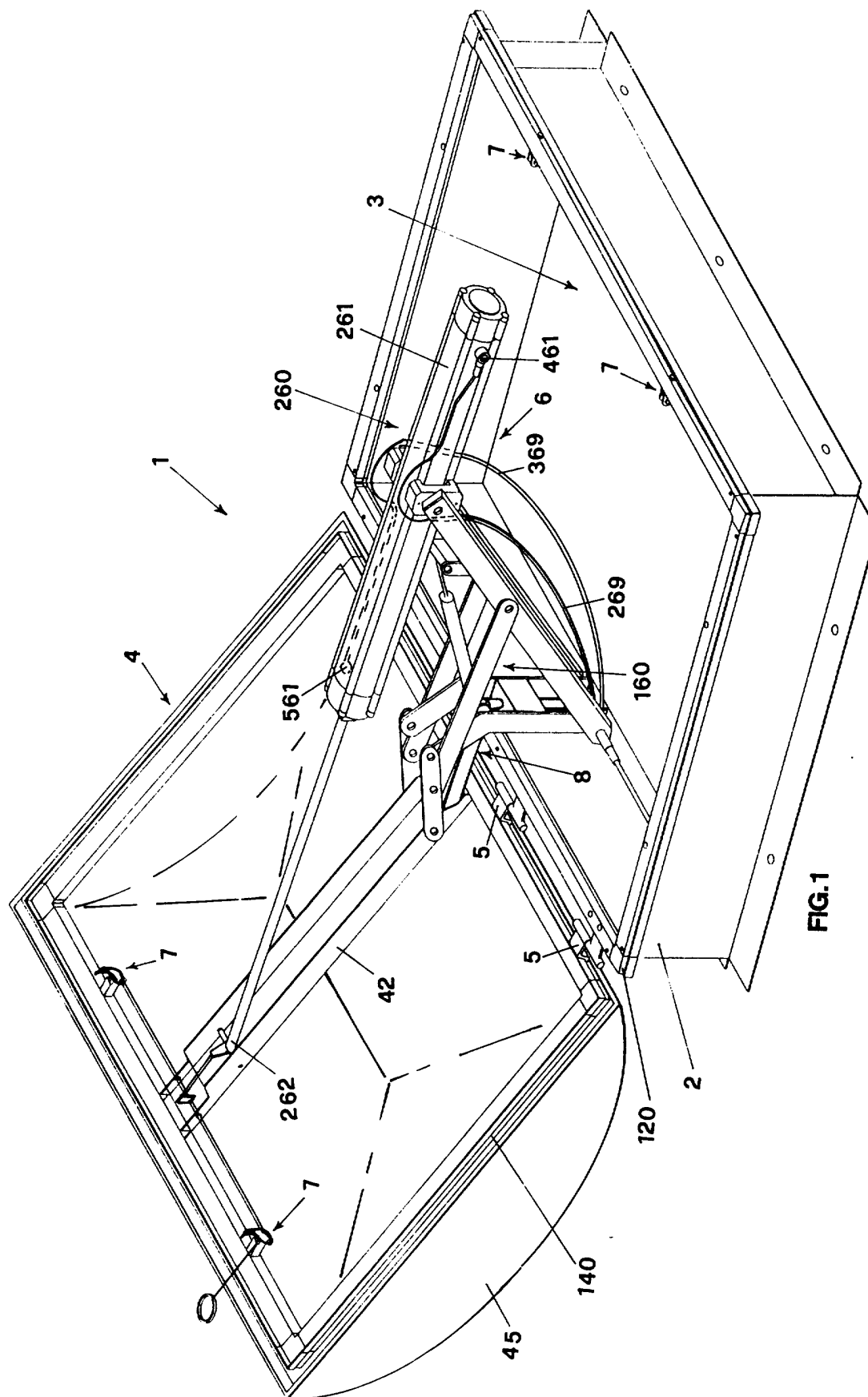
ayant un raccordement de point d'appui sur une extrémité (661) avec un point intermédiaire de la barre correspondante dudit deuxième couple de barres (460) et un raccordement de point d'appui sur l'extrémité opposée (662) avec un point intermédiaire dudit premier couple de barres (360). 5

