Innovation, Sciences et Développement économique Canada
Office de la Propriété Intellectuelle du Canada

Innovation, Science and Economic Development Canada
Canadian Intellectual Property Office

CA 2938324 C 2023/08/29

(11)(21) 2 938 324

(12) BREVET CANADIEN
CANADIAN PATENT

(13) C

(22) Date de dépôt/Filing Date: 2016/08/08

(41) Mise à la disp. pub./Open to Public Insp.: 2018/02/08

(45) Date de délivrance/Issue Date: 2023/08/29

(51) Cl.Int./Int.Cl. *F24F 13/06* (2006.01), *F24F 13/08* (2006.01), *F24F 7/10* (2006.01)

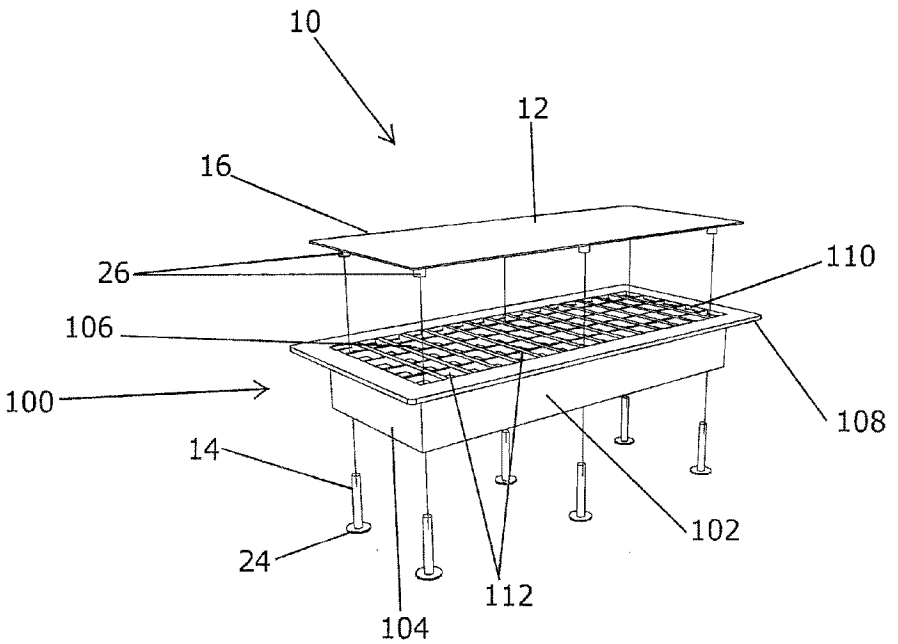
(72) Inventeur/Inventor:
KAMBEITZ, DARCEY, CA

(73) Propriétaire/Owner:
KAMBEITZ, DARCEY, CA

(74) Agent: NEXUS LAW GROUP LLP

(54) Titre : DEFLECTEUR D'AIR DESTINE A DES REGISTRES D'AIR INSTALLES AU PLANCHER

(54) Title: AIR DEFLECTOR FOR FLOOR MOUNTED AIR REGISTERS



(57) Abrégé/Abstract:
An air deflector having a forced air activated deflector body of a thin flat rigid piece of material substantially the same length and width as a register opening. A plurality of pins are positioned at spaced intervals around a periphery of the deflector body and depend from an underlying face of the deflector body to serve as travel guides. Each of the plurality of pins have a proximal end and a distal end. Feet are positioned on the distal end of each of the plurality of pins to serve as travel limiters.

ABSTRACT OF THE DISCLOSURE

An air deflector having a forced air activated deflector body of a thin flat rigid piece of material substantially the same length and width as a register opening. A plurality of pins are positioned at spaced intervals around a periphery of the deflector body and depend from an underlying face of the deflector body to serve as travel guides. Each of the plurality of pins have a proximal end and a distal end. Feet are positioned on the distal end of each of the plurality of pins to serve as travel limiters.

TITLE

[0001] Air Deflector for floor mounted air registers

FIELD

[0002] There is described an air deflector which is mounted onto a floor mounted air register of a forced air heating system.

BACKGROUND

[0003] Air registers are connected to ducts connected to a central forced air heating system. As the name implies, forced air heating systems force heated air along the ducts and out through the air registers positioned in the floor. This results in heated air being blown from the floor toward the ceiling. Since warm air naturally rises, blowing heated air from the floor toward the ceiling is an inefficient way to heat a room.

