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(54) **A modular ventilation system**

(57) A modular ventilation hood has a wall plate (105) being connected to a wall and a first and a second bracket (180,190). A first and second flat panels (200,210) are hung under the wall plate. A third and fourth flat panels (220,230) connect to the wall plate being disposed at ninety degrees with respect to the first and the second flat panels. A first and a second rod (160,170) join the third and the fourth flat panels to the first and the second brackets. A fifth and sixth flat panels

(260, 270) are joined to a free end of the third and the fourth flat panels to form a front of the ventilation hood. A seventh and eighth flat panels (290,300) are joined to the sides of the structure to complete the ventilation hood. A removable grease tray is removably disposed in an interior of the ventilation hood. The flat panels all are lightweight and have a modular and complementary size and shape to facilitate shipping and transport thereof.

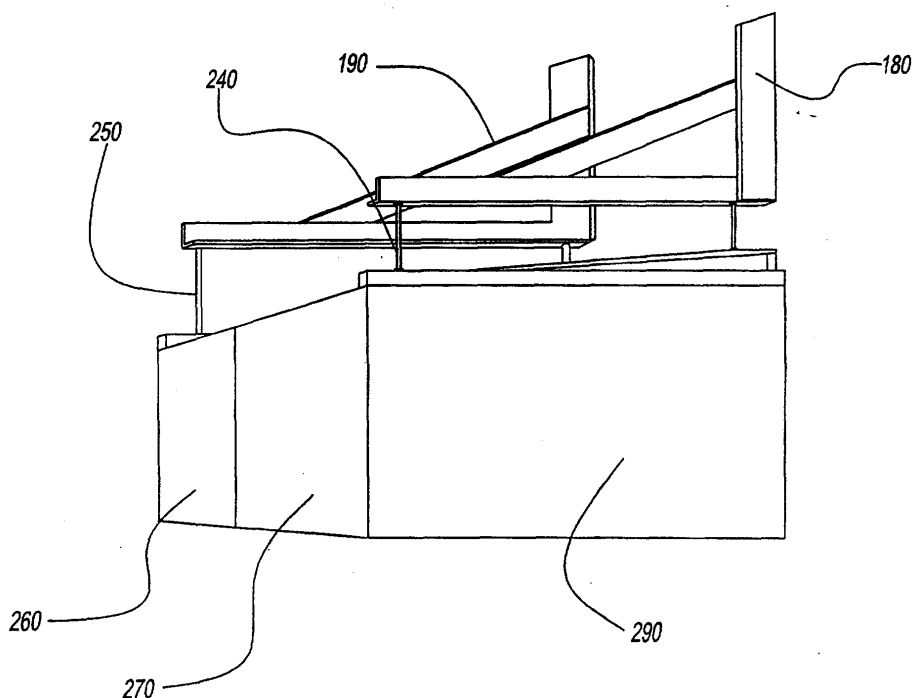


Fig. 1

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Description

[0001] This invention relates to a ventilation system used in commercial cooking. More particularly, the present invention relates to a modular ventilation canopy being assembled by a number of substantially flat panels. The substantially flat panels allow for ease of shipping and for ease of installation. Even more particularly, the present invention relates to the modular ventilation canopy having a grease tray. The grease tray has an improved geometry. The geometry provides for ease of removal and washing.

[0002] Ventilation systems are known for removing contaminated air produced by cooking food products on a cooking appliance. The contaminated air stream has contaminants, such as smoke, grease, oil, smells and other unwanted airborne gaseous substances therein.

[0003] One of the known problems in the art is that there exist numerous and different pollution environments in the commercial cooking and hospitality industries. It is known in the art to tailor pollution abatement solutions to these different commercial cooking pollution environments. These different pollution environments are created by the fact that a number of different restaurant locations often have different cooking appliances and cooking requirements depending upon the food that is prepared at the particular cooking establishment.

[0004] The size of a ventilation hood is an important criteria that varies from restaurant to restaurant. For example, a restaurant that offers a number of fried items on the menu may require a first sized ventilation hood to accommodate several grease fryers disposed adjacent to one another under the ventilation hood. A second restaurant that offers a number of grilled items may require a second sized ventilation hood where one gas grill or gas stove is disposed underneath a smaller sized ventilation hood. The size of the ventilation hood may vary depending on a number of other factors. These factors depend upon the size of the kitchen, the type of food being prepared, relevant fire codes and the combination of cooking appliances being used.

[0005] It has been observed that recently there are an increased number of cooking and fast food establishments that have commenced operations in North America, Asia, and Europe and around the globe. The prevalence of these fast food cooking establishments and relevant fire codes create an increased demand for ventilation system equipment. Often, a supplier of ventilation system equipment typically ships ventilation systems from the supplier to the establishment using commercial freight or one or more commercial carriers.

[0006] The problem is that shipping is costly because the ventilation systems are often large, bulky and heavy. Ventilation systems are often assembled from a number of parts. The numbers of parts each have a different size and weight and are shipped in individual packages. Care must be given to this shipping process such that the parts will not be damaged when they arrive at their

destination. Accordingly, care and time must be given to wrap and package each differently sized part of the ventilation system in paperboard boxes, cardboard boxes or wood boxes with each of the boxes having different sizes.

[0007] This results in each part of the ventilation system having a different packaging arrangement. As such, the supplier must not only expend time and effort to package each part for transport, but also the supplier must order and expend funds for packaging materials. Furthermore, these expenditures are great, as the supplier must expend for differently sized boxes and for each differently sized part of the ventilation system. These packaging materials are expensive and needlessly increase the cost of the product to the consumer.

[0008] Prior art ventilation systems are made from resilient thick members and are generally made from iron or other heavy, fire retardant materials. Most of these materials were designed with main concern that the members be fire retardant. Although effective upon shipping from a central supply location, these thick members can be very costly to transport. These bulky parts of the ventilation system have a size that is inconsistent with the size of most conventional boxes. The bulky size of the parts also results in increased shipping costs and thus increased cost to the consumer.

[0009] Another problem in the prior art is the fact that a number of these heavy and bulky parts can include the heavy grease tray and grease filter. A large, bulky and heavy grease filter has a number of deleterious effects to the ventilation system. The grease filter and grease tray are difficult to remove from the ventilation hood. An important aspect of the grease filter and grease trap is to obviate a fire hazard. However, if the grease trap and grease filter are heavy and in an inconvenient location, the kitchen staff (and other maintenance personnel) may be reluctant to lift and clean them. This difficulty may result in the kitchen staff avoiding removal of the grease filter and washing and proper maintenance of the grease filter.

[0010] Accordingly, there is a need for an improved ventilation system that is less bulky relative to known ventilation systems.

[0011] There is a need for an improved ventilation system formed from a number of modular parts that has a size that facilitates transport.

[0012] There is a need for an improved ventilation system that has an improved geometry that is conducive for packaging.

[0013] There is a still another need for an improved ventilation system that is lightweight.

[0014] There is a still another need for an improved ventilation system that can be formed in a number of different sizes depending upon the requirements of the cooking establishment.

[0015] There is a need for a modular ventilation system that can be readily assembled in a rapid fashion.

[0016] There is a need for a ventilation system that

has a grease trap and a grease filter that are both easily removable and easily cleaned.

[0017] There is a further need for a ventilation system that can be assembled in a rapid and cost effective manner.

[0018] A modular ventilation hood for easy shipment and assembly of the present invention has a first longitudinal support member and a plurality of modular components connected to the first longitudinal support member for forming the modular ventilation hood. Each of the plurality of modular components has a size with a height, a width and a thickness. The height is in a range between about 500 millimeters to about 1500 millimeters. The width is less than about 500 millimeters, and the thickness is less than about 150 millimeters. The plurality of modular components are stackable, and the plurality of modular components are not welded to one another when assembled.

[0019] In a first embodiment, the modular ventilation hood has the plurality of modular components forming a generally orthogonal shaped ventilation hood for being supported on a location of a kitchen with the location being selected from the group consisting of a floor, a ceiling, a wall, a horizontal support structure, a vertical support structure, and any combinations thereof.

[0020] In a second embodiment, the modular ventilation hood has each of the plurality of modular components selected from the group consisting of a stainless steel, a steel, a coated stainless steel, a lightweight metal material, aluminum, a grade S 304 satin stainless steel, and any combinations thereof.

[0021] In a third embodiment, the modular ventilation hood has each of the plurality of modular components with a shape selected from the group consisting of a square shape, a rectangular shape, an orthogonal shape, a substantially square shape, a substantially rectangular shape, and any combinations thereof.

[0022] In a fourth embodiment, the modular ventilation hood has each of the plurality of modular components being connected by a fastener.

[0023] In another embodiment, the modular ventilation hood has the fastener being selected from the group consisting of a rivet, a pop rivet, a plastic pop rivet, a cleat, a U shaped cleat, a nut, a bolt, a threaded bolt, and any combinations thereof, wherein each of the plurality of modular components are connectable to one another without the use of a tool.

[0024] In still another embodiment, the modular ventilation hood has the first longitudinal support member being a wall plate.

[0025] In yet another embodiment, the modular ventilation hood has the first longitudinal support member being rods for connecting to a ceiling.

[0026] In still yet another embodiment, the modular ventilation hood has the size suitable so that each of the plurality of modular components is adapted to be packaged in a complementary substantially similar sized package.

[0027] In yet another embodiment, the modular ventilation hood has the first longitudinal support member being a wall plate with apertures therethrough for connecting the wall plate to a vertical surface and further comprises a substantially "U" shaped flange for engaging the plurality of modular components.

[0028] In yet another embodiment, the modular ventilation hood has each of the plurality of modular components made from a suitable material that is resistant to heat and resistant to steam at a temperature in a range between 400 degrees Fahrenheit to about 450 degrees Fahrenheit (about 200 to 235 degrees Celsius).

[0029] In another embodiment, the modular ventilation hood has a ventilation duct connected to the modular ventilation hood to draw a heated contaminated air stream in a direction away from a cooking appliance.

[0030] In another embodiment, the modular ventilation hood has the plurality of modular components each with a cooking appliance facing side and an outer side, and further comprises an intake area for receiving a contaminated air stream with the intake area being substantially adjacent to the cooking appliance facing side, and wherein the modular ventilation hood has a plurality of internal features being connected at the intake area with the plurality of internal features selected from the group consisting of a lighting system, a plurality of grease filters, a plurality of grease trays, a plurality of insulated cover strips, a safety device and any combinations thereof.

[0031] In another second embodiment, the modular ventilation hood has a ventilation canopy for receiving a grease laden contaminated air stream and a first longitudinal support member having a first space thereon and a recess and the first longitudinal support member is connected to the ventilation canopy at a bottom side thereof. The modular ventilation hood has a second longitudinal support member with a second space thereon and the second longitudinal support member is connected to the ventilation canopy over the first longitudinal support member. The modular ventilation hood has a first grease tray being between the first space and the second space for receiving the grease laden contaminated air stream and a grease tray having a longitudinal member extending therefrom for selectively engaging the orthogonal recess, wherein grease from the grease laden contaminated air stream collects on the first grease tray, and wherein the grease flows opposite the ventilation canopy, and wherein the grease collects in the first grease tray for disposal. The grease filter and the grease tray dispose the grease without any installation of a welded grease channel in the ventilation canopy.

[0032] Certain preferred embodiments will now be described in greater detail by way of example only and with reference to the accompanying drawings, in which like reference characters denote like elements of structure and:

Fig. 1 is a side view of a preferred ventilation hood of the present invention;

Fig. 2 is a perspective view of the ventilation hood of Fig. 1;

Fig. 3 is a perspective view of a wall plate of the ventilation hood of Fig. 1; 5

Fig. 4 is a perspective view of the wall plate of Fig. 3 being installed on a wall;

Fig. 5 is a perspective view of an end of the wall plate of Fig. 3 with a connector disposed through an aperture of the wall plate; 10

Fig. 6 is a side view of the wall plate of Fig. 3 having a first and a second rod extending through apertures to a first and a second bracket;

Fig. 7 is another perspective view of the wall plate with the first and the second rods of Fig. 6 being connected to the first and the second bracket; 15

Fig. 8 is a left side view of the wall plate of Fig. 3 being joined to a first flat panel;

Fig. 9 is another left side view of the wall plate of Fig. 3 having a first flat panel, a second flat panel and a third flat panel; 20

Fig. 10 is a top view of the third flat panel being assembled to the wall plate of Fig. 3;

Fig. 11 is a top view of a "C" being joined between the third flat panel and the fourth flat panel of the ventilation hood; 25

Fig. 12 is a side view of the ventilation hood being assembled with a fifth and a sixth flat panels being joined to the second and the third flat panels of Fig. 9; 30

Fig. 13 is a left side view of the ventilation hood being assembly with a seventh flat panel being joined to sixth flat panel and the fourth flat panel;

Fig. 14 is a right side view of the ventilation hood being assembled with an eighth flat panel being joined to the third flat panel and the first flat panel; 35

Fig. 15 is an interior view of the ventilation hood showing a flange installed;

Fig. 16 is a close up interior view of the flange of Fig. 15; 40

Fig. 17 is another interior view of the preferred ventilation hood of the present invention with a filter bracket;

Fig. 18 is another interior view of the preferred ventilation hood of the present invention with a second filter bracket being installed; 45

Fig. 19 is still another interior view of preferred the ventilation hood of the present invention with a removable grease tray;

Fig. 20 is yet another interior view of the preferred ventilation hood of the present invention with the removable grease tray and a first grease filter being disposed on the filter brackets of Figs. 17 and 18;

Fig. 21 is still yet another interior view of the preferred ventilation hood of the present invention with dual grease filters disposed on the filter brackets of Figs. 17 and 18; 50

Fig. 22 is a view of the ventilation system arranged as a condense ventilation canopy;

Fig. 23 is another embodiment of the condense ventilation canopy of Fig. 22;

Fig. 24 is an embodiment of the ventilation system for use with grease filters being hung from a wall;

Fig. 25 is an embodiment of the ventilation system for use with grease filters being hung from a ceiling;

Fig. 26 is another embodiment of the ventilation system for use with grease filters being hung from a ceiling of Fig. 25;

Fig. 27 is another embodiment of a low level ventilation system for use with grease filters;

Fig. 28 is a perspective view of the wall plate;

Fig. 29 is another perspective view of the wall plate having a flange with the flat panel connected thereto;

Fig. 30 is a perspective view of a pop rivet fastener;

Fig. 31 is a top view of the pop rivet of Fig. 30 being connected to the flat panel;

Fig. 32 is a perspective view of the ventilation system with a rod structure;

Fig. 33 is a close view of the threaded rod of Fig. 32;

Fig. 34 is a view of an interior of the ventilation system;

Fig. 35 is a close up view of a filter bracket in the interior;

Fig. 36 is a view of the grease filter connected to the filter bracket;

Fig. 37 is a cross sectional view of a grease tray and lip;

Fig. 38 is a view of a light of the interior of the ventilation system;

Fig. 39 is a view of a light cover of the light of Fig. 38;

Fig. 40 is a perspective view of an insulated cover strip of the preferred ventilation system of the present invention;

Fig. 41 is a perspective view of the low level ventilation system for use with grease filters of Fig. 27;

Fig. 42 is a back plate of the low level ventilation system for use with grease filters of Fig. 27;

Fig. 43 is a first triangular shaped side panel of the low level ventilation system for use with grease filters of Fig. 27; and

Fig. 44 is a grease tray of the low level ventilation system embodiment for use with grease filters of Fig. 27. 55

[0033] With reference to Figs. 1 and 2, there is provided a ventilation canopy or hood of a ventilation system generally being designated as reference numeral 100. A preferred aspect of the present invention is that the ventilation hood 100 is a modular structure and may be shipped in a number of substantially flat components or panels to decrease a bulkiness of the components and reduce shipping costs. The ventilation system 100 further has the improved feature that it is assembled without any costly welding operations. This allows the

ventilation system 100 to be assembled in a quicker and more rapid manner and further reduces installation costs and welding equipment.

[0034] Preferably, the present invention is directed to a ventilation hood 100. However one skilled in the art should appreciate that the present invention may be used in conjunction with cooking equipment, ventilation ducts, filters, ultra-violet lamp applications, ozone based applications, germicidal applications and any other commercial or residential kitchen ventilation systems known in the art.

[0035] As will be understood from the drawings, the ventilation hood 100 is shipped in a number of flat modular components and is preferably assembled on site. One skilled in the art should appreciate that the ventilation hood 100 could be formed in any size or shape suitable for the desired kitchen application. The ventilation hood 100, for example, could be arranged in nontraditional sizes to accommodate a number of different cooking appliances based upon a need of the kitchen operator or chef. For example, if the kitchen establishment offered solely fried items for sale, the ventilation hood 100 could be assembled to accommodate any number of grease fryers.

[0036] Referring to Figs. 3 through 5, there is shown a wall plate of the present invention generally designated as reference numeral 105. Preferably, the wall plate 105 is a resilient laterally shaped member. The wall plate 105 has a generally "L" shaped cross section. The wall plate 105 also has a first surface 110 having a first and a second aperture 120, 130 and a second surface 115 having a third aperture 140 and a fourth aperture 150.

[0037] Preferably, the first aperture 120 and the second aperture 130 are disposed across the first surface 110 in spaced relation from one another. The third aperture 140 and the fourth aperture 150 are disposed across the second surface 115 in spaced relation from one another.

[0038] As shown in Figs. 4 and 5, a suitable fastener is disposed through the wall to mount wall plate 105. Preferably, a drilling operation is performed being shown on Fig. 4, through the wall. The third and the fourth apertures 140, 150 are aligned with the apertures on the wall to mount the wall plate 105 on a suitable vertical surface such the wall, or any other structure. The fasteners may be any fasteners known in the art, including but not limited to screws, nails, plugs, adhesive, a support structure, bolts, and any combinations thereof.

