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(54) **Boiler unit**

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Unité de chaudière

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EP 2 366 962 B1

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Description

[0001] The present invention relates to a boiler assembly comprising a removable boiler unit and in particular, although not exclusively, to a removable domestic boiler

[0002] At present a domestic boiler that has broken down or requires servicing has to be worked on in-situ. This requires the maintenance person to carry a large selection of spare parts. If the repair is a complex one, the household may be without heating for a considerable period of time.

[0003] GB2246848 A of Baxi Partnership Limited discloses a gas boiler assembly comprising a flue assembly adapted to be permanently mounted on a building, and a removable boiler unit adapted to be removably mounted on the flue assembly. Water, gas and electricity connections are provided on the flue assembly for connection to the boiler unit, when mounted in position on the flue assembly.

[0004] EP0784192 discloses an appliance for heating water, which includes a manifold unit and a boiler unit, and the units are arranged to be detachably connectable to each other by way of rapid-connect couplings. This document shows an assembly as defined in the preamble of claim 1.

According to a first aspect of the present invention there is provided a boiler assembly comprising a removable boiler unit detachably connected to a manifold unit, the arrangement being such that the manifold unit provides the boiler unit with a connection interface to a pipework system, characterised in that the boiler unit and the manifold unit each comprising respective means to isolate the connection, and wherein the isolation means are configured to prevent the flow of a fluid through the connection prior to removal of the boiler unit from the manifold unit.

[0005] The boiler unit is preferably a self contained unit comprising the components required for the production of heat, the components being a fan motor, a fan pressure switch, a burner unit, a heat exchanger, a fluid pump, a gas valve and a PCB control box.

[0006] The boiler unit is preferably a self contained unit comprising the components required for the production of hot water, the components being a fan motor, a fan pressure switch, a burner unit, a heat exchanger, a fluid pump, a gas valve and a PCB control box.

[0007] The boiler unit is preferably a self contained unit comprising the components required for the production of domestic heat and domestic hot water.

[0008] Preferably, the connection interface comprises a plurality of connections between the boiler unit and the manifold unit.

[0009] The pipework system may incorporate a fluid supply and a fluid return, each being connected to the boiler unit via the manifold unit.

[0010] The connections of the connection interface are preferably quick release connections.

[0011] The isolation means is preferably located at the front of the boiler assembly. The location of the isolation means at the front of the boiler assembly provides easy access to the isolation means.

[0012] The boiler assembly is preferably capable of being wall mounted or floor standing. The location of the isolation means at the front of the boiler assembly facilitate the boiler assembly being wall mounted or floor standing.

[0013] Preferably, the manifold unit comprises guide means for guiding the boiler during removal and re-assembly. The guide means helps to ensure that the connections between the boiler unit and the manifold unit are in the correct location in the assembled state.

[0014] The boiler assembly preferably comprises a support rail for supporting the boiler unit during removal and re-assembly.

[0015] The boiler assembly preferably comprises security means for preventing unauthorised removal of the boiler unit.

[0016] The boiler assembly may comprise a remote management system whereby the management system is in communication with the boiler assembly via a modem, the boiler assembly providing analysis information to the management system. The management system may be used to monitor one or more boiler assembly(ies) remotely and detect potential faults.

[0017] According to a second aspect of the present invention there is provided a heating system characterised in that the system comprises a boiler assembly according to the first aspect of the present invention.

[0018] According to a third aspect of the present invention there is provided a method of servicing or repairing a boiler unit of a boiler assembly according to the first aspect of the present invention, characterised by the method comprising detaching and removing a first boiler unit from a manifold unit; then replacing the first boiler unit with a second boiler unit and connecting the second boiler unit to the manifold unit.

[0019] By replacing the boiler unit with a second boiler unit the heating system may be used while the first boiler unit is being serviced or repaired.

[0020] The present invention may be carried into practice in various ways, but two embodiments will now be described by way of example only with reference to the accompanying drawings in which:

Figure 1 is a schematic view of a boiler assembly comprising a boiler unit and a manifold unit;

Figure 2 is a side view of the boiler assembly shown in Figure 1;

Figure 3 is an isometric front view of the boiler unit shown in Figures 1 and 2, and shows the boiler unit with a front panel removed;

Figure 4 is an isometric rear view of the boiler shown

in Figure 3;

Figure 5 is an isometric front view of the manifold unit shown in Figure 1 with the boiler unit removed;

Figure 6 is a schematic view of a further embodiment of a boiler assembly comprising a boiler unit (shown in ghost form) partially assembled on a manifold unit;

Figure 7 is a side view of a corner of the manifold unit shown in Figure 6 and a support rail partially removed from the manifold unit; and

Figure 8 is an isometric rear view of the boiler shown in Figure 6.

[0021] Referring to the Figures 1 to 5, a boiler assembly 1 comprises a removable domestic boiler unit 2 detachably connected to a manifold unit 4, the arrangement being such that the manifold unit 4 provides the boiler unit 2 with a connection interface to a heating pipework system (not shown).

[0022] The boiler unit 2 may be quickly and simply removed from the manifold unit 4 and taken away to be serviced or repaired. In order that the heating system may be used while the servicing is being carried out a replacement boiler unit is connected to the manifold unit 4.

[0023] The boiler unit 2 is a box-like shape comprising a removable front panel 8; two removable side panels 10, 12 each being formed with a handle recess 13; a removable top panel 14; a base panel 16 and a back panel 18. The removable panels of the manifold unit 4 are secured to the unit by a number of screws 20 (not shown in some Figures). The front panel 8 comprises a security lock 22, which helps to prevent unauthorised access to the boiler unit 2. The skilled person will appreciate that any suitable security device may be used to prevent unauthorised access to the boiler unit 2. Disposed below the front panel 8 is a rectangular instrumentation panel 24 that comprises a pressure gauge 26 and a timer 28 for turning the boiler unit 2 on and off. The timer 28 may also be used to indicate when a service is due or to indicate a fault.

[0024] The boiler unit 2 contains an array of standard elements normally found in a domestic boiler including a burner unit 30, a heat exchanger 31, a combustion chamber 32, a fluid pump 34, a pressure switch 36 for a fan, a gas valve 38, a diverter valve 40 for the heat exchanger 31, a water pressure switch 42 and a PCB control box 44. The boiler unit 2 also comprises series of pipe connections 46. The pipe connections 46 are used as water inlet and water outlet ports for the boiler unit 2. One or more of the pipe connections 46 may be used as a gas feed port for the burner 30. The correct rating and design of the connections and the internal pipework would be chosen for the different functions of the connections 46 and internal pipework. Attached to each connection 46

there is an isolation valve 48 (see Figure 1).

