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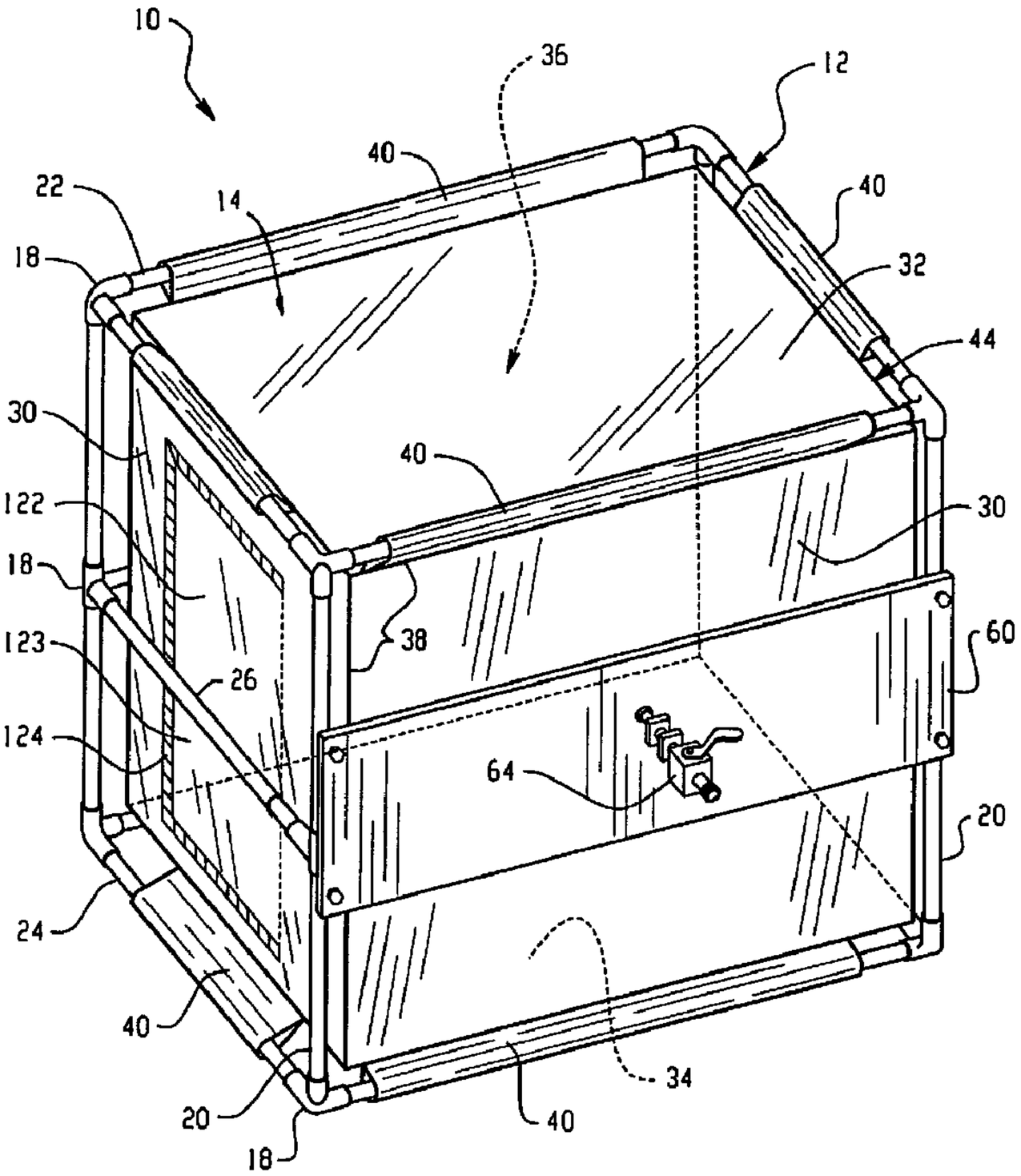
(54) Title: FLEXIBLE WALK-IN ENVIRONMENTAL ENCLOSURE



(57) Abrégé/Abstract:
An enclosure assembly (10, 10', 10") includes a framework (12) formed from structural members and a flexible transparent enclosure (14) which provides an enclosed space for isolation and or treatment of patients, equipment, and the like. A treatment

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(57) Abrégé(suite)/Abstract(continued):
material, such as hydrogen peroxide or other gaseous or vapor sterilant, may be fed to the enclosure to microbially decontaminate or otherwise treat the equipment. The enclosure is quickly assembled and disassembled after use, making it suitable for treatment of large pieces of equipment which are not readily moved or which are too large to be accommodated conventional sterilization equipment.

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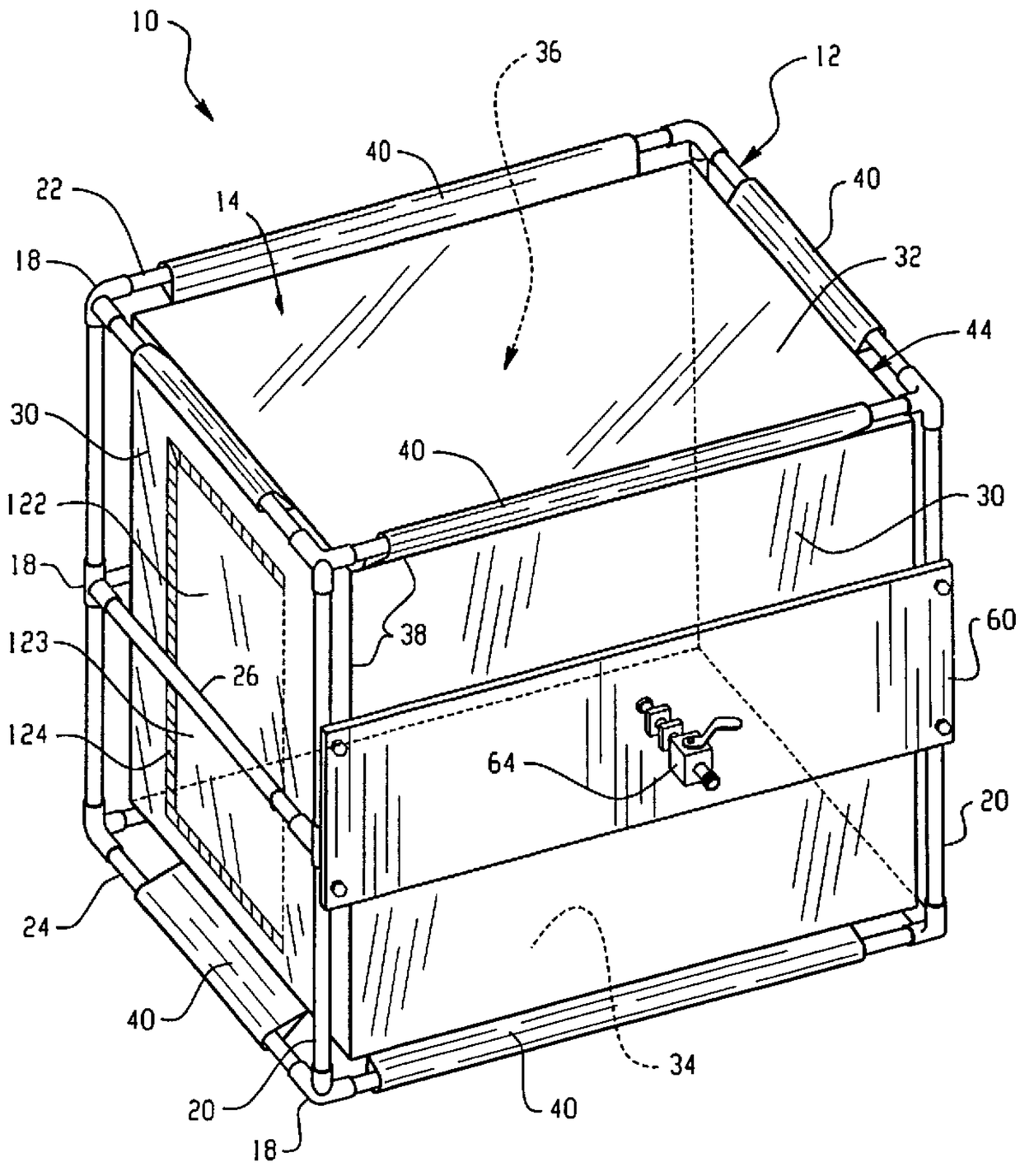
(54) Title: FLEXIBLE WALK-IN ENVIRONMENTAL ENCLOSURE



(57) Abstract: An enclosure assembly (10, 10', 10'') includes a framework (12) formed from structural members and a flexible transparent enclosure (14) which provides an enclosed space for isolation and or treatment of patients, equipment, and the like. A treatment material, such as hydrogen peroxide or other gaseous or vapor sterilant, may be fed to the enclosure to microbially decontaminate or otherwise treat the equipment. The enclosure is quickly assembled and disassembled after use, making it suitable for treatment of large pieces of equipment which are not readily moved or which are too large to be accommodated conventional sterilization equipment.