6. Un appareil pour l'évacuation de la fumée (1) selon la revendication 1) **caractérisé en ce que** lesdits moyens d'accrochage (7) comprennent : 10

- une barre (72) positionnée de manière transversale sur le couvercle (4) et soutenue sur les extrémités par une paire de supports (73) sur lesquels elle est reliée de manière pivotante ; 15
- une paire de crochets (71) chacun relié au niveau d'une extrémité de ladite barre (72) ;
- un élément saillant (74) fixé à ladite barre (72) au niveau de sa partie moyenne, ledit élément saillant (74) étant relié au moyen d'un tirant (75) avec un levier (76) ayant un raccordement de point d'appui avec un support (77) fixé audit couvercle (4) et relié avec une extrémité (262) de la tige (263) dudit actuateur (260) ; 20 25
- une paire de contre-crochets (78) appartenant à ladite base (2), chacun étant indiqué pour recevoir un desdits crochets (7) quand ledit couvercle (4) est placé en position de fermeture par rapport à ladite base (2). 30

7. Un appareil pour l'évacuation de la fumée (1) selon la revendication 1) **caractérisé en ce que** ledit couvercle (4) interagit en phase de fermeture avec ladite base (2), ledit couvercle et ladite base étant reliés de manière réciproque et pivotante à travers une ou plusieurs charnières, chacune appartenant audit couvercle (4), étant reliée à un châssis (140) qui est lui aussi relié au couvercle (4), et à la base (2), étant fixée au contre-châssis (120) qui est fixé lui aussi à la base, ledit châssis (140) supportant dans sa partie moyenne une traverse (42) à laquelle des éléments mécaniques (262 ; 461) sont reliés mécaniquement, qui appartiennent audit moyen de mouvement (6) ; 35 40 45

8. Un appareil pour l'évacuation de la fumée (1) selon la revendication 1) **caractérisé en ce que** ledit moyen de mouvement (6) et ledit au moins un dispositif de relâchement (150) se composent d'au moins un cylindre pneumatique (260 ; 100) relié à un circuit qui est alimenté par CO₂, de manière automatique afin d'obtenir l'ouverture du couvercle (4) en cas d'incendie et, comme alternative, alimenté par l'air comprimé de manière manuelle quand un opérateur intervient pour ouvrir et fermer le couvercle (4) afin d'obtenir l'aération de la pièce. 50 55



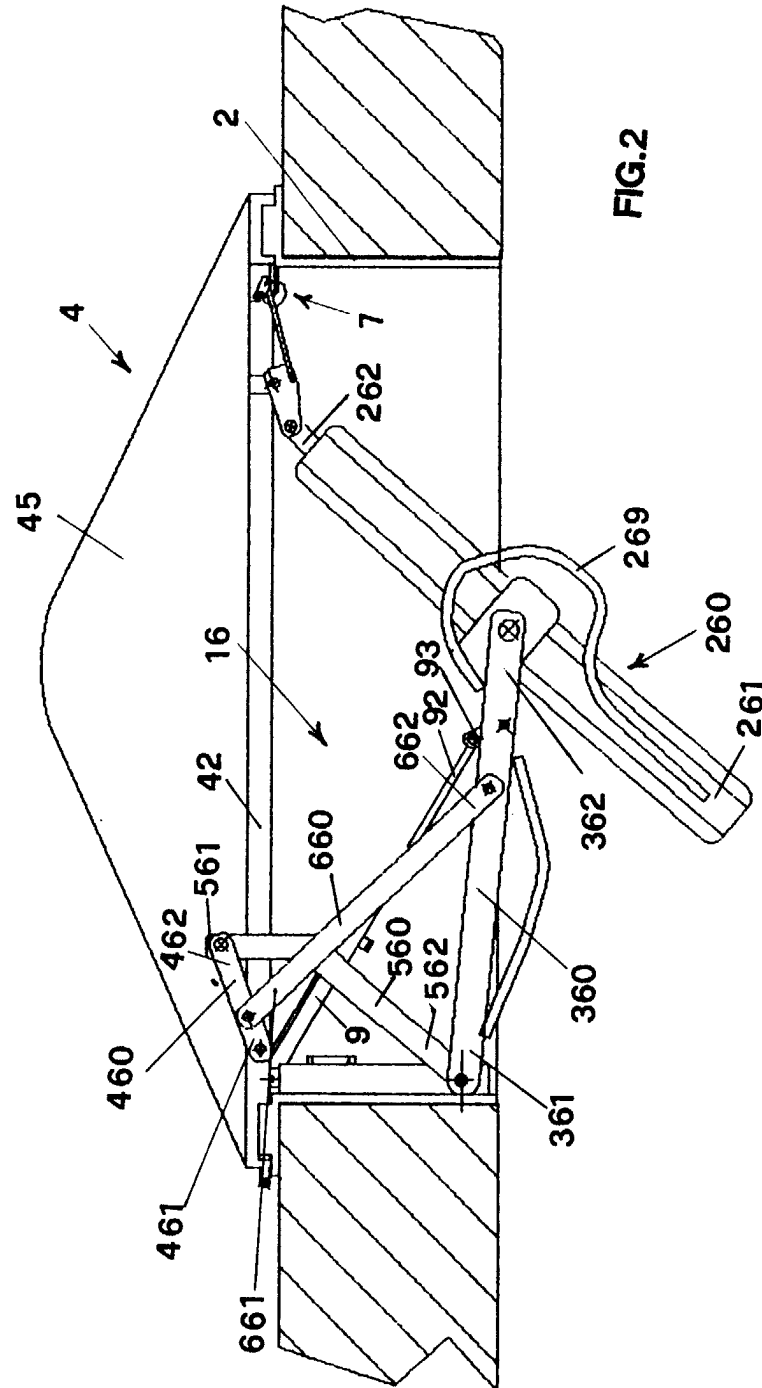


FIG. 2

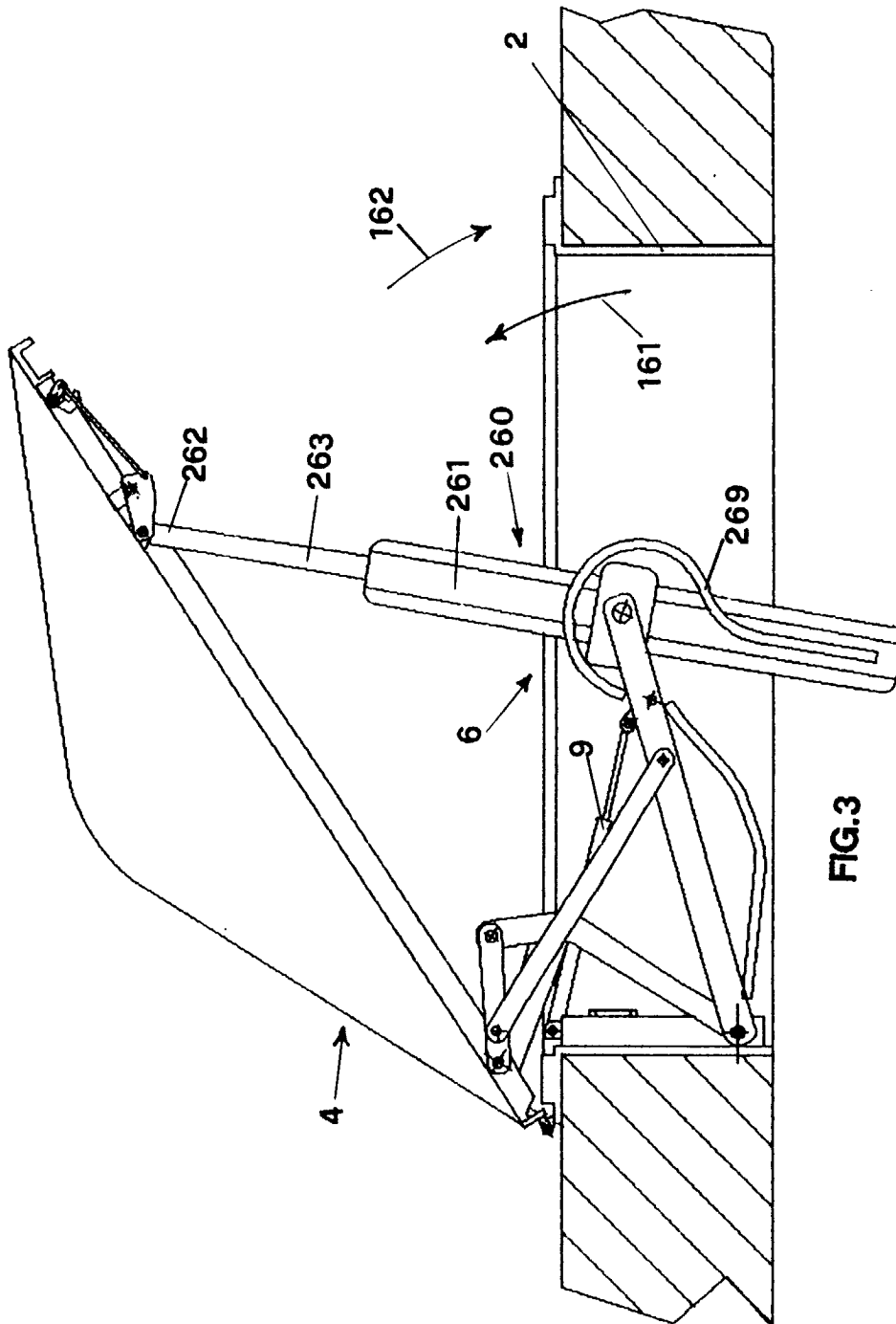
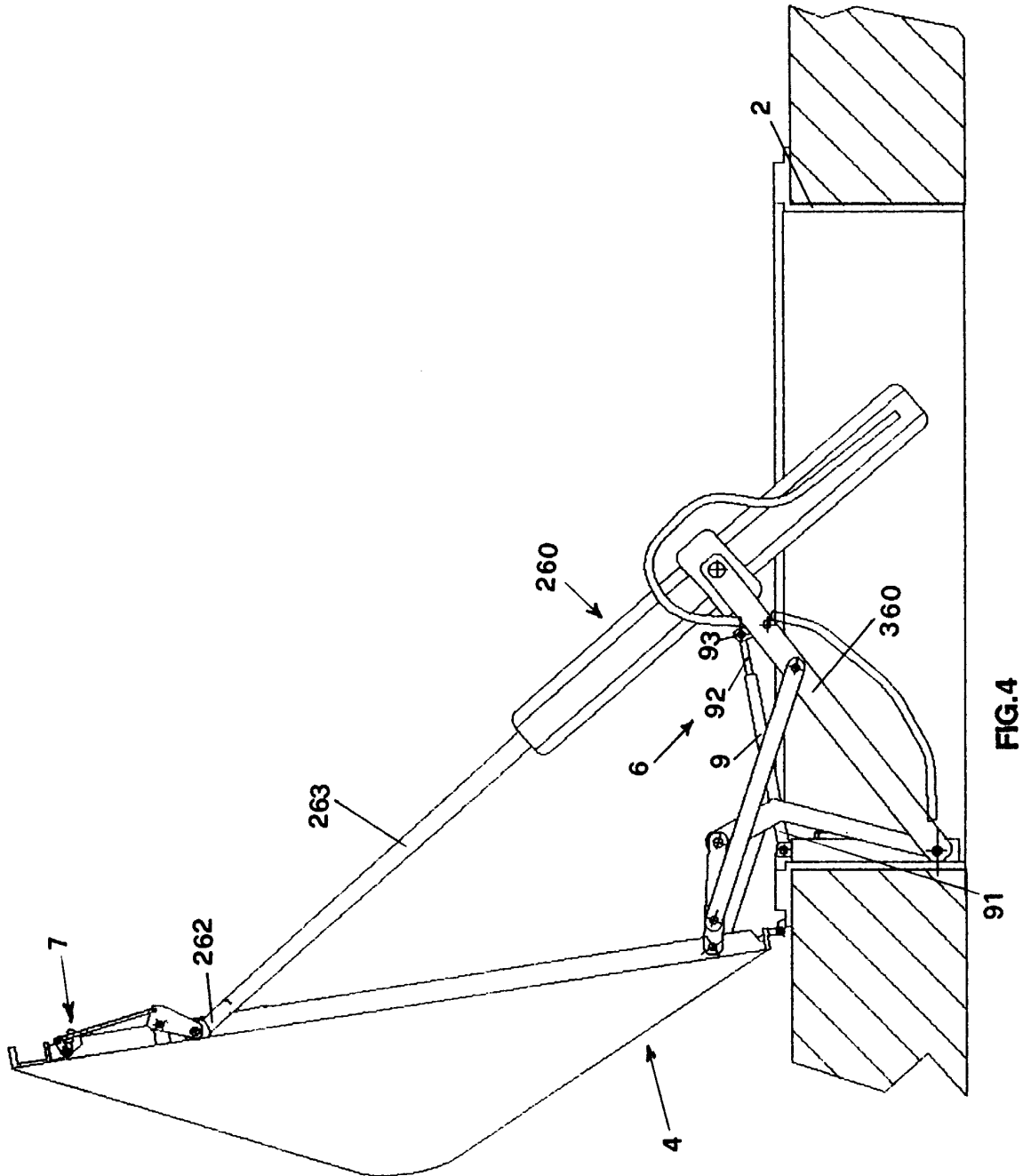