[0025] Disposed at each corner of the boiler unit 2 there is a guide channel 50 each of which extend from the back panel 18 in a direction towards the front of the boiler unit 2. The back panel 18 is also formed with an electrical plug element 54, and a circular port 52 that provides an exhaust for a flue of the boiler unit 2.

[0026] The manifold unit 4 is a substantially L-shaped structure comprising a rectangular rear box section 60 and a rectangular base section 62. The rear box section 60 contains an expansion chamber 64 that is used for the pipework, which contains the heated water. An upper region of the rear box section 60 is formed with an electrical socket 67 and a flue port 66 for the exhaust gases of the boiler unit 2. When the boiler unit 2 is assembled on the manifold unit 4 the flue port 66 aligns and connects with the circular port 52 of the boiler unit 2 and the electrical plug element 54 of the boiler unit 2 is received by the electrical socket 67 of the manifold unit 4.

[0027] The uppermost panel 70 of the rear box section 60 is formed with a series of circular holes 72. One or more pipes of the heating pipework system may use the holes 72 for access into the manifold. The uppermost panel 70 is also formed with a push-out circular section 74, which may be removed to allow access by an exhaust flue (not shown).

[0028] The manifold unit 4 comprises four guide rails 76 extending in a direction substantially parallel to the base section 62. In the assembled state of the boiler assembly the rails 76 are received by the channels 50 of the boiler unit 2 and help provide support for the boiler unit 2.

[0029] The base section 62 comprises a series of pipelines 78 the respective distal ends of which are held on a horizontal bracket 80. Connected to the respective distal ends of the pipelines 78 are respective isolation valves 82. In the assembled state the isolation valves 82 of the manifold unit 4 are connected to the isolation valves 48 of the boiler unit 2 (see Figure 1).

[0030] The boiler assembly 1 may be fitted to an existing domestic heating system or alternatively a whole new heating pipework network may be fitted and connected to the boiler assembly 1. The manifold unit 4 is fixed to the wall or floor of the building. The various water pipes of the heating network are connected to the manifold unit 4. If the boiler unit 2 uses gas then the gas pipe is connected to the manifold unit 4 and the gas exhaust flue is connected to the manifold unit 4. The skilled person will appreciate that any type of boiler may be used, such as an electric boiler or an oil boiler. The boiler unit 2 receives electrical power via the electrical plug 54 and socket 67.

[0031] When the boiler unit 2 is due a service or requires repair the maintenance person isolates the heating pipework system from the boiler unit 2 and the gas supply by closing the isolation valves 48 and 82. The connections between the respective isolation valves 48 and 82 are undone. The boiler unit 2 is then easily re-

moved from the manifold unit 4 using the handles 13. When removing the boiler unit 2 from the manifold unit 4, the guide channels 50 slide on the rails 76, the electrical connection between plug 54 and the socket 67 is broken and the connection between the circular port 52 and the flue port 66 is broken. There is no need to remove the front panel 8 of the boiler unit 2 as the work is carried out off-site.

[0032] Once the boiler unit 2 has been removed from the manifold unit 4 a replacement boiler unit may be assembled onto the manifold unit 4 and all the connections made so that the heating system may be used while the original boiler unit is being serviced off-site.

[0033] A particular benefit of the manifold unit 4 is that some of the elements of a boiler assembly, such as the expansion chamber 64 and the exhaust flue port 66, which do not normally require servicing may be contained in the manifold unit 4. The boiler unit 2 may contain only those elements that require regular servicing or are likely to need repair. The other elements of a domestic boiler assembly can be left behind when the boiler unit 2 is taken away.

[0034] The boiler unit may comprise a device to measure pressure within one or more of the elements of the boiler assembly, a device for analysing moisture within the boiler unit and a device for measuring the various gases within the boiler assembly. The information from these various devices can be relayed to a remote computer management system via a modem. The computer management system monitors the information received from the devices. Any faults or potential faults are logged and such information may be used by a service technician.

[0035] The boiler assembly may comprise a remote management system whereby in use the management system is in communication with the boiler assembly via a modem, the boiler assembly providing analysis information to the management system. The management system may be used to monitor one or more boiler assembly(ies) remotely and detect potential faults.

[0036] In an alternative embodiment (not shown in the Figures) a boiler unit comprises a removable boiler unit that is detachably connected to a pipework system via a connection interface comprising quick release connections. The pipework system comprises isolation valve adjacent to the connections of the pipework system. The boiler unit may also comprise isolation valves adjacent to the connections.

[0037] The isolation valves are used to prevent the flow of a fluid through the connections and they may be used to stop the flow of a fluid through the connections prior to the removal of the boiler unit from the pipework system. The connection interface may comprise an electrical power connection for providing the boiler unit with a power supply and a gas pipe connection for providing the boiler unit with a connection to a gas inlet pipe. The connection interface may also comprise an exhaust connection for providing the boiler unit with a connection to a

gas outlet duct.

[0038] Once the boiler unit has been disconnected and removed from the pipework system a replacement boiler unit may be connected to the pipework system so that the heating system may be used while the original boiler unit is being serviced off-site.

[0039] Referring to the Figures 6 to 8, a boiler assembly 1 comprises a removable domestic boiler unit 2 detachably connected to a manifold unit 4, the arrangement being such that the manifold unit 4 provides the boiler unit 2 with a connection interface to a heating pipework system (not shown).

[0040] In this particular embodiment the manifold unit 4 comprises four guide rails 90 extending in a direction substantially parallel to the base section 62. In the assembled state of the boiler assembly the rails 90 are received by channels 95 of the boiler 7 unit 2 and help provide support for the boiler unit 2. The guide rails 90 are each attached to the manifold at one of their respective end so forming a cantilever. The guide rails 90 each have a circular cross section. The distal end 91 of each guide rail 90 is a cone shape to aid the insertion into the respective channels 95.

[0041] The boiler assembly 1 also comprises two removable support rails 94. The support rails 94 have an L-shaped vertical cross section and are used during the assembly and disassembly of the boiler unit 2 from the manifold unit 4 to provide support of the boiler unit 2. In the assembled state the support rails 94 can be removed from boiler assembly 1.