[0039] Preferably, the wall plate 105 is disposed on the wall at about 2620 millimeters from a floor. Preferably, a lowest edge of the completed ventilation hood 100 is about 2000 mm from the floor. One skilled in the art should appreciate that the ventilation hood 100 is constructed a suitable distance from the floor to allow one or more kitchen appliances to be disposed underneath the ventilation hood. Preferably, the wall plate 105 is disposed in a level fashion on the wall. A suitable pair of fasteners is disposed through the third and the fourth

apertures 140, 150 on the second surface 115 of the wall plate 105 to secure the wall plate 105 on the wall.

[0040] In one exemplary embodiment of the present invention, the wall may not be structurally sound to support the wall plate 105 thereon. For example, the wall may be formed from a dry wall or another non-load bearing material. This problem may be remedied by adding additional support members to the wall plate 105. As shown in Figs. 6 and 7, a first rod 160 and a second rod 170 are connected through the respective first aperture 120 and the second aperture 130.

[0041] The first rod 160 and second rod 170 are then connected to a first bracket 180 and a second bracket 190. The first and the second brackets 180, 190 are both generally triangular in shape. The first and the second brackets 180, 190 each have a free end and a mounting end. Preferably, the first and the second brackets 180, 190 are mounted on the wall by the mounting end so the free end extends outward opposite the wall in a cantilever fashion. A third pair of fasteners mounts the first bracket and the second bracket 180, 190 to the wall on the mounting end. In this manner the first rod and the second rod 160, 170 are rigidly connected to the first bracket and the second bracket 180, 190 to secure the wall plate 105 to the wall.

[0042] Referring to Fig. 8, a first flat panel 200 and a second flat panel 210 are provided. Preferably, the first panel 200 and the second 210 and each of the panels are generally flat and are rectangular or square shaped. Each of the flat panels may fit into a respective number of complementary sized boxes for shipping. Each of the first flat panel 200 and the second flat panel 210 have a height, a width and a thickness with the height being in a range between about 500 millimeters to about 1500 millimeters, and the width being about 500 millimeters, and wherein the thickness is a maximum of about 150 millimeters. Each flat panel is stackable, and is connected to one another by non-welding operations to facilitate costs. Preferably, the first flat panel 200 and the second flat panel 210 are joined to the wall plate 105. Preferably, the first flat panel 200 and the second flat panel 210 are used as a datum or reference point for the assembly of the remainder of the ventilation hood 100. The first flat panel 200 and the second flat panel 210 have a thin width relative to the prior art ventilation hood components and have a thin, flat, lightweight, narrow design. The first flat panel 200 and the second flat panel 210 also have a thin width relative to a height and length of each of the first flat panel and the second flat panel. This allows the first flat panel and the second flat panel 200, 210 to be packed flat during shipping, for example with a commercial carrier.

[0043] This is a greatly unexpected result relative to assembly of the prior art ventilation hoods. Prior art ventilation hoods mostly were constructed with the pervasive belief to deal only with fire retardant concerns. This belief led to assembly with costly thicker metal, and heavy fire retardant materials, such as thick and heavy

irregularly shaped members. These prior art ventilation hoods further needed to be welded to one another. The belief is partly attributed to the fact that these materials withstand a high temperature grease laden air stream and the heat from the cooking appliance. A synergistic result of the present invention that is greatly unexpected relative to the prior art is that the first flat panel 200 and the second flat panel 210 are fire retardant and also are thin members that are not welded to one another to reduce shipping costs. Also, these members are not irregularly shaped but instead can be stacked and are lightweight for easier shipping. This is unexpectedly superior to the prior art as the kitchen operator can have a low cost, low freight unit that is equally fire retardant and acceptable and also can be assembled in modular fashion to accommodate a particular kitchen exhaust need of the commercial kitchen. Moreover, the ventilation system can be easily carried into a kitchen as it is not bulky and does not involve any strenuous lifting of ventilation hood sections. This beneficial property of a low cost, and a low freight unit that is equally fire retardant and acceptable is not present in the prior art. Moreover, for the manufacturer, there is no need for extensive storage costs for many irregularly shaped units. In fact a number of modular components for such a ventilation system 100 can be stacked flat in a relatively smaller space to further reduce costs.

[0044] The first flat panel 200 and the second flat panel 210 are both connected to the wall plate 105 by suitable fasteners and preferably hang substantially underneath the wall plate 105. Referring to Figs. 9 and 10, a third and a fourth flat panels 220, 230 are provided. The third and the fourth flat panels 220, 230 are preferably flat and have a similar shape and size relative to the first and the second flat panels 200, 210. The third and the fourth flat panels 220, 230 are each joined to the wall plate 105. Preferably, the third and the fourth panels 220, 230 extend in a horizontal fashion from the wall plate 105 and preferably form a top of the ventilation hood 100. The third and the fourth flat panels 220, 230 may be formed with a number of apertures thereon to be joined to a ventilation duct (not shown).

[0045] Each of the third and the fourth flat panels 220, 230 form a ninety -degree angle with respect to an orientation of the first flat panel 200 and the second flat panel 210 that are both being hung from underneath the wall plate 105. Preferably, the third and the fourth flat panels 220, 230 are supported in position by a third and a fourth rods 240, 250. The third and fourth rods 240, 250 are connected to the first and the second brackets 180, 190. The third and the fourth rods 240, 250 are longitudinal members and are joined to the first and the second brackets 180, 190 that are connected to the wall. In another embodiment of the present invention, the third and the fourth flat panels 220, 230 may be suitable to be supported directly with the wall in a cantilever fashion.

[0046] Referring to Figs. 11 and 12, a fifth and a sixth

flat panels 260, 270 form a front of the ventilation hood 100 and are joined to an end of the third and the fourth flat panels 220, 230 being opposite the wall plate 105. Preferably, the fifth and the sixth flat panels 260, 270 are disposed with a cleat structure, preferably a substantially "C" cleat structure 280. The "C" cleat structure 280 joins the fifth and the sixth flat panels 260, 270 to one another with the third and the fourth flat panels 220, 230 as shown in Fig. 11. The "C" cleat allows for two adjacent panels to be joined as a rigid structure relative to one another. One skilled in the art should appreciate that the two adjacent panels are joined to one another in a sealed manner so that no grease-laden air could escape therebetween to ambient.

[0047] Referring to Fig. 13, a seventh flat panel 290 is disposed on a respective lateral edge of the third flat panel 220 and sixth flat panel 270. An eighth flat panel 300 is also disposed on a respective lateral edge of the fourth flat panel 230 and the fifth flat panel 260 to complete the generally rectangular shaped ventilation hood 100. One skilled in the art should appreciate that the ventilation hood 100 may have other shapes other than rectangular and the present invention is not limited to this shape. Other shapes are possible such as square, rectangular, polygonal, substantially rectangular shaped, and any combinations thereof.

[0048] Referring to an interior of the ventilation hood 100 a number of internal mating flanges 310 using a number of cleats, preferably "U" shaped cleats for locking the ventilation hood 100 into a rigid rectangular structure as shown in Figs. 15 through 16. Preferably, the internal mating flanges are disposed across the respective flat panels to allow the flat panel to remain rigid and prevent deformation. One skilled in the art should appreciate that the panels are rigid and sealed so that no grease-laden air could escape therebetween to ambient or the kitchen.

[0049] Referring again to the interior of the ventilation hood 100, disposed in the interior of the ventilation hood 100 is a first and a second filter brackets 400, 410. Preferably, the first filter bracket 400 is mounted in a first position being adjacent to the wall plate 105. The second filter bracket 410 is mounted in a second position being underneath the third and the fourth panels 220, 230. However one skilled in the art should appreciate that this position is not limiting. Preferably, the first filter bracket 400 and the second filter bracket 410 are both being disposed in position by suitable connectors or fasteners such as bolts. The first and the second filter brackets 400, 410 are weight-bearing members to allow a grease filter of the present invention to be disposed and supported thereon.

[0050] Referring to Fig. 19, a grease tray 500 having a concave shape is disposed over the first filter bracket 400 and the wall plate 105. One or more grease filters 510 are then positioned to fit between the first filter bracket 400 and the second filter bracket 410.

[0051] An exemplary feature of the present invention

is that the grease tray 500 is removable. The grease tray 500 has a male rectangular member that is disposed on a rear side of the grease tray. Preferably, the grease tray 500 has the male member extending along a length of the grease tray. The male rectangular member mates into a curved lip 520 of the wall plate 105 by a slight application of a force downward.

[0052] In this manner, grease from the contaminated air stream may collect on the grease filter 510 that is disposed in an interior of the ventilation hood 100. The grease that collects thereon from the contaminated air stream flows in a downward manner being pulled by the force of gravity to collect in the grease tray 500. When the grease tray 500 is filled to capacity, the user may selectively lift the male member out of the lip 520 of the wall plate 105. In this manner, the grease tray 500 is released from the wall plate 105 and may be removed for washing. The grease tray 500 is preferably formed from a lightweight material such as stainless steel and has a size conducive to be placed in a conventional washing machine.

[0053] Preferably, the grease tray 500 is lightweight and may be disposed in a conventional washing machine for cleaning. Upon the completion of the cleaning, the grease tray 500 may be replaced to the original and initial position on the wall plate 105 of the ventilation hood 100.

[0054] Grease filter 510 is also preferably flat and has a similar shape as the flat panels. In this manner the grease filter 510 is easily shipped and thin. Grease filter 510 is lightweight and may be easily removed by lifting the grease filter from the first and the second filter brackets 400, 410. The grease filter 510 may also be placed in a conventional washing machine and then replaced to avoid the risk of a fire hazard.

[0055] In this manner, a power washing of the grease filter 510 using a high-pressurized hose of the grease tray 500 may be avoided. This convenience and lightweight nature of the grease filter 510 and the grease tray 500 adds to the ease of assembly of the ventilation hood 100.

[0056] Referring again to Figs. 1 and 2, the completed ventilation hood 100 is assembled and adapted to receive one or more optional ancillary fittings, such as a light assembly (not shown). One skilled in the art should appreciate that the first, second, third, fourth, fifth, sixth, seventh and eighth flat panels 200, 210, 220, 230, 260, 270, 290, 300 can be dimensioned to accommodate, any length or size of ventilation hood 100 that is required and each preferably has a complementary shape relative to one another.

[0057] The present invention is intended to draw in a stream of contaminated air from the cooking appliance (not shown) such as for example a grease fryer, a stove, a grill or any other commercial or residential cooking appliance that is known in the art by using a fan (not shown). Although, shown as a ventilation hood 100 over the cooking appliance, one skilled in the art should ap-

preciate that the present invention may be used in connection with any other air purifier technologies known in the art for removing contaminants from air or fluid.

[0058] In a preferred embodiment, the cooking appliance (not shown) produces a relatively high temperature air stream in a range between about 400 to about 450 degrees Fahrenheit (about 200 to 235 degrees Celsius). One skilled in the art would appreciate that the flat panels 200, 210, 220, 230, 260, 270, 290, 300 are all made from a durable and heat resistant material suitable for receiving a high temperature air stream.

[0059] The flat panels 200, 210, 220, 230, 260, 270, 290, 300 are preferably made from a heavy galvanized steel, a grade S 304 coated satin stainless steel, a polished stainless steel, aluminum, an alloy, and any combinations thereof. The grease filters 510 also have a number of pores or slots disposed therethrough. The pores allow the contaminated air stream to enter the ventilation hood 100 and prevent grease from entering the ventilation duct (not shown). Preferably, the grease collects substantially on the inlet face of the one or more grease filters 510. In this manner, the grease and oil preferably flow opposite the ventilation hood 100 for subsequent collection and removal thereof in the removable grease tray 500 in an easier and a more convenient manner relative to the prior art. This removal of grease and oil is useful and is intended to obviate the risk of fire hazard.

[0060] Referring to another embodiment of the ventilation system 100 being shown in Fig. 22, there is shown the ventilation system being arranged as a condense ventilation canopy 525 or a ventilation system that predominately ventilates steam. One skilled in the art should appreciate that the ventilation system 100 of the present invention may be fashioned in a number of different configurations so as to be installed and ventilate either steam or grease laden contaminated air streams and be mounted on either a wall or a ceiling depending on the selective need of the restaurant or commercial cooking establishment. The condense ventilation canopy 525 in this embodiment is preferably mounted to a wall or similar vertical support structure by the wall plate 105. Referring to Fig. 23, there is shown the condense ventilation canopy 525 being mounted to a ceiling by a first rod support structure 530 and a second rod support structure 535. The wall plate 105 may be first mounted on the ceiling and then connected to both the first rod support structure 530 and the second rod support structure 535.

[0061] Referring to another embodiment of the ventilation system 100 shown in Figs. 24 through 27, the ventilation system is arranged as a filter ventilation canopy 540 or a ventilation system that predominately ventilates a grease laden air stream. Referring to Fig. 24, the filter ventilation canopy 540 is preferably in one embodiment mounted to the wall by the wall plate 105 and has the grease filter 510 therein. Referring to Fig. 25, the filter ventilation canopy 540 is mounted to the ceiling by the

first rod support structure 530 and the second rod support structure 535. One skilled in the art should appreciate that the first rod support structure 530 in this embodiment may in a front most portion of the filter ventilation canopy 540 and the second rod support structure 535 may in a rear of the filter ventilation canopy. Referring to Fig. 26, there is shown the first filter ventilation canopy 540 being adjacent to a second filter ventilation canopy 545. In this manner, the commercial kitchen may introduce and use more appliances under the first filter ventilation canopy 540 and the second filter ventilation canopy 545. In this embodiment, the wall plate 105 is preferably connected to the ceiling and the first rod support structure 530, the second rod support structure 535, a third rod support structure 550, and a fourth rod support structure 555 are connected to the respective first filter ventilation canopy 540 and second filter ventilation canopy 545. Referring to Fig. 27, there is shown another low-level embodiment of the filter ventilation canopy 540. In this embodiment, another embodiment of the wall plate 105 is preferably disposed a predetermined distance from the ground for beneficial positioning of the filter ventilation canopy 540 where commercial kitchen space constraints exist or alternatively for residential use.

[0062] Referring to Fig. 28, there is shown another preferred embodiment of the wall plate 105 of the present invention. Preferably, the wall plate 105 is formed with a curved "U" shaped lip 560 on a first lateral side and a second lateral side of the wall plate away from the body of the wall plate. The curved "U" shaped lip 560 facilitates hanging of the first flat panel 200 and the second flat panel 210 as shown in Fig. 29. The curved "U" shaped lip preferably extends outward an amount to facilitate connection to the first flat panel 200 and the second flat panel 210 as shown. Referring to Fig. 30, in another preferred embodiment of the present invention, each of the flat panels 200, 210, 220, 230, 250, 270, 290, 300 are preferably connected to one another by a pop rivet 565 as shown. Most preferably, the pop rivet 565 is plastic push fit rivet that passes through mating holes in a flange and in the flat panel. The pop rivet 565 preferably is a bolt or pin having a head on one end that is inserted through the aligned holes in the respective flat panels 200, 210, 220, 230, 250, 270, 290, 300 and the flange to be joined and then pushed on a plain end so as to form a second head to connect the flat panels without any costly welding. Referring again to Fig. 30, there is shown the pop rivet 565 in a first elongated state and the pop rivet in a second compressed state 570. One skilled in the art should appreciate that the pop rivet 565 is compressed by a mere application of force F. Referring to Fig. 31, the pop rivet 565 in the second compressed state 570 is preferably shown disposed through the first flat panel 200 for illustration purposes.

[0063] Referring to Fig. 32, there is shown assembly of the filter ventilation canopy 540 having the first rod

support structure 530 and the second rod support structure 535 being connected thereto. One skilled in the art should appreciate that the first rod support structure 530 and the second rod support structure 535 most preferably maintain the filter ventilation canopy 540 in a level fashion. Referring to Fig. 33 there is shown an enlarged view of the first rod support structure 530 being connected to the flat panels 220, 270 of the filter ventilation canopy 540. One skilled in the art should appreciate that the first rod support structure may be a threaded rod, or any bolt know in the art.

[0064] Referring to Fig. 34, there is shown an interior space 575 of the filter ventilation canopy 540. One skilled in the art should appreciate that the first and second filter brackets 400, 410 are connected to the interior space 575 of the filter ventilation canopy 540 as shown by the pop rivets 565. Referring to Fig. 35, there is shown a close up view of the filter bracket 400. Preferably, each of the first and the second filter brackets 400, 410 has a space 580 for holding the grease filter 400 therein. One advantage of the present invention is that in prior art ventilation systems, often the installer had to fashion a grease channel via a welding operation in the prior art ventilation hood. This grease channel and installation operation is costly, labor intensive and consumes a great deal of time. The present invention obviates this need.

[0065] Referring to Fig. 36, preferably the grease filter 510 collects the grease from the grease laden air stream and allows the grease to traverse in a direction opposite the ventilation duct toward the cooking appliance on the grease filter 510. Disposed connected to the grease filter 510 is the grease tray 500 that collects the grease without the use of any welded channel. Referring to Fig. 37, there is shown a cross sectional view of the grease tray 500 connected to the filter ventilation canopy 540. The grease tray 500 shown in Fig. 37 preferably has the lip 520 or retaining flange. The lip 520 selectively allows the grease tray 500 to be retained on a back plate 585 and be removed from the back plate (that is connected to the wall plate 105) for cleaning. In this manner, the grease tray 500 preferable selectively connects to the filter ventilation canopy 540 to easy removal and disposal of the grease. The grease tray 510 preferably is lightweight and has a suitable size to be placed in a conventional washing machine. Further, the grease tray 500 is spaced directly underneath the grease filter 500 to collect all the grease without any costly welding operation.

