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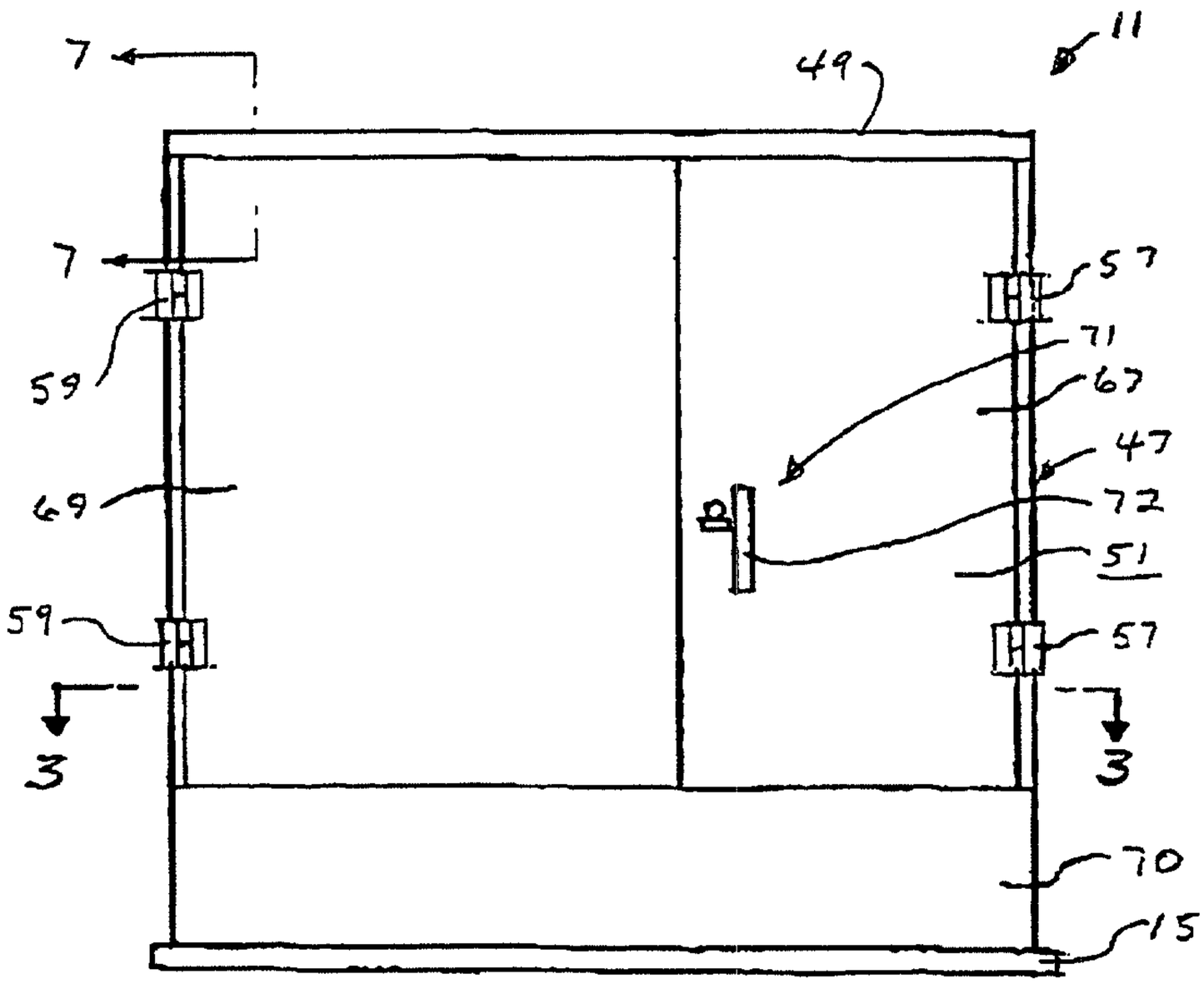
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(54) Titre : ARMOIRE DE TRANSFORMATEUR SUR SOCLE
(54) Title: PADMOUNT TRANSFORMER CABINET



(57) Abrégé/Abstract:
A pad-mounted transformer enclosure may have a wiring compartment utilizing multiple hinge points on each side panel with an additional set of hinges located at the back of the compartment area to allow the doors to be opened as normal or to allow the sides to be also opened, allowing the wiring compartment to be totally exposed on all three sides. The tank of the transformer enclosure may have a cover secured in a manner that allows the cover to be removed with simple hand tools while preventing unauthorized removal thereof, that increases tank top structural rigidity, and that does not trap water on the tank cover.

ABSTRACT OF THE DISCLOSURE

A pad-mounted transformer enclosure may have a wiring compartment utilizing multiple hinge points on each side panel with an additional set of hinges located at the back of the compartment area to allow the doors to be opened as normal or to allow the sides to be also opened, allowing the wiring compartment to be totally exposed on all three sides. The tank of the transformer enclosure may have a cover secured in a manner that allows the cover to be removed with simple hand tools while preventing unauthorized removal thereof, that increases tank top structural rigidity, and that does not trap water on the tank cover.

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CANADA

APPLICANT: ERMCO

TITLE: PADMOUNT TRANSFORMER CABINET

SPECIFICATION

TITLE OF THE INVENTION

PADMOUNT TRANSFORMER ENCLOSURE

BACKGROUND OF THE INVENTION

(1) 1. Field of the Invention: The present invention relates, in general, to transformers, and in particular, to an improved padmount transformer enclosure.

(2) 2. Information Disclosure Statement: A preliminary patentability search in Class 174, subclass 50, and Class 312, subclasses 223.1 and 100, produced the following patents, which appear to be relevant to the present invention: Nelson et al., U.S. Patent 3,014,158, issued December 19, 1961; Fisher, U.S. Patent 3,376,086, issued April 2, 1968; Main, U.S. Patent 4,003,610, issued January 18, 1977; Nilsson, U.S. Patent 4,466,676, issued August 21, 1984; Borgmeyer et al., U.S. Patent 5,189,257, issued February 23, 1993; Dirk, U.S. Patent 5,573,319, issued November 12, 1996; Marusinec, U.S. Patent 5,783,775; Arizpe et al., U.S. Patent 5,823,646; Marusinec et al., U.S. Patent 5,889,231, issued March 30, 1999; and Reinke et al.,

U.S. Patent 6,066,802, issued May 23, 2000.

(3) Padmount transformer enclosures are used in electrical power distribution systems to contain distribution transformers used to step down voltage from the high voltage terminal of an underground electrical distribution systems to the low voltage terminal thereof going to the end user=s electrical system, etc.. A typical prior art padmount transformer enclosure includes a tank for holding the core/coil assembly of the transformer immersed in oil or the like, and a wiring cabinet having high and low voltage wiring compartments for enclosing the high and low voltage bushings, respectively, of the transformer, etc. In order to prevent unauthorized access to the core/coil assembly of the transformer held within the tank of the padmount transformer enclosure, the most common prior art practice is to weld a cover over the top of the tank. Other prior art tank covers are secured with carriage bolt-nut assemblies, and include some means for shield the nuts, etc. Such shielding means result in a cover that protrudes past the top of the tank cover by several inches and causes water, etc., to be trapped along the edge of the cover. The wiring cabinet of a typical prior art padmount transformer

enclosure includes left and right sidewalls, and left and right lockable doors that swing open, exposing the high and low voltage wiring compartment. One of the doors swings out to the right and the other door swings out to the left, leaving the front completely open, but the right and left sidewalls remain fixed in place.