Claims

1. A boiler assembly (1) comprising a removable boiler unit (2) detachably connected to a manifold unit (4), the arrangement being such that the manifold unit (4) provides the boiler unit (2) with a connection interface to a pipework system, **characterised in that** the boiler unit (2) and the manifold unit (4) each comprising respective means (48, 82) to isolate the connection, and wherein the isolation means (48, 52) are configured to prevent the flow of a fluid through the connection prior to removal of the boiler unit from the manifold unit.
2. A boiler assembly (1) as claimed in claim 1 wherein the boiler unit (2) is a self-contained unit comprising the components required for the production of heat, the components being a fan motor, a fan pressure switch (36), a burner unit (30), a heat exchanger (31), a fluid pump (34), a gas valve (38) and a PCB control box (44).
3. A boiler assembly (1) as claimed in claim 1 wherein the boiler unit (2) is a self contained unit comprising the components required for the production of hot water, the components being a fan motor, a fan pres-

sure switch (36), a burner unit (30), a heat exchanger (31), a fluid pump (34), a gas valve (38) and a PCB control box (44).

4. A boiler assembly (1) as claimed in any one of claims 1 to 3 wherein, the connection interface comprises a plurality of connections between the boiler unit (2) and the manifold unit (4). 5
5. A boiler assembly (1) as claimed in claim 4 wherein the pipework system incorporates a fluid supply and a fluid return, each being connected to the boiler unit (2) via the manifold unit (4). 10
6. A boiler assembly (1) as claimed in any one of claims 4 or 5 wherein the connections of the connection interface are quick release connections. 15
7. A boiler assembly (1) as claimed in any one of claims 1 to 6 wherein the isolation means (48) is located at the front of the boiler assembly (1). 20
8. A boiler assembly (1) as claimed in any one of the preceding claims wherein the boiler assembly (1) is capable of being wall mounted or floor standing. 25
9. A boiler assembly (1) as claimed in any one of the preceding claims wherein the manifold unit (4) comprises guide means (76) for guiding the boiler unit (2) during removal and re-assembly. 30
10. A boiler assembly (1) as claimed in claim 1 comprising a support rail (94) for supporting the boiler unit (2) during removal and re-assembly. 35
11. A boiler assembly (1) as claimed in claim 1 comprising security means for preventing unauthorised removal of the boiler unit (2). 40
12. A boiler assembly (1) as claimed in any one of the preceding claims comprising a remote management system whereby the management system is in communication with the boiler assembly (1) via a modem, the boiler assembly (1) providing analysis information to the management system. 45
13. A heating system comprising a boiler assembly (1) as claimed in any one of claims 1 to 12.
14. A method of servicing or repairing a boiler unit (2) of a boiler assembly (1) according to any one of claims 1 to 12, the method comprising detaching and removing a first boiler unit (2) from a manifold unit (4); then replacing the first boiler unit (2) with a second boiler unit (2) and connecting the second boiler unit (2) to the manifold unit (4). 50

Patentansprüche

1. Eine Boilereinheit (2), die eine abnehmbare Boilereinheit (2) aufweist, die lösbar mit einer Verteilereinheit (4) verbunden ist, die Einrichtung ist so, dass die Verteilereinheit (4) eine Boilereinheit (2) mit einer Verbindungsschnittstelle zu einem Rohrleitungssystem bietet, **dadurch gekennzeichnet, dass** die Boilereinheit (2) und die Verteilereinheit (4) jeweils entsprechende Vorrichtungen (48, 82) aufweisen, um die Verbindung zu isolieren, und wobei die Isolationsvorrichtungen (48,52) so gestaltet sind, dass sie den Durchfluss einer Flüssigkeit durch die Verbindung vor der Entnahme der Boilereinheit von der Verteilereinheit verhindern.
2. Eine Boilereinheit (1) gemäß Anspruch 1, wobei die Boilereinheit (2) eine in sich abgeschlossene Einheit ist, die die für die Erzeugung von Wärme erforderlichen Komponenten aufweist, die Komponenten sind dabei ein Lüftermotor, ein Lüfterdruckschalter (36), eine Brenneinheit (30), ein Wärmetauscher (31), eine Flüssigkeitspumpe (34), ein Gasventil (38) und ein Leiterplatten-Steuerkasten (44).
3. Eine Boilereinheit (1) gemäß Anspruch 1, wobei die Boilereinheit (2) eine in sich abgeschlossene Einheit ist, die die für die Erzeugung von Heißwasser erforderlichen Komponenten aufweist, die Komponenten sind dabei ein Lüftermotor, ein Lüfterdruckschalter (36), eine Brenneinheit (30), ein Wärmetauscher (31), eine Flüssigkeitspumpe (34), ein Gasventil (38) und ein Leiterplatten-Steuerkasten (44).
4. Eine Boilereinheit (1) gemäß eines der Ansprüche 1 bis 3, wobei die Verbindungsschnittstelle eine Vielzahl von Anschlüssen zwischen der Boilereinheit (2) und der Verteilereinheit (4) aufweist.
5. Eine Boilereinheit (1) gemäß Anspruch 4, wobei das Rohrleitungssystem einen Flüssigkeitszulauf und einen Flüssigkeitsrücklauf einschließt, die jeweils mit der Boilereinheit (2) über die Verteilereinheit (4) verbunden sind.
6. Eine Boilereinheit (1) gemäß eines der Ansprüche 4 oder 5, wobei die Verbindungen der Verbindungsschnittstelle Schnellverschlüsse sind.
7. Eine Boilereinheit (1) gemäß eines der Ansprüche 1 bis 6, wobei die Isolationsvorrichtung (48) an der Vorderseite der Boilereinheit (1) angebracht ist.
8. Eine Boilereinheit (1) gemäß eines der vorhergehenden Ansprüche, wobei die Boilereinheit (1) an der Wand montiert wird oder auf dem Boden steht.