[0066] Referring to Fig. 38 through 40, the interior space 575 of the filter ventilation canopy 540 may have one or more ancillary fittings thereon such as for example a lighting system 590 with cover 595 and insulated flange cover strips 600. Referring to Fig. 41, there is shown the low-level embodiment of the filter ventilation canopy 540 being mounted to the wall. In this embodiment, the low-level filter ventilation canopy 540 has a back plate 605 shown in Fig. 42. The back plate 605 is a generally orthogonal shaped heat resistant structure

that connects to the wall by one or more bolts. Referring to Figs. 42 and 43, the back plate 605 then has the first panel 200 and the second panel 210 connected thereto. Referring to Fig. 4, the low-level filter ventilation canopy 540 further has a first triangular shaped side panel 610 and a second triangular shaped side panel 615 connected to the back plate 600. The low-level filter ventilation canopy 540 further has the first and the second filter brackets 400, 410 connected thereto with the grease tray 500 as shown in Fig. 44 being removably inserted therein.

[0067] The present invention having been thus described with particular reference to the preferred forms thereof, it will be obvious that various changes and modifications may be made therein without departing from the scope of the present invention as defined in the appended claims.

Claims

1. A modular ventilation hood for easy shipment and assembly, the modular ventilation hood comprising:
 - a first longitudinal support member;
 - a plurality of modular components connected to said first longitudinal support member for forming the modular ventilation hood, wherein each of said plurality of modular components has a size with a height, a width and a thickness, said height being in a range between about 500 millimeters to about 1500 millimeters, and wherein said width is less than about 500 millimeters, and wherein said thickness is less than about 150 millimeters, wherein said plurality of modular components are stackable, and wherein said plurality of modular components are not welded to one another when assembled.
2. The modular ventilation hood of claim 1, wherein said plurality of modular components form a generally orthogonal shaped ventilation hood for being supported on a location of a kitchen, said location being selected from the group consisting of a floor, a ceiling, a wall, a horizontal support structure, a vertical support structure, and any combinations thereof.
3. The modular ventilation hood of claim 1 or 2, wherein said plurality of modular components is each substantially flat shaped.
4. The modular ventilation hood of claim 1, 2 or 3, wherein each of said plurality of modular components are selected from the group consisting of a stainless steel, a steel, a coated stainless steel, a lightweight metal material, aluminum, a grade S 304 satin stainless steel, and any combinations thereof.
5. The modular ventilation hood of any preceding claim, wherein each of said plurality of modular components has a shape selected from the group consisting of a square shape, a rectangular shape, an orthogonal shape, a substantially square shape, a substantially rectangular shape, and any combinations thereof.
6. The modular ventilation hood of any preceding claim, wherein each of said plurality of modular components are connected by a fastener.
7. The modular ventilation hood of claim 6, wherein said fastener is selected from the group consisting of a rivet, a pop rivet, a plastic pop rivet, a cleat, a "C" shaped cleat, a nut, a bolt, a threaded bolt, and any combinations thereof, wherein each of said plurality of modular components are connectable to one another without the use of a tool.
8. The modular ventilation hood of any preceding claim, wherein said first longitudinal support member is a wall plate.
9. The modular ventilation hood of any of claims 1 to 8, wherein said first longitudinal support member is a plurality of threaded rods for connecting to a ceiling.
10. The modular ventilation hood of any preceding claim, wherein said size is suitable so that each of said plurality of modular components is adapted to be packaged flat in a plurality of complementary substantially similar sized packages.
11. The modular ventilation hood of any of claims 1 to 8, wherein said first longitudinal support member is a wall plate having a plurality of apertures there-through for connecting said wall plate to a vertical surface, said wall plate further comprising a substantially "U" shaped flange for engaging said plurality of modular components.
12. The modular ventilation hood of any preceding claim, wherein each of said plurality of modular components are made from a suitable material that is resistant to heat and resistant to steam at a temperature in a range between 400 degrees Fahrenheit to about 450 degrees Fahrenheit (204 to 232°C).
13. The modular ventilation hood of any preceding claim, further comprising a ventilation duct connected to the modular ventilation hood to draw a heated contaminated air stream in a direction away from a cooking appliance.

14. The modular ventilation hood of any preceding claim, wherein said plurality of modular components each has a cooking appliance facing side and an outer side, and wherein the modular ventilation hood further comprises an intake area for receiving a contaminated air stream, said intake area being substantially adjacent to said cooking appliance facing side, and wherein the modular ventilation hood has a plurality of internal features being connected at said intake area, said plurality of internal features being selected from the group consisting of a lighting system, a plurality of grease filters, a plurality of grease trays, a plurality of insulated cover strips, a safety device and any combinations thereof.

15. A modular ventilation hood for easy shipment and assembly, the modular ventilation hood comprising:

a ventilation canopy for receiving a grease laden contaminated air stream;
 a first longitudinal support member having a first space thereon and a recess, said first longitudinal support member being connected to said ventilation canopy at a bottom side thereof;
 a second longitudinal support member having a second space thereon, said second longitudinal support member being connected to said ventilation canopy over said first longitudinal support member;
 a first grease tray being between said first space and said second space for receiving the grease laden contaminated air stream; and
 a grease tray having a longitudinal member extending therefrom for selectively engaging said recess, wherein grease from said grease laden contaminated air stream collects on said first grease tray, and wherein said grease flows opposite said ventilation canopy, and wherein said grease collects in said first grease tray for disposal, said grease filter and said grease tray disposing said grease without any installation of a welded grease channel in said ventilation canopy.

16. The modular ventilation hood of claim 15, wherein said ventilation canopy is assembled without welding.

17. The modular ventilation hood of claim 15 or 16, wherein said ventilation canopy is formed from a plurality of modular components, wherein each of said modular components has a size having a height, a width and a thickness, said height being in a range between about 500 millimeters to about 1500 millimeters, and wherein said width is less than about 500 millimeters, and wherein said thick-

ness is less than about 150 millimeters, and wherein said modular components are stackable.

18. The modular ventilation hood of claim 15, 16 or 17, wherein said grease tray is generally longitudinal shaped and comprises a grease receiving space having a volume, said grease tray being made from a material selected from the group consisting of a steel, aluminum, a stainless steel, a coated stainless steel, a grade S 304 satin stainless steel, and any combinations thereof.

19. The modular ventilation hood of any of claims 15 to 18, wherein said longitudinal member is a lip for selective removable insertion in said recess, said lip and said recess preventing grease from entering therein.

20. The modular ventilation hood of any of claims 15 to 19, wherein said grease tray is made of a material being suitable for receiving an air stream having a temperature in a range between about four hundred degrees Fahrenheit to about four hundred fifty degrees Fahrenheit (204 to 232°C), and wherein said grease tray has a suitable weight to be lifted and placed in a conventional dishwashing apparatus by an operator.

21. The modular ventilation hood of any of claims 15 to 20, wherein said first longitudinal support member comprises a first filter bracket and said second longitudinal support member is a second filter bracket.