(4) Nothing in the known prior art discloses or suggests the present invention. More specifically, nothing in the known prior art discloses or suggests a padmount transformer enclosure that allows the doors and the side walls of the wiring compartment to be opened so that the wiring compartment is totally exposed on all three sides; or a padmount transformer enclosure including a liquid tight tank having a cover that can be removed with simple hand tools without requiring removal or disassembly of the wiring compartment, and having a tamperguard which prevents removal of the cover except by authorized personnel.

BRIEF SUMMARY OF THE INVENTION

(5) The present invention provides an improved padmount transformer enclosure for a 3-phase padmount distribution transformer or the like. One basic concept of

the present invention is to provide the terminal or wiring compartment of a padmount transformer enclosure with left and right side panels that are hinged to the transformer tank front panel so that the side panels of the wiring compartment can swing open to allow the wiring compartment to be totally exposed or open on all three sides. Another basic concept of the present invention is to provide the transformer tank of a padmount transformer enclosure with a tamper proof cover that can be removed with simple hand tools by authorized personnel.

(6) One object of the present invention to provide a padmounted, distribution transformer enclosure with a tank cover that can be removed by the manufacturer or end user with simple hand tools, more easily than prior art tank covers.

(7) Another object of the present invention is to provide such a transformer enclosure with a tamperguard which requires access to the interior of a lockable wiring compartment for removal of the tank cover, with the tamperguard positioned in a box section or channel in the tank beneath the cover which strengthens the tank and allows for a unique, recessed tamperguard located under the cover

rather than covering the top edge of the cover, so that there is no tendency to trap water along the edge of the cover.

(8) Another object of the present invention is to provide a padmounted, distribution transformer enclosure with a wiring compartment that can be swung open to be totally exposed on all three sides, allowing work to be done within the wiring compartment without any obstructions caused by the cabinet.

BRIEF DESCRIPTION OF THE SEVERAL VIEWS OF THE DRAWINGS

(9) Fig. 1 is a somewhat diagrammatic front elevational view of the padmount transformer enclosure of the present invention.

(10) Fig. 2 is a somewhat diagrammatic left side elevational view of the padmount transformer enclosure of the present invention.

(11) Fig. 3 is a somewhat diagrammatic sectional view of a portion of the padmount transformer enclosure of the present invention, as taken on line 3-3 of Fig. 1, showing the first door panel of the wiring compartment thereof in an opened position.

(12) Fig. 4 is a somewhat diagrammatic sectional view of a portion of the padmount transformer enclosure of the present invention, similar to Fig. 3 but showing the first and second door panels of the wiring compartment thereof in opened positions.

(13) Fig. 5 is a somewhat diagrammatic sectional view of a portion of the padmount transformer enclosure of the present invention, similar to Fig. 3 but showing the first and second door panels, and the first side panel of the wiring compartment thereof in opened positions.

(14) Fig. 6 is a somewhat diagrammatic sectional view of a portion of the padmount transformer enclosure of the present invention, similar to Fig. 3 but showing the first and second door panels and the first and second side panels of the wiring compartment thereof in opened positions.

(15) Fig. 7 is a somewhat diagrammatic sectional view of a portion of the padmount transformer enclosure of the present invention, as taken on line 7-7 of Fig. 1, with portions thereof omitted or broken away for clarity.

(16) Fig. 8 is a somewhat diagrammatic sectional view of a portion of the padmount transformer enclosure of the present invention, as taken on line 8-8 of Fig. 2, with

portions thereof omitted or broken away for clarity.

DETAILED DESCRIPTION OF THE INVENTION

(17) A preferred embodiment of the padmount transformer enclosure of the present invention is shown in Figs. 1-8, and identified by the numeral **11**. The cabinet **11** is designed to safely house a standard three-phase electrical distribution transformer or the like mounted on a ground level platform or pad **15**, etc. Such a transformer is commonly used to step down voltage from the high voltage terminal of an underground electrical distribution systems to the low voltage terminal thereof, and includes a core/coil assembly, and electrical connectors **19** such as high voltage bushings and low voltage bushings, or other conventional couplings, to allow electrical connection between the core/coil assembly, and the high and low voltage terminals, etc.

(18) The cabinet **11** includes a transformer tank **21** having an opened top, liquid tight enclosure or vessel **23** (often referred to simply as the Atank@) for holding a quantity of oil or the like and for holding the core/coil assembly of the transformer immersed in the oil or the like

as will now be apparent to those skilled in the art, and a cover or lid **25** for closing the opened top of the vessel **23**.

(19) The vessel **23** may be somewhat box shaped, having a substantially flat, rectangular or square front wall or panel **27** (typically referred to as the transformer front panel or plate **27**), a substantially flat, rectangular or square rear wall or panel **29**, a pair of substantially flat, rectangular side walls or panels **31** extending between the front and rear plates **27**, **29**, and a bottom panel **33** will all the various panels joined together to form the opened top, liquid-tight vessel **23**. The electrical connectors **19** of the transformer are mounted on the exterior face of the transformer front plate **27** with electrical conductors extending through the transformer front plate **27** between the electrical connectors **19** and the core/coil assembly inside the tank **21** as will now be apparent to those skilled in the art.

(20) The cover **25** is preferably designed to completely cover and close the opened top of the vessel **23**. The cover **25** may have a lip **34** around the outer edges thereof. The lip **34** is preferably down-turned around the rear and side edges of the cover **25**, and may be up-turned along the front edge

of the cover **25**. The lip **34** reinforces and structurally strengthens the cover **25**, and plays an important role in preventing unauthorized removal of the cover **25** from the vessel **23** as will hereinbelow be explained. Bolts **35**, preferably carriage head bolts, extend through the edge of the cover **25** and through a flange **37** in the upper edges of the front, rear and side panels **27**, **29**, **31**. Nuts **39** are preferably used to secure the bolts **35** and fix the cover **25** to the vessel **23**. A gasket **41** may be provided between the cover **25** and the flange **37**.

(21) The vessel **23** preferably has a reinforced portion at the opened top thereof. The reinforced portion may be formed by a channel, i.e., an outwardly opening, box or U-shaped section or channel **43**, extending around at least the upper edges of the rear and side panels **29**, **31** of the vessel **23**, with the flange **37** forming the upper leg or arm of the channel **43**. The channel **43** strengthens the vessel **23** sufficiently and acts as a structural member to allow for the use of thinner material than what has been traditionally used for such transformer tanks with removable covers. The box section or channel **43** also assists in keeping the top flange **37** of the vessel **23** straight, when looking along the

length, giving better alignment with the cover **25** (e.g., between the apertures in the cover **25** and the flange **37** for the shaft of the bolts **35**) than traditional designs. When used to secure the cover **25** to the vessel **23**, the nuts **39** and distal ends of the bolts **35** are located with a cavity **45** formed by the channel **43**, and the channel **43** will play an important role in preventing unauthorized removal of the cover **25** from the vessel **23** as will hereinbelow be explained.