9. Eine Boilieranordnung (1) gemäß eines der vorhergehenden Ansprüche, wobei die Verteilereinheit (4) Führungsvorrichtungen (76) für die Führung der Boilereinheit (2) beim Ausbau und Wiedereinbau aufweist.
10. Eine Boilieranordnung (1) gemäß Anspruch 1, die eine Halteschiene (94) als Stütze für die Boilereinheit (2) beim Ausbau und Wiedereinbau aufweist.
11. Eine Boilieranordnung (1) gemäß Anspruch 1, die eine Sicherheitsvorrichtung für die Verhinderung eines nicht autorisierten Ausbaus der Boilereinheit (2) aufweist.
12. Eine Boilieranordnung (1) gemäß eines der vorhergehenden Ansprüche, die ein Fern-Managementsystem aufweist, wobei das Managementsystem über ein Modem in Verbindung mit der Boilieranordnung (1) steht, die Boilieranordnung (1) liefert dabei dem Managementsystem Analyseinformationen.
13. Ein Heizsystem, das eine Boilieranordnung (1) gemäß eines der Ansprüche 1 bis 12 aufweist.
14. Ein Verfahren für die Wartung oder Reparatur einer Boilereinheit (2) einer Boilieranordnung (1) gemäß eines der Ansprüche 1 bis 12, das Verfahren weist dabei die Demontage und Entnahme einer ersten Boilereinheit (2) aus einer Verteilereinheit (4) auf; dann den Austausch der ersten Boilereinheit (2) gegen eine zweite Boilereinheit (2) und den Anschluss der zweiten Boilereinheit (2) an die Verteilereinheit (4).

Revendications

1. Un ensemble chaudière (1) comprenant une unité chaudière amovible (2) raccordée de manière détachable à une unité collecteur (4), l'agencement étant tel que l'unité collecteur (4) fournit à l'unité chaudière (2) une interface de raccordement à un système de conduites, **caractérisé en ce que** l'unité chaudière (2) et l'unité collecteur (4) comprennent chacune un moyen respectif (48, 82) d'isolation du raccord, et où le moyen d'isolation (48, 52) est configuré de façon à empêcher l'écoulement d'un fluide au travers du raccord avant le retrait de l'unité chaudière de l'unité collecteur.
2. Un ensemble chaudière (1) selon la Revendication 1 où l'unité chaudière (2) est une unité autonome comprenant les composants nécessaires à la production de chaleur, les composants étant un moteur de ventilateur, un commutateur de pression de ventilateur (36), une unité brûleur (30), un échangeur thermique (31), une pompe à fluide (34), une soupape de gaz (38) et une boîte de commande de PCB (44).
3. Un ensemble chaudière (1) selon la Revendication 1 où l'unité chaudière (2) est une unité autonome comprenant les composants nécessaires à la production d'eau chaude, les composants étant un moteur de ventilateur, un commutateur de pression de ventilateur (36), une unité brûleur (30), un échangeur thermique (31), une pompe à fluide (34), une soupape de gaz (38) et une boîte de commande de PCB (44).
4. Un ensemble chaudière (1) selon l'une quelconque des Revendications 1 à 3 où, l'interface de raccordement comprend une pluralité de raccords entre l'unité chaudière (2) et l'unité collecteur (4).
5. Un ensemble chaudière (1) selon la Revendication 4 où le système de conduites comprend une arrivée de fluide et un retour de fluide, chacun d'eux étant raccordé à l'unité chaudière (2) par l'intermédiaire de l'unité collecteur (4).
6. Un ensemble chaudière (1) selon l'une quelconque des Revendications 4 ou 5 où les raccords de l'interface de raccordement sont des raccords à libération rapide.
7. Un ensemble chaudière (1) selon l'une quelconque des Revendications 1 à 6 où le moyen d'isolation (48) se situe à l'avant de l'ensemble chaudière (1).
8. Un ensemble chaudière (1) selon l'une quelconque des Revendications précédentes où l'ensemble chaudière (1) peut être monté sur un mur ou posé sur le sol.
9. Un ensemble chaudière (1) selon l'une quelconque des Revendications précédentes où l'unité collecteur (4) comprend un moyen de guidage (76) destiné au guidage de l'unité chaudière (2) au cours du retrait et du remontage.
10. Un ensemble chaudière (1) selon la Revendication 1 comprenant un rail support (94) destiné au support de l'unité chaudière (2) au cours du retrait et du remontage.
11. Un ensemble chaudière (1) selon la Revendication 1 comprenant un moyen de sécurité destiné à empêcher un retrait non autorisé de l'unité chaudière (2).
12. Un ensemble chaudière (1) selon l'une quelconque des Revendications précédentes comprenant un système de gestion à distance, le système de gestion étant en communication avec l'ensemble chau-

dière (1) par l'intermédiaire d'un modem, l'ensemble chaudière (1) fournissant des informations d'analyse au système de gestion.

13. Un système de chauffage comprenant un ensemble chaudière (1) selon l'une quelconque des Revendications 1 à 12. 5
14. Un procédé d'entretien ou de réparation d'une unité chaudière (2) d'un ensemble chaudière (1) selon l'une quelconque des Revendications 1 à 12, le procédé comprenant le détachement et le retrait d'une première unité chaudière (2) d'une unité collecteur (4), ensuite le remplacement de la première unité chaudière (2) par une deuxième unité chaudière (2) et le raccordement de la deuxième unité chaudière (2) à l'unité collecteur (4). 10 15