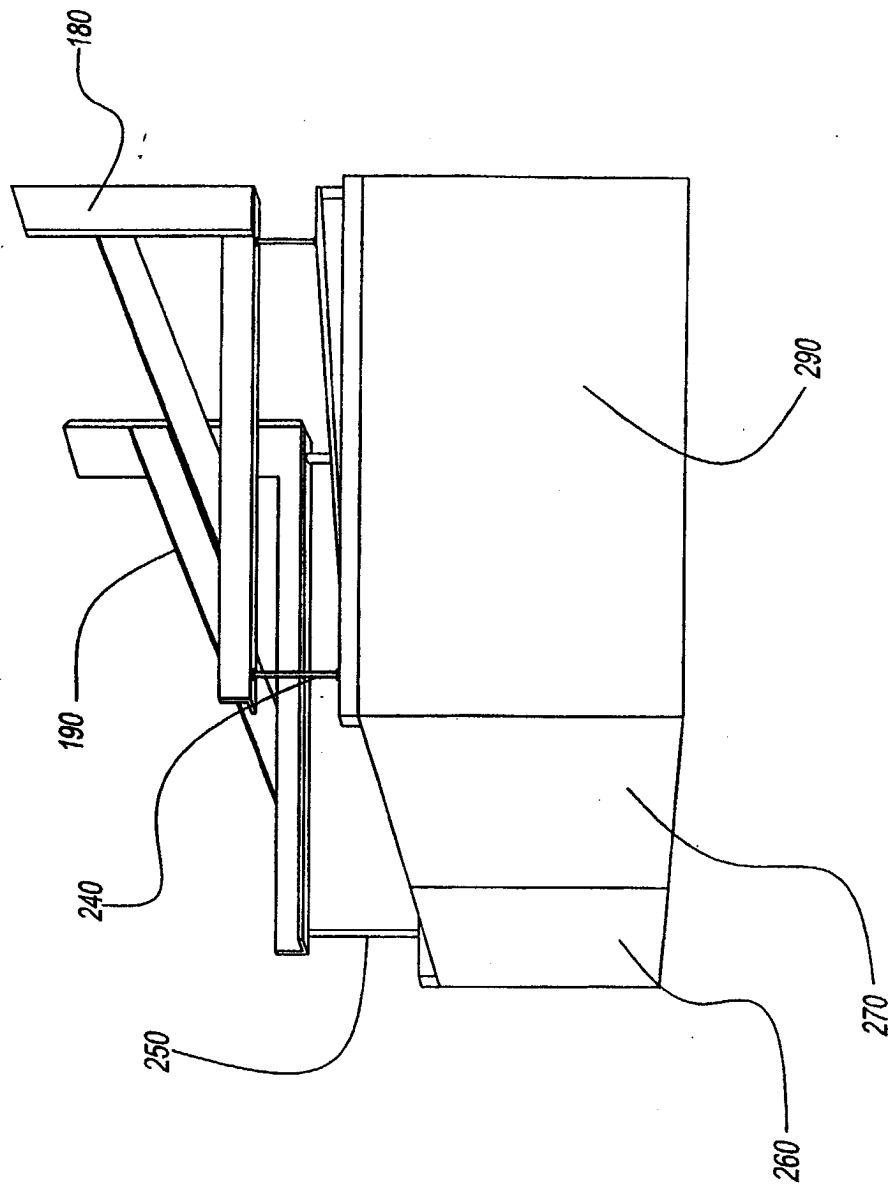


Fig. 1

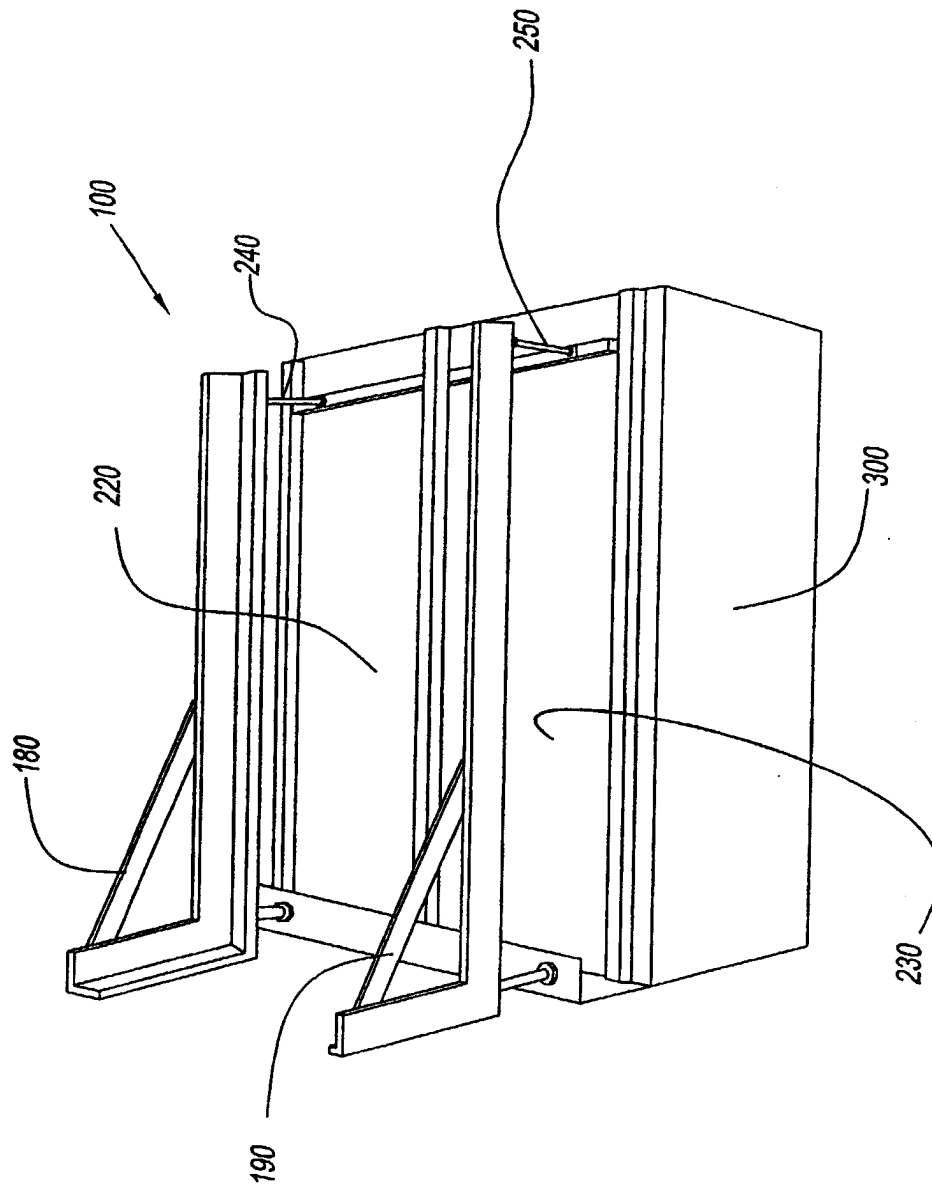


Fig. 2

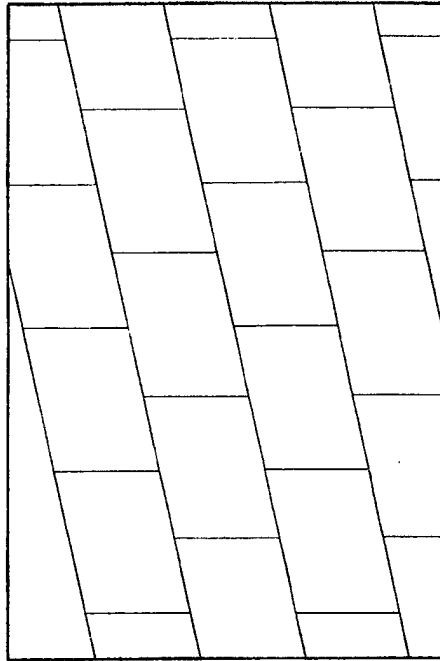


Fig. 4

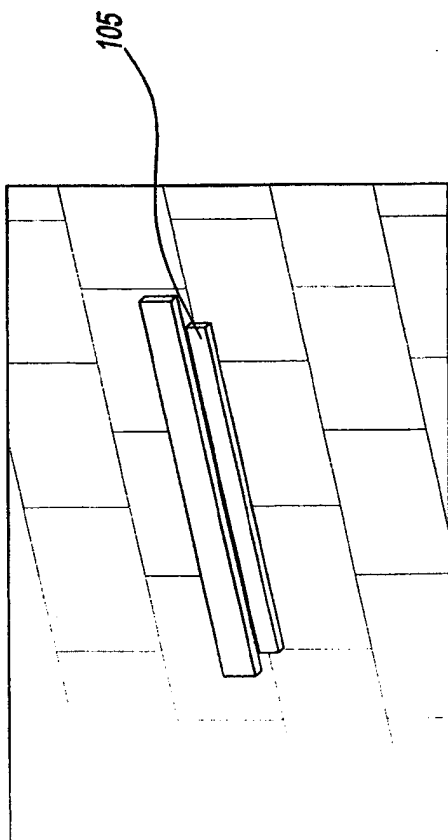


Fig. 3

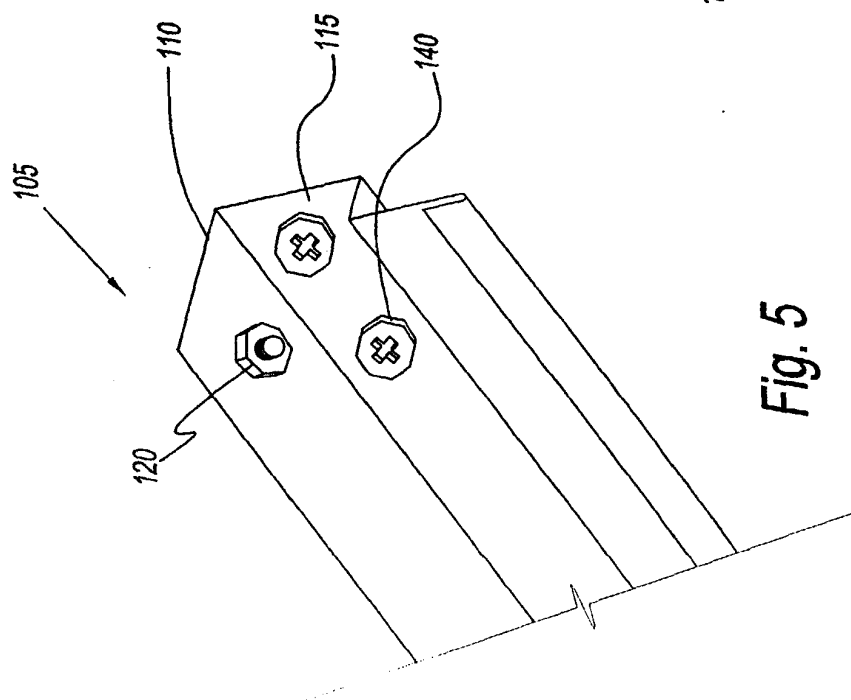


Fig. 5

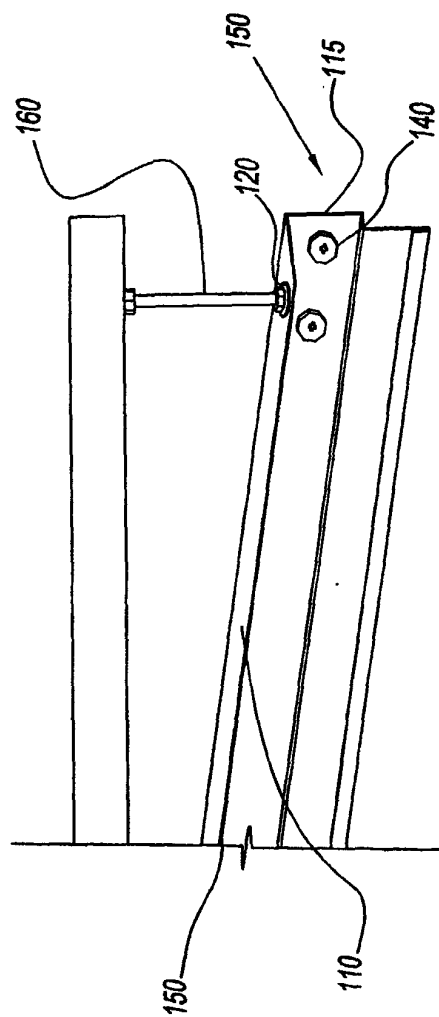


Fig. 6

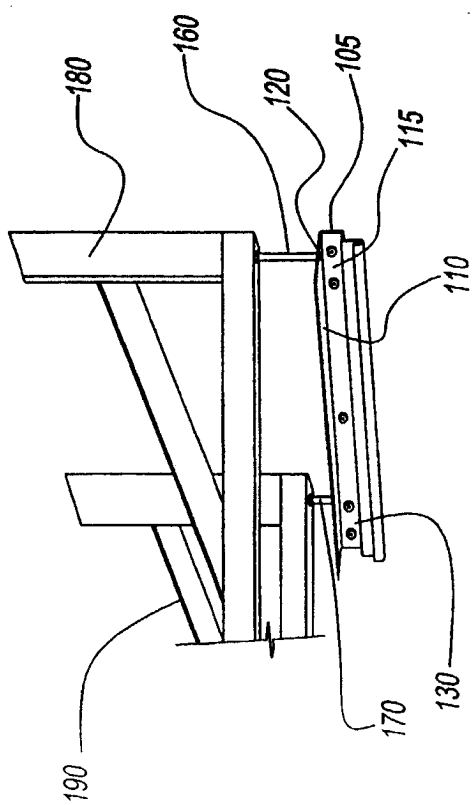


Fig. 7

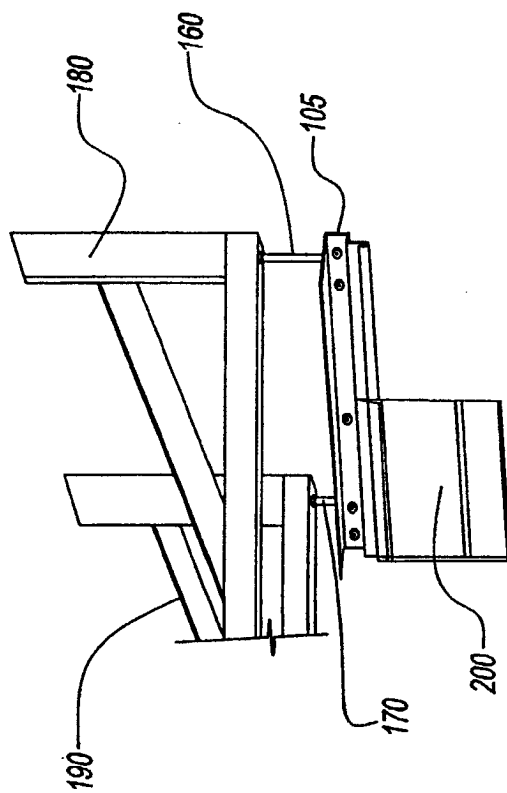


Fig. 8

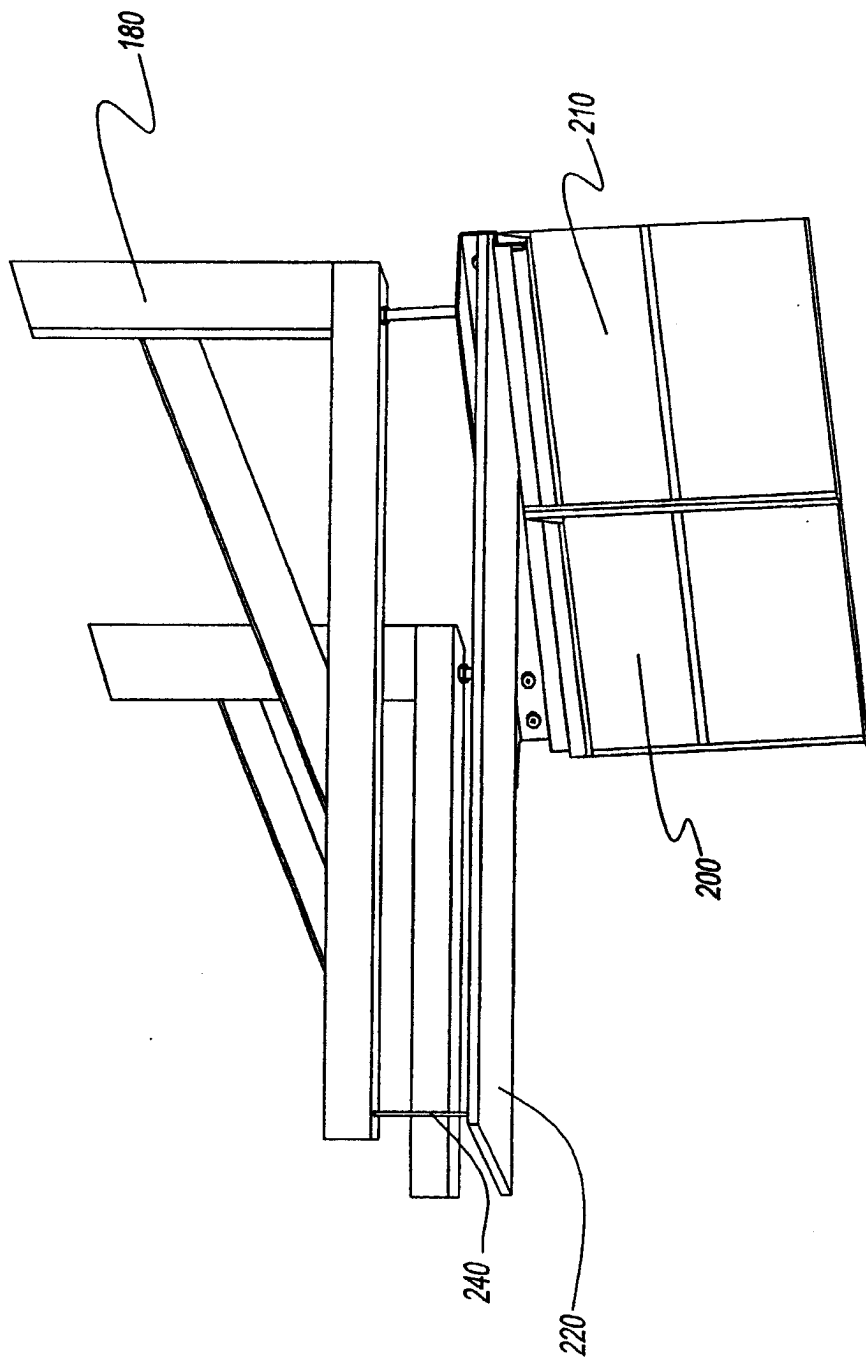


Fig. 9

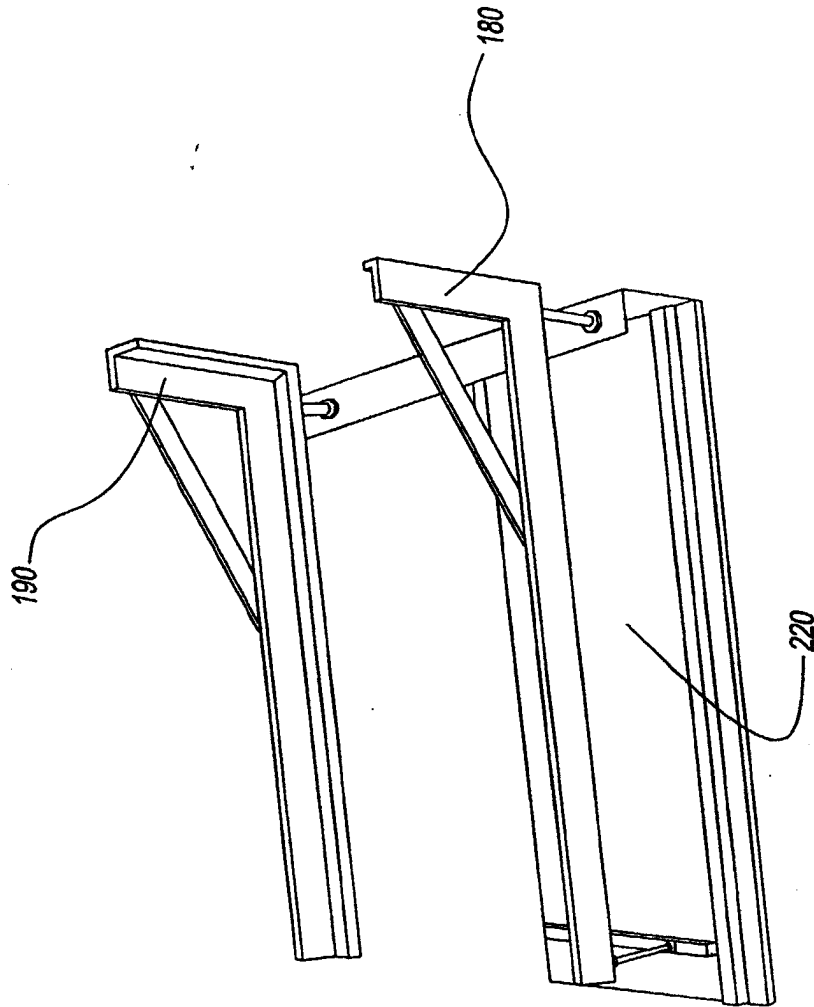


Fig. 10

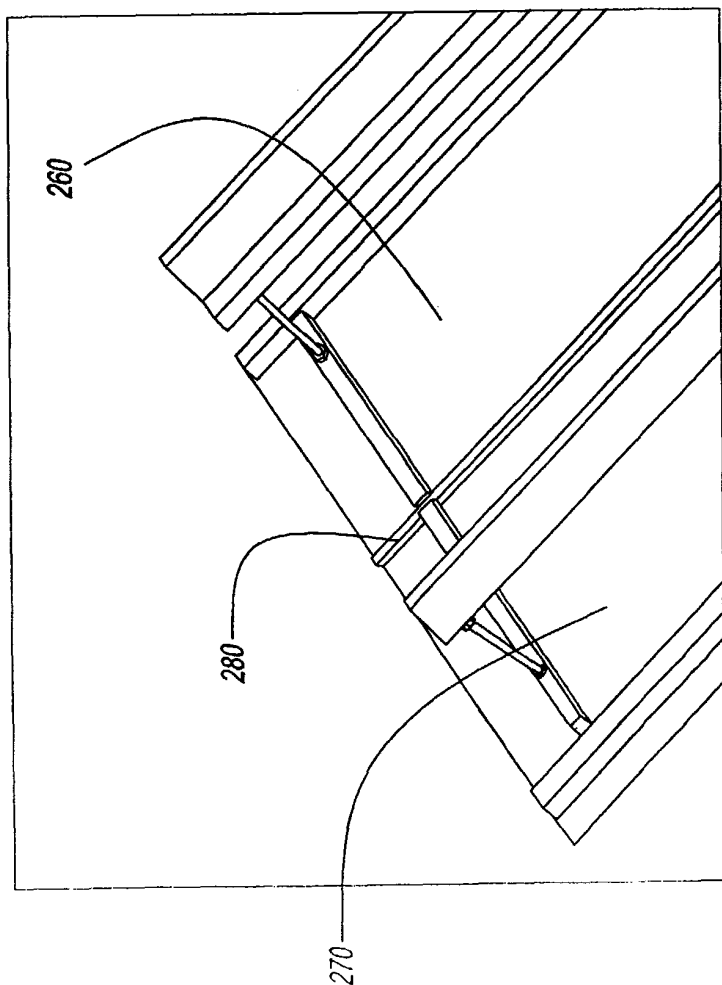