(22) The cabinet **11** includes a wiring cabinet or compartment **47**, sometimes referred to as the air compartment or cabinet, covering at least a portion of the transformer tank front plate **27** for enclosing the electrical connectors **19** mounted on the exterior face of the transformer front plate **27**. The wiring compartment **47** includes a cover or hood **49**, a door assembly **51**, a first side panel **53**, a second side panel **55**, first hinge means or structure **57** joining the door assembly **51** and the first side panel **53** together to allow the door assembly **51** to pivot relative to the first side panel **53**, second hinge means or structure **59** joining the door assembly **51** and the second side panel **55** together to

allow the door assembly **51** to pivot relative to the second side panel **55**, third hinge means or structure **61** joining the first side panel **53** and the transformer tank front plate **27** together to allow the first side panel **53** to pivot relative to the transformer tank front plate **27**, and fourth hinge means or structure **63** joining the second side panel **55** and the transformer tank front plate **27** together to allow the second side panel **55** to pivot relative to the transformer tank front plate **27**. A partition **64** may extend from the transformer front plate **27** into the interior of the wiring compartment **47** to divide the interior of the wiring compartment **47** into high and low voltage areas. The wiring compartment **47** preferably includes fifth hinge means or structure **65** joining the hood **49** and the transformer tank front plate **27** together (via a U-shaped hinge channel **66** which extends across the transformer tank front plate **27** and is secured to the flange **37** of the transformer tank front plate **27** using the bolts **35** and nuts **39** assemblies or formed as part of the front plate **27**) to allow the hood **49** to pivot relative to the transformer tank front plate **27**. The door assembly **51** preferably includes a first door panel **67** joined

to the first side panel **53** by the first hinge means or structure **57** and a second door panel **69** joined to the second side panel **55** by the second hinge means or structure **59**.

(23) The first and second hinge structures **57**, **59** allow the door assembly **51** (i.e., the first and second door panels **67**, **69**) to open and close in the typical manner. The third hinge structure **61** allows the first side panel **53**, with the first door panel **67** attached thereto, to swing between fully opened and closed positions. The fourth hinge structure **63** allows the second side panel **55**, with the second door panel **69** attached thereto, to swing between fully opened and closed positions. The fifth hinge structure **65** allows the hood **49** to open and close in the typical manner.

(24) The overall effect of the hinge structures **57**, **59**, **61**, **63**, **65** is to allow the wiring compartment **47** to be opened by authorized personnel to allow the interior of the wiring compartment **47** to be totally exposed on all three sides and the top. This allows utility linemen, etc., to work on the electrical connectors **19** and other wiring within the wiring compartment **47** without any obstructions caused by the compartment **47**. The hood **49**, side panels **53**, **55**, hinge

structures **57**, **59**, **61**, **63**, **65**, and door panels **67**, **69** are preferably constructed to enable easy removal of the hood **49**, either or both door panels **67**, **69** only, or either or both door panels **67**, **69** and associated side panels **53**, **55**, etc.

(25) A U-shaped sill **70** preferably sits on the pad **15** and extends from the transformer front plate **27** below the side panels **53**, **55** and door panels **67**, **69** of the wiring compartment **47**. The sill **70** is preferably bolted or otherwise detachably secured to the bottom of the transformer front plate **27**. The sill **70** allows the side panels **53**, **55** to swing open without scrapping on the pad **15** or the ground, and to function as doors.

(26) The hood **49**, side panels **53**, **55**, hinge structures **57**, **59**, **61**, **63**, and door panels **67**, **69** of the wiring compartment **47**, and the U-shaped sill **70**, etc., are preferably designed and constructed so that with the wiring compartment **47** closed, the various parts form tight fits with multiple bends to resist wire entry and meet the tamper requirements outlined in ANSI C57.12.28-1999. A standard locking means **71** including a handle **72** is provided to lock the wiring compartment **47** in the fully closed position. The

hood **49** and side panels **53**, **55** are preferably designed so that the hood **49** must be raised before the side panels **53**, **55** can swing open.

(27) The cabinet **11** preferably includes tamper-proof securing means **73** for preventing or hindering unauthorized removal of the transformer tank cover **25** from the open top of the transformer tank vessel **23**. The tamper-proof securing means **73** includes a shield member **75** for blocking unauthorized access to the nuts **39** securing the bolts **35**, and thus the cover **25**, to the opened top vessel **23**. The shield member **75** is designed to fit into or be positioned within the channel **43** of the vessel **23** to block unauthorized access to the nuts **39**. The shield member **75** may be U-shaped in cross section (see Fig. 7), and U-shaped in plan, having a back portion **77** extending within the cavity **45** of the channel **43** along the rear panel **29** of the vessel **23** and side members **79** for extending within the cavity **45** of the channel **43** along both side panels **31** of the vessel **23**. As will be noted from Fig. 7, depending on the specific design of the channel **43** and shield member **75**, the lip **34** of the cover **25** may also play part in limiting access to the nuts **39**. The

shield member **75** is secured to the transformer enclosure **11** in a manner that access into the interior of the wiring compartment **47** is required to remove the shield member **75**. For example, the shield member **75** may be affixed to the transformer front plate **27** by way of weld studs or bolts **81** extending through an end plate **83** on each side portion **79** of the shield member **75** and then through the transformer front plate **27**, and hardware or nuts **85** affixed to each bolt **81** within the interior of the wiring compartment **47** (see Fig. 8), which can be removed only after gaining access through the door assembly **51** of the wiring compartment **47**, thereby limiting access to the nuts **85** to authorized personnel having a key or code, etc., to the locking means **71**.

(28) Construction and operation of the padmount transformer enclosure **11** should now be apparent to those skilled in the art. The vessel **23** of the transformer tank **21** can be constructed as a liquid tight enclosure out of relatively thin sheet metal due to the box or U-shaped reinforcement provided by the channel **43**. In addition, due to the strength of the design, some of the traditional tank stiffening, including the need for additional stiffening gussets around the upper section of the tank **21**, can be

eliminated, especially when used with external cooling fins. Lift lugs **87** may be welded or otherwise fixed to the vessel **23** to allow the transformer enclosure **11** to be easily moved in the typical manner. The hood **49**, side panels **53**, **55**, and door panels **67**, **69** of the wiring compartment **47**, and the sill **70** are preferably constructed out of sheet metal with multiple bends, etc., at the edges so that when the wiring compartment **47** is closed, the hood **49**, side panels **53**, **55**, and door panels **67**, **69**, and sill **70** form tight fits with one another to resist wire entry and preclude tampering, etc.

(29) Although the present invention has been described and illustrated with respect to a preferred embodiment and a preferred use therefor, it is not to be so limited since modifications and changes can be made therein which are within the full intended scope of the invention.

CLAIMS

1. A padmount transformer enclosure for housing a transformer; said transformer enclosure comprising:

(a) a transformer tank having a transformer tank front plate; and

(b) a wiring compartment covering at least a portion of said transformer tank front plate; said wiring compartment including a hood, a door assembly, a first side panel, a second side panel, first hinge structure joining said door assembly and said first side panel together to allow said door assembly to pivot relative to said first side panel, second hinge structure joining said door assembly and said second side panel together to allow said door assembly to pivot relative to said second side panel, third hinge structure joining said first side panel and said transformer tank front plate together to allow said first side panel to pivot relative to said transformer tank front plate, and fourth hinge structure joining said second side panel and said transformer tank front plate together to allow said second side panel to pivot relative to said transformer tank front plate.

2. The padmount transformer enclosure of claim 1 in which said wiring compartment includes fifth hinge structure joining said hood and said transformer tank front plate together to allow said hood to pivot relative to said transformer tank front plate.

3. The padmount transformer enclosure of claim 1 in which said door assembly of said wiring compartment includes a first door panel joined to said first side panel by said first hinge structure and a second door panel joined to said second side panel by said second hinge structure.

4. The padmount transformer enclosure of claim 1 in which said transformer tank includes a transformer tank container having an opened top, in which said transformer tank includes a cover; and in which said padmount transformer enclosure includes tamper-proof securing means for securing said transformer tank cover to said transformer tank container to close said opened top of said transformer tank container.