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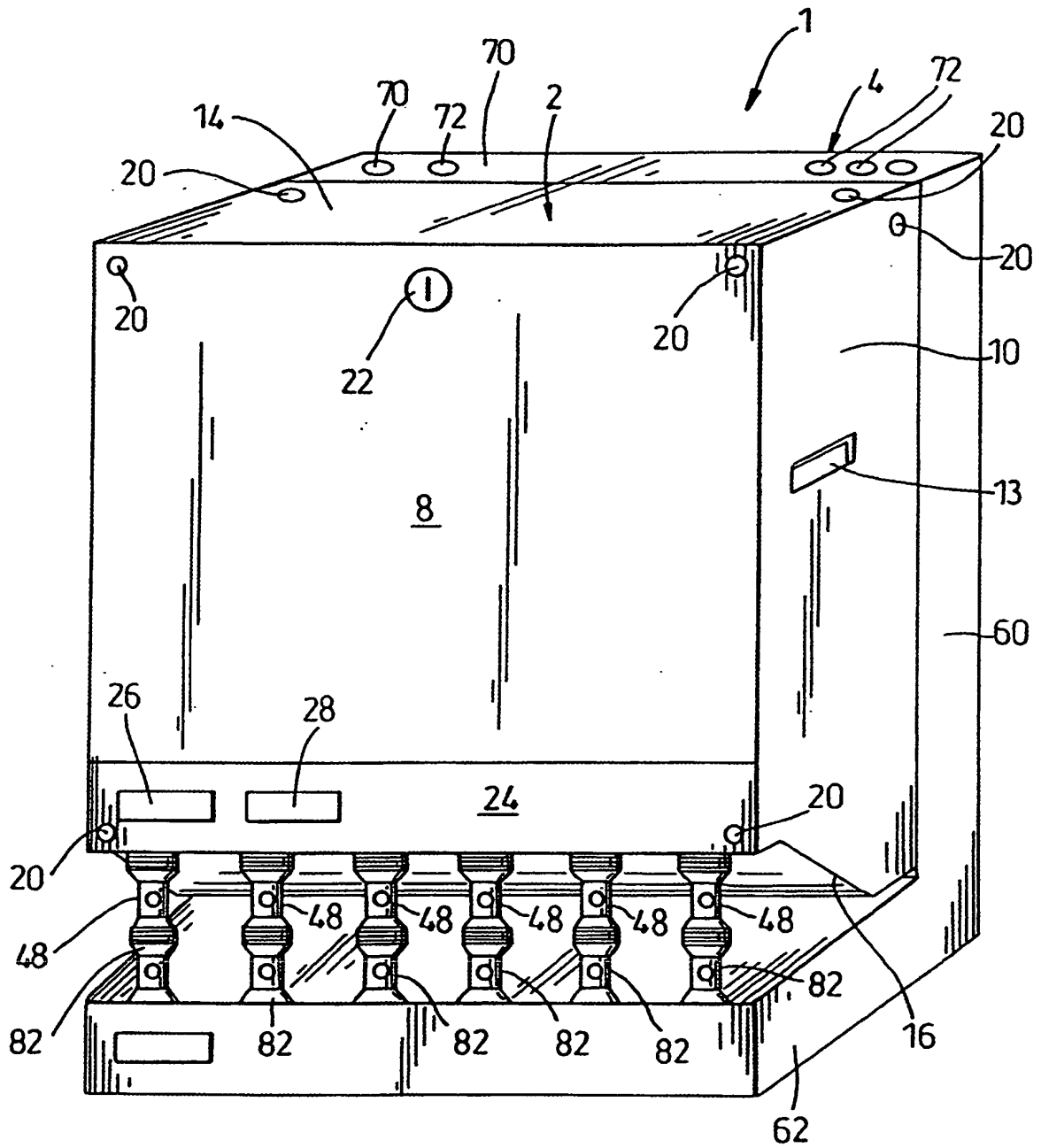