[0004] To address this problem, a number of air deflectors have been developed which deflect heated air exiting floor mounted air registers along the floor. Examples of air deflectors for floor mounted air registers include U.S. Patent 562,530 (Hanson) titled "Heat Deflector"; U.S. 4,501,195 (Held) titled "Air Deflector"; U.S. Patent 4,654,198 (Berardini) titled "Dynamic Air Register"; U.S. Patent 6,183,359 (Klein et al) titled "Self Opening Flexible Protective Covering for Heat Registers" and U.S. Patent Application Publication 2012/0156982 (DeSouza) titled "Floor Register with Rotatable Air Defector".

SUMMARY

[0005] According to one aspect there is provided an air deflector. The air deflector was developed for use with a prior art floor mounted air register having a register body with a peripheral sidewall that defines a register opening, a flange that extends outwardly from the peripheral sidewall, and members positioned across the register opening to define a plurality of air flow openings. The air deflector consists of a forced air activated deflector body comprising a thin flat rigid piece of material substantially the same length and width as the register opening. This air deflector is made of light materials such as plastic that are influenced by forced air. The air deflector rises vertically when forced air flows through the air register opening and falls by force of gravity back into position overlying the register opening when forced air ceases to flow through the air register opening. Travel guides are

provided which extend through the air flow openings to maintain movement of the deflector body on a vertical path while maintaining the deflector body on a horizontal plane parallel to the register opening. Travel limiters are provided which limit vertical movement of the deflector body.

[0006] In the preferred embodiment which will hereinafter be described, the travel guides are a plurality of pins positioned at spaced intervals around a periphery of the deflector body and which depend from an underlying face of the deflector body.

[0007] Each of the plurality of pins has a proximal end and a distal end. In the preferred embodiment that will hereafter be described, the travel limiters are feet positioned on the distal end of each of the plurality of pins. The feet are larger than the air flow openings. The pins pass freely through the air flow openings until vertical travel of the deflector body is stopped by the feet, which are unable to pass through the air flow openings, engaging the members positioned across the register opening.

[0008] This combination of desirable features results in a preferred embodiment of air deflector which consists of a forced air activated deflector body of a thin flat rigid piece of material substantially the same length and width as the register opening. A plurality of pins are positioned at spaced intervals around a periphery of the deflector body and depend from an underlying face of the deflector body. Each of the plurality of pins have a proximal end and a distal end. Feet are positioned on the distal end of each of the plurality of pins.

[0009] In order to facilitate retrofitting the air deflector onto a prior art air register, the underlying face of the deflector body has a plurality of female receptacles to which the proximal end of each of the plurality of pins is detachably secured.

[0010] It is recognized that the air deflector need not be removable and may be installed onto the air register at the factory. Therefore, according to another aspect there is provided an air deflector and a floor mounted air register combination.

[0011] According to another aspect there is provided a method of mounting an air deflector onto a floor air register having a register body with a peripheral sidewall that defines a register opening, a flange that extends outwardly from the peripheral sidewall, and members positioned across the register opening to define a plurality of air flow openings. The method involves a first step of providing a forced air activated deflector body comprising a thin flat rigid piece of material substantially the same length and width as the register opening. The method involves a second step of positioning the deflector body over the register opening, such that the deflector body rises vertically when forced air flows through the air register opening and falls by force of gravity back into position overlying the register opening when forced air ceases to flow through the air register opening. The method involves a third step of using travel guides which extend through the air flow openings to maintain movement of the deflector body on a vertical path while maintaining the deflector body on a horizontal plane parallel to the register opening and using travel limiters to limit maximum vertical movement of the deflector body.

BRIEF DESCRIPTION OF THE DRAWINGS

[0012] These and other features will become more apparent from the following description in which reference is made to the appended drawings, the drawings are for the purpose of illustration only and are not intended to be in any way limiting, wherein:

[0013] FIG. 1 is a bottom plan view of an air deflector body with travel limiting pins removed.

[0014] FIG. 2 is an exploded side elevation view of the air deflector of FIG. 1, with travel limiting pins ready for insertion.

[0015] FIG. 3 is an exploded end elevation view of the air deflector of FIG. 1, with travel limiting pins ready for insertion.

[0016] FIG. 4 is a side elevation view of the air deflector of FIG. 2 with travel limiting pins coupled to the air deflector.

[0017] FIG. 5 is an end elevation view of the air deflector of FIG. 3 with travel limiting pins coupled to the air deflector.

[0018] FIG. 6 is an exploded perspective view of the air deflector of FIG. 2 with an air register.

[0019] FIG. 7 is an exploded side elevation view of the air deflector and air register combination of FIG. 6, with travel limiting pins ready for insertion into the air deflector body.

[0020] FIG. 8 is an exploded end elevation view of the air deflector and air register combination illustrated FIG. 6, with travel limiting pins ready for insertion into the air deflector body.