5. The padmount transformer enclosure of claim 4 in which said transformer tank includes a plurality of bolts extending through said transformer tank cover and said transformer tank container, and a plurality of nuts with one of said nuts attached to each of said bolts; and in which said tamper-proof securing means includes a shield member for blocking access to said nuts.

6. The padmount transformer enclosure of claim 5 in which said transformer tank container has a reinforced portion at said opened top thereof.

7. The padmount transformer enclosure of claim 6 in which said reinforced portion of said transformer tank container is formed by a channel extending around at least a portion of said opened top of said transformer tank container.

8. The padmount transformer enclosure of claim 7 in which said channel is box-shaped.

9. The padmount transformer enclosure of claim 7 in

which said channel is U-shaped.

10. The padmount transformer enclosure of claim 9 in which said bolts extend through one side of said U-shaped channel, in which said nuts are located within said U-shaped channel, and in which said shield member is positioned within said U-shaped channel to restrict access to said nuts.

11. A padmount transformer enclosure for housing a transformer; said transformer enclosure comprising:

(a) a transformer tank including a transformer tank cover, a transformer tank container having an opened top, a plurality of bolts extending through said transformer tank cover and said transformer tank container, and a plurality of nuts with one of said nuts attached to each of said bolts to secure said transformer tank cover to said transformer tank container and to close said opened top of said transformer tank container;

(b) tamper-proof securing means for preventing unauthorized removal of said transformer tank cover from said transformer tank container; said tamper-proof securing

means including a shield member for blocking access to said nuts; and

(c) a wiring compartment covering at least a portion of said transformer tank front plate.

12. The padmount transformer enclosure of claim 11 in which said transformer tank container has a reinforced portion at said opened top thereof.

13. The padmount transformer enclosure of claim 12 in which said reinforced portion of said transformer tank container is formed by a channel extending around at least a portion of said opened top of said transformer tank container.

14. The padmount transformer enclosure of claim 13 in which said channel is box-shaped.

15. The padmount transformer enclosure of claim 13 in which said channel is U-shaped.

16. The padmount transformer enclosure of claim 15 in

which said bolts extend through one side of said U-shaped channel, in which said nuts are located within said U-shaped channel, and in which said shield member is positioned within said U-shaped channel to restrict access to said nuts.

17. The padmount transformer enclosure of claim 11 in which said wiring compartment includes a hood, a door assembly, a first side panel, a second side panel, first hinge structure joining said door assembly and said first side panel together to allow said door assembly to pivot relative to said first side panel, second hinge structure joining said door assembly and said second side panel together to allow said door assembly to pivot relative to said second side panel, third hinge structure joining said first side panel and said transformer tank front plate together to allow said first side panel to pivot relative to said transformer tank front plate, and fourth hinge structure joining said second side panel and said transformer tank front plate together to allow said second side panel to pivot relative to said transformer tank front plate.

18. The padmount transformer enclosure of claim 17 in which said wiring compartment includes fifth hinge structure joining said hood and said transformer tank front plate together to allow said hood to pivot relative to said transformer tank front plate.

19. The padmount transformer enclosure of claim 17 in which said door assembly of said wiring compartment includes a first door panel joined to said first side panel by said first hinge structure and a second door panel joined to said second side panel by said second hinge structure.

20. An improved padmount transformer enclosure including a transformer tank, and a wiring compartment having a first side panel extending from said transformer tank, a second side panel extending from said transformer tank, and a door assembly attached to said first and second side panels by door hinges; wherein the improvement comprises: a first side panel hinge attaching said first side panel to said transformer tank; and a second side panel hinge attaching said second side panel to said transformer

tank.

21. The improvement of claim 20 in which said first and second side panels are removable from said transformer tank.

22. The improvement of claim 20 in which said wiring compartment has a hood extending from said transformer tank, and a hood hinge attaching said hood to said transformer tank for allowing said hood to be moved between closed and raised positions, and in which said first and second side panel hinges allow said first and second side panels to move between closed and opened positions only when said hood is in said raised position.

23. An improved padmount transformer enclosure including a transformer tank having an opened top vessel and a cover, and a wiring compartment having lockable doors; wherein the improvement comprises: attachment means attaching said cover to said open top of said vessel; and a shield member preventing removal of said attachment means except through said lockable doors.