Fig. 1

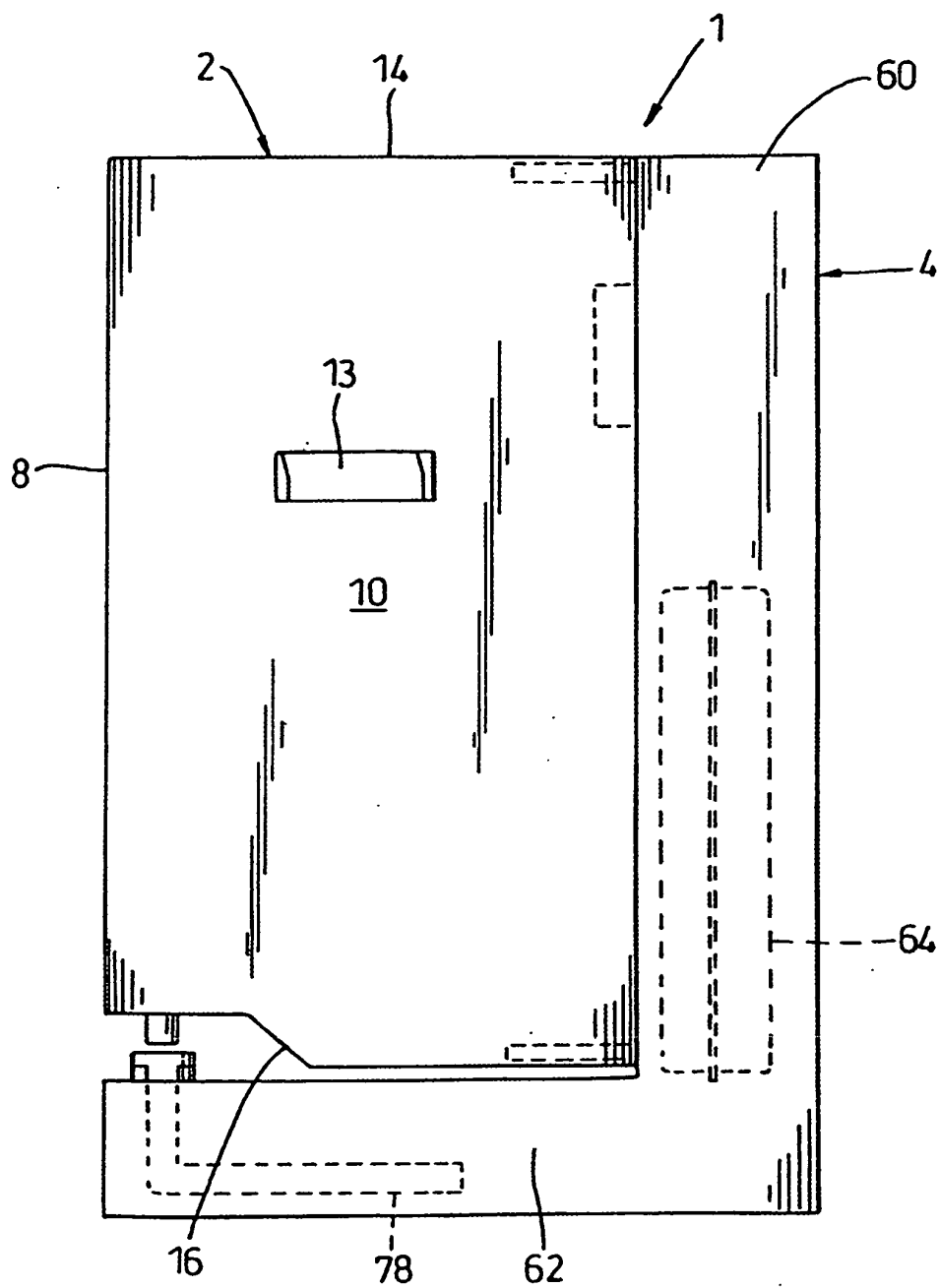


Fig. 2

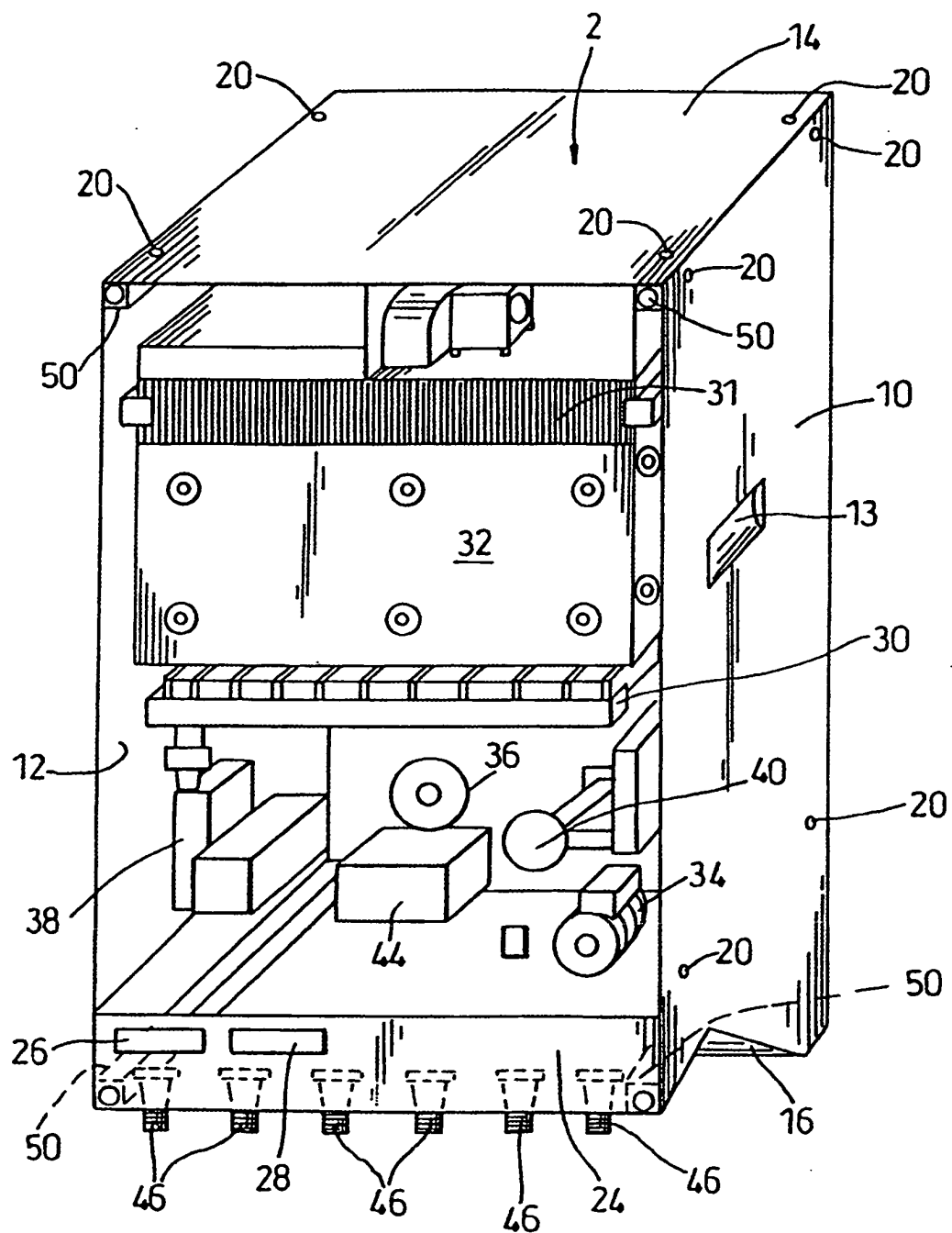


Fig. 3

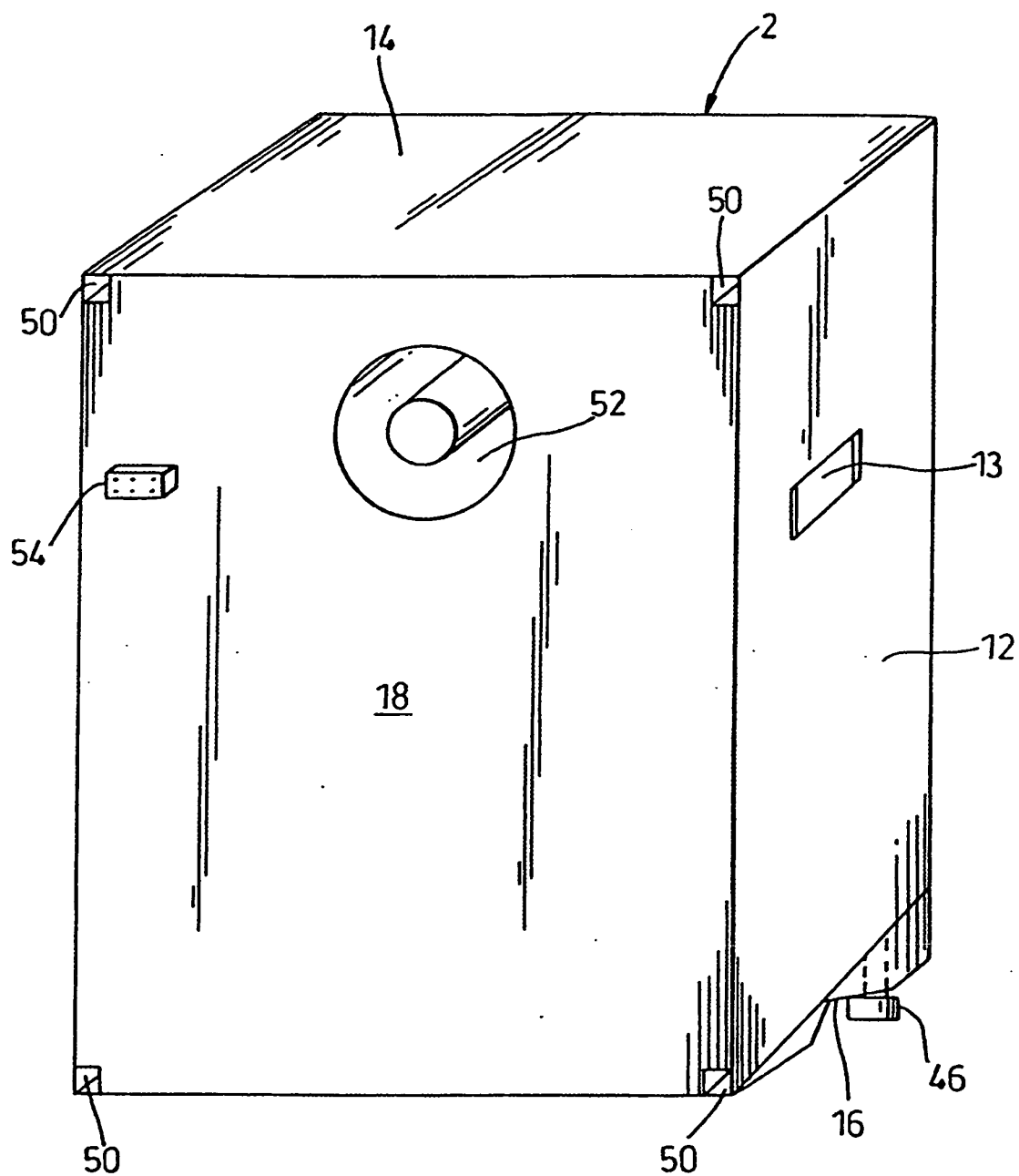