[0021] FIG. 9 is a side elevation view of the air deflector and air register combination of FIG. 7 with travel limiting pins coupled to the air deflector body.

[0022] FIG. 10 is an end elevation view of the air deflector and air register combination of FIG. 8 with travel limiting pins coupled to the air deflector body.

[0023] FIG. 11 is a side elevation view of the air deflector and air register combination of FIG. 9, with the air deflector body raised by forced air.

[0024] FIG. 12 is an end elevation view of the air deflector and air register combination of FIG. 10, with the air deflector body raised by forced air.

DETAILED DESCRIPTION

[0025] An air deflector generally identified by reference numeral 20, will now be described with reference to FIG. 1 through FIG. 10.

Structure and Relationship of Parts:

[0026] Referring to FIG. 1 through 5, air deflector 10 consists of a forced air activated deflector body 12 of a thin flat rigid piece of material substantially the same length and width as a register opening to be covered. In developing proto-types a lightweight polymer plastic was used. It will be recognized that other materials could be used, as long as such materials enabled air deflector body 12 being lifted by forced air. Referring to FIG. 2 through 4 and FIG. 6, a plurality of travel limiting pins 14 are positioned at spaced intervals around a periphery 16 of deflector body 12. Pins 14 depend from an underlying face 18 of deflector body 12. Referring to FIG. 2 and FIG. 3, each of pins 14 has a proximal end 20 and a distal end 22. Travel limiting feet 24 are positioned on distal end 22 of each of the plurality of pins 14.

[0027] Referring to FIG. 1, in order to facilitate installation of air deflector 10 on a pre-existing air register, underlying face 18 of deflector body 12 has a plurality of female receptacles 26 to which proximal end 20 of each of the plurality of pins 14 is detachably secured. In the proto-type, each of female receptacles 26 had internal threads which engaged external threads at proximal end 20 of pins 14. It will be recognized that a friction fit or other form of engagement could be used, as long as a coupling of pins 14 with deflector body 12 occurs. It will also be recognized that if air deflector 10 were secured to an air register 100 at the factory, where would be no need for an ability to detach pins 14 or, alternatively, feet 24.

Operation:

[0028] Referring to FIG. 6, prior to describing the method of use, there will first be described a PRIOR ART floor air register 100. Air register 100 has a register body 102 with a peripheral sidewall 104 that defines a register opening 106. A peripheral flange 108 extends outwardly from peripheral sidewall 104. Members 110 are positioned across register opening 106 to define a plurality of air flow openings 112. Members 110 will generally form a grid pattern or a slotted pattern.

[0029] Referring to FIG. 6, a forced air activated deflector body 12 is selected that is substantially the same length and width as register opening 106. Referring to FIG. 7 and FIG. 8, deflector body 12 is positioned over register opening 106. Proximal end 20 of pins 14 are extended into air flow openings 112 and engaged with female receptacles 26 of deflector body 12.

[0030] Referring to FIG. 11 and FIG. 12, deflector body 12 rises vertically when forced air flows through register opening 106. Referring to FIG. 9 and FIG. 10, deflector body 12 falls by force of gravity back into position overlying register opening 106 when forced air ceases to flow through the air register opening;

[0031] Pins 14 serve as travel guides. Referring to FIG. 6, FIG. 9 and FIG. 10, it is to be noted that pins 14 are positioned at spaced intervals around periphery 16 of deflector body 12 and depend from underlying face 18 of deflector body 12. Pins 14 are confined from lateral

movement by air flow openings 112. Referring to FIG. 11 and FIG. 12, the engagement of pins 14 with air flow openings 112 maintains movement of deflector body 12 on a vertical path while maintaining deflector body 12 on a horizontal plane parallel to register opening 106 during movement.

[0032] Feet 24 serve as travel limiters. Feet 24 are larger than air flow openings 112. Pins 14 pass freely through air flow openings 112 until vertical travel of deflector body 12 is stopped by feet 24, which are unable to pass through air flow openings 112, engaging members 110 positioned across register opening 106.

Advantages:

[0033] The method and the air deflector constructed in accordance with the method provide the following benefits:

[0034] 1. Heated air is deflected outwardly along the floor surface in all directions, whereas many prior art air deflectors tend to be unidirectional.

[0035] 2. When in the closed position, the deflector is not an obstacle to home owners, whereas many prior art air deflectors present a tripping hazard and are easily broken if stepped on.

[0036] 3. When in closed position, the air deflector does not allow dirt or foreign objects to be dropped down the duct through the air register, whereas many prior art air deflectors do not limit entry of dirt or foreign objects into the ducts.