FIG. 1

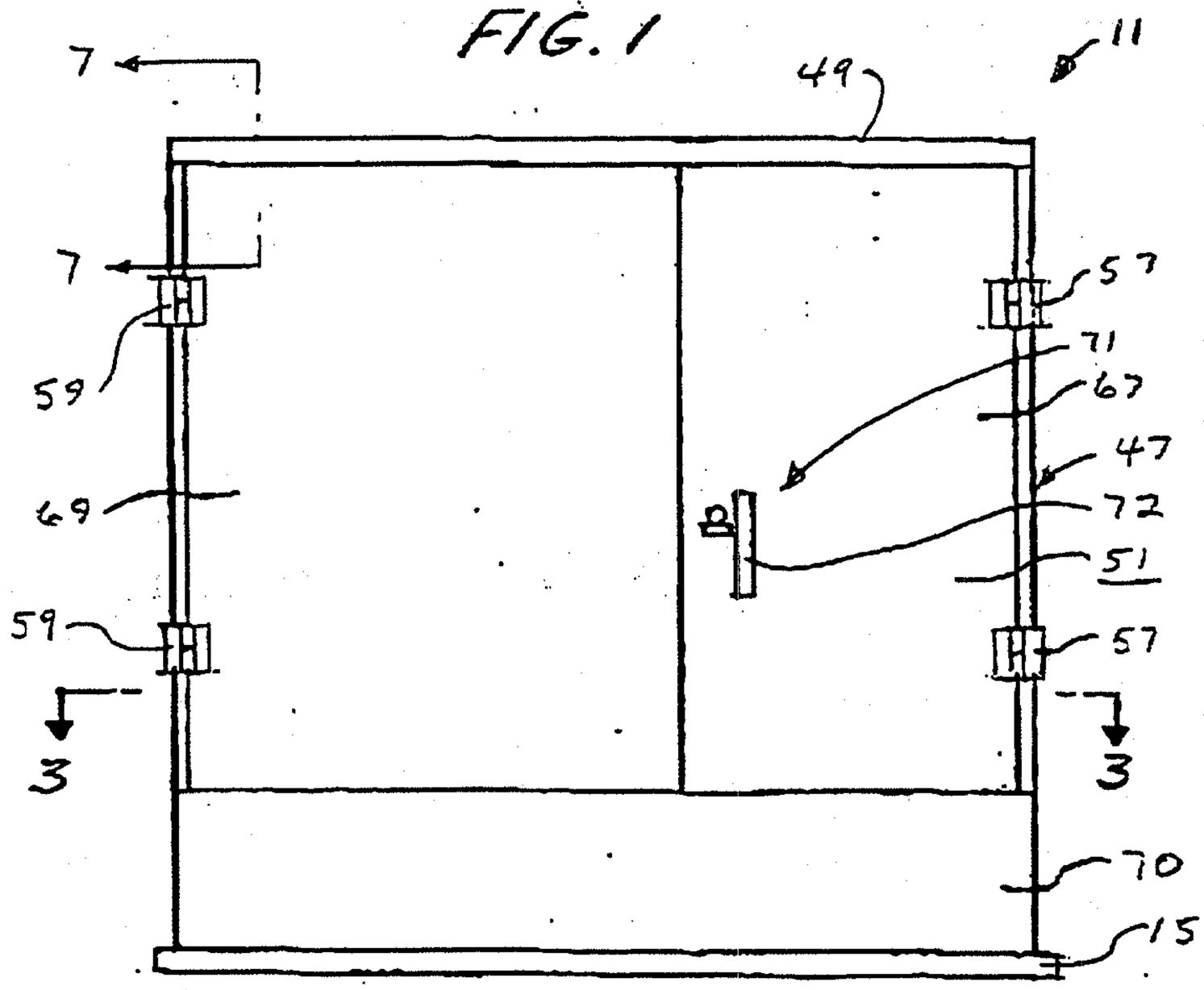

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FIG. 2

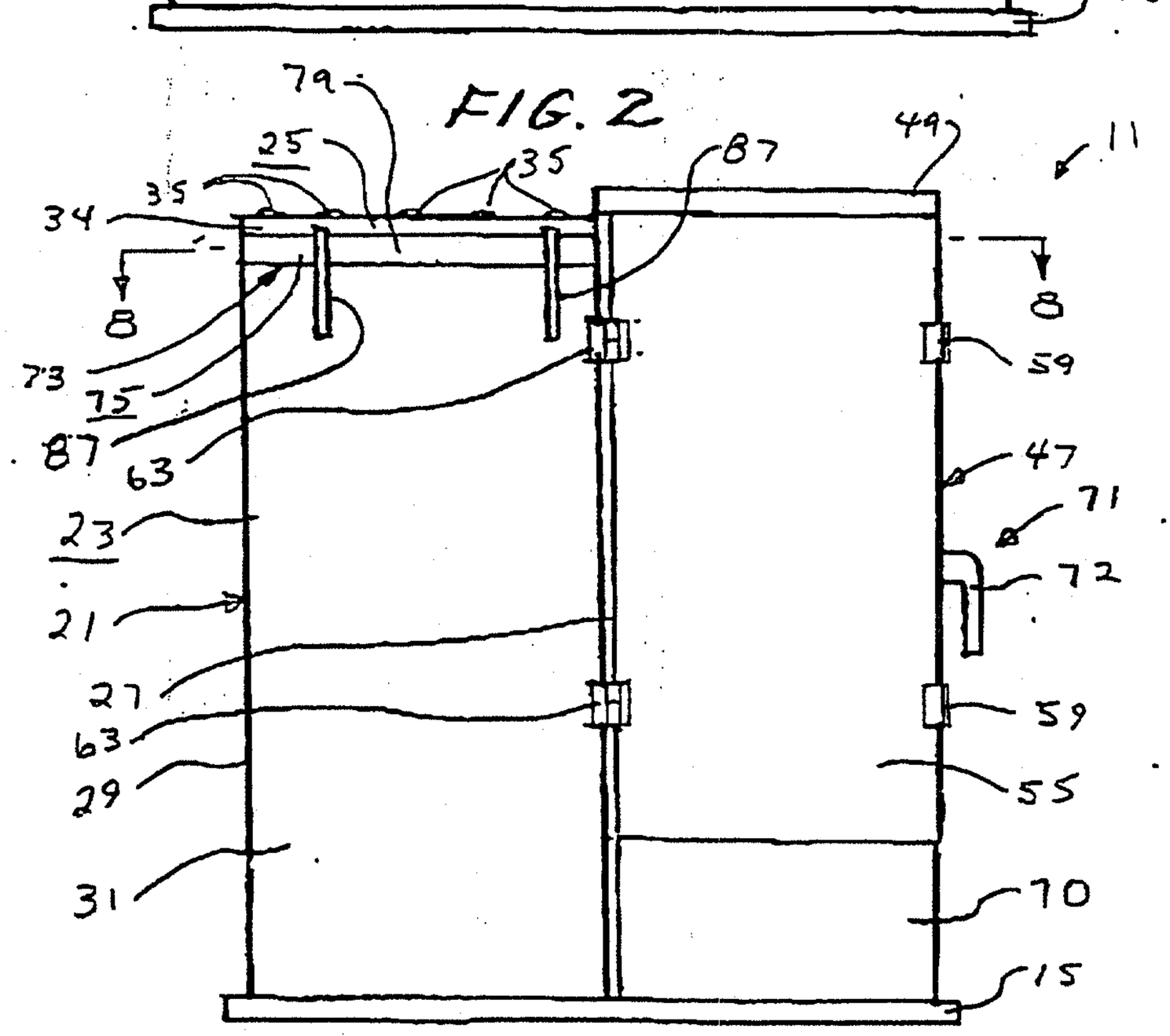

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FIG. 3