Fig. 4

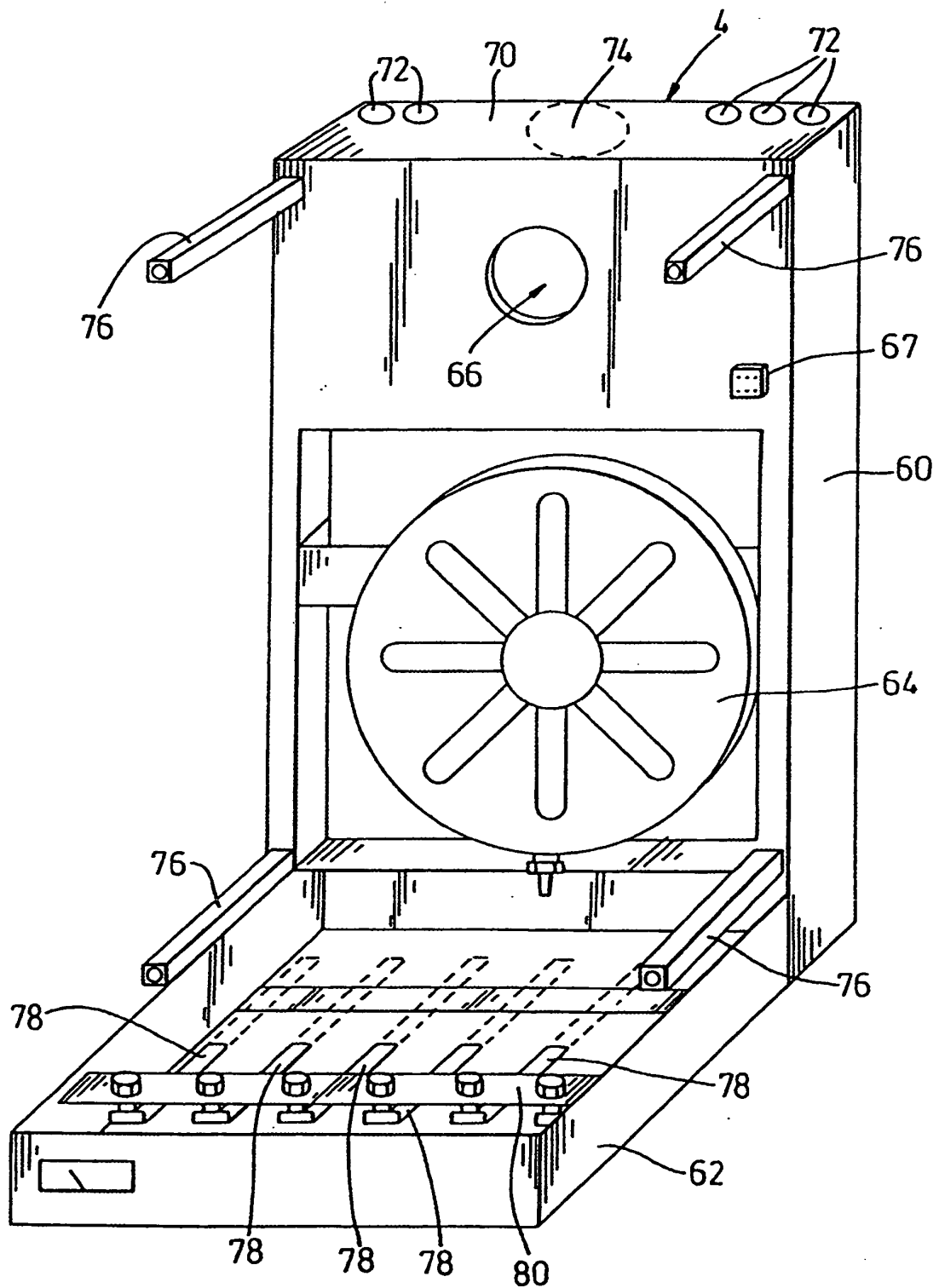


Fig. 5

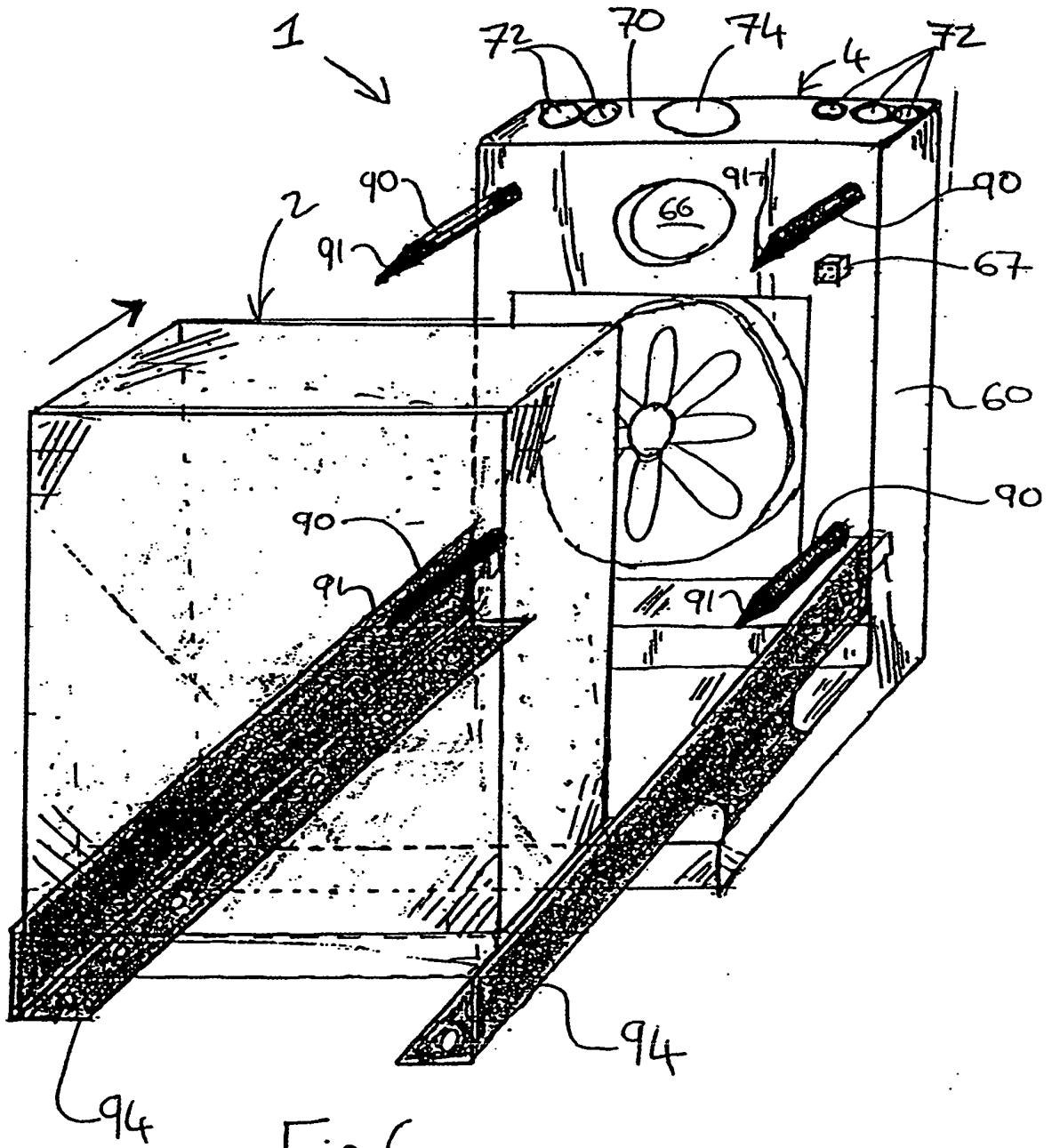


Fig 6

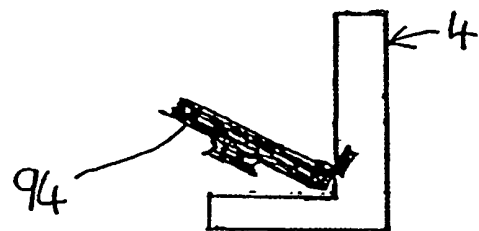