Fig. 11

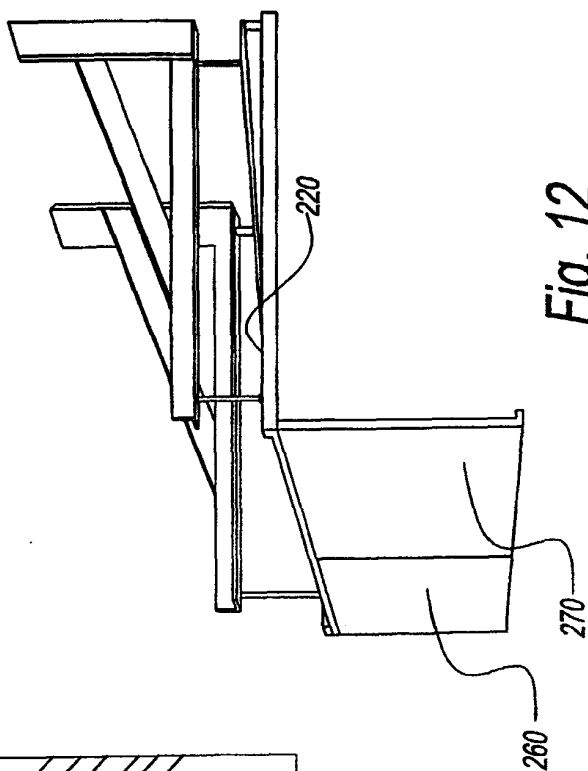


Fig. 12

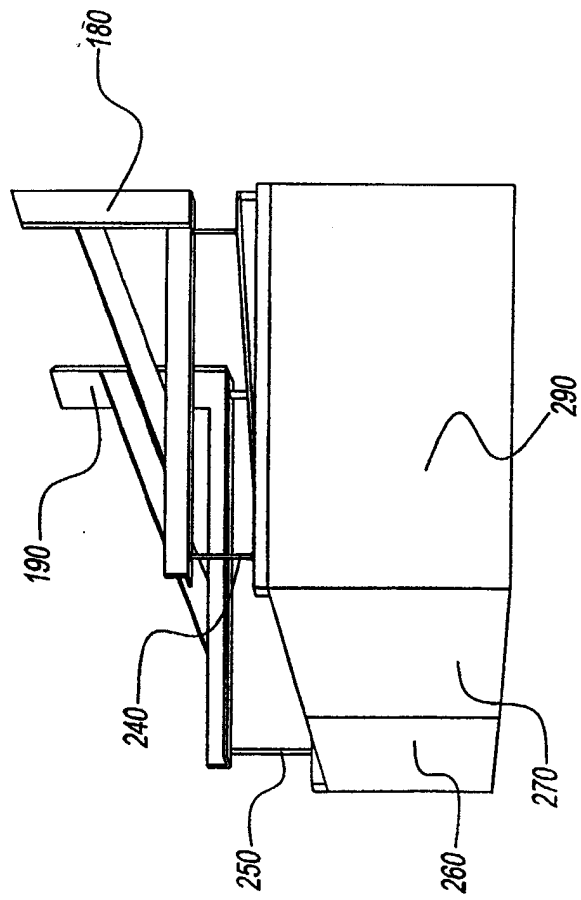


Fig. 13

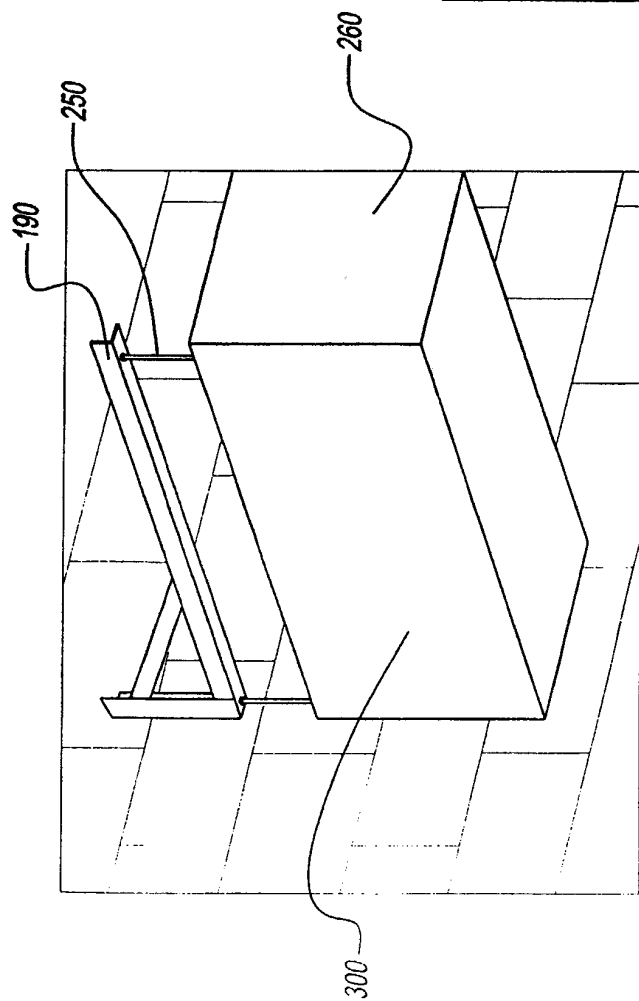


Fig. 14

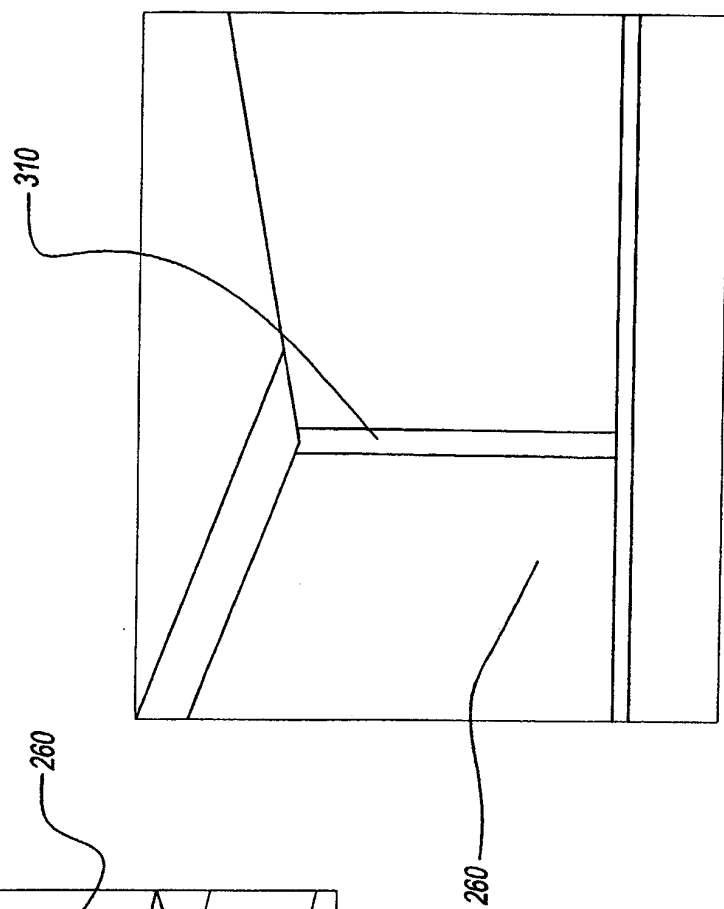


Fig. 15

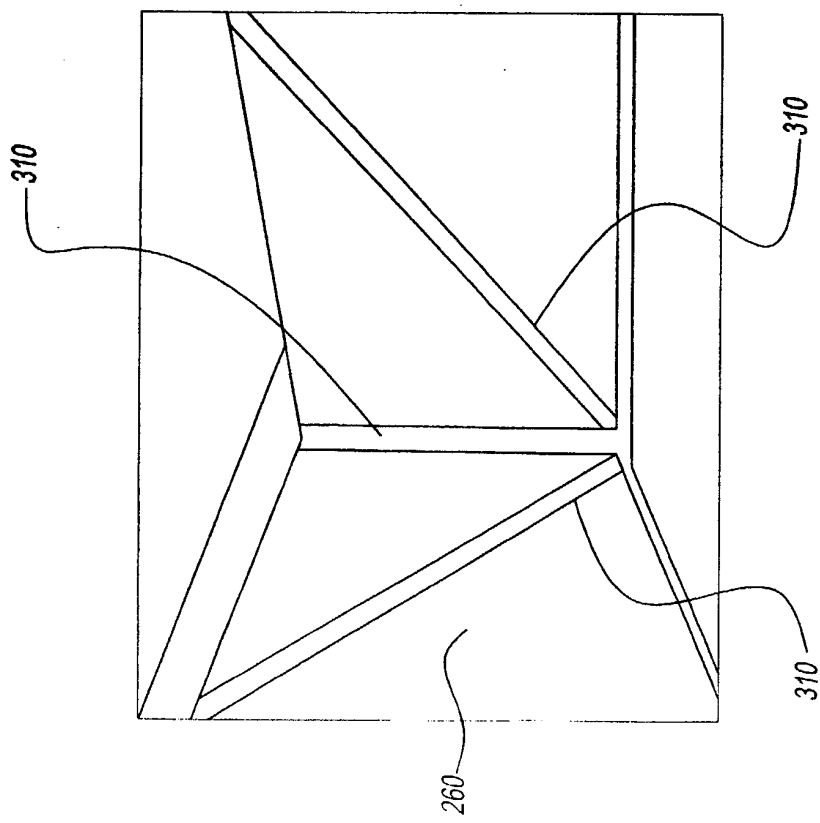


Fig. 16

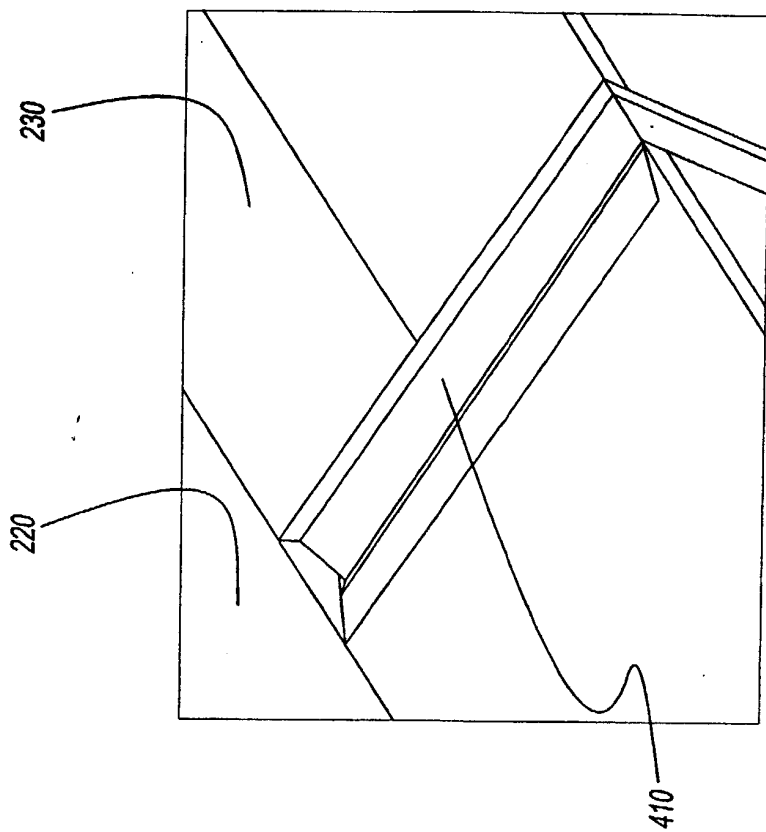


Fig. 17

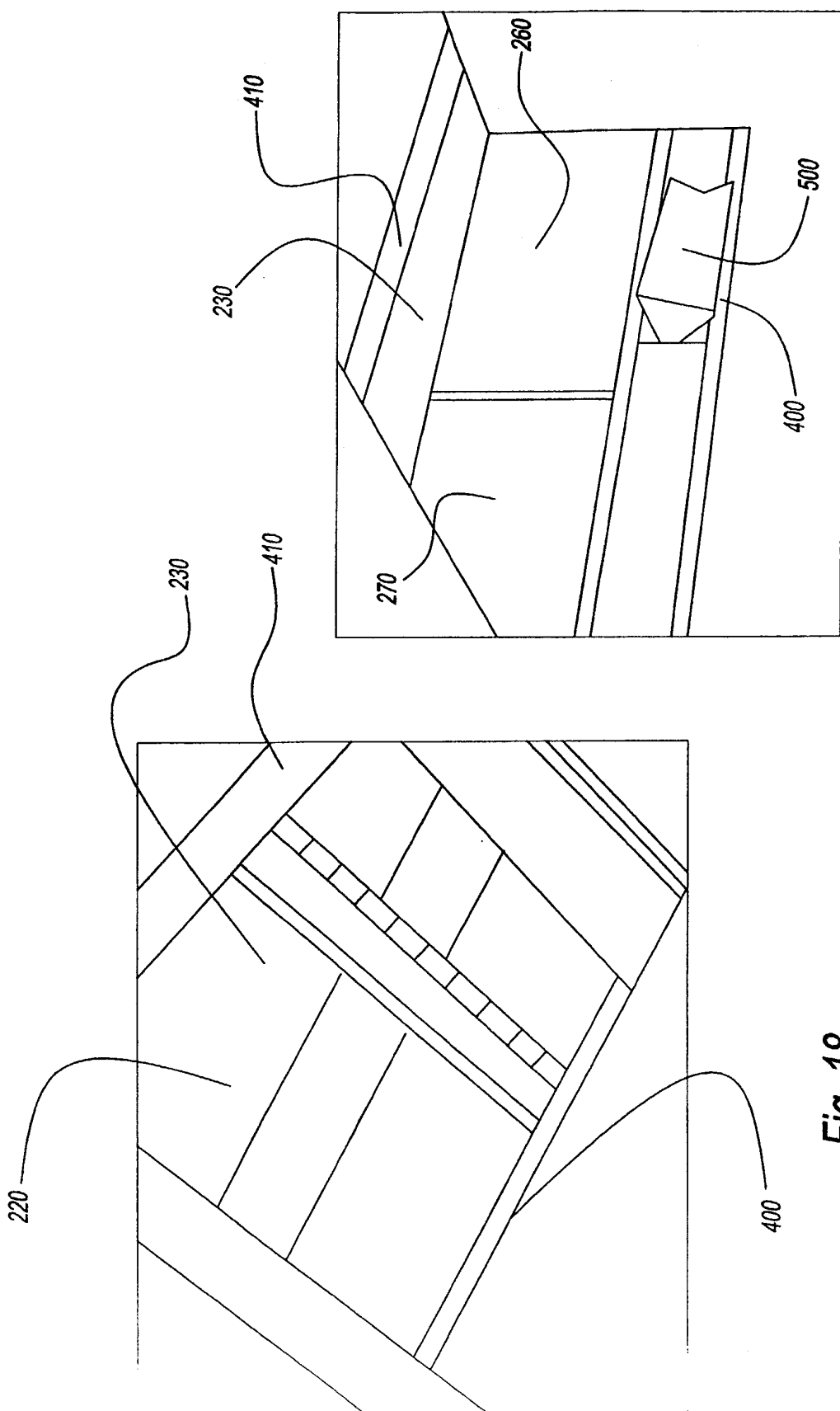


Fig. 19

Fig. 18

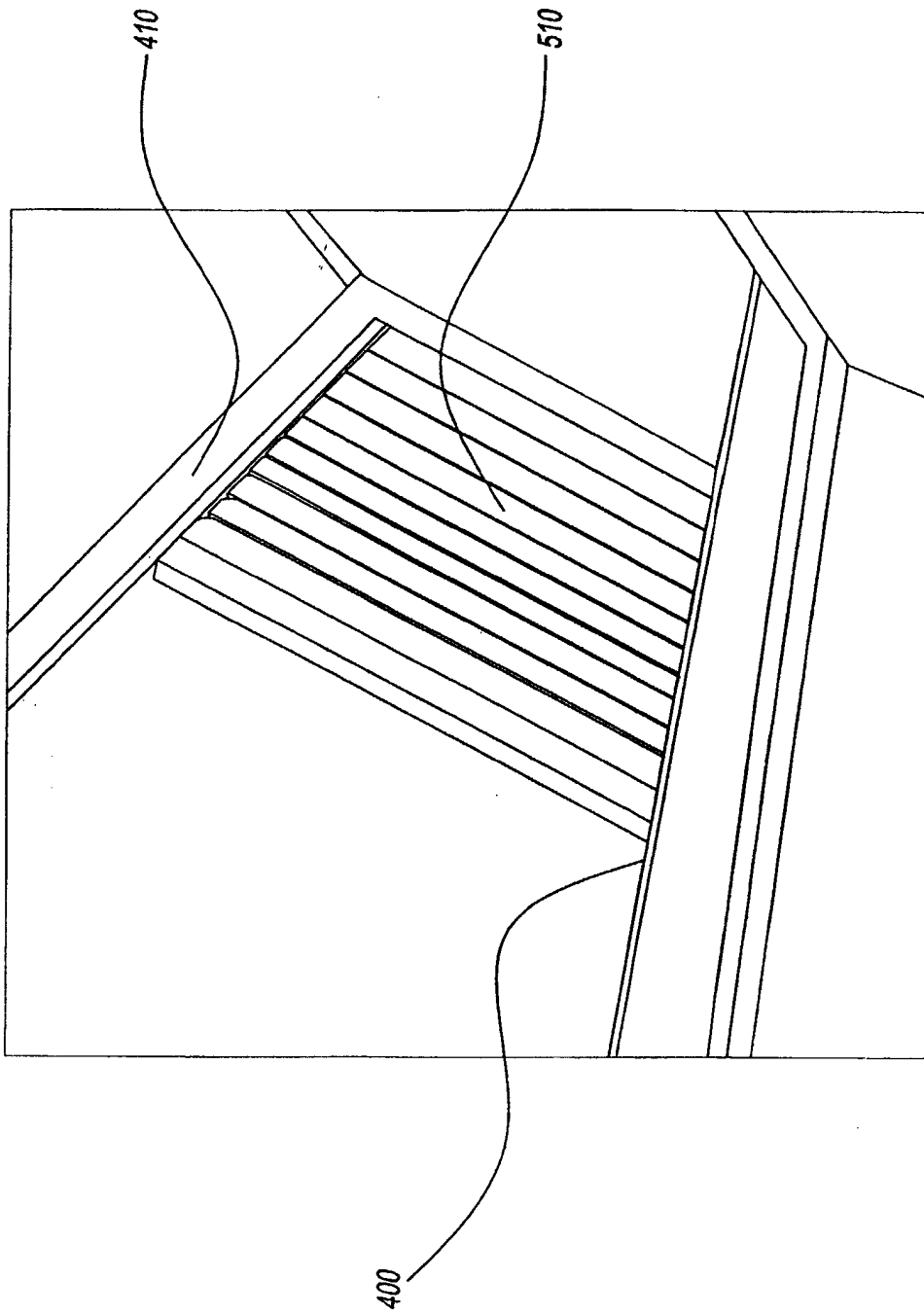


Fig. 20

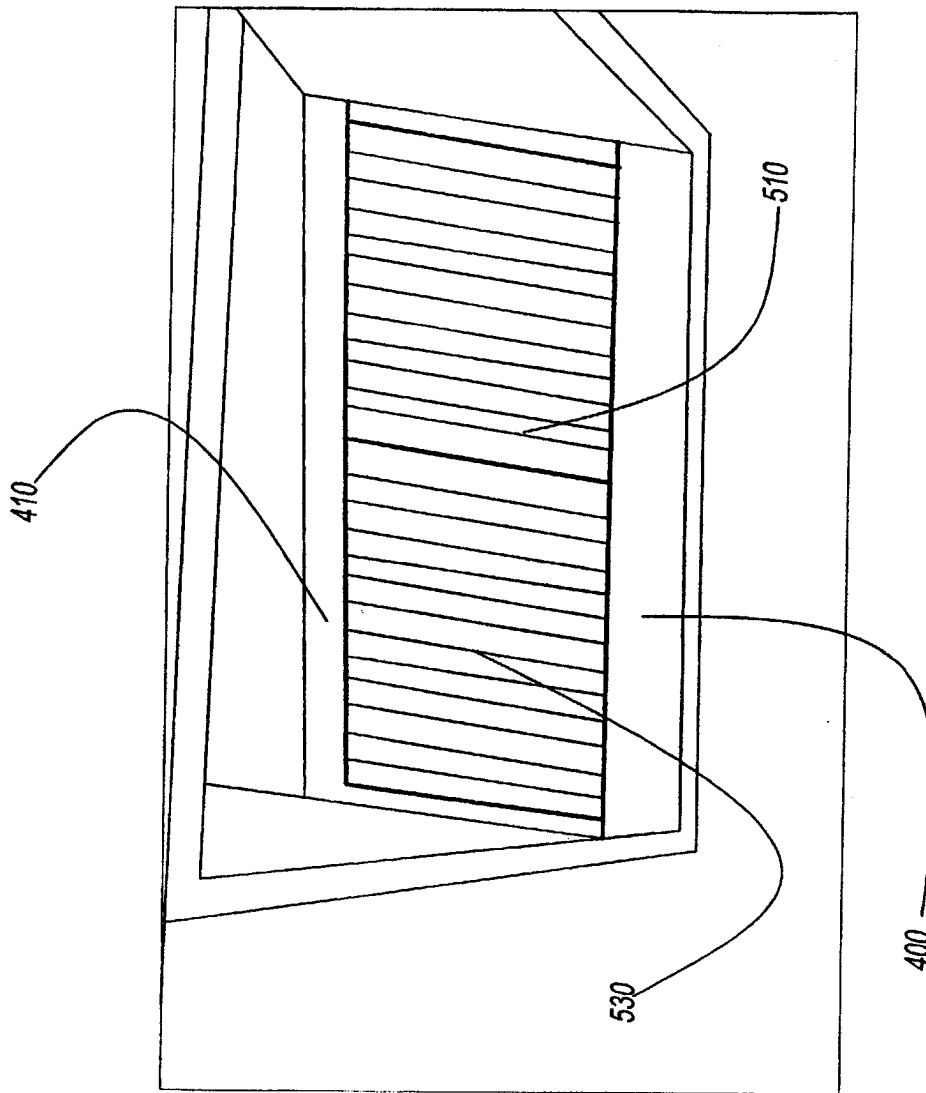
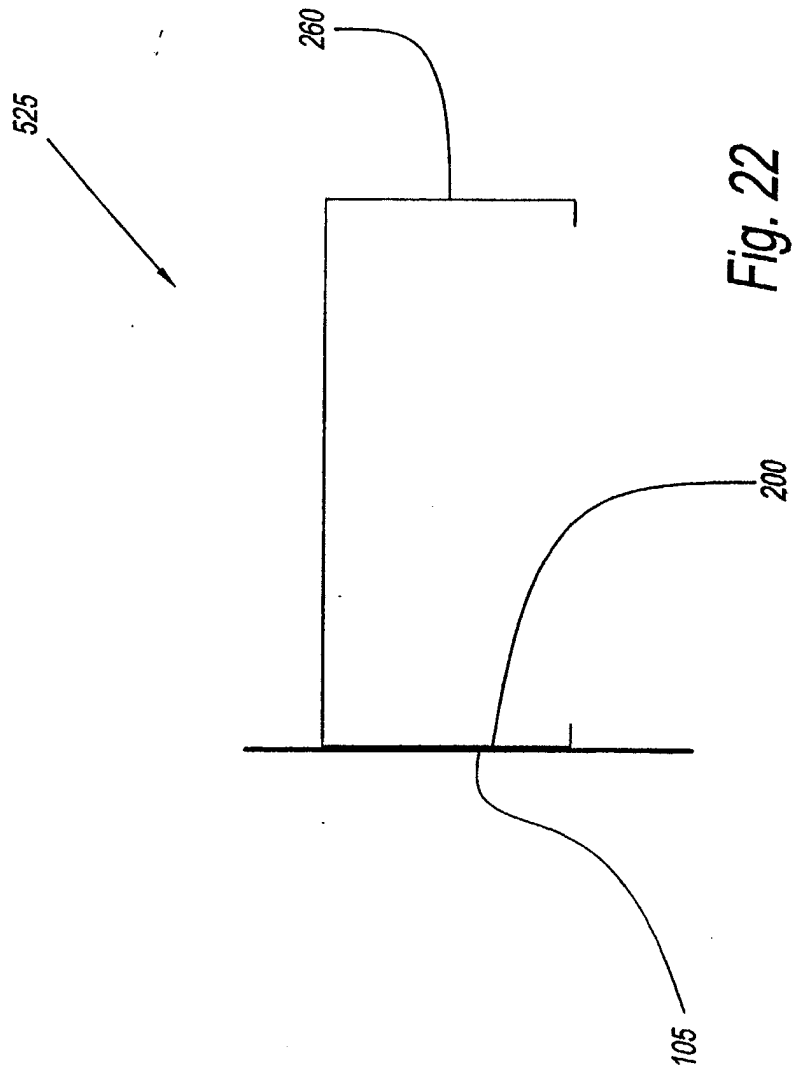