FIG.3



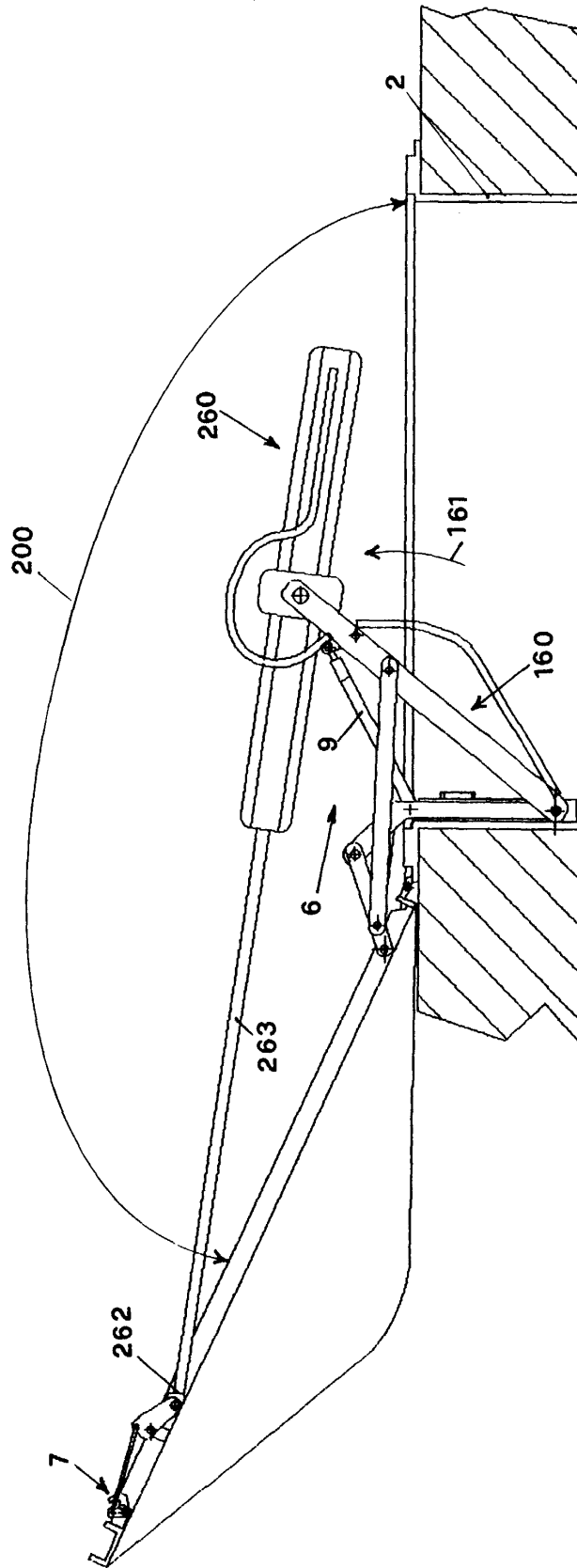
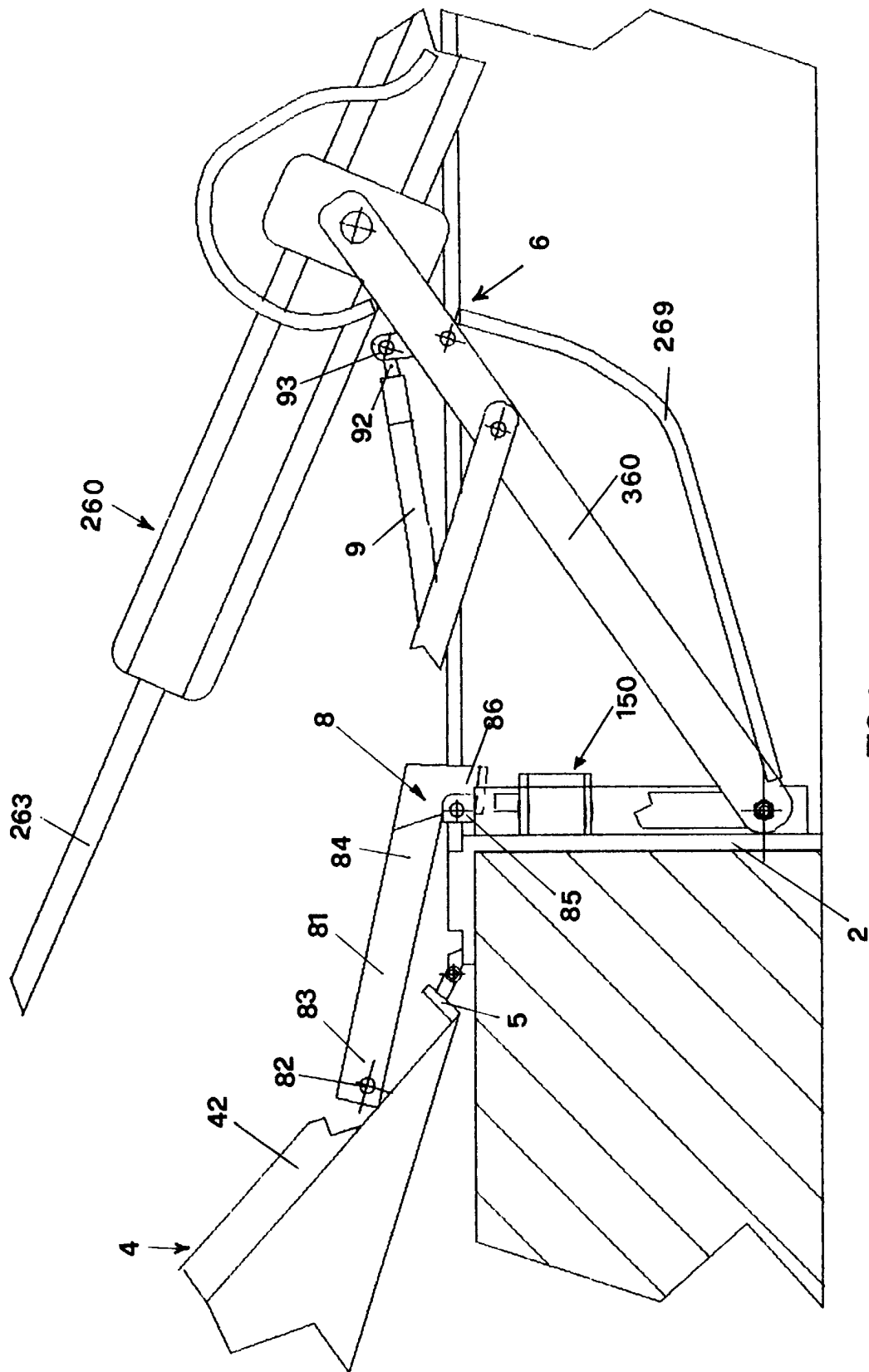
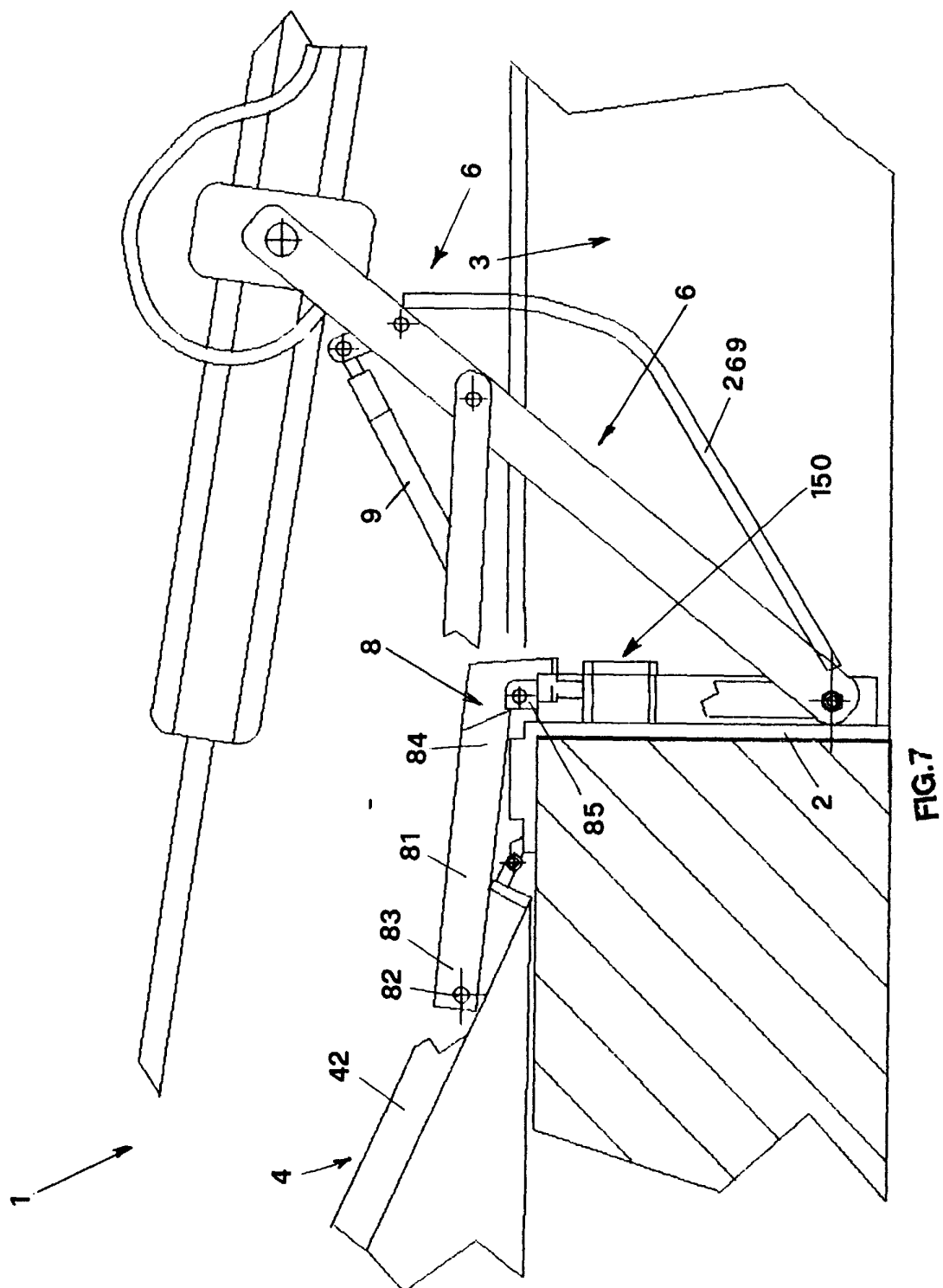
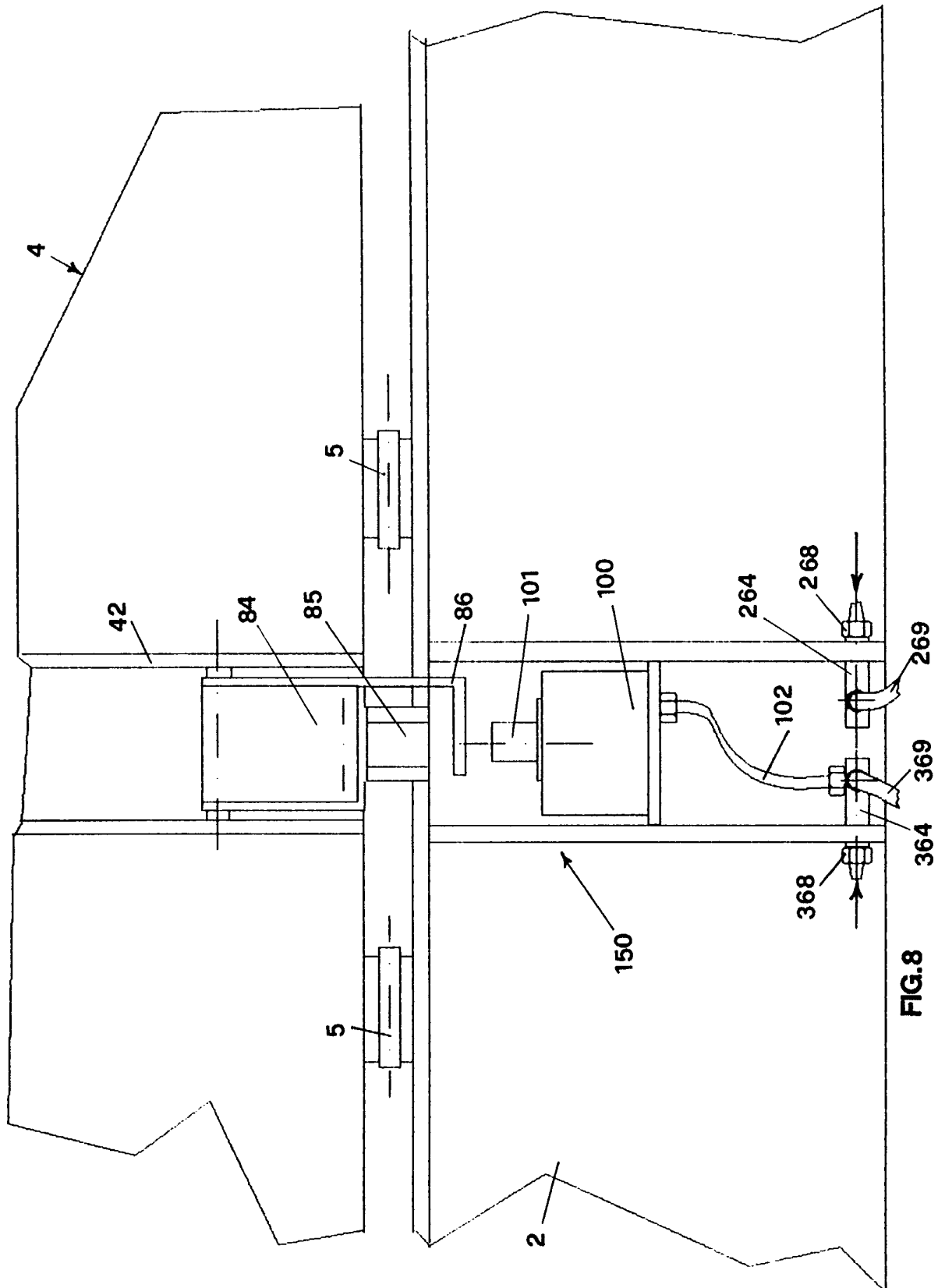
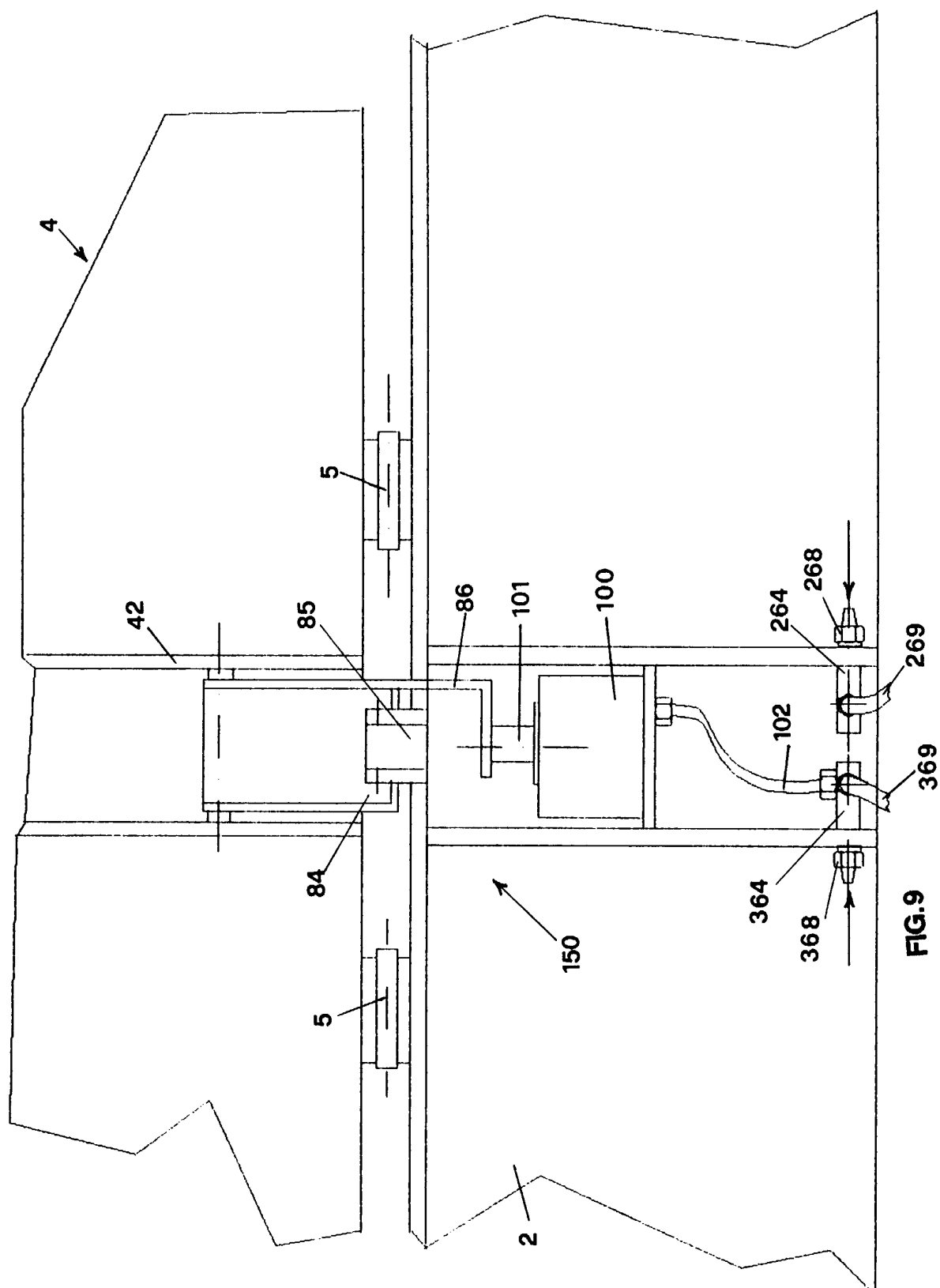


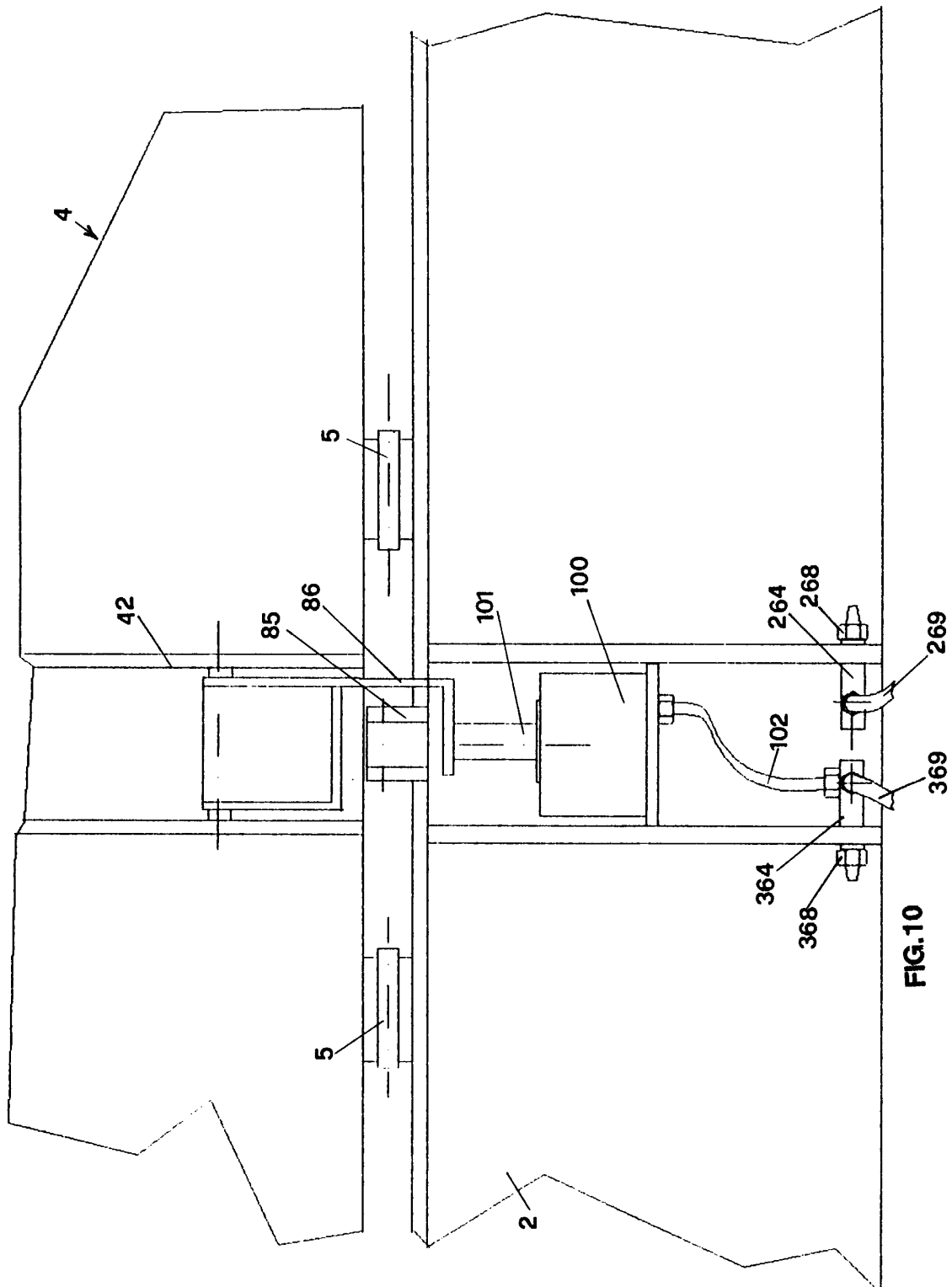
FIG.5

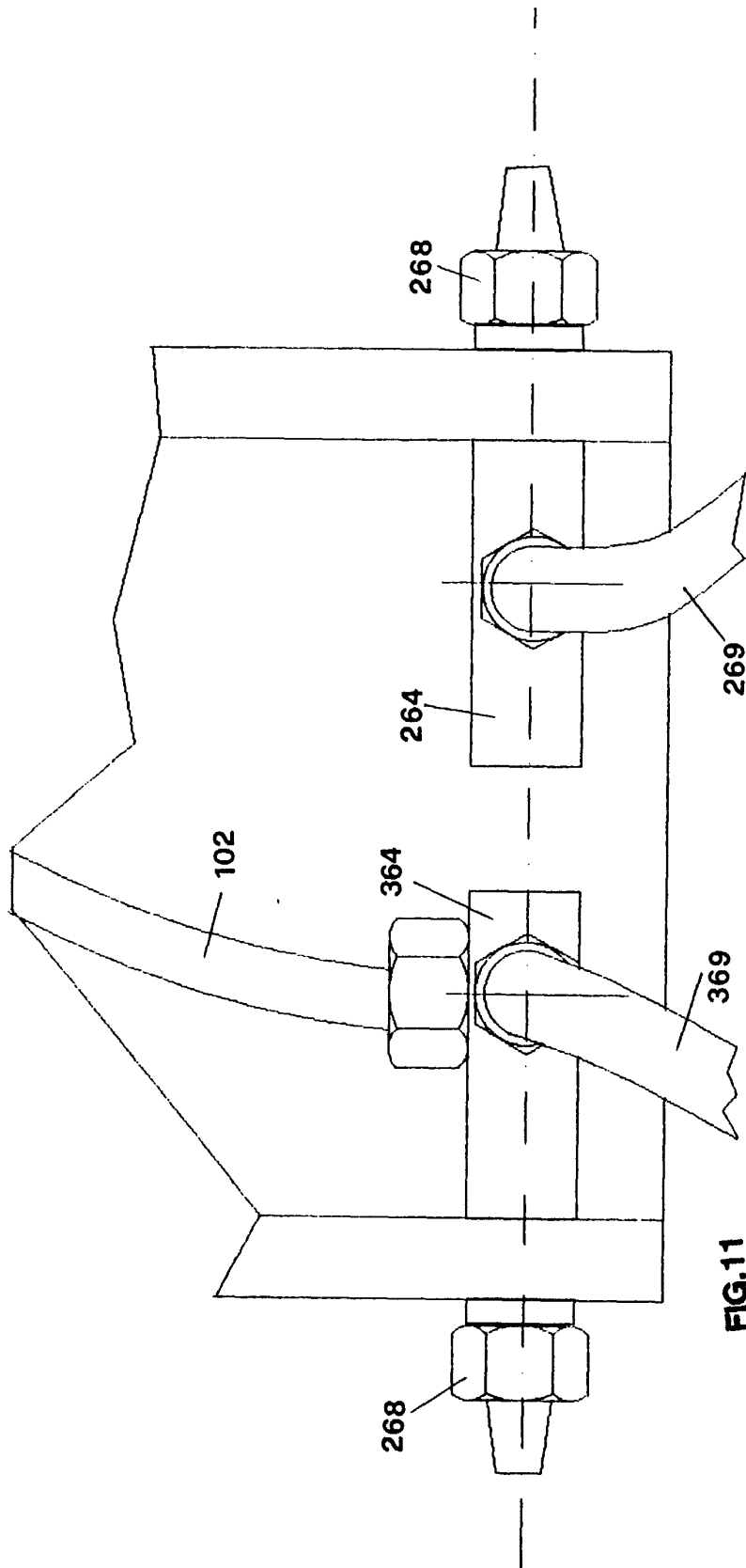












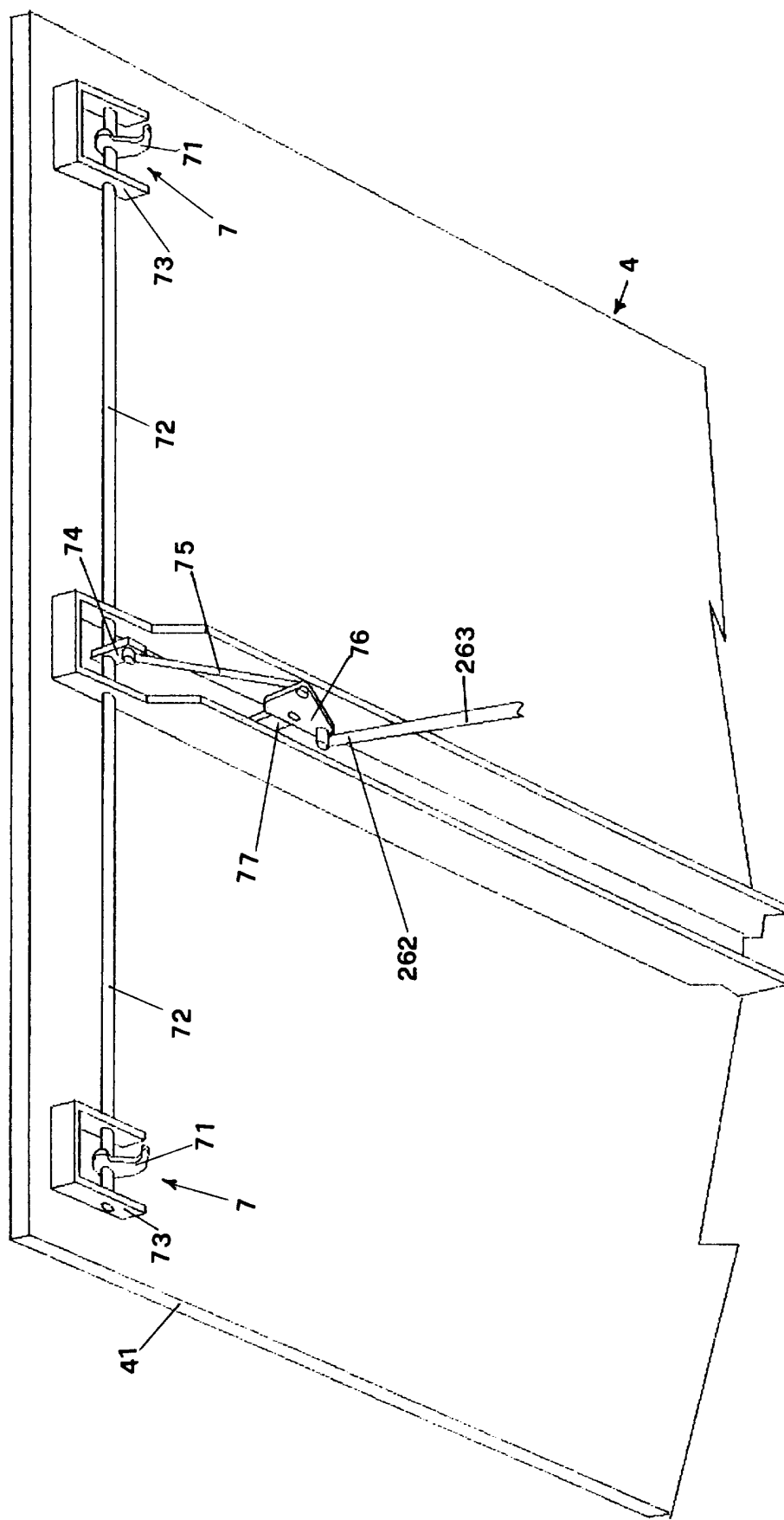


FIG.12