Fig 7

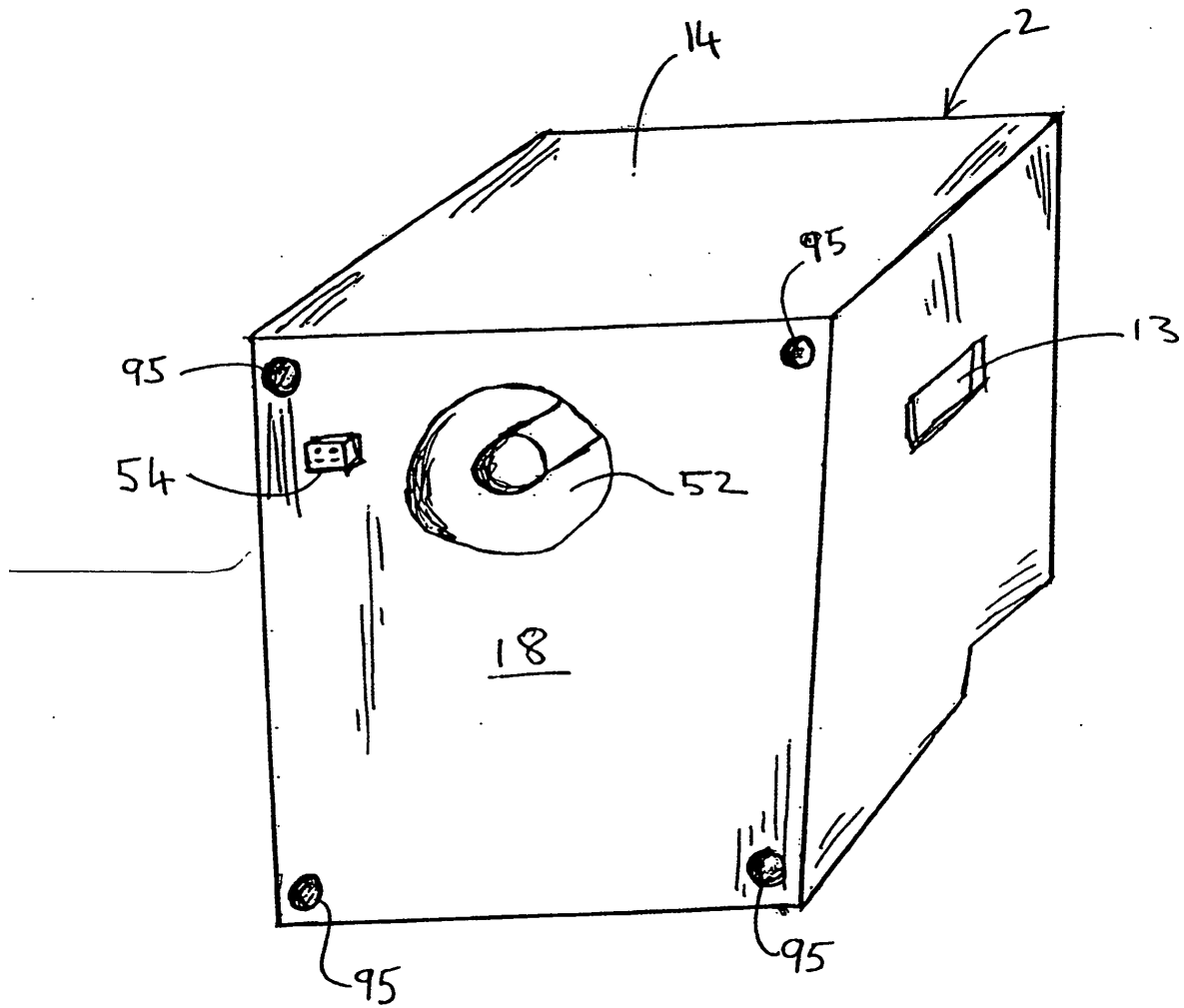


Fig 8

REFERENCES CITED IN THE DESCRIPTION

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