Fig. 21



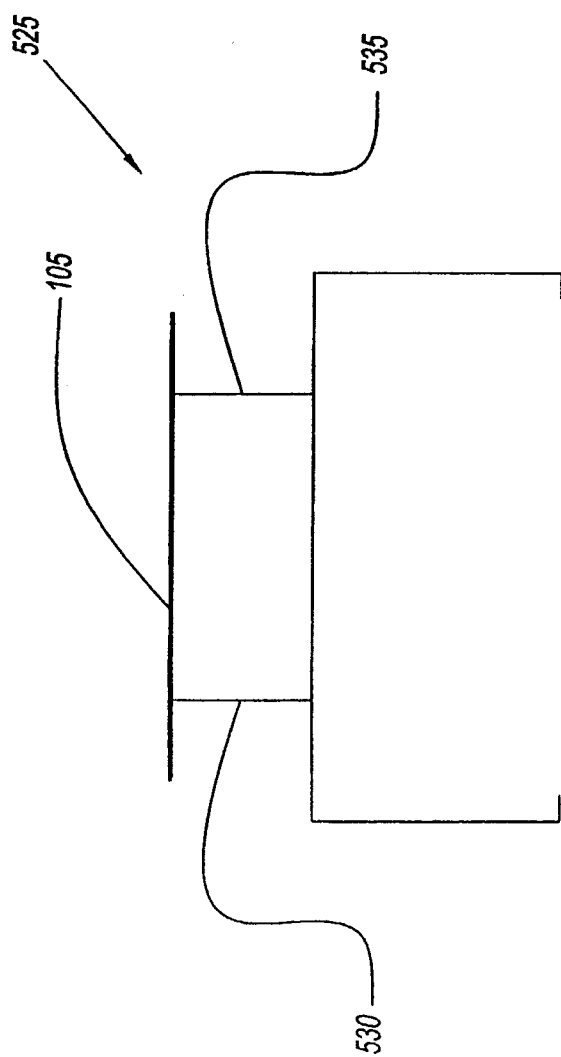


Fig. 23

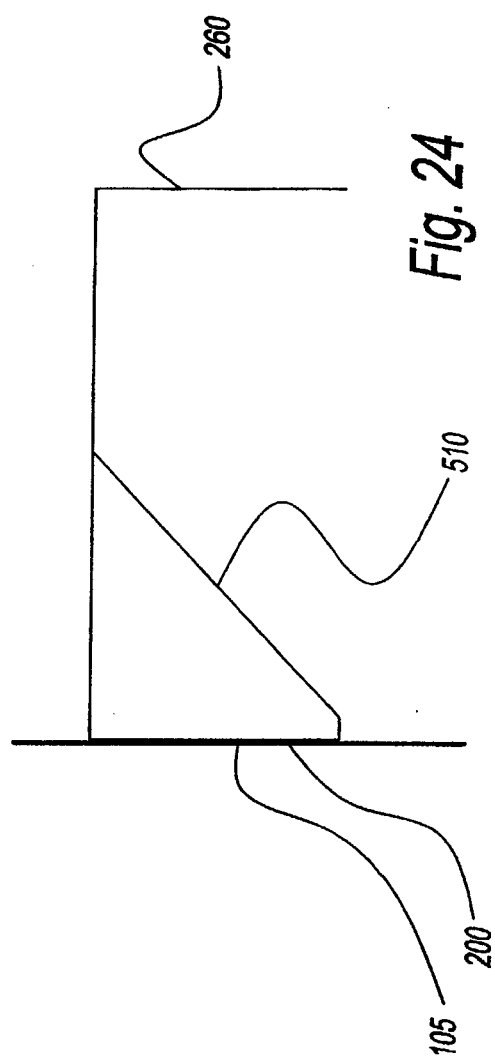
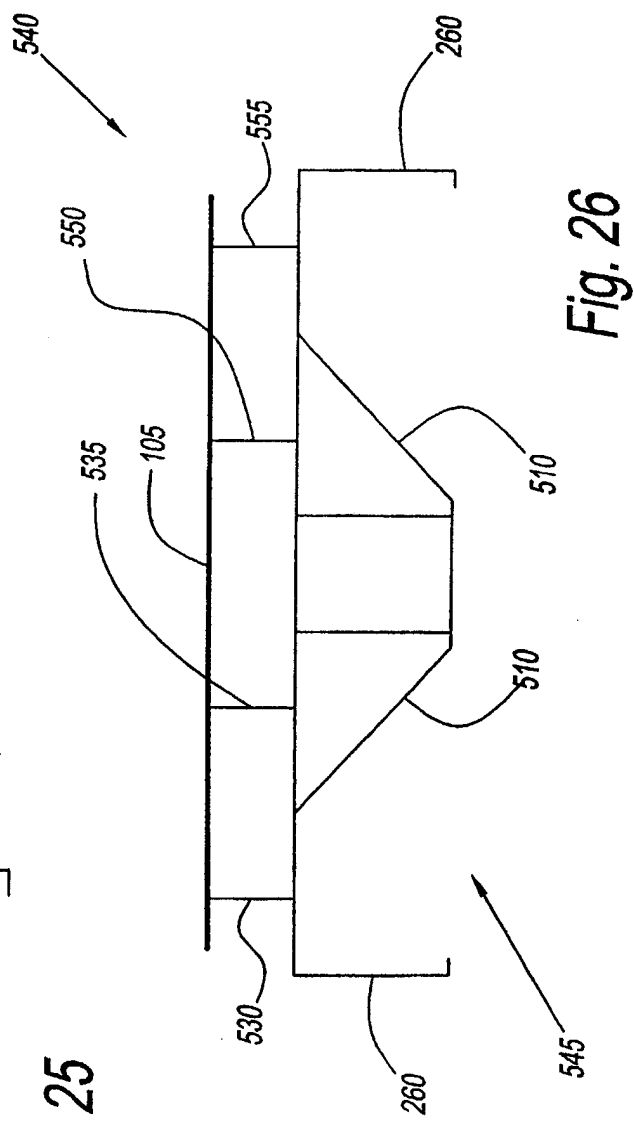
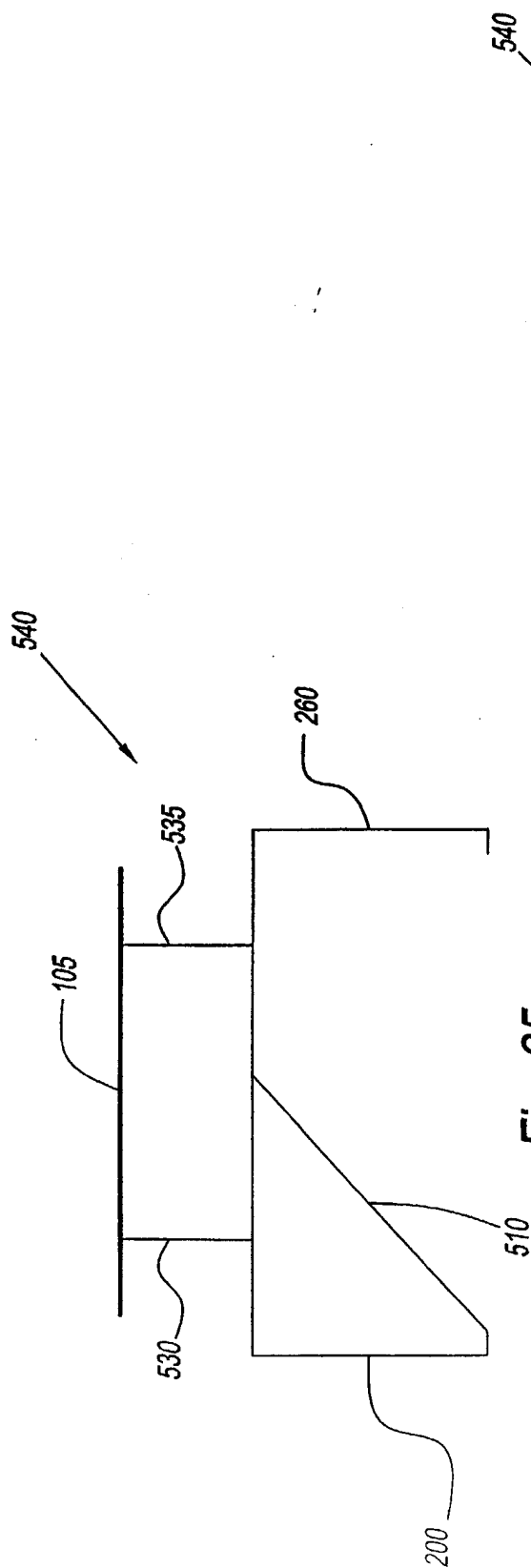