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FLEXIBLE WALK-IN ENVIRONMENTAL ENCLOSURE

Background of the Invention

The present invention relates to the field of environmental decontamination. It finds particular application in conjunction with a portable enclosure for microbial decontamination of large pieces of equipment, and will be described with particular reference thereto. It should be appreciated, however, that the invention is also applicable to the decontamination, treatment, or isolation of other items, both large and small.

Small pieces of equipment used in medical, pharmaceutical, food, and other applications are frequently sterilized or otherwise microbially decontaminated prior to use or reuse. Concerns arise, however, when larger pieces of equipment, such as food and pharmaceutical processing equipment, mail handling equipment, and the like become contaminated with harmful organisms or other species. Such equipment is often too large or is unsuited to being transported to a decontamination system, such as a sterilizer. Further, there is often concern that transporting the contaminated equipment around a facility or to an offsite decontamination system may pose hazards to those transporting the equipment or may spread the contamination around the facility or to transportation equipment.

The present invention provides a new and improved portable environmental enclosure and method of use which overcome the above-referenced problems and others.

Summary of the Invention

In accordance with one aspect of the present invention, a method of isolating and treating an item is provided. The method includes enclosing the item in an enclosure assembly which includes assembling a framework and hanging a flexible enclosure on the framework. The flexible enclosure defines, at least in part, an enclosed space. At least one fluid supply passage is connected with the enclosure for supplying a treatment fluid thereto. The item is isolated within the enclosed space. The fluid supply passage is connected with a source of the treatment fluid. The treatment fluid is supplied to the enclosed space to treat the item.

In accordance with another aspect of the present invention, a walk-in enclosure assembly is provided. The assembly includes a framework. A flexible enclosure is hung on the framework which defines, at least in part, a substantially airtight enclosed space. A fluid supply passage is fluidly connected with the enclosed space for supplying the enclosed space with a microbial decontaminant.

In accordance with another aspect of the present invention, a decontaminant system is provided. The system includes a portable framework and a flexible enclosure hung on the framework which defines, at least in part, an enclosed space. A fluid flowpath fluidly connects a source of microbial decontaminant with the enclosed space for supplying the enclosed space with a decontaminant fluid.

One advantage of the present invention is that items which are immovable may be readily isolated or sterilized.

Another advantage of the present invention is that equipment which is contaminated may be isolated without moving the equipment to a separate isolation area.

Another advantage resides in its thermal control of the isolated environment.

Still further advantages of the present invention will become apparent to those of ordinary skill in the art upon reading and understanding the following detailed description

of the preferred embodiments.

Brief Description of the Drawings

The invention may take form in various components and arrangements of components, and in various steps and arrangements of steps. The drawings are only for purposes of illustrating a preferred embodiment and are not to be construed as limiting the invention.

FIGURE 1 is a perspective view of an environmental enclosure according to the present invention;

FIGURE 2 is a perspective view of a wall of second embodiment of an environmental enclosure according to the present invention;

FIGURE 3 is a perspective view of a portion of the enclosure of FIGURE 2;

FIGURE 4 is an enlarged view of the control panel of FIGURE 2;

FIGURE 5 is a side view of the control panel of FIGURE 2 and a portable equipment cart; and

FIGURE 6 is a side view of a third embodiment of an environmental enclosure according to the present invention.

Detailed Description of the Preferred Embodiments

With reference to **FIGURE 1**, a portable enclosure assembly **10** is suitable for temporarily isolating and/or treating equipment. The enclosure is readily erected or placed around the equipment to isolate the equipment for a treatment process, such as gaseous decontamination process, for example, with vapor hydrogen peroxide or other gaseous sterilant. The enclosure assembly **10** is also suited to isolating a patient having a communicable disease or who is otherwise contaminated or for protecting people from an exterior hazardous environment. Equipment which can be isolated or treated in the enclosure includes food and beverage processing equipment, such as cooking, processing, chilling, slicing, packaging and bottling equipment which

may be contaminated by food or airborne microorganisms and/or other potentially harmful species. Other equipment can also be treated, such as medical and veterinary equipment contaminated with body fluids or other sources of microorganisms, including beds, chairs, washing facilities, and the like. Pharmaceutical processing equipment, mail-handling equipment, and other equipment may be isolated and/or treated. Equipment is isolated and treated without moving the equipment to an isolation site, reducing the chance that harmful microorganisms will be spread around a facility. Additionally, some equipment which is too heavy or too large convenient movement can be cleaned in place.

The enclosure assembly **10** is configured for treatment processes, particularly microbial decontamination processes, such as sterilization or lesser forms of decontamination, including disinfection and sanitization, but other processes are also contemplated.

The assembly **10** includes an exterior framework **12**, and a flexible enclosure or tent **14**, which is supported by the framework. The framework is formed from elongate rigid members, such as poles **16**, which may be hollow tubes or solid members, and interconnecting pieces or elbows **18**, which allow the framework **12** to be readily assembled and then disassembled when no longer required. The poles **16** and interconnecting pieces **18** are preferably formed of aluminum or other suitable lightweight material. The framework **12** is suitably sized to surround a piece of equipment to be decontaminated or to provide a room which allows isolation of a patient or the like. For example, the framework **12** is 2-5 meters in each dimension.

The framework **12** shown in **FIGURE 1** is assembled from horizontally and vertically oriented members **16**. For example, the framework **12** includes four generally vertical corner members, such as poles **20**, four upper horizontal members, such as poles **22**, and four lower horizontal members, such poles **24**, which together define the shape of

a cube or other six-sided rectangular structure. Four or more horizontal bracing members, such as poles **26** are mounted between the adjacent vertical poles **20** by suitable interconnecting pieces **18**. Similarly, for larger room structures, additional intermediate vertical poles (not shown) are provided between pairs of vertical poles **20**. Diagonal and other bracing arrangements are also contemplated. It will be appreciated that the framework **12** is not limited to six sides but can have any number of sides depending on the desired size and shape of the item or items to be enclosed.

The enclosure **14** is preferably formed from a flexible transparent sheet material, which is airtight, such as vinyl, and is sized to fit in the space provided by the framework **12**. Preferably, the enclosure is slightly smaller than the framework and is suspended inside of it. A suitable vinyl is about 15-25 gauge, preferably about 19 gauge. The enclosure **14** shown in **FIGURE 1** is formed from panels, specifically, four side panels **30**, a roof or top panel **32**, and a floor panel **34**. The panels **30, 32, 34** are sealed together at their edges to define an enclosed space **36** which is preferably airtight, or substantially airtight. By substantially airtight it is meant that if air at a pressure equivalent to 1.5" (about 3.81 cm) water is supplied to the enclosure **14** and allowed to equilibrate for 2 minutes, and then the air pressure supply is disconnected, the pressure within the enclosure after a further 5 minutes is at least 0.8" (about 2 cm) water, more preferably, at least about 1.0" water (2.54 cm). The enclosure **14** may be leak tested, prior to use, to check that the enclosure is substantially airtight, for example, by pressurizing the enclosure to about 1.5 cm water, equilibrating for 1 minute, and testing to ensure that an acceptable pressure level is maintained, such as a pressure of 1.0 cm after 2 minutes

Seams **38** are preferably double lapped and sewn, adhesively joined, thermally fused together, or the like.

The flexible enclosure **14** is suspended from the upper horizontal poles **22** and anchored to the lower horizontal poles **24** by tabs or loops **40**, which are looped over a respective horizontal pole. The tabs **40** keep the enclosure **14** relatively taut when the enclosure assembly **10** is fully assembled to provide the enclosed space **36**. While a single elongated tab **40** is shown for each horizontal pole **22, 24** it will be appreciated that more than one tab or other suspension and anchoring mechanisms may be provided.

The enclosure assembly **10** of **FIGURE 1** is particularly suited to treatment of items which can be transported, for example on a wheeled cart or conveyor, into the enclosure **12**. Food and beverage items, packaging materials, medical appliances, vehicles, mail, and the like are readily treated in the enclosure **10**.