[0037] 4. When in the closed position, the air deflector prevents cold air from entering the room through the air register when the forced air heating system is not in operation, whereas many prior art air deflectors do not limit entry of cold air into the room via the ducts.

[0038] 5. Compared to many prior art air deflectors, the air deflector described is relatively inexpensive to manufacture.

[0039] 6. Although the air deflector described could be integrally incorporated into an air register, the air deflector described also be used to retrofit existing air registers.

[0040] In this patent document, the word "comprising" is used in its non-limiting sense

to mean that items following the word are included, but items not specifically mentioned are not excluded. A reference to an element by the indefinite article "a" does not exclude the possibility that more than one of the element is present, unless the context clearly requires that there be one and only one of the elements.

[0041] The scope of the claims should not be limited by the illustrated embodiments set forth as examples, but should be given the broadest interpretation consistent with a purposive construction of the claims in view of the description as a whole.

What is Claimed is:

1. An air deflector for a floor mounted air register having a register body with a peripheral sidewall that defines a register opening, a flange that extends outwardly from the peripheral sidewall, and members positioned across the register opening to define a plurality of air flow openings, the air deflector comprising:

a forced air activated deflector body comprising a thin flat rigid piece of material substantially the same length and width as the register opening, which rises vertically when forced air flows through the air register opening and falls by force of gravity back into position overlying the register opening when forced air ceases to flow through the air register opening;

travel guides which extend through the air flow openings to maintain movement of the deflector body on a vertical path while maintaining the deflector body on a horizontal plane parallel to the register opening; and

travel limiters which limit vertical movement of the deflector body.

2. The air deflector of Claim 1, wherein the travel guides are comprised of a plurality of pins positioned at spaced intervals around a periphery of the deflector body and which depend from an underlying face of the deflector body.

3. The air deflector of Claim 2, wherein each of the plurality of pins has a proximal end and a distal end, the underlying face of the deflector body having a plurality of female receptacles to which the proximal end of each of the plurality of pins is detachably secured

4. The air deflector of Claim 2, wherein each of the plurality of pins has a proximal end and a distal end, the travel limiters being feet positioned on the distal end of each of the plurality of pins, the feet being larger than the air flow openings, the pins passing freely through the air flow openings until vertical travel of the deflector body is stopped by the feet, which are unable to pass through the air flow openings, engaging the members positioned across the register opening.

5. An air deflector and a floor mounted air register combination, comprising:

the floor mounted air register comprising:

a register body with a peripheral sidewall that defines a register opening;

a flange that extends outwardly from the peripheral sidewall; and

members positioned across the register opening to define a plurality of air flow openings;

the air deflector comprising:

a forced air activated deflector body comprising a thin flat rigid piece of material substantially the same length and width as the register opening, the deflector body rising vertically when forced air flows through the air register opening and falling by force of gravity when forced air ceases to flow through the air register opening;

travel guides in the form of a plurality of pins which extend through the air flow openings, the plurality of pins being positioned at spaced intervals around a periphery of the deflector body and depending from an underlying face of the deflector body to maintain movement of the deflector body on a vertical path while maintaining the deflector body on a horizontal plane parallel to the register opening during movement; and

each of the plurality of pins has a proximal end and a distal end, feet positioned on the distal end of each of the plurality of pins which function as travel limiters, the feet are larger than the air flow openings, the pins passing freely through the air flow openings until vertical travel of the deflector body is stopped by the feet, which are unable to pass through the air flow openings, engaging the members positioned across the register opening.

6. The combination of Claim 5, wherein the underlying face of the deflector body has a plurality of female receptacles to which the proximal end of each of the plurality of pins is detachably secured.

7. A method of mounting an air deflector onto a floor air register having a register body with a peripheral sidewall that defines a register opening, a flange that extends outwardly from the peripheral sidewall, and members positioned across the register opening to define a plurality

of air flow openings, the method comprising:

providing a forced air activated deflector body comprising a thin flat rigid piece of material substantially the same length and width as the register opening;

positioning the deflector body over the register opening, such that the deflector body rises vertically when forced air flows through the air register opening and falls by force of gravity back into position overlying the register opening when forced air ceases to flow through the air register opening;

using travel guides which extend through the air flow openings to maintain movement of the deflector body on a vertical path while maintaining the deflector body on a horizontal plane parallel to the register opening; and

using travel limiters to limit maximum vertical movement of the deflector body.