Fig. 24



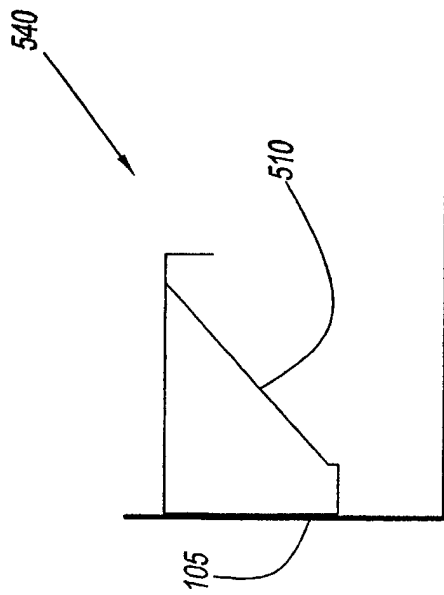


Fig. 27

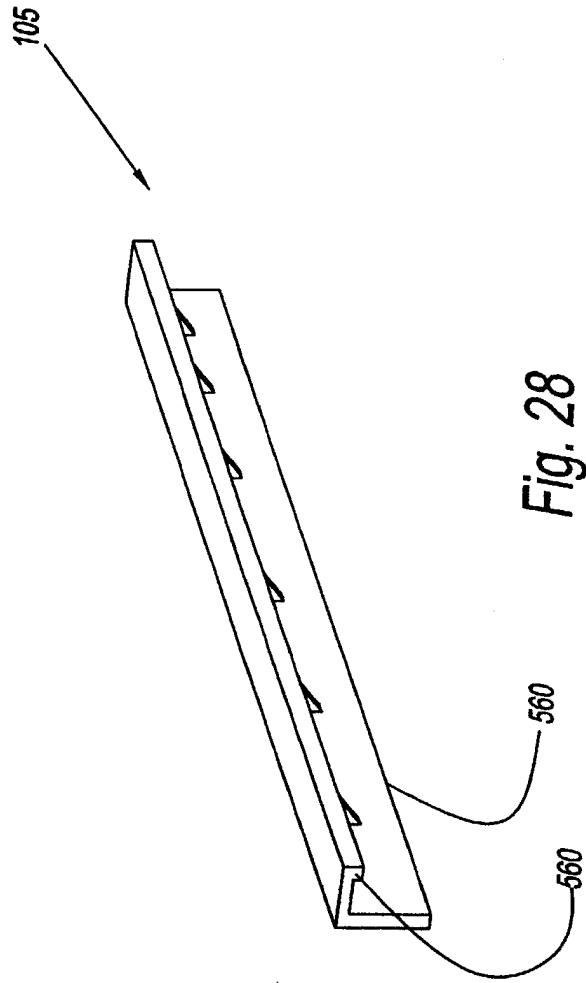


Fig. 28

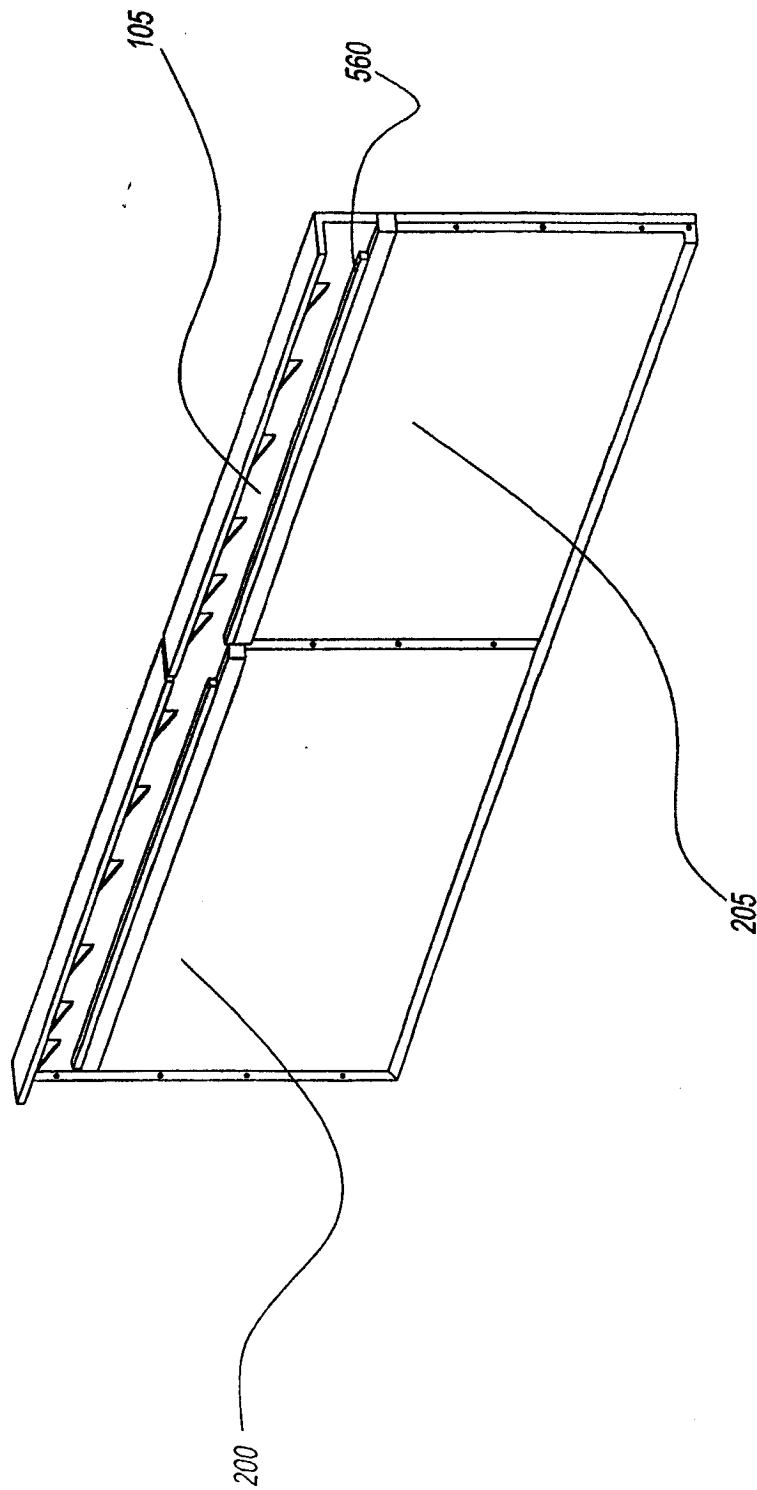


Fig. 29

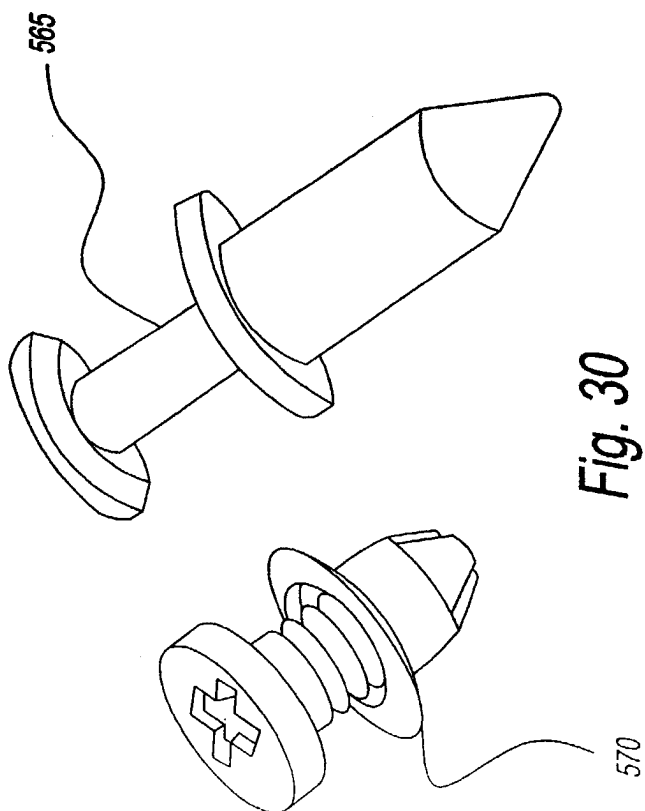


Fig. 30

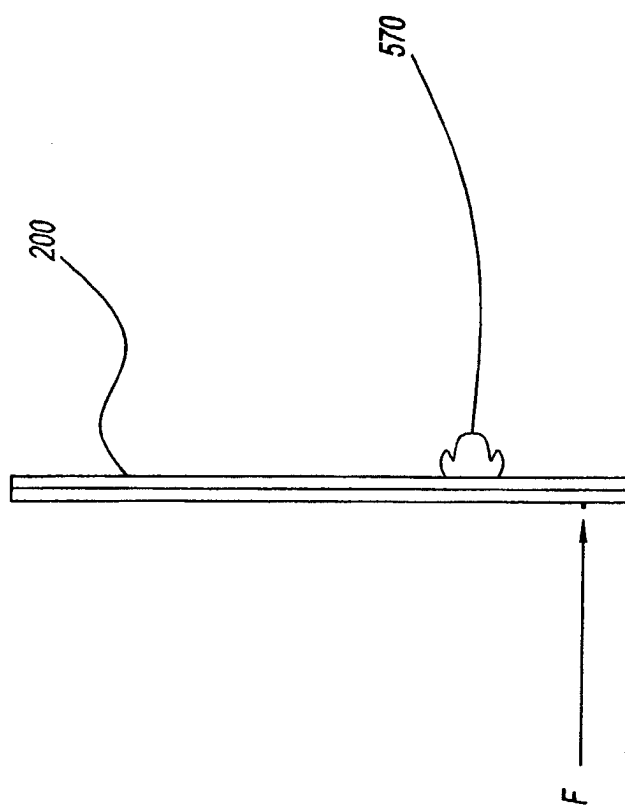
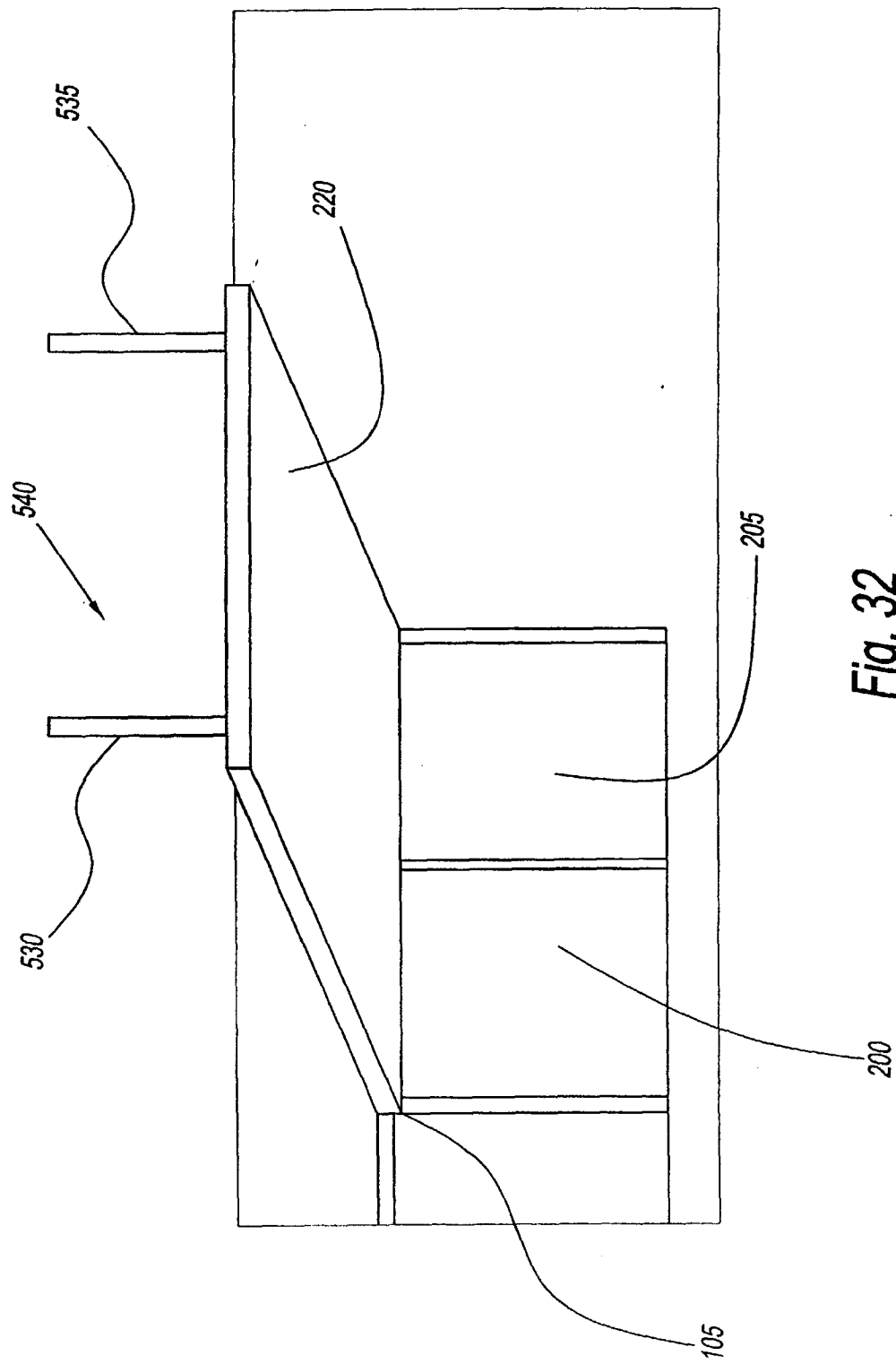
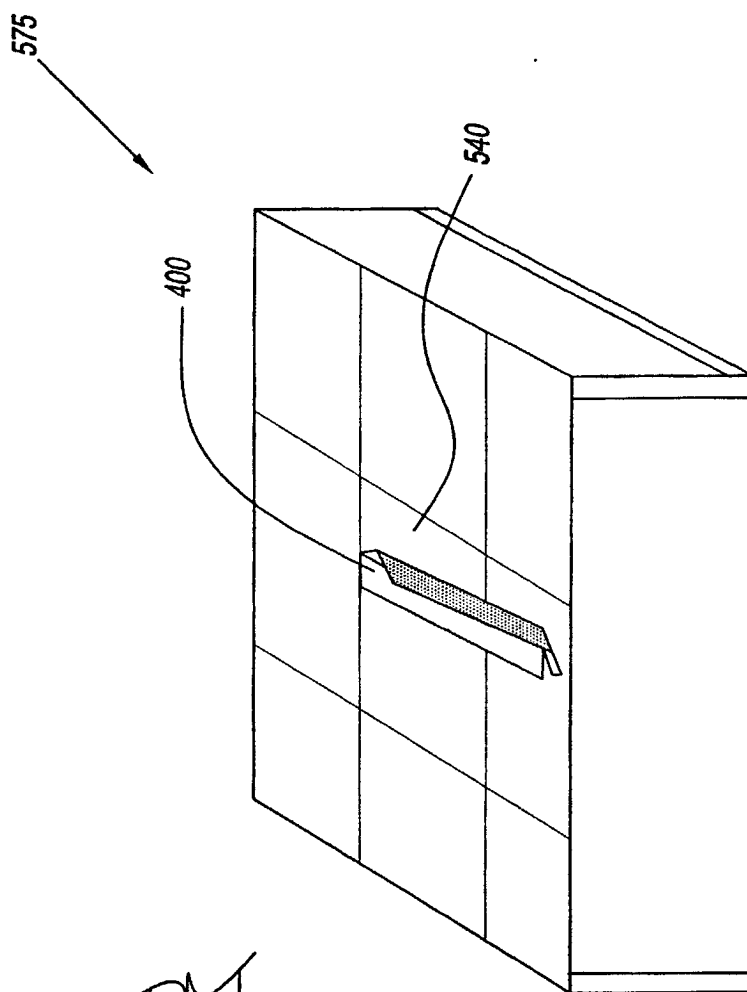
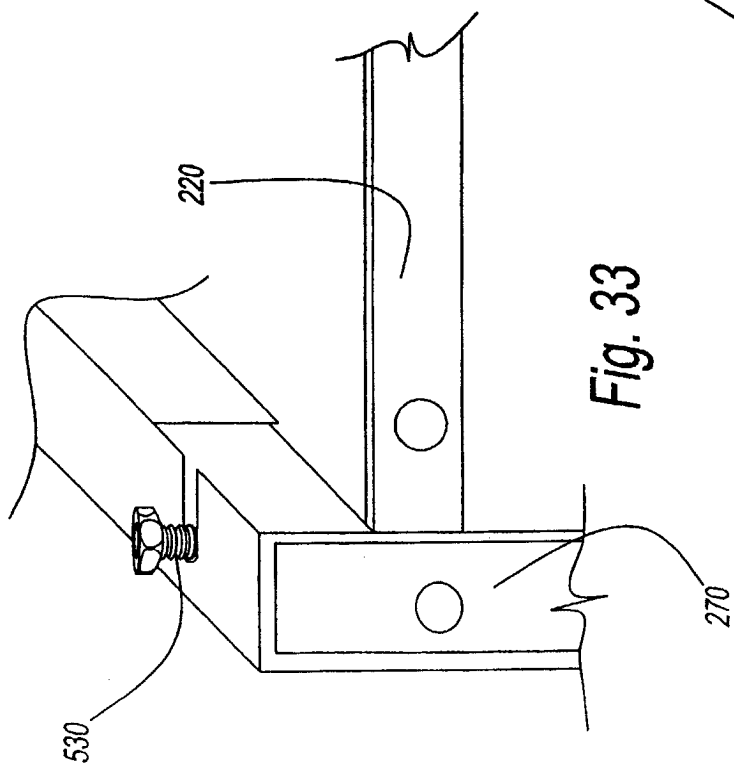