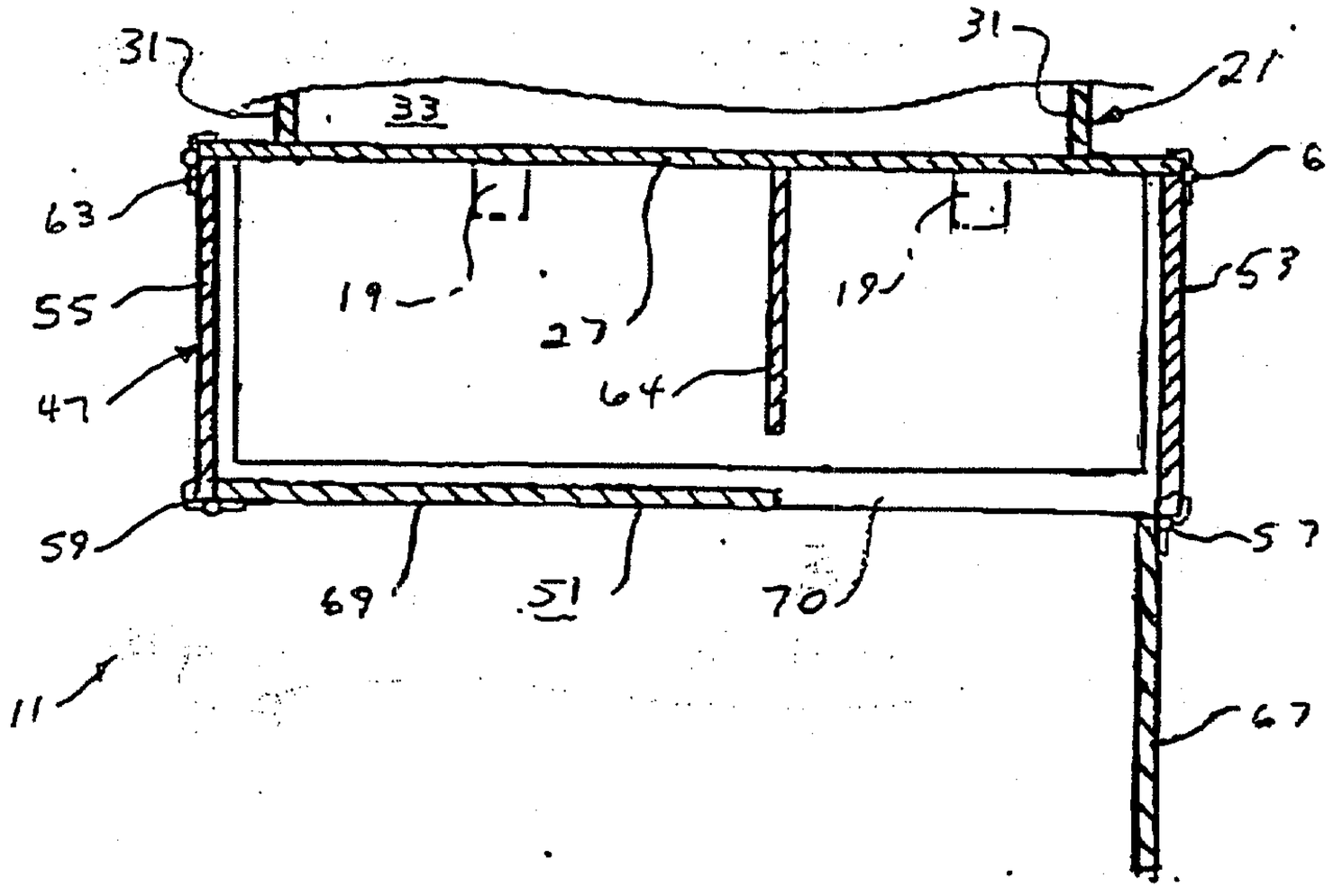
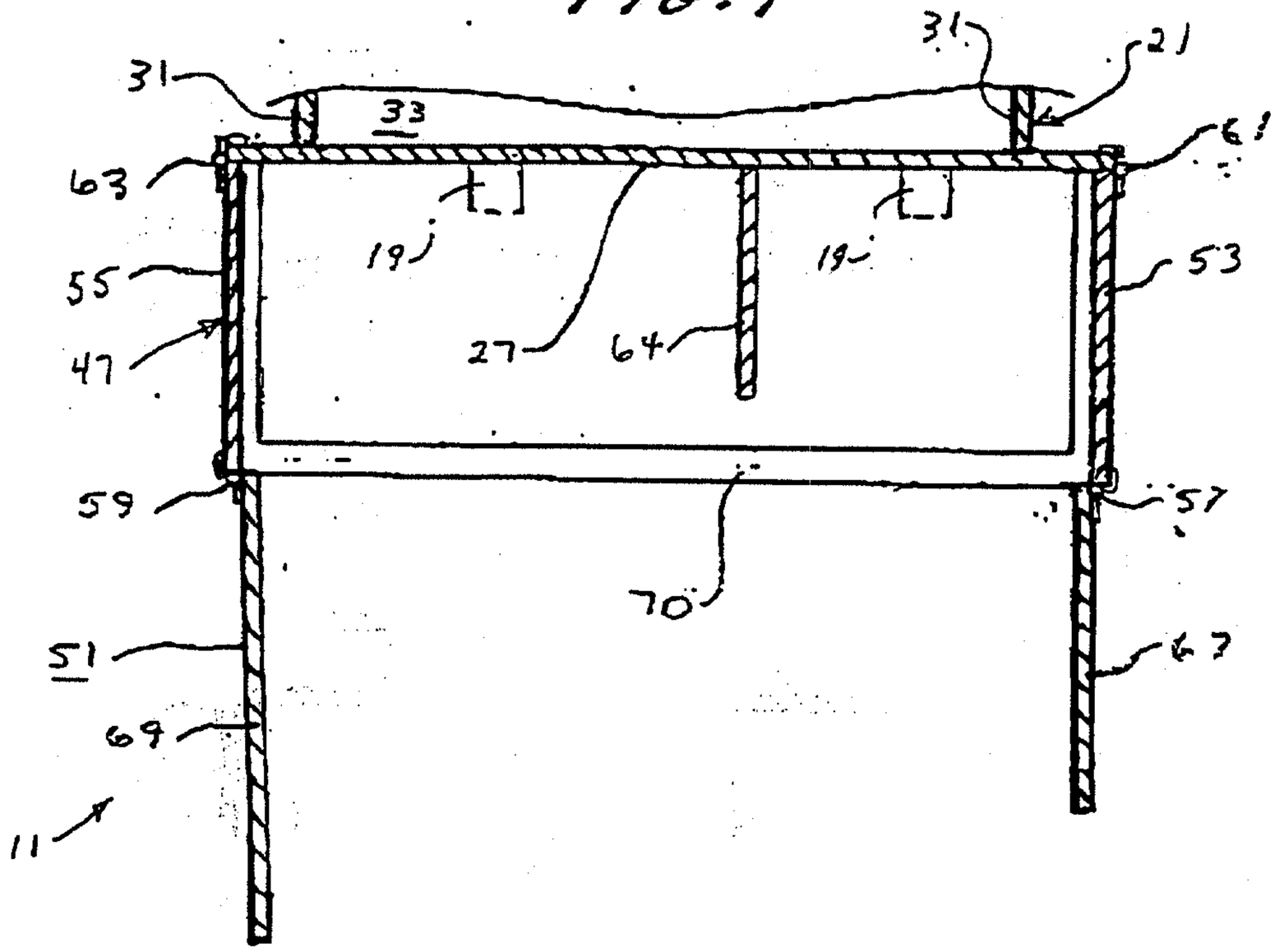

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FIG. 4


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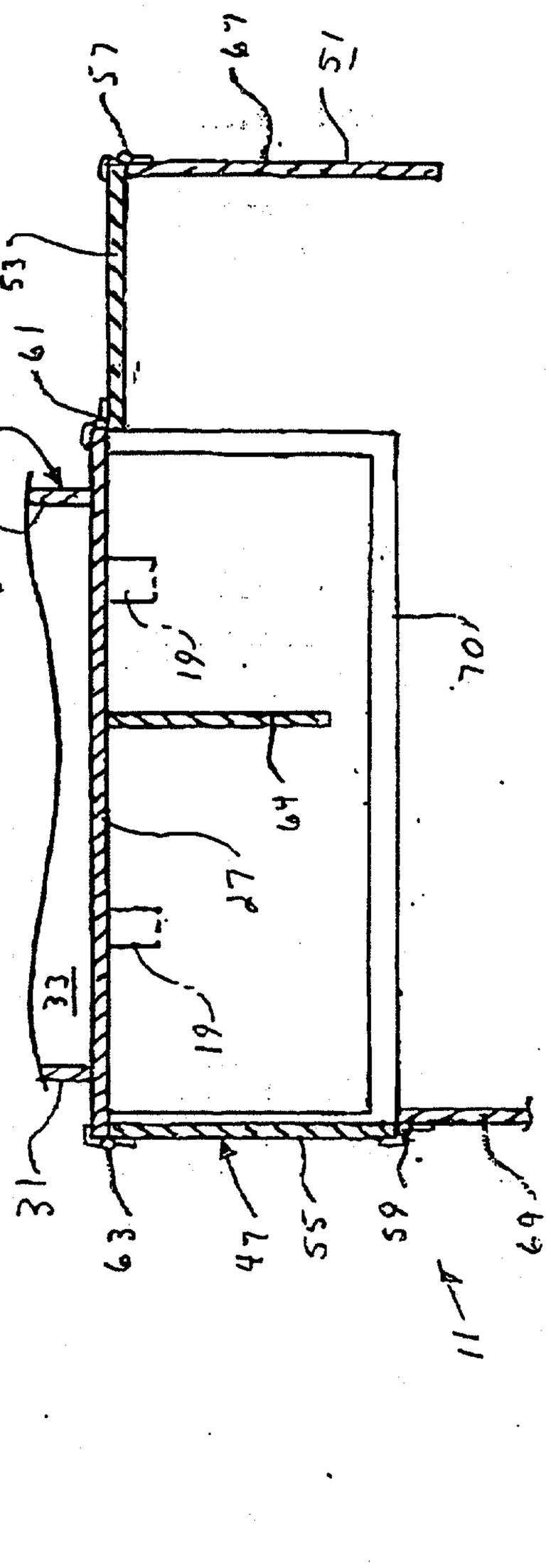