With reference now to **FIGURE 2**, a second embodiment of an enclosure assembly **10'** is formed without a floor panel and, optionally, without lower horizontal members. The enclosure assembly is similar to the embodiment of **FIGURE 1**. Like components are given the same numerals, designated by a prime (') while new elements are given new numerals.

With reference also to **FIGURE 3**, the enclosure assembly **10'** has a framework **12'** which includes four upper horizontal members **22'**, four vertical corner members **20'**, and optionally additional bracing members **26'**. Plates **46**, which are welded or otherwise attached to a lower end of each vertical corner member **20'**, are provided for mounting the frame+work **12'** to the floor or for resting it thereon.

The enclosure assembly **10'** of **FIGURES 2** and **3** is suited to enclosing a piece of equipment **48** or other structure which is mounted to the floor or which is not readily transported into an enclosure such as that of **FIGURE 1**. The framework **12'** is thus preferably constructed around the equipment **48**, or other item to be enclosed, and the enclosure **14'** hung over the item. Alternatively, the entire enclosure assembly **10'** can be lowered over the equipment

from above.

In this embodiment, flaps **50** are provided at the lower ends of each of the side panels **30'**. These can be extensions of the panels **30'** and formed from the same material. The flaps **50** are configured for resting on the adjacent floor surface **52** on which the enclosure assembly is erected. The edges of the flaps are taped to the floor using duct tape **54** or similar removable tape or other adhering medium to provide a substantially airtight enclosed space **36'** by forming a seal between the enclosure and the floor **52**. For this purpose, the floor **52**, or other surface on which the enclosure is erected, is smooth, or substantially smooth, and is formed from a non-porous material. In the embodiment shown in **FIGURE 2**, the flaps are turned inward, into the enclosed space **36'** within the enclosure **14'**. This embodiment is generally preferred when the enclosure **14'** is to be maintained at an above atmospheric pressure during operation. For instances in which the enclosure **14'** is to be maintained at below atmospheric pressure, the flaps **50** are preferably turned outward, away from the enclosure **14'** and the tape **54** applied outside the enclosure.

As shown in **FIGURE 3**, the walls **30'**, **32'** of the enclosure **14**, **14'** may be formed from two or more separate wall panels (e.g., **30A** and **30B**), which are joined at seams **56**. Optionally, corner reinforcements are provided for extended life.

A rigid support panel in the form of a plate or multiple plates **60**, **60'** is/are mounted to the framework **12**, **12'** of either embodiment for providing gas, electric, and other connections between the exterior of the enclosure and the interior space. As shown in **FIGURE 4**, the plate **60'** is mounted to two adjacent vertical members **20** by bolts **62**, or other suitable fixing members. With reference also to **FIGURE 5**, suitable connectors in the form of ports **64**, **66**, for selective connection with gas inlet and outlet conduits,

such as tubes **68**, **70**, respectively, are provided on a front face **72** of the plate **60'**. The ports **64**, **66** are connected with fluid passages, such as tubes **74**, **76**, which pass through a side panel **30'** of the enclosure **14'**, thereby providing fluid flowpaths into and out of the enclosure. As shown in **FIGURE 5**, quick connects **78**, **80** may be provided for quickly connecting and disconnecting the fluid passages **74**, **76** from the plate **60**. The fluid passages **74**, **76** pass through openings in the enclosure wall **30'** and are sealed around their exteriors to the adjacent wall surface by suitable sealing members **82**. In one embodiment, grommets, flap valves, gaskets, or the like sealingly engage individual passages. In another embodiment, the side panel **30**, **30'** is sealed permanently or releasibly to the plate **60'**. For example, in one embodiment, the side panel **30'** has an opening (not shown) just smaller than the rigid plate **60'**. An adhesive, magnetic, or other seal extends around the periphery of the opening to seal the side panel to the plate.

The plate **60**, **60'** also supports electrical connections **84**, such as an electrical socket or sockets for connecting a source of electrical power (not shown) with equipment within the enclosure **14**, **14'**, such as one or more heaters **86** and one or more circulation fans **88**, lights, electrical equipment, and the like. Connectors **90** for connecting exterior monitoring equipment with sensors **92** within the enclosure are also provided on the plate **60**, **60'**. Such connections **90** may include connections to temperature and humidity sensors, chemical sensors, and the like. Two or more of each of the sensors **92** are preferably disposed around the enclosed space **36'** for determining maximum and minimum values. As with the fluid connections, electrical and sensor wiring **94**, **96** is quickly connectable to and disconnectable from the plate **60**, **60'** for example, by providing suitable electrical sockets **98** on a rear surface **100** of the plate.

As shown in **FIGURE 5**, supporting equipment **102** for maintaining and monitoring the environment within the enclosure **14, 14'** is preferably mounted on a wheeled cart **104**, which is positioned, when needed, adjacent the plate **60, 60'**. The various maintaining and monitoring equipment **102** is advantageously mounted on suitable shelves **106** of the cart.

The equipment **102** illustrated in **FIGURE 5** is exemplary of a system for supplying and monitoring a vapor hydrogen peroxide decontaminant or similar gaseous or vapor decontaminant. It will be appreciated that a variety of gaseous decontaminants are alternatively contemplated, such as vapor peracids, e.g, peracetic acid, gaseous sterilants, such as ethylene oxide, and the like. Alternatively, the enclosure **14, 14'** is used to control escape of hazardous agents from the equipment **48** into the surrounding air or to enclose the equipment during another treatment process.

As shown in **FIGURE 5**, a suitable system **102** for supplying and monitoring vapor hydrogen peroxide introduction and decontamination includes a source **110** of liquid hydrogen peroxide in solution, such as a reservoir of aqueous hydrogen peroxide at a concentration of about 20-40% by weight hydrogen peroxide. The hydrogen peroxide liquid is fed by a pump **111** into a vaporizer **112**, where the hydrogen peroxide and water components are vaporized on a heated surface (not shown). The vapor is carried in a carrier gas, such as air or other flow medium from a source of carrier gas, such as a pump or pressurized reservoir, along the supply conduit **68** to the inlet port **64** using a pump **113**. Valves **114, 115** in the inlet and outlet ports **64, 66**, respectively, are used to regulate the inflow of vapor to the enclosure **14** and outflow of spent vapor. Several inlet ports **64** are preferably provided for supplying different areas of the enclosure space **36**. The spent vapor exits the enclosure **14** through the outlet line **70** and port **66** and is advantageously transported to a catalytic

converter **116** or other destroyer before being released to the atmosphere. Alternatively, all or a portion of the vapor is recirculated through the vaporizer **112**. A control system **118** includes monitoring equipment which receives information from the sensors **92**, such as temperature, humidity, and hydrogen peroxide concentration. The control system uses the information to control variables, such as the rate of hydrogen peroxide vaporization, the carrier gas flow rate, the temperature of the heater **86**, and other operating parameters in order to maintain desired conditions for microbial decontamination within the enclosure.

Hydrogen peroxide is a particularly effective decontaminant for many air and food borne microbes and other toxic materials, including bacteria, fungi, yeasts, and prions. The spores responsible for Anthrax and other microbial contamination, for example, are readily destroyed using a short exposure period of a few minutes. Chemical contaminants may also be treated with a decontaminant gas or vapor, or with another treatment, such as UV radiation, or the like.

Prior to introducing the vapor, a slight negative pressure is preferably applied to the enclosure **14, 14'**, to speed up the introduction and dispersal of the vapor.

The enclosure **14, 14'** is capable of maintaining an interior pressure which is slightly above atmospheric pressure or slightly below atmospheric pressure. Below atmospheric pressures are preferred when it is desirable to minimize any leakage of airborne contaminants from the enclosure. Preferably, for vapor hydrogen peroxide decontamination, the enclosure is able to withstand approximately three times a normal operating pressure of 2-5 cm of water to provide a margin of safety.

With reference once more to **FIGURE 2**, access to the enclosure **14'** is provided by a closure member, preferably a zipper or zippers **120**, which provide a resealable opening **121** into the enclosure. The zipper **120** is preferably of the

type which allows an airtight or substantially airtight seal to be maintained, such as a rail seal type zipper. A suitable zipper is YKK, Inc.'s model No. 8RS-PVC40 (YKK, Inc., Springfield, PA). As shown in **FIGURE 2**, two vertical zippers **120, 120'** are preferably provided at left and right sides of the opening, respectively. The vinyl door **122** panel thus formed between the two zippers is rolled upward to allow access to the enclosure **14'**. The door has its own flap **123**, which can be held down by tape, as for the wall panel flaps **50**. Alternatively, as illustrated in **FIGURE 1**, a single zipper **124** provides three sides of a door. As illustrated, the zipper **124** runs along a lower end of the opening turns, and runs vertically up to the top of the opening and then runs along the top of the opening. The wall panel is sufficiently flexible to allow the door **122** thus created to open. The horizontal bracing members **26** may be removed or left off in the area of the door. In another embodiment, the bracing member is hinged on one side and has a button released snap lock on the other to swing open like a gate.