Fig. 31





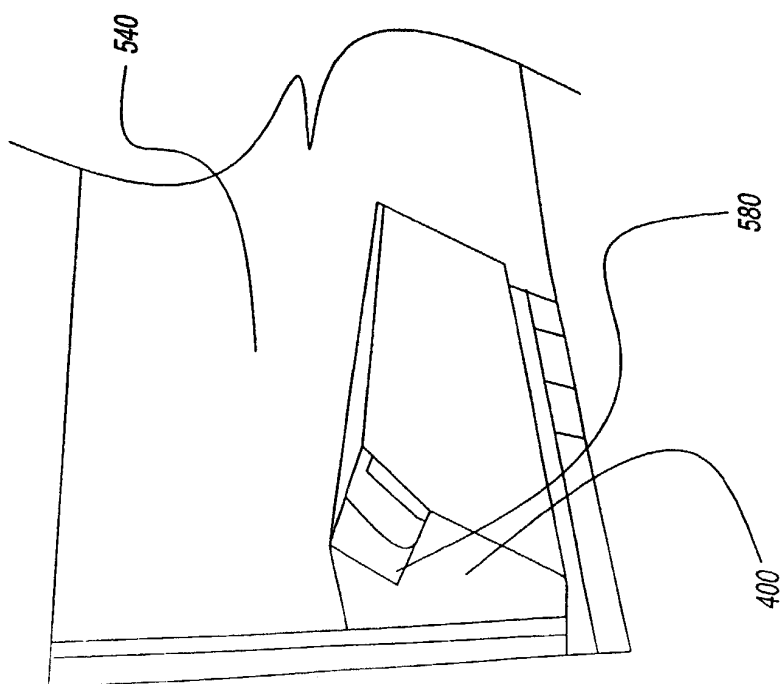


Fig. 35

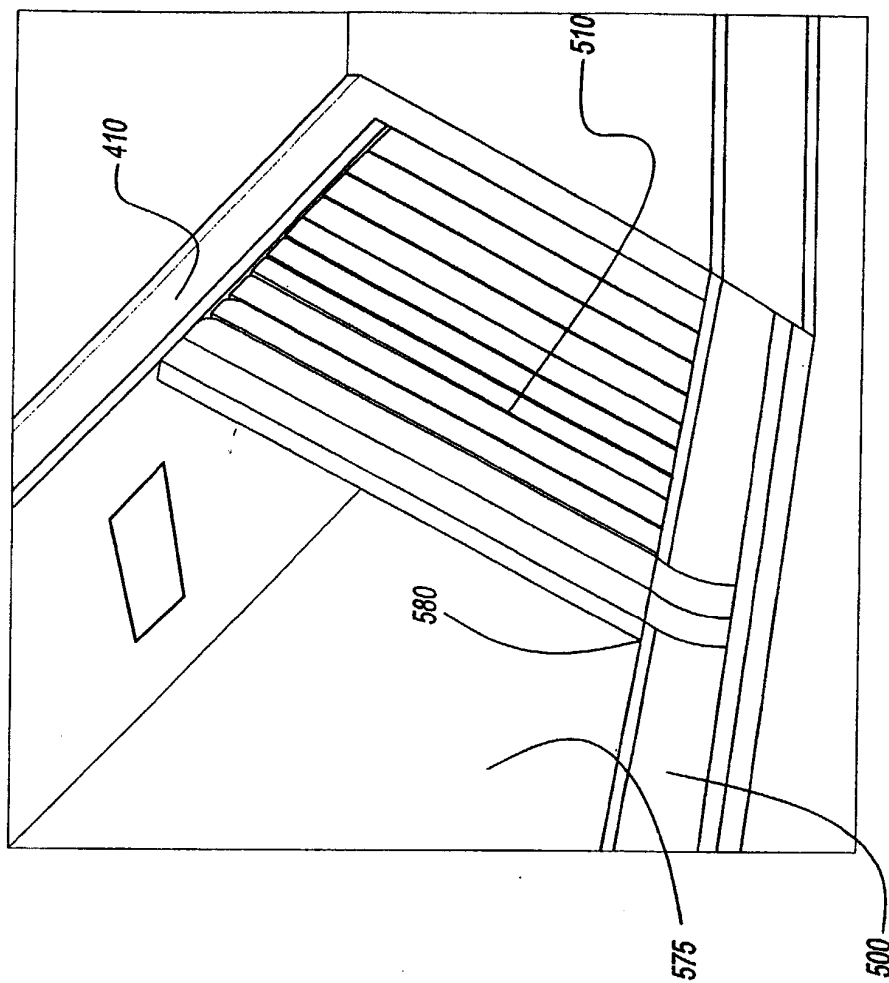


Fig. 36

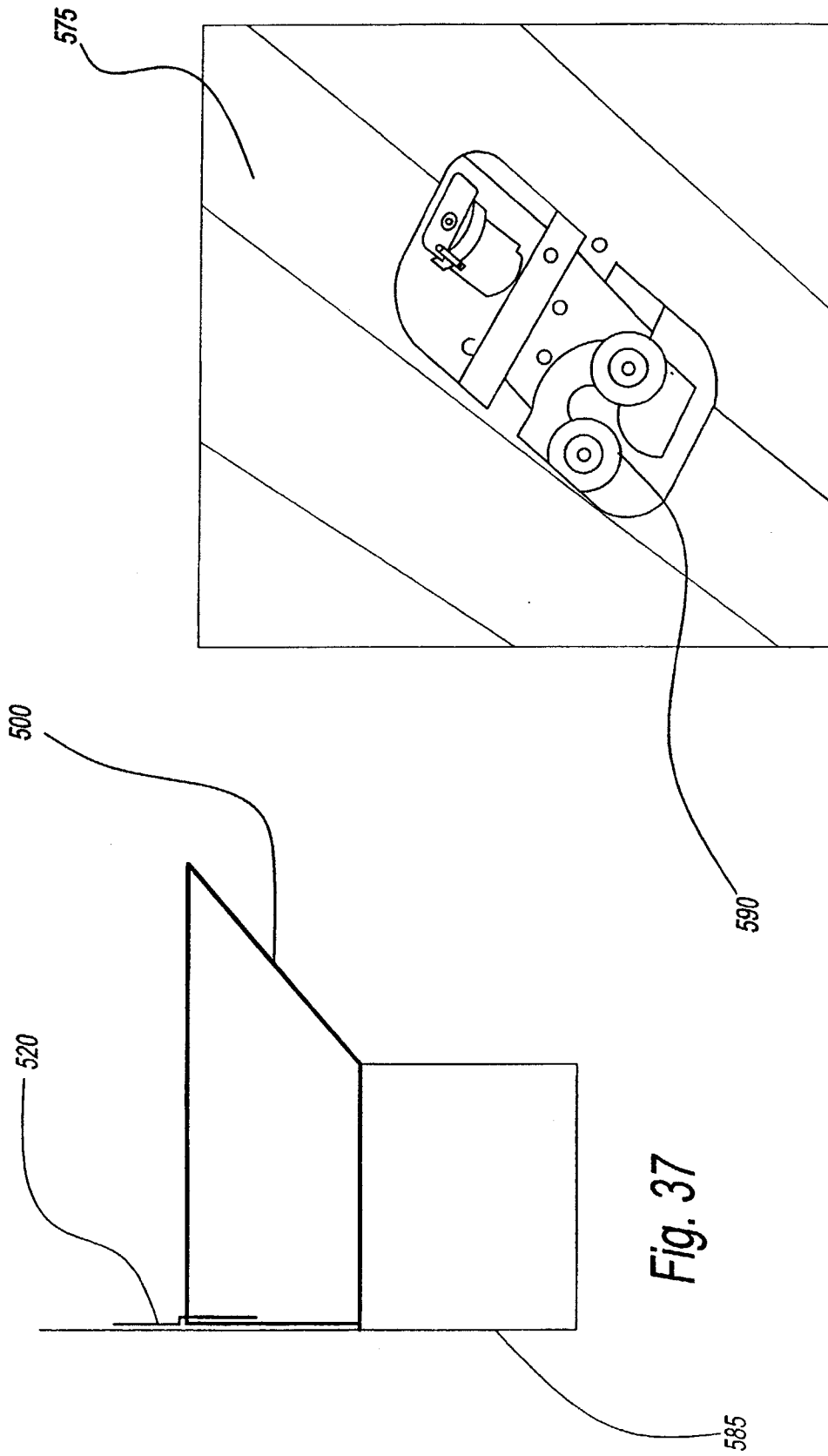


Fig. 38

Fig. 37

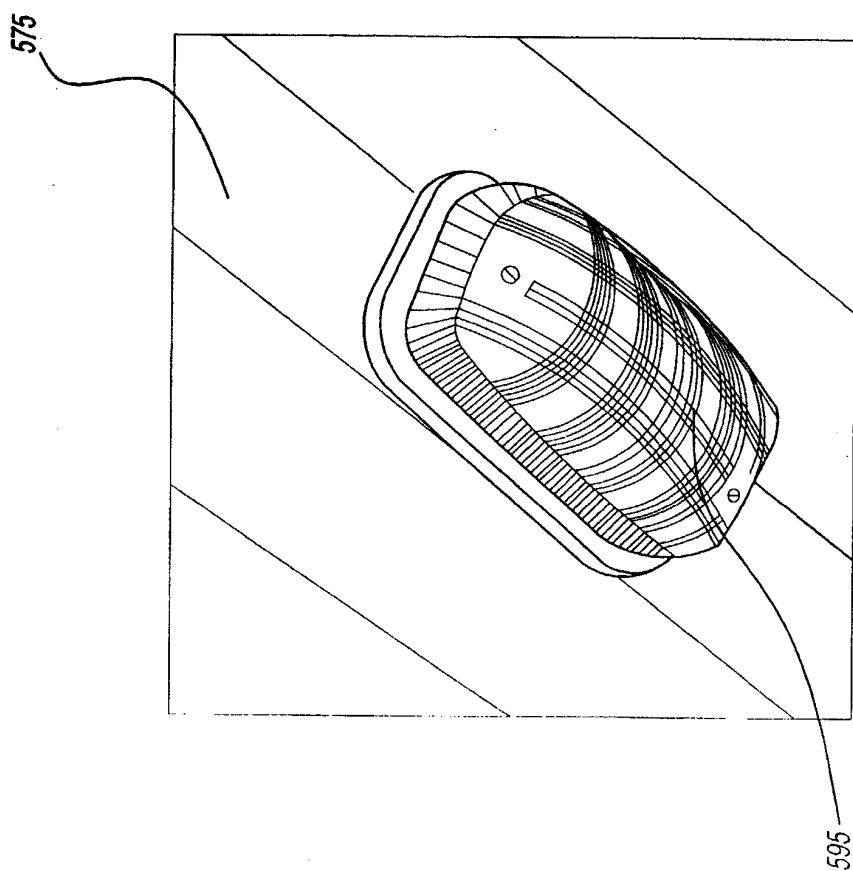


Fig. 39

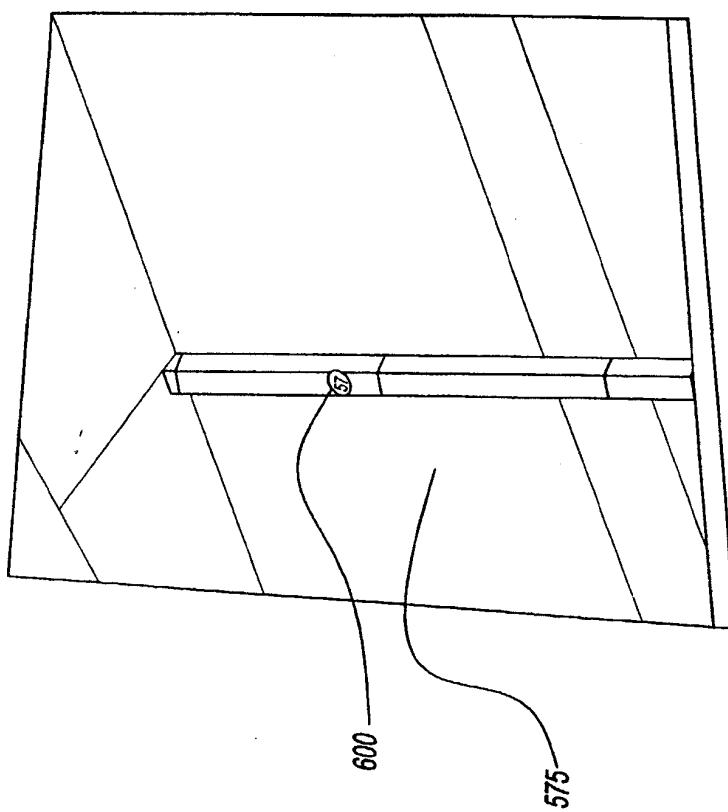


Fig. 40

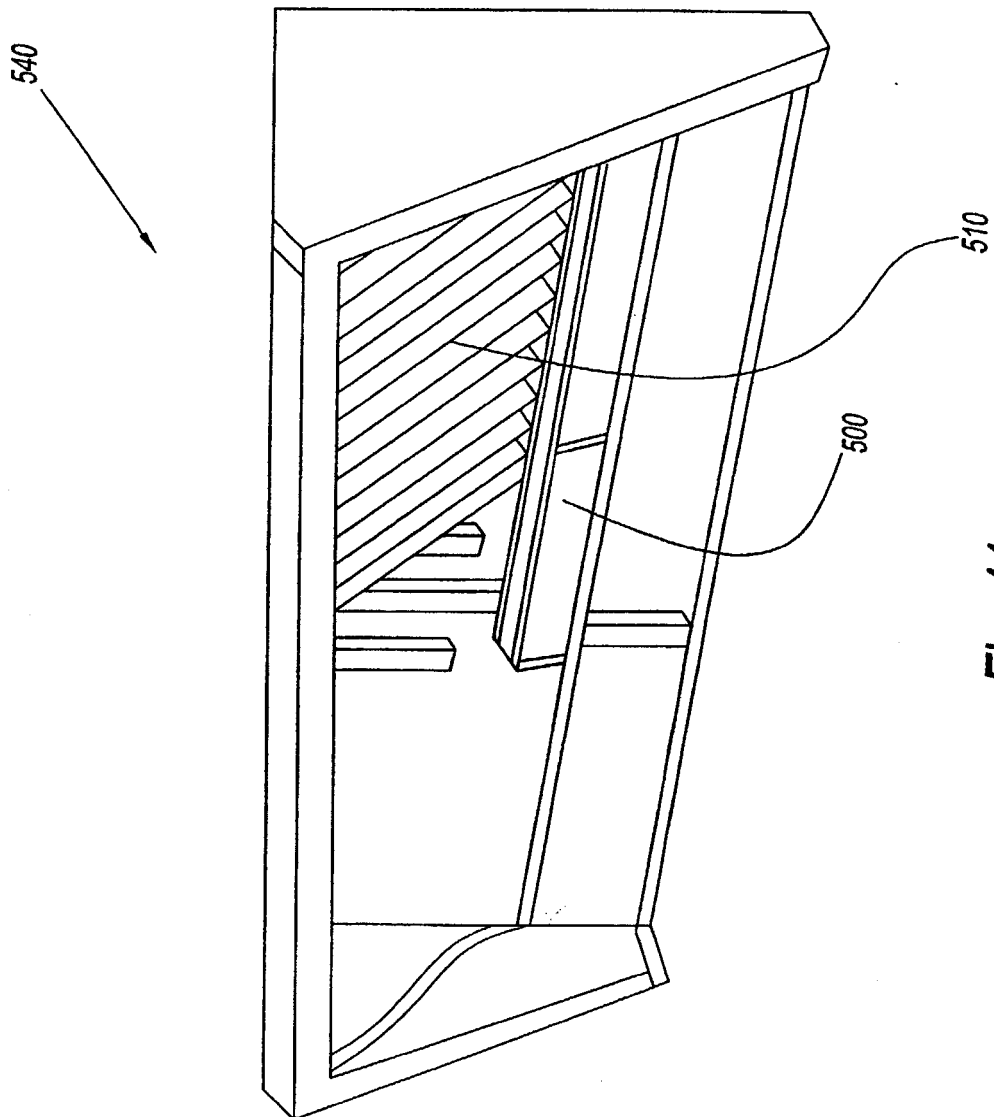


Fig. 41

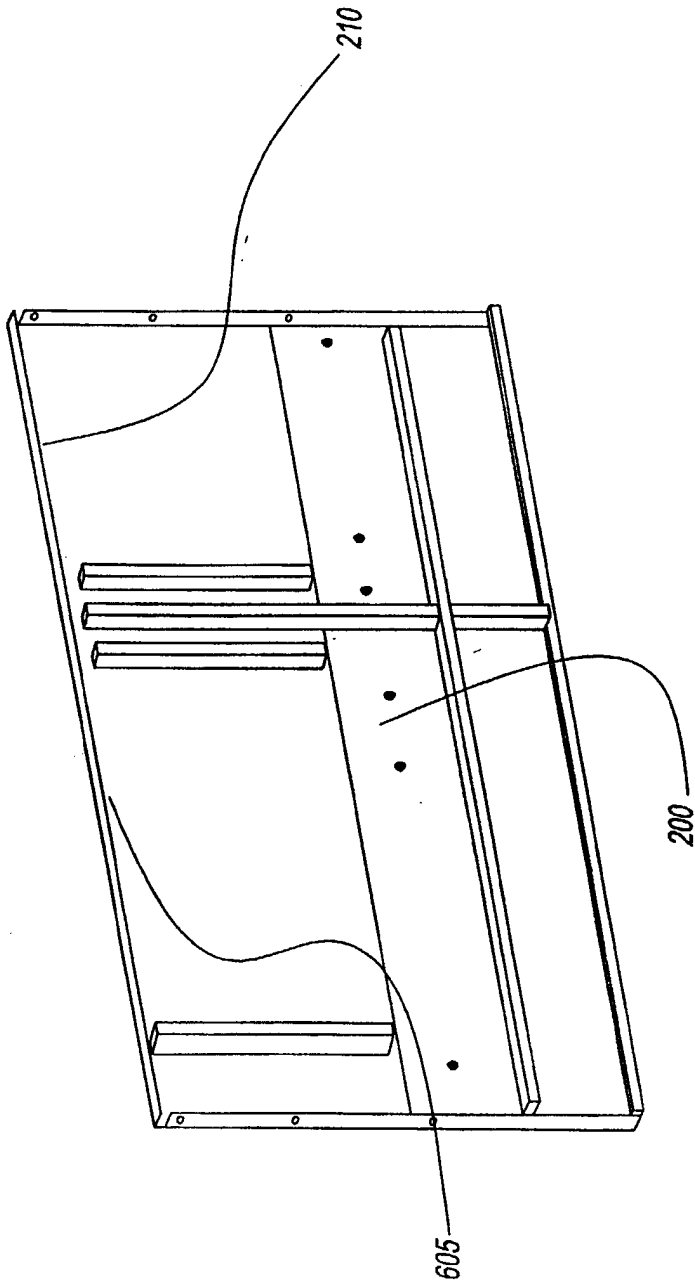


Fig. 42

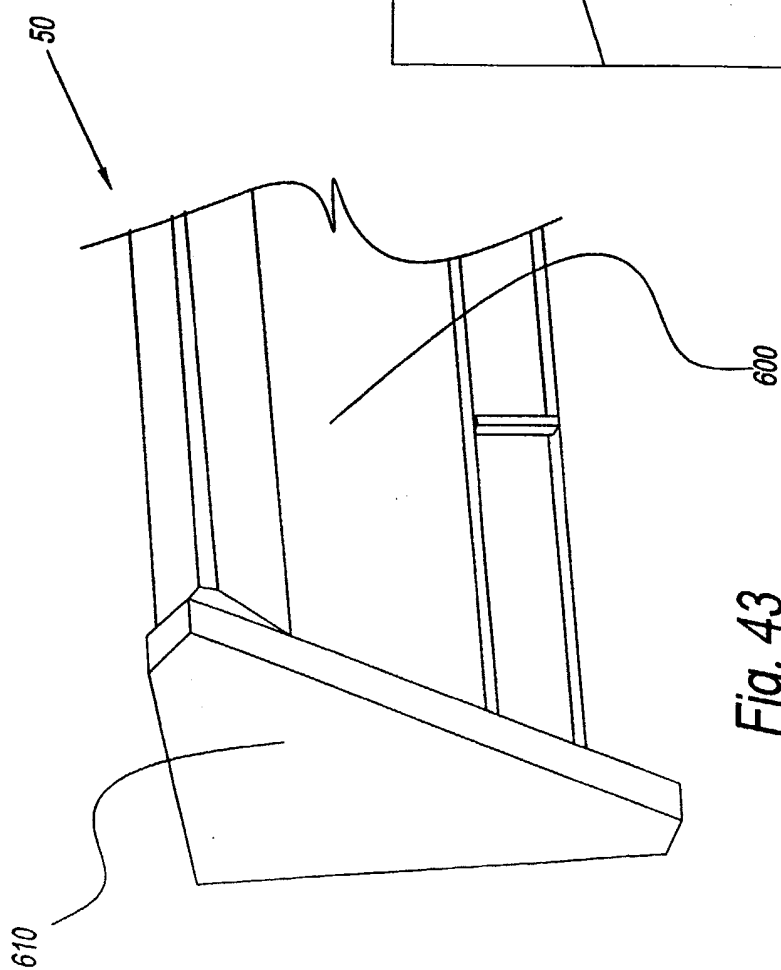


Fig. 43

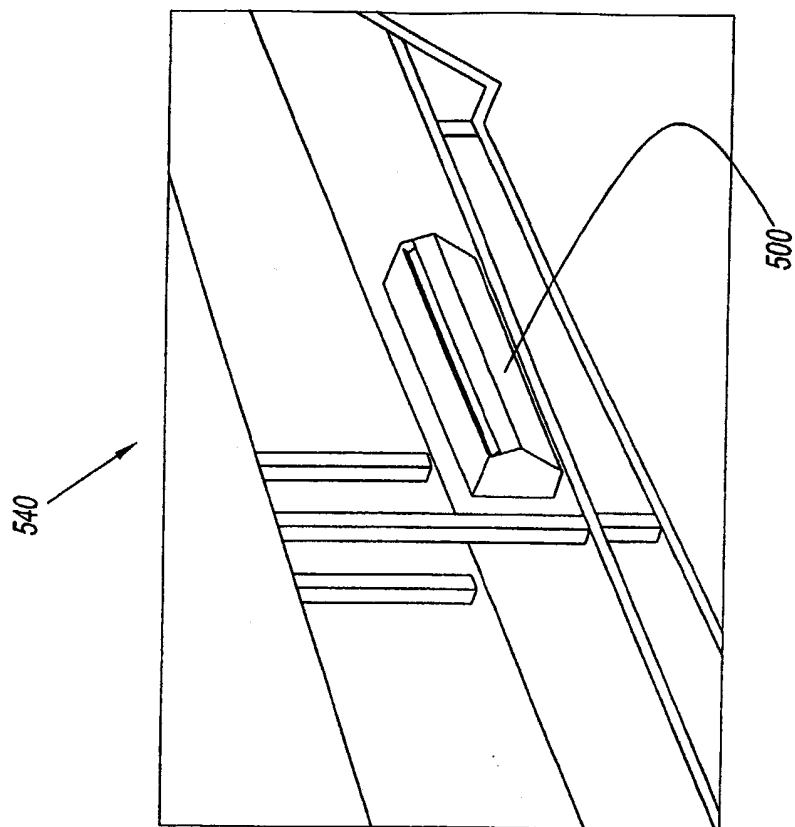


Fig. 44