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FIG. 5

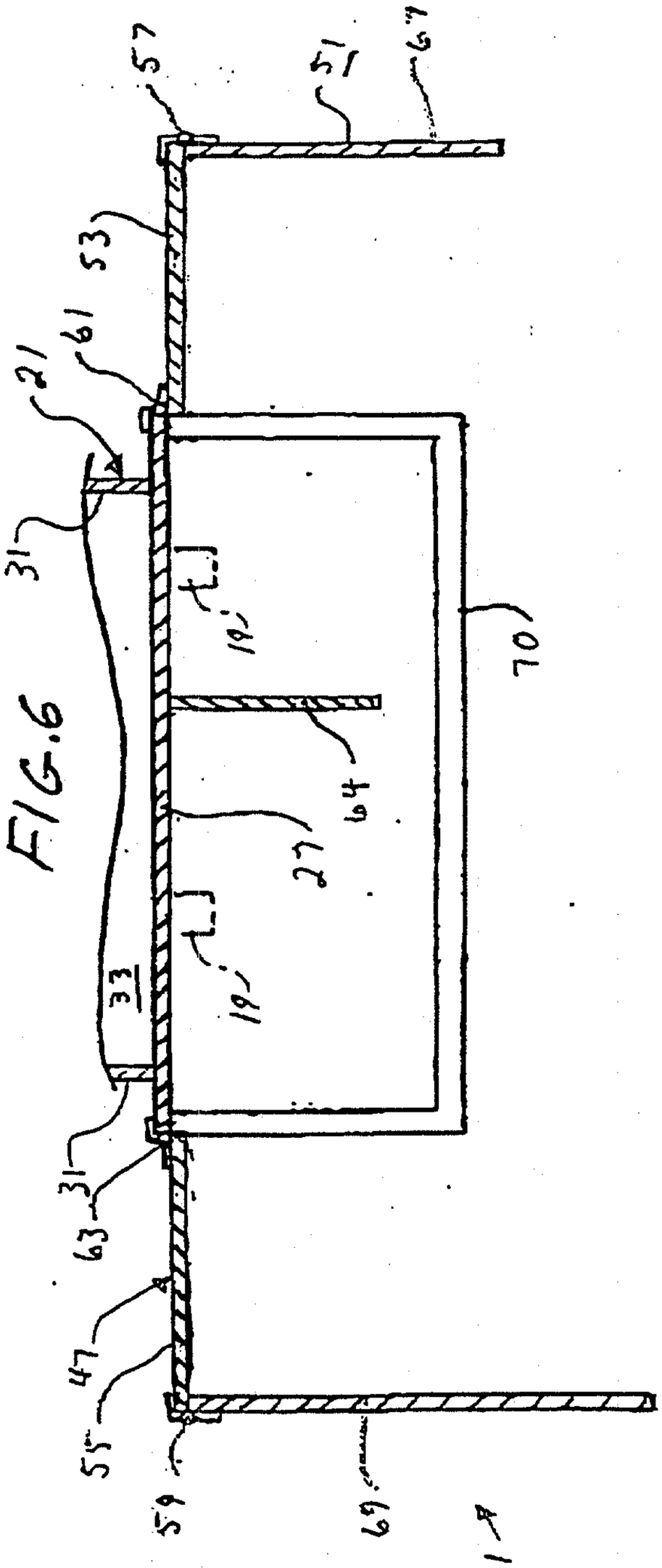

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FIG. 6

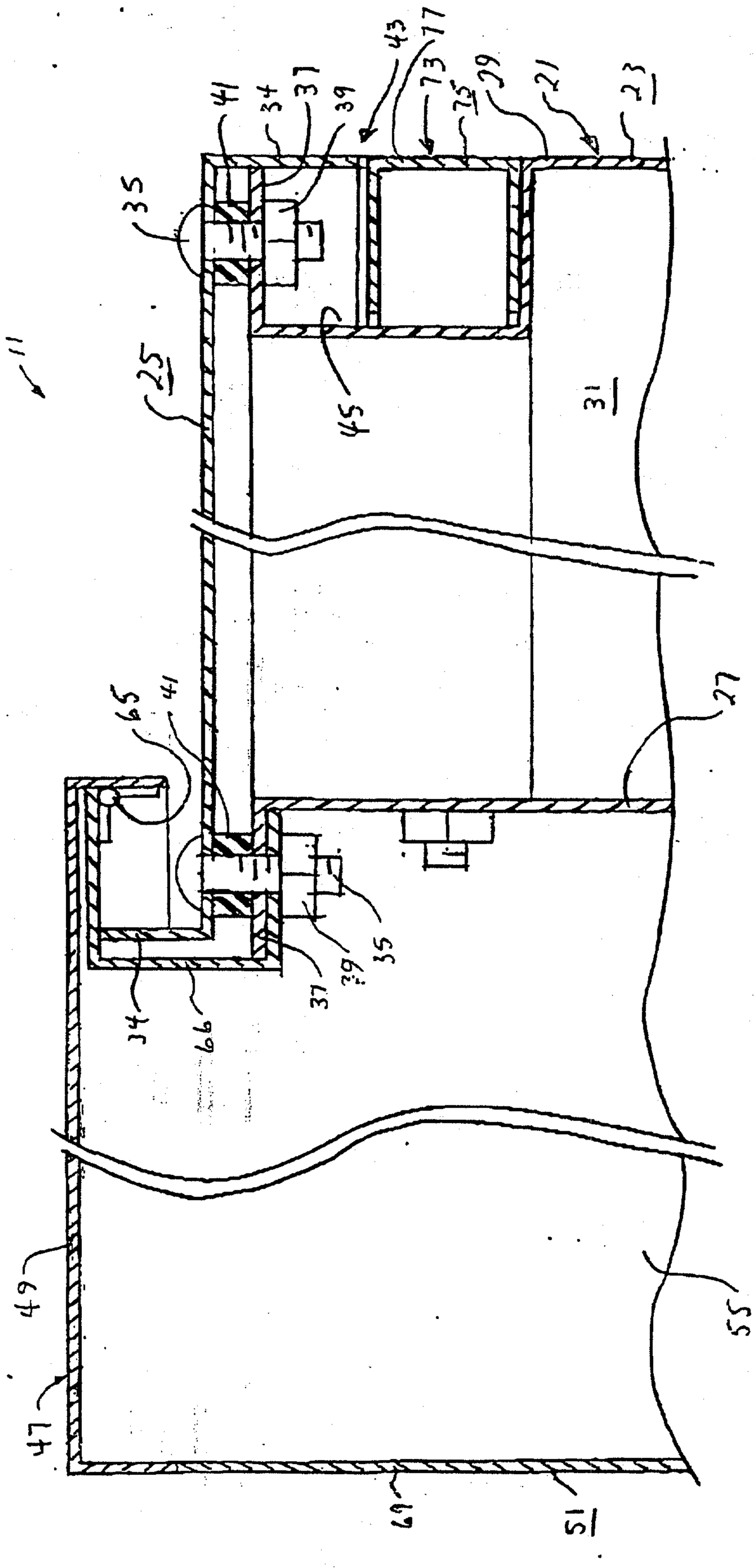