8. An air deflector comprising:

a forced air activated deflector body comprising a thin flat rigid piece of material substantially the same length and width as the register opening;

a plurality of pins positioned at spaced intervals around a periphery of the deflector body and depending from an underlying face of the deflector body, each of the plurality of pins having a proximal end and a distal end; and

feet positioned on the distal end of each of the plurality of pins.

9. The air deflector of Claim 8, wherein the plurality of pins are detachable from the deflector body for the purpose of installation on an air register.

10. The air deflector of Claim 8, wherein the feet are detachable from the distal end of the plurality of pins for the purpose of installation on an air register.

11. The air deflector of Claim 9, wherein the underlying face of the deflector body has a plurality of female receptacles to which the proximal end of each of the plurality of pins is detachably secured.

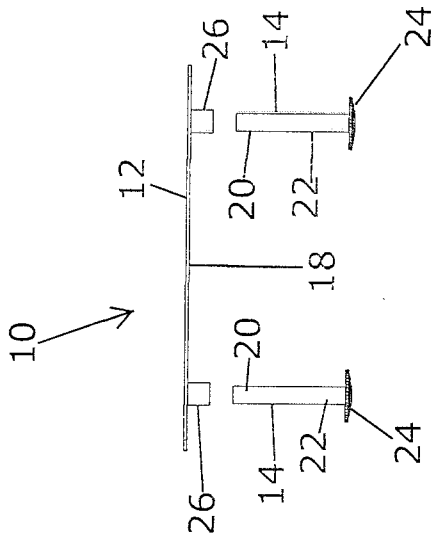


Fig. 3

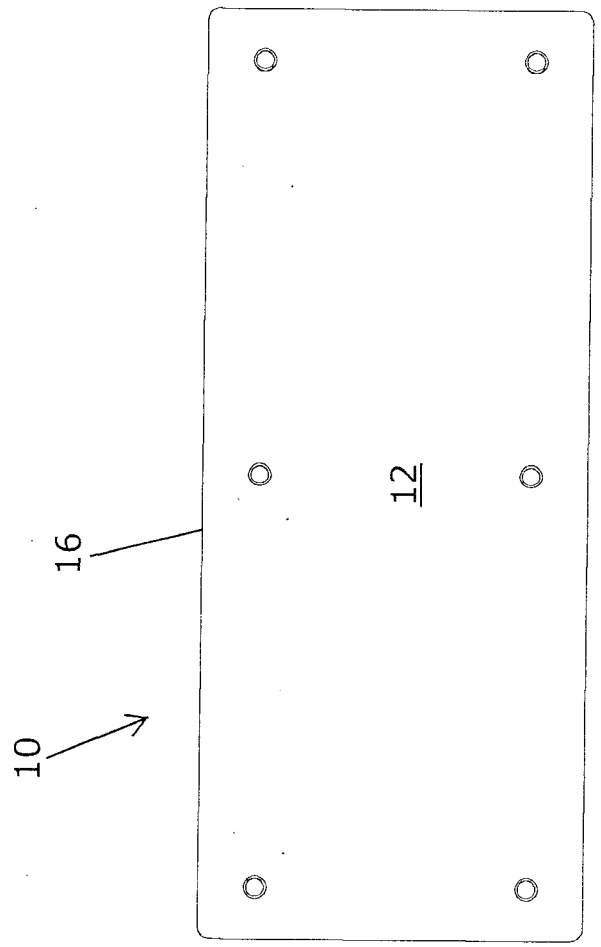


Fig. 1

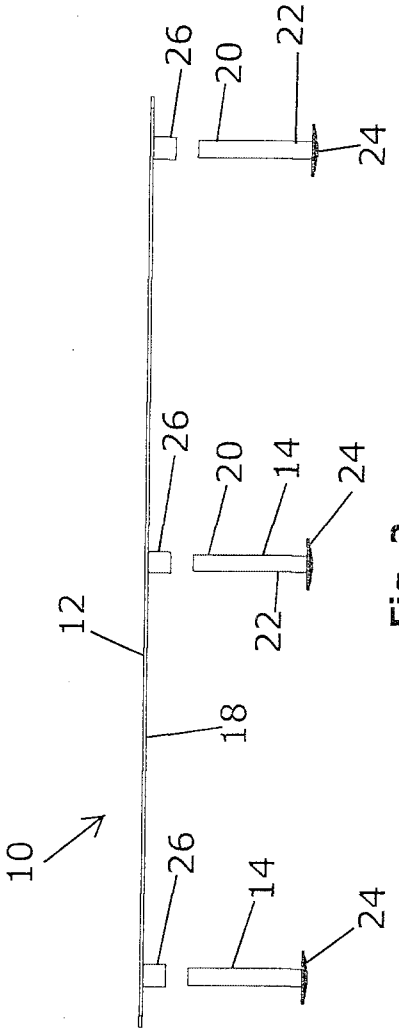


Fig. 2

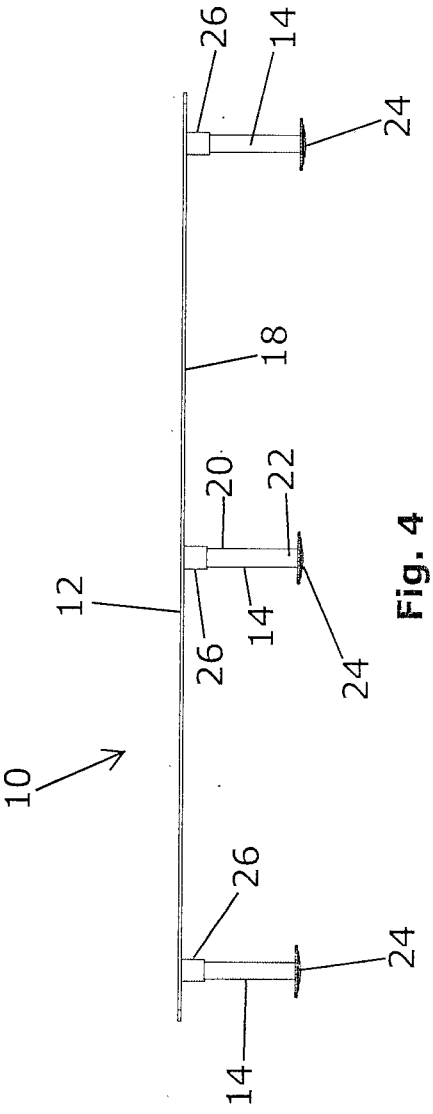

26
14
24
18
20
22
12
26
14
24
10
26
24
14

Fig. 4

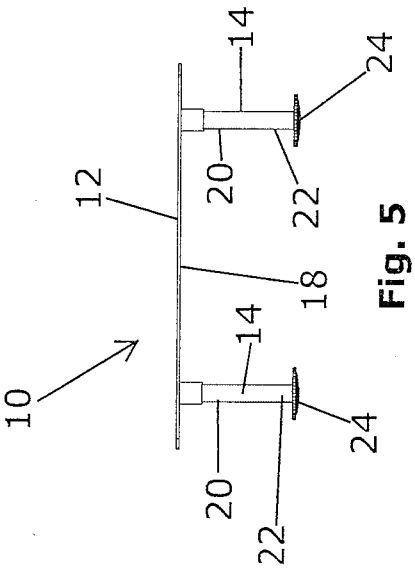

14
24
12
20
22
18
14
10
24
20
22

Fig. 5

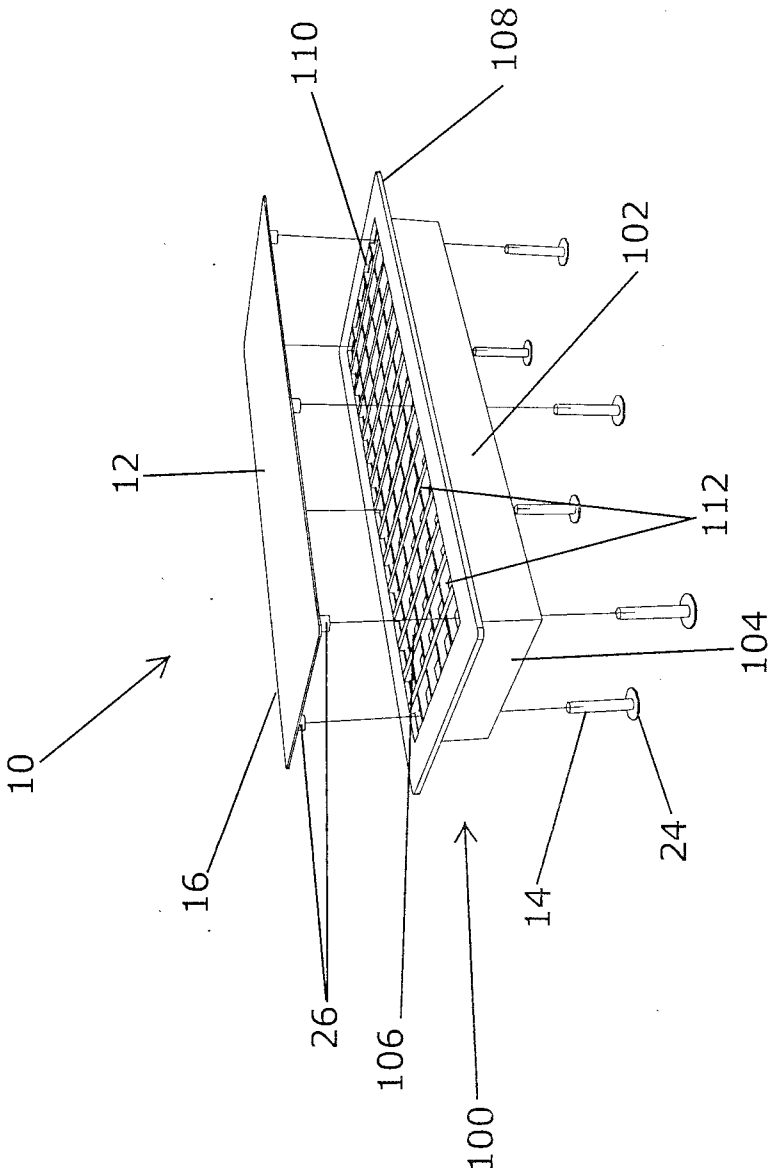


Fig. 6

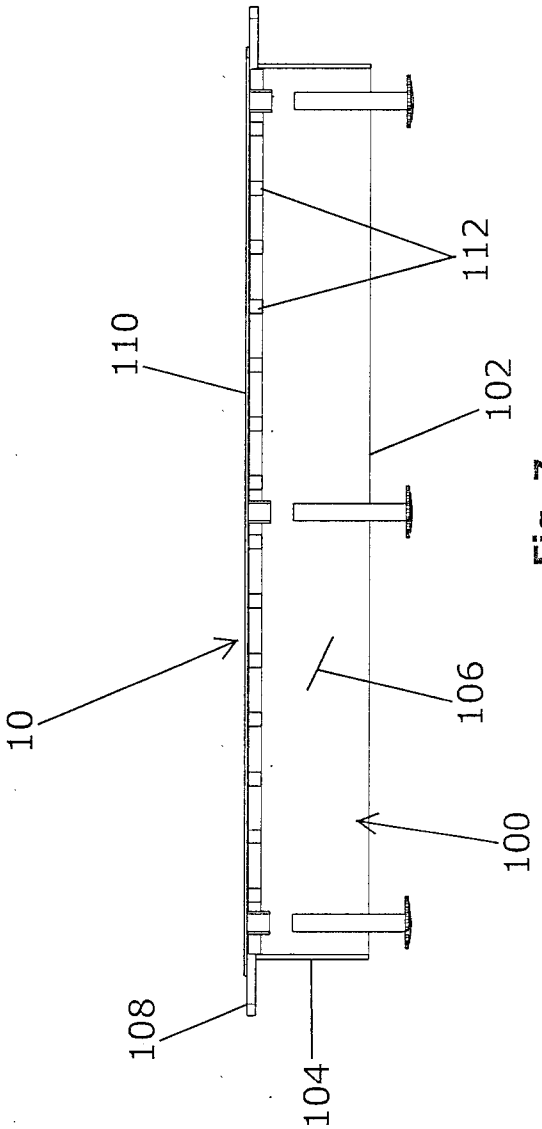


Fig. 7

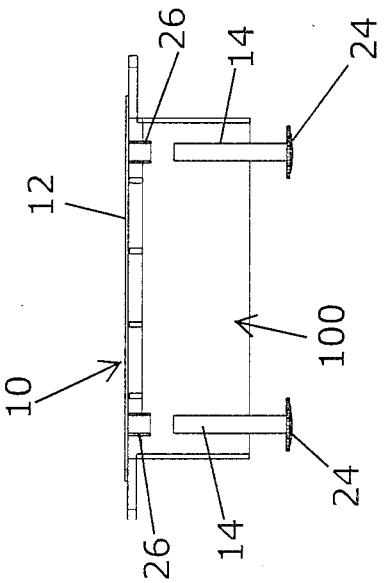


Fig. 8

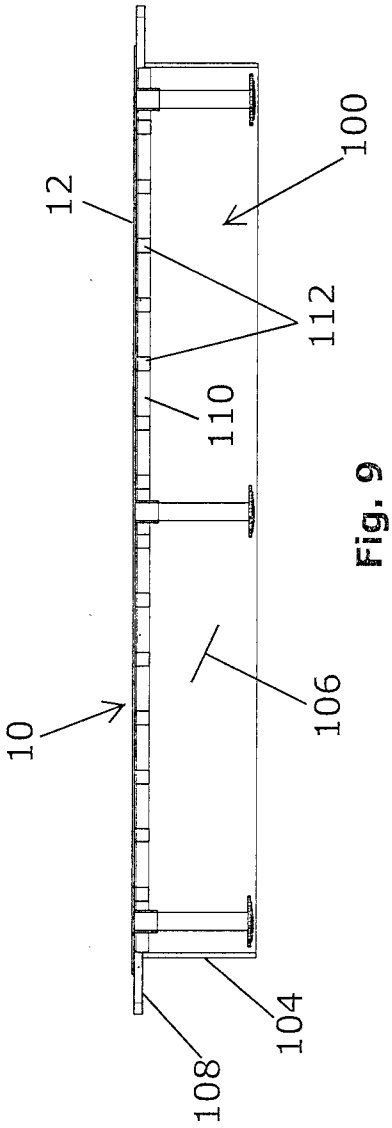


Fig. 9

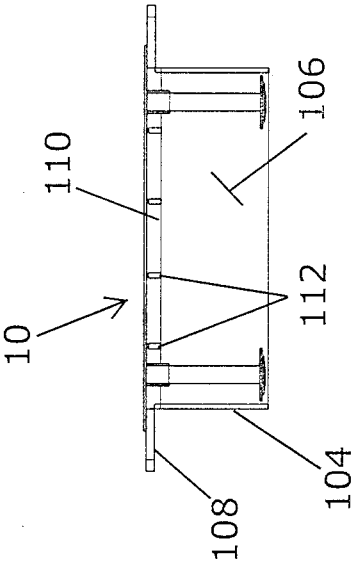


Fig. 10

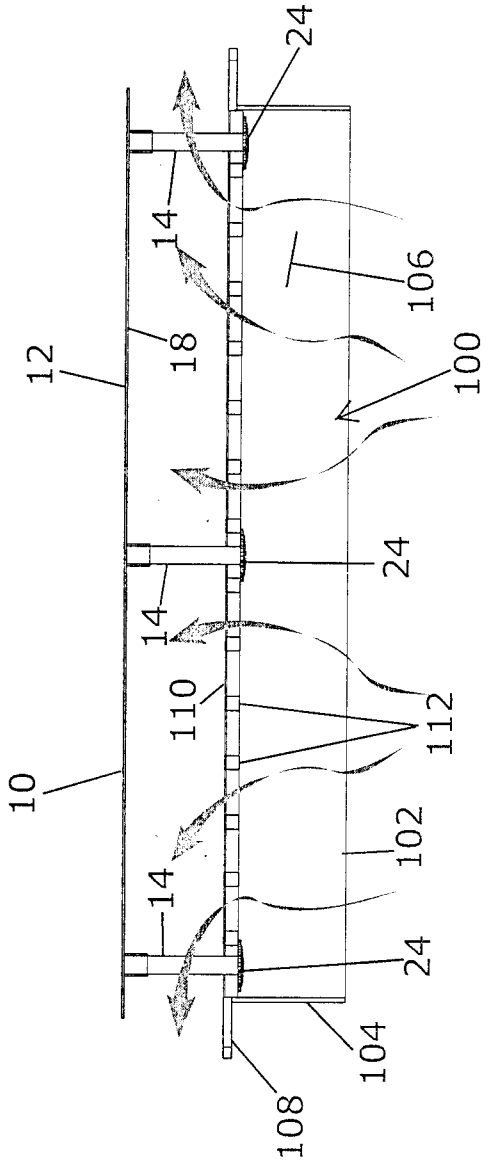

24
14
106
18
12
100
24
14
110
112
10
102
14
24
104
108

Fig. 11

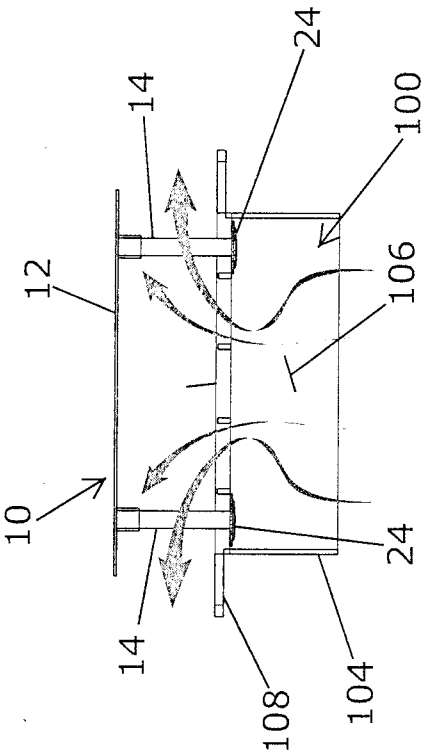