With reference now to **FIGURE 6** an alternative embodiment of an enclosure assembly **10''**, where like elements are denoted by a double prime (''), has walls **30''** formed from inner and outer layers **130, 132** of vinyl, or other transparent material. The assembly **10''** may be analogous to assembly **10** or **10'** in other respects. The inner layer **130** is suspended inside the outer layer **132** and sealed thereto at upper and lower ends to provide an enclosed wall space **134** therebetween. The enclosed space **134** which can be heated or cooled to maintain a desired temperature within the enclosure **14''**. At the top and side corners, tabs **133** with air passages support the inner wall **130** and maintain the spacing. Each of the walls **30''**, and also the ceiling panel **32''**, and door panel **122''** are preferably double walled. In one embodiment, each panel provides a separate enclosed wall space **134**. Alternatively,

the enclosed spaces **134** in the walls and ceiling are interconnected by fluid passages **135** which allow air to flow between the enclosed spaces and equalize in pressure. The enclosed wall space **134** is inflated by supplying it with air or other fluid under a slight positive pressure. For this purpose, an inlet valve **136** is selectively connected with a source **138** of air (which can be the same as the source of carrier gas, or a different source), such as a pressurized cylinder **140** or a pump or compressor **142.** The air is supplied to the inlet valve **136** under slight positive pressure via a temperature element, such as a heating or cooling element **144.** For hydrogen peroxide or other vapor or gaseous sterilization processes, the temperature element **144** is preferably a heating element, which heats the incoming air to a suitable temperature for maintaining the enclosure **14''** at an optimal temperature for microbial decontamination and to prevent condensation on the walls. An outlet valve **146** provides for release of the air from the enclosed wall space **134** the end of a treatment process and optionally allows the air to slowly bleed from the enclosed space **36''** to allow the enclosed wall space to be supplied with additional heated air, if desired. Flaps **50''** are readily formed by sealing the inner and outer wall layers **130, 132** together at their lower ends.

In an alternative embodiment, heating elements, such as heat lamps (not shown) are placed around the exterior of the enclosure **10, 10', 10''** to heat the walls and the interior space.

To assemble the enclosure assembly **10', 10''**, the framework **12',** is constructed, preferably around an item to be isolated or treated, or in the case of assembly **10**, prior to introduction of the items. The tabs **40, 40', 40''** of the enclosure **14, 14', 14''** are preferably hung on the upper horizontal members **22, 22', 22''** prior to connecting these with the corner connecting members. In the case of the assembly of **FIGURE 2**, the zipper(s) **120** are opened and an

operator enters the room to tape the flaps **50** to the floor. The heaters **86**, fans **88**, and any other equipment for a treatment process are positioned in the enclosed space **36** and connections made to the panel **60, 60'** using the quick connects. The zipper(s) **120** are then closed and taping of the door panel flap **123** is carried out, if necessary. The ends of the zipper **120** are also sealed by design of the zipper. In the case of the enclosure of **FIGURE 6**, heated or cooled air at a suitable temperature is supplied to the wall spaces **134**. Control equipment and supply and monitoring equipment **102** are positioned adjacent the enclosure assembly and the appropriate connections made via the plate **60, 60'**.

A treatment material, such as a vapor or gaseous sterilant, is fed to the enclosed space **36, 36'**, e.g., at a pressure of about 2-5 cm of water, and maintained in the enclosure for a sufficient period of time to effect the desired treatment process, such as sterilization or disinfection. During the treatment process, conditions within the enclosure are preferably monitored and controlled to maintained desired conditions for treatment. At the end of the treatment process, a slight negative pressure is applied to the enclosure **14, 14'** to draw the vapor out of the enclosure and to draw fresh air into the enclosure in its place. Alternatively, the enclosed space **36** is flushed with filtered air. Once a safe atmosphere in the enclosure has been restored, the zipper **120** is opened and the operator enters to remove the tape **54** from the flaps **50**. The electrical and fluid connections **78, 80, 98,** are disconnected and the lines **68, 70** disconnected from their respective ports **64, 66**. The enclosure assembly **10, 10', 10''** is then disassembled and moved to another location or placed into storage until needed again. The equipment cart **104** is wheeled away.

It will be appreciated that the enclosure **10, 10', 10''** has a variety of other applications, including isolation of potentially contaminated equipment and patients. For such

applications, the enclosure may be maintained under a slight negative pressure using a pump or other suitable suction equipment (not shown). Air that is withdrawn from the enclosure through valve **115** is passed through a filter, such as a HEPA filter (not shown), and any other treatment equipment needed to remove the contamination from the air. The enclosure, being not completely leak tight, allows a small amount of air to slowly leak into the enclosure to replace the withdrawn air, thereby allowing the air quality in the enclosure to be maintained. Alternatively, the inlet valve **114** is cracked open to allow air to bleed into the enclosure to replace the withdrawn air. Inlet air is optionally filtered.

Having thus described the preferred embodiments, the invention is now claimed to be:

1. A method of isolating and treating an item characterized by:

enclosing the item in an enclosure assembly including:

assembling a framework, the framework being sized to surround the item;

hanging a flexible enclosure on the framework, the flexible enclosure defining, at least in part, an enclosed space, at least one fluid supply passage (74) being connected with the enclosure for supplying a treatment fluid thereto;

sealing a lower end of the flexible enclosure to an associated floor surface to provide a substantially airtight enclosed space around the item;

isolating the item within the enclosed space;

connecting the fluid supply passage with a source of the treatment fluid; and

supplying the treatment fluid to the enclosed space to treat the item.

2. The method of claim 1, further characterized by:

after the step of supplying the treatment fluid to the enclosure, removing the enclosure from the framework and disassembling the framework.

3. The method of either one of preceding claims 1 and 2, further characterized by:

the step of assembling the framework including connecting together a plurality of elongate members.

4. The method of claim 3, further characterized by:

the step of hanging the flexible enclosure on the framework including:

suspending the flexible enclosure from upper elongate member by a plurality of tabs.

5. The method of any one of preceding claims 1-4, further characterized by:

prior to the step of supplying the treatment fluid to the enclosure, testing the enclosure to ensure that it is at least substantially airtight.

6. The method of any one of preceding claims 1-5, further characterized by:

the enclosure including a plurality of flexible panels, joined together at seams thereof.

7. The method of claim 6, further characterized by:

the flexible panels including a top panel, at least one side panel, and a floor panel, which together define the enclosed space.

8. The method of any one of claims 6-7, further characterized by:

at least one of the flexible panels including an inner layer and an outer layer which together define an interior wall space therebetween, the method further comprising:

supplying a fluid at positive pressure to the interior wall space.

9. The method of claim 8, further characterized by:

one of heating and cooling the fluid before the fluid enters the interior wall space.

10. The method of any one of claims 1-9, further characterized by:

the treatment fluid including an antimicrobial gas or vapor.

11. The method of claim 10, further characterized by:

the antimicrobial gas or vapor including hydrogen peroxide.

12. The method of any one of claims 1-11, further characterized by:

at least one fluid outlet passage being connected with the flexible enclosure for passing treatment fluid out of the flexible enclosure and the method further includes removing treatment fluid from the enclosure via the fluid outlet passage.

13. The method of claim 12, further characterized by:

propelling the treatment fluid throughout the enclosure and into difficult to access portions of the item.

14. The method of any one of claims 1-13, further characterized by:

a support panel being mounted to the framework and supporting a connector, connected with the fluid supply passage, for selectively connecting the fluid supply passage with a fluid supply conduit which is connected with the source of the treatment fluid, the step of connecting the fluid supply passage with the source of treatment fluid including selectively connecting the connector with the fluid supply conduit.

15. The method of any one of claims 1-14, further characterized by:

the flexible enclosure being formed from an airtight material.

16. The method of any one of claims 1-15, further characterized by:

the source of treatment fluid including a vaporizer for converting a liquid to the treatment fluid, the method

further comprising:

vaporizing the liquid to form the treatment fluid; and

transporting the treatment fluid to the enclosure in a flow of a carrier gas.

17. A method of isolating and treating an item comprising:

enclosing the item in an enclosure assembly including:

assembling a framework, the framework being sized to surround the item

hanging a flexible enclosure on the framework around the item, the flexible enclosure defining, at least in part, an enclosed space, and including a plurality of flexible panels joined together at seams thereof, at least one of the flexible panels including a door formed, at least in part, by a rail-type zipper, at least one fluid supply passage being connected with the enclosure for supplying a treatment fluid thereto;

selectively opening the door to provide access to the enclosed space;

isolating the item within the enclosed space;

connecting the fluid supply passage with a source of the treatment fluid; and

supplying the treatment fluid to the enclosed space to treat the item.

18. The method of claim 17, further comprising:

sealing a lower end of the flexible enclosure to an associated floor surface to provide a substantially airtight enclosed space around the item.

19. A method of isolating and treating an item comprising:

enclosing the item in an enclosure assembly including:

assembling a framework, the framework being sized to surround the item;

hanging a flexible enclosure on the framework, the flexible enclosure defining, at least in part, an enclosed space, a support panel being mounted to the framework, the support panel including a connector for connecting a sensor within the enclosure with monitoring equipment, at least one fluid supply passage being connected with the enclosure for supplying a treatment fluid thereto;

isolating the item within the enclosed space;

connecting the fluid supply passage with a source of the treatment fluid;

supplying the treatment fluid to the enclosed space to treat the item;

selectively connecting the sensor with the monitoring equipment via the connector; and

monitoring environmental conditions within the enclosure with the sensor.

20. A method of isolating and treating an item characterized by:

enclosing the item in an enclosure assembly including:

assembling a framework, the framework being sized to surround the item;

hanging a flexible enclosure on the framework, the flexible enclosure defining, at least in part, an enclosed space, at least one fluid supply passage being connected with the enclosure for supplying a treatment fluid thereto;

isolating the item within the enclosed space;

connecting the fluid supply passage with a source of the treatment fluid;

supplying the treatment fluid to the enclosed space to treat the item, the source of treatment fluid being supported by a movable cart; and

positioning the cart adjacent the enclosure.

21. The method of claim 20, further comprising:

the cart also supporting at least one of:

a source of a carrier gas;

a reservoir of a liquid;

a vaporizer for converting the liquid to the treatment fluid;

a pump for pumping the liquid to the vaporizer;

a catalytic converter for decomposing spent treatment fluid which has passed through the enclosure;

monitoring equipment for monitoring environmental conditions within the enclosure, the environmental conditions including at least one of temperature, pressure, and concentration of at least one component of the treatment fluid.

22. A walk-in enclosure assembly comprising:

a framework;

a flexible enclosure hung on the framework which defines, at least in part, a substantially airtight enclosed space;

a fluid supply passage fluidly connected with the enclosed space for supplying the enclosed space with a microbial decontaminant; and

a support panel mounted to the framework, the support panel carrying a connection which selectively connects a fluid supply conduit, exterior to the enclosure, with the fluid supply passage for supplying the microbial decontaminant fluid to the enclosed space and an electrical interconnection which provides an electrical feed-through from the exterior of the enclosure into the enclosed space.

23. The enclosure assembly of claim 22, further comprising:

the framework including a plurality of poles selectively held together by interconnecting pieces.

24. The enclosure assembly of either one of preceding claims 22 and 23, wherein:

the flexible enclosure is transparent.

25. The enclosure assembly of any one of preceding claims 22-24, wherein:

the flexible enclosure is formed from an airtight material which is impervious to strong oxidants.

26. The enclosure assembly of of any one of preceding claims 22-24, wherein:

the flexible enclosure is formed from a plurality of flexible panels joined together by seams.

27. The enclosure assembly of claim 26, wherein:

at least one of the flexible panels includes a door defined by a zipper which is selectively openable to provide access to the enclosed space.

28. The enclosure assembly of either one of preceding claims 26 and 27, wherein:

the enclosed space is defined, at least in part, by an associated floor surface, at least one flap extending from the flexible panels, the flap being configured for being sealed to the floor surface.

29. The enclosure assembly of any one of claims 26-28, wherein:

at least one of the flexible panels includes an inner layer and an outer layer which together define an interior wall space therebetween.

30. The enclosure assembly of claim 29, further including:

a source of gas fluidly connected with the interior wall space which supplies a gas under positive pressure to the interior wall space.

31. The enclosure assembly of either one of claims 29 and 30, further including:

a temperature element which selectively heats or cools the gas before entering the interior wall space.

32. A decontaminant system including:

a portable framework;

a flexible enclosure hung on the framework which defines, at least in part, an enclosed space;

a source of a microbial decontaminant including;

a reservoir containing a liquid; and

a vaporizer for vaporizing the liquid to form the microbial decontaminant;

a source of carrier gas for mixing with the vaporized microbial decontaminant and transporting the vaporized microbial decontaminant to the enclosure;

a fluid flowpath fluidly connecting the vaporizer with the enclosed space for supplying the enclosed space with the vaporized microbial decontaminant.

33. The enclosure assembly of claim 32, further comprising a support panel mounted to the framework, the support panel carrying a connection which selectively connects a fluid supply conduit, exterior to the enclosure, with the fluid supply passage for supplying the decontaminant fluid to the enclosed space.

34. The decontaminant system of claim 33, wherein:

the fluid flowpath includes a fluid conduit exterior to the enclosure which is fluidly connected with the source of

decontaminant and a fluid supply passage which enters the enclosure, the system further including a connector, mounted to the framework, for selectively fluidly connecting the fluid conduit and the fluid supply passage.

35. The decontaminant system of claim 33, further including:

a cart, at least one of the reservoir, vaporizer, and source of carrier gas being mounted on the cart.

36. The decontaminant system of any one of claims 33-35, wherein:

the enclosure is configured for maintaining a positive pressure such that when air at a pressure equivalent to about 3.81 cm water is supplied to the enclosure, the enclosure maintains a pressure equivalent to at least 2 cm water for at least five minutes after the air supply is disconnected.

37. The decontaminant system of any one of claims 33-36, further including:

a fluid exhaust flowpath, connected with the enclosure, through which spent microbial decontaminant exits the enclosure.

38. The decontaminant system of any one of claims 33-37, further including:

a support panel mounted to the framework, the support panel carrying:

a first connection which selectively connects a fluid supply conduit, exterior to the enclosure, with a fluid supply passage to form the fluid supply flowpath; and

a second connection which selectively connects a fluid passage, connected with the enclosure, with an outlet conduit to form the fluid exhaust flowpath.

39. The decontaminant system of claim 38, further including:

the support panel supporting a connection for selectively connecting a sensor within the enclosure with monitoring means, outside the enclosure.

40. The decontaminant system of any one of claims 33-39, further including:

a circulation means, disposed within the enclosure, for circulating the microbial decontaminant throughout the enclosed space.

41. The decontaminant system of claim 40, wherein:

the circulation means includes a fan.

42. A decontaminant system comprising:

a portable framework;

a flexible enclosure hung on the framework which defines, at least in part, an enclosed space;

a cart, movable to a position adjacent the enclosure;

a source of microbial decontaminant mounted on the cart;

a fluid flowpath fluidly connecting the source of microbial decontaminant with the enclosed space for supplying the enclosed space with the microbial decontaminant.

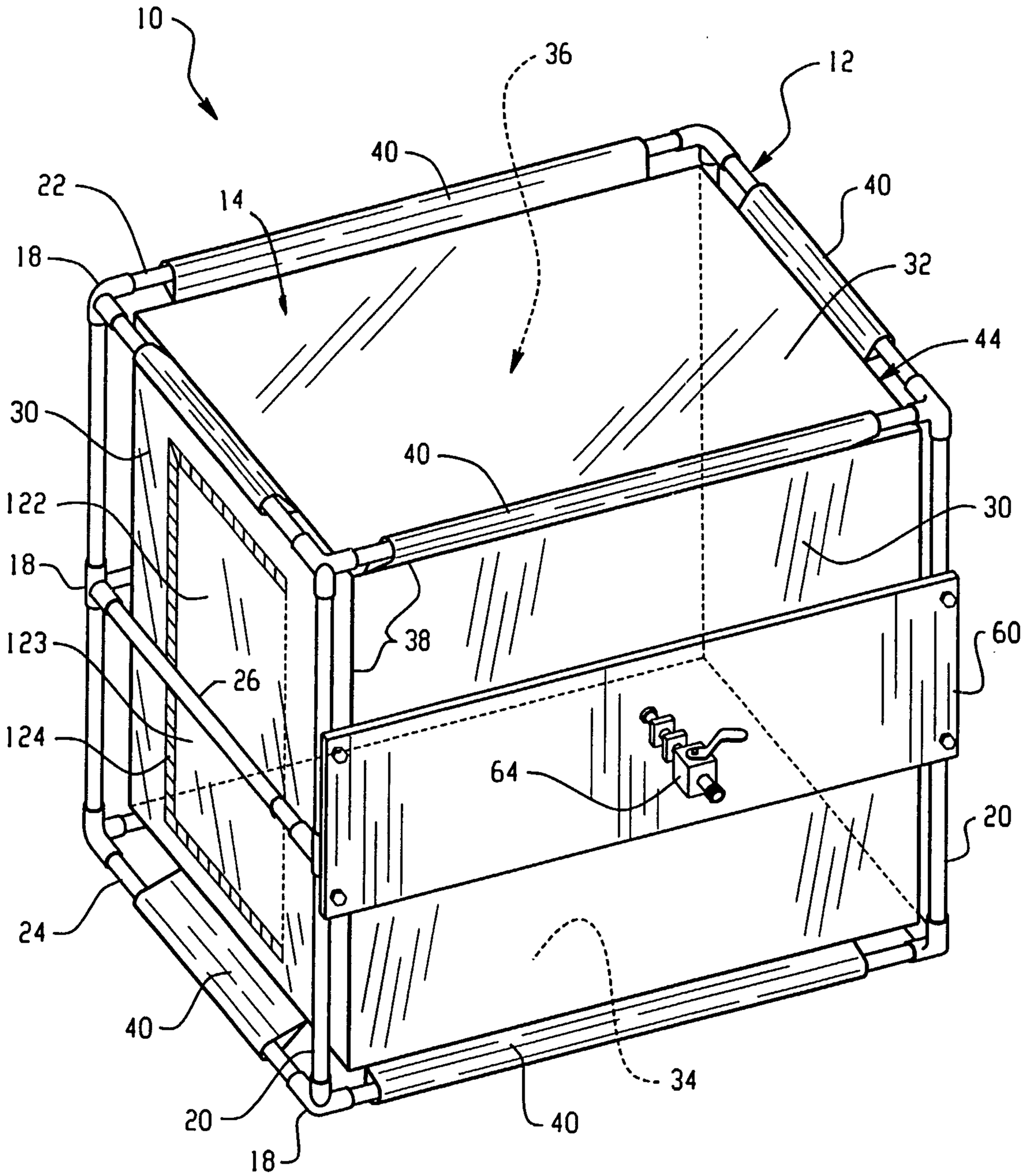
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Fig. 1

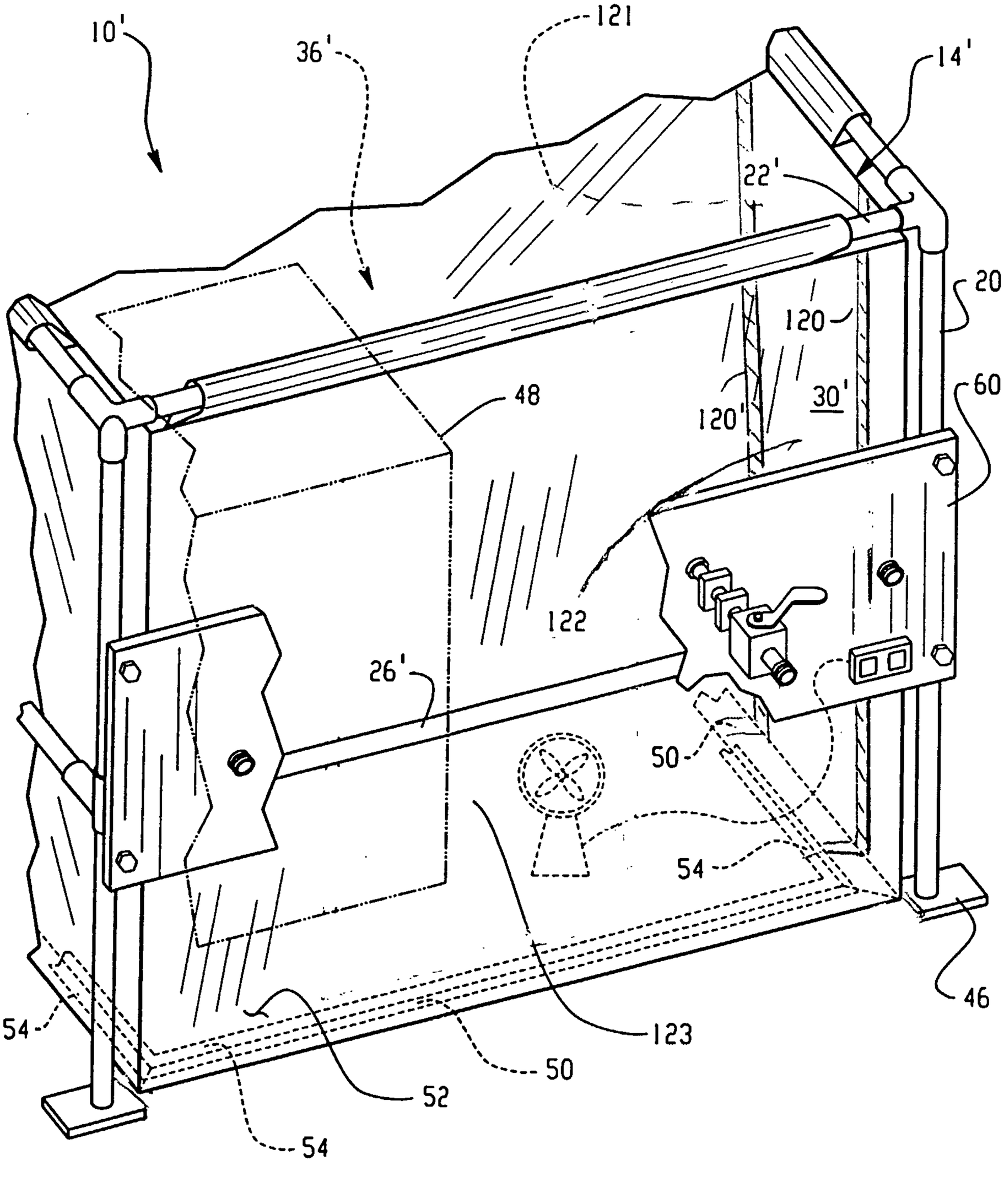

Fig. 2

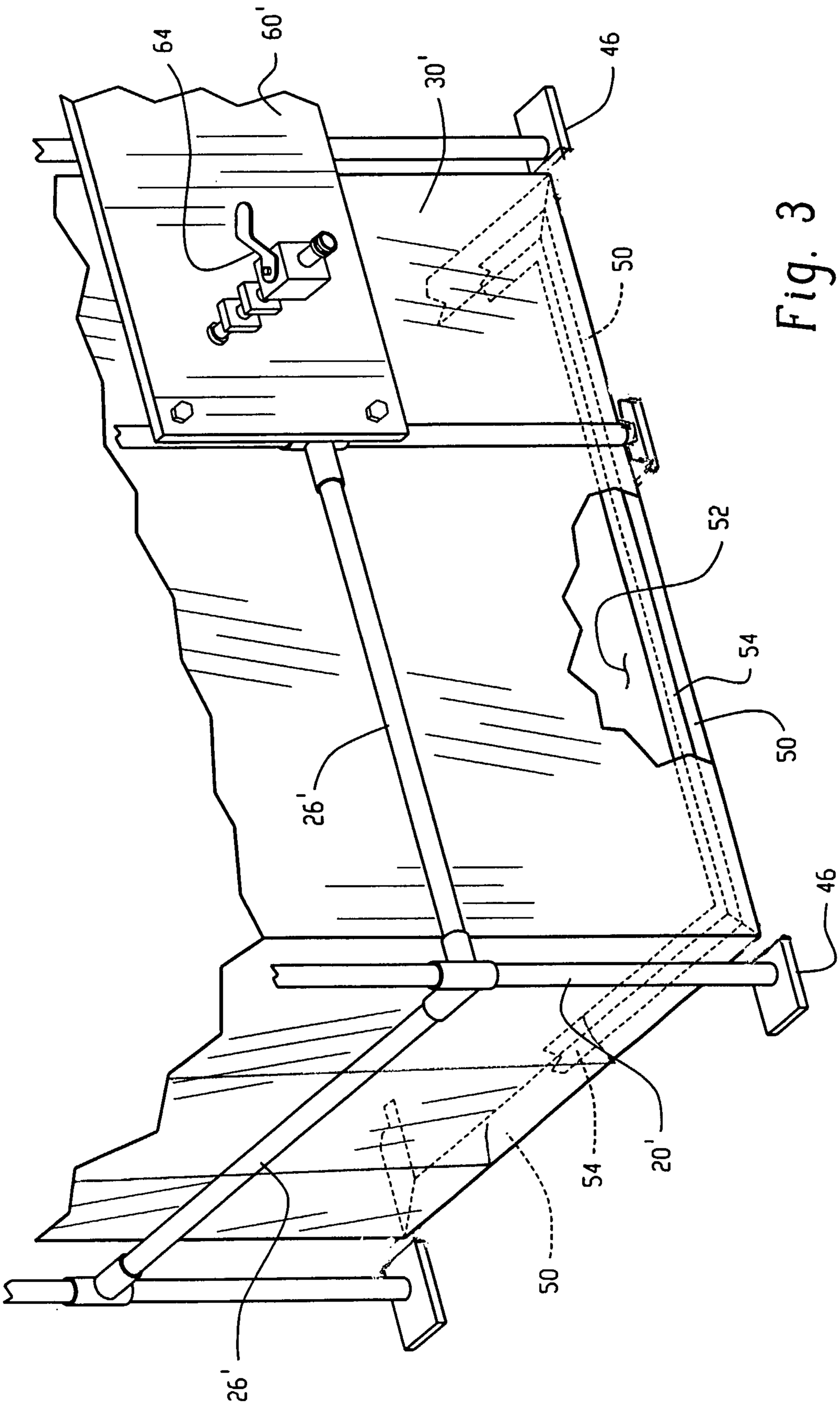

Fig. 3

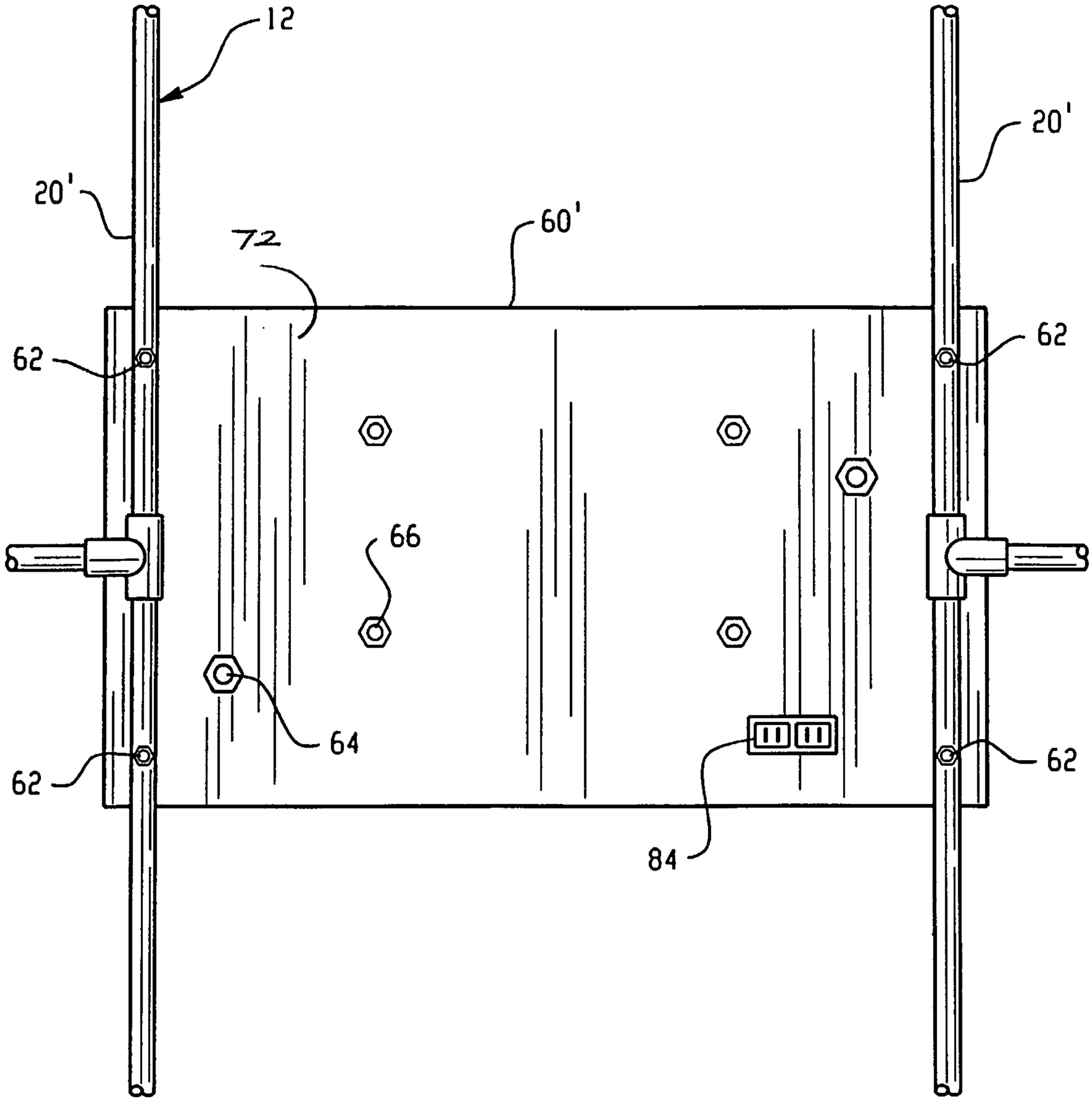

Fig. 4

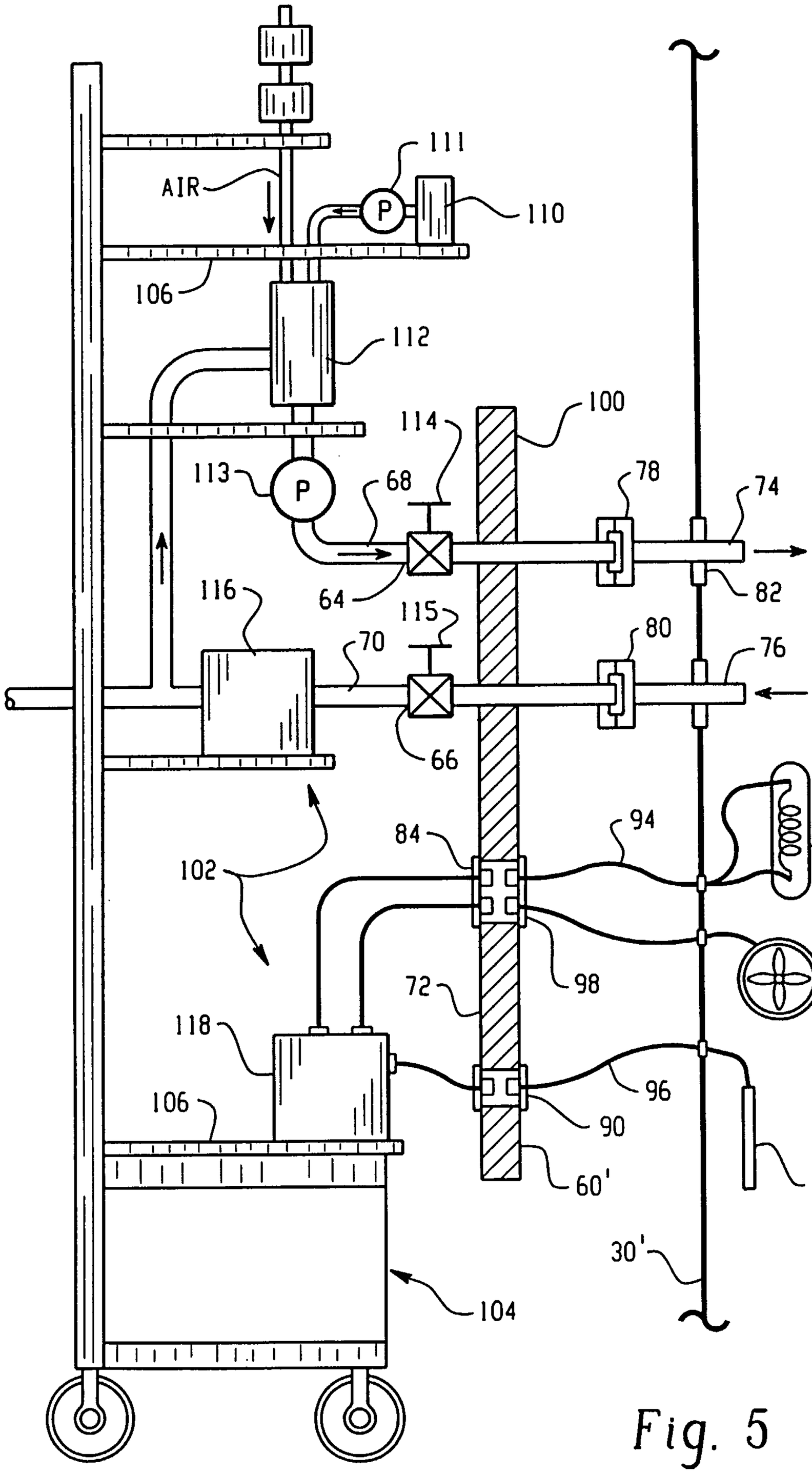
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Fig. 5

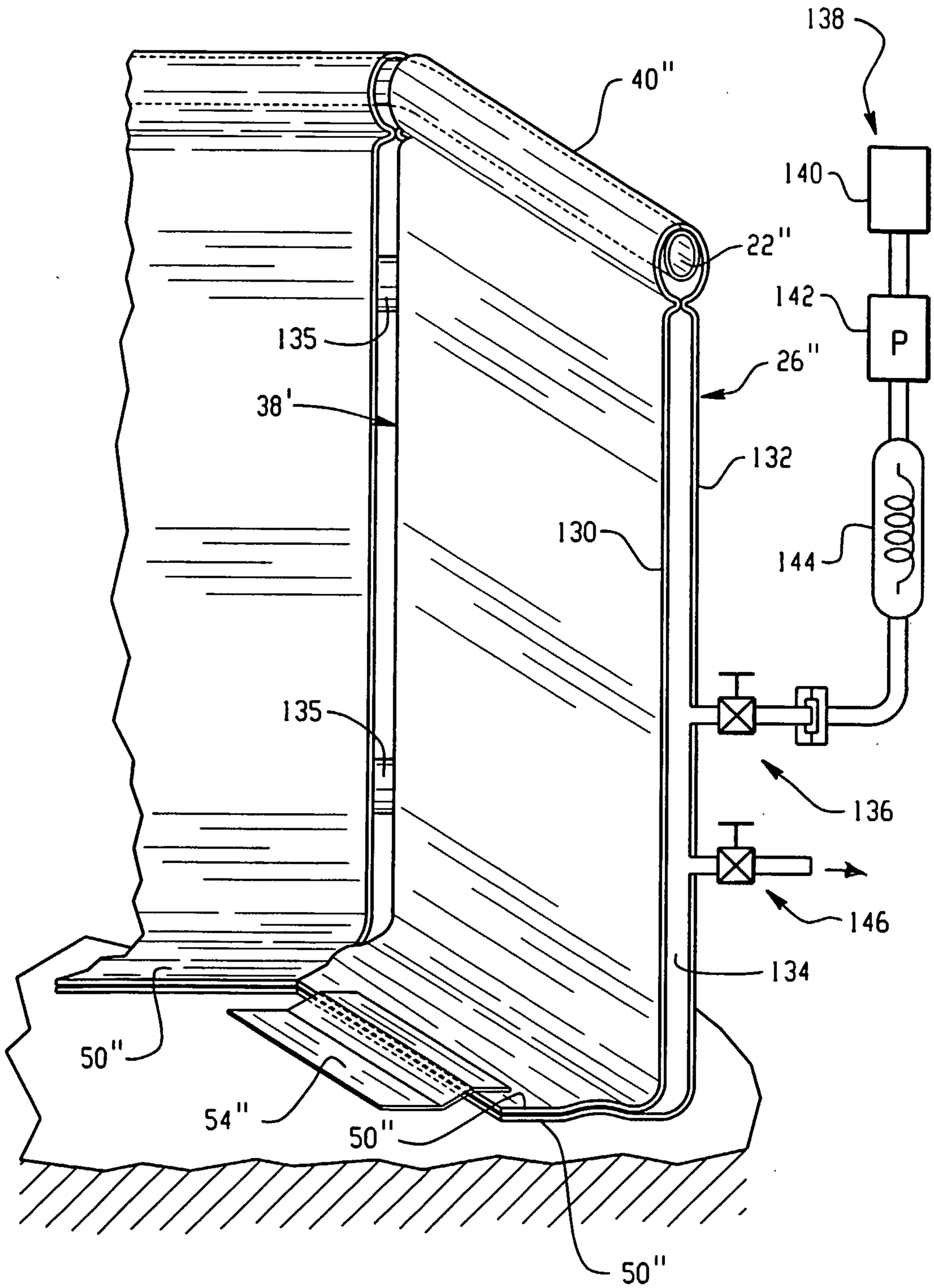
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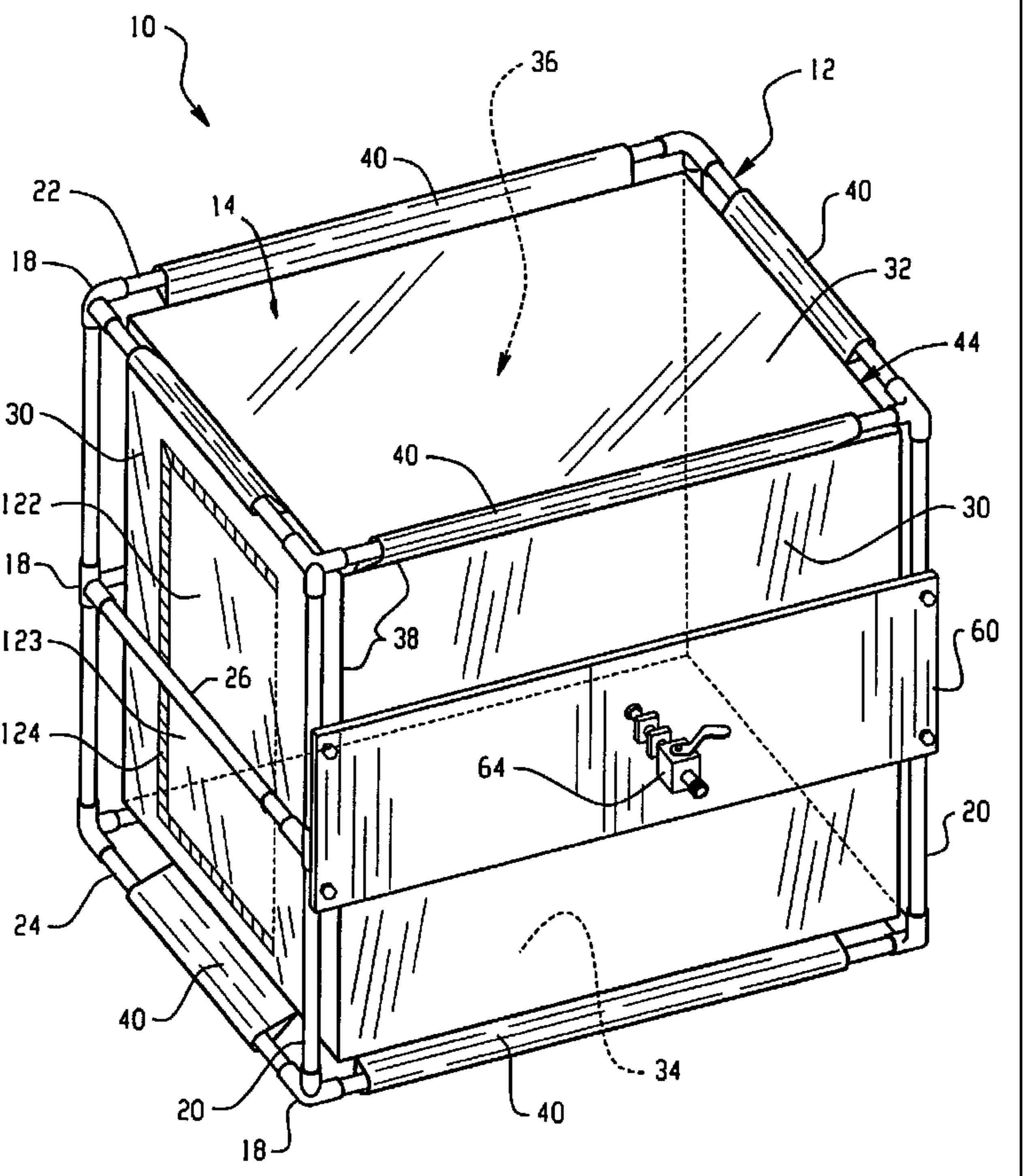
Fig. 6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