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FIG. 7

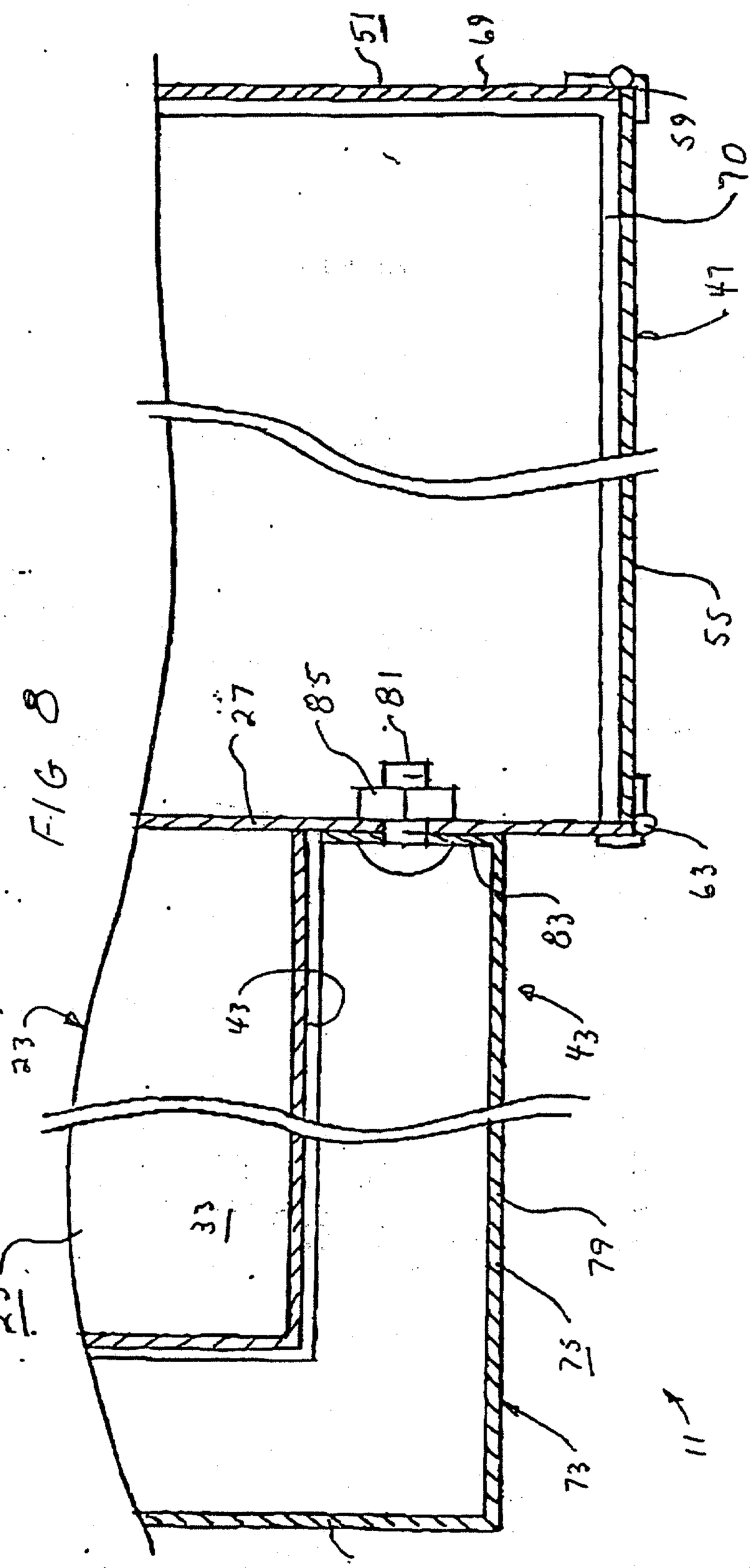
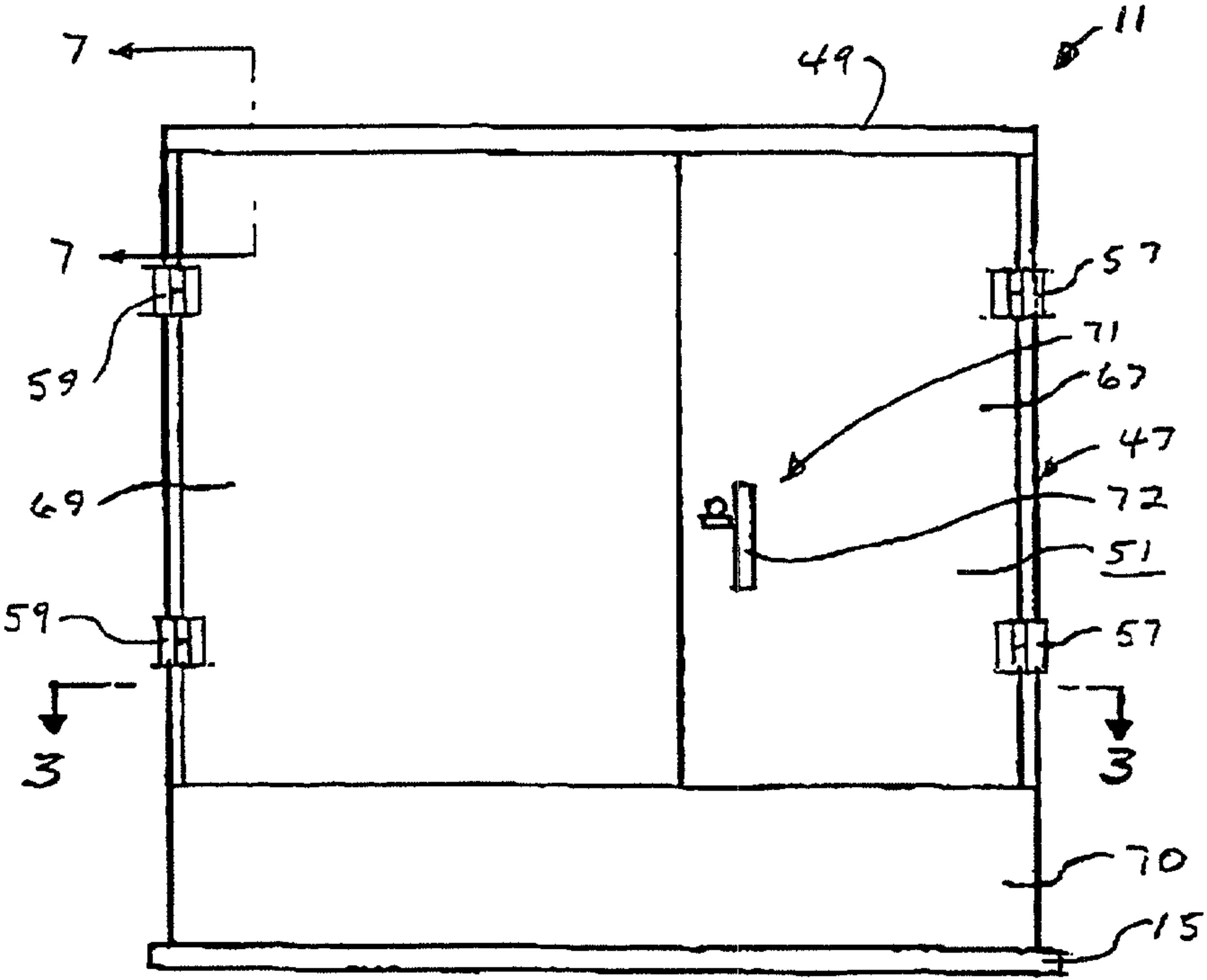


FIG 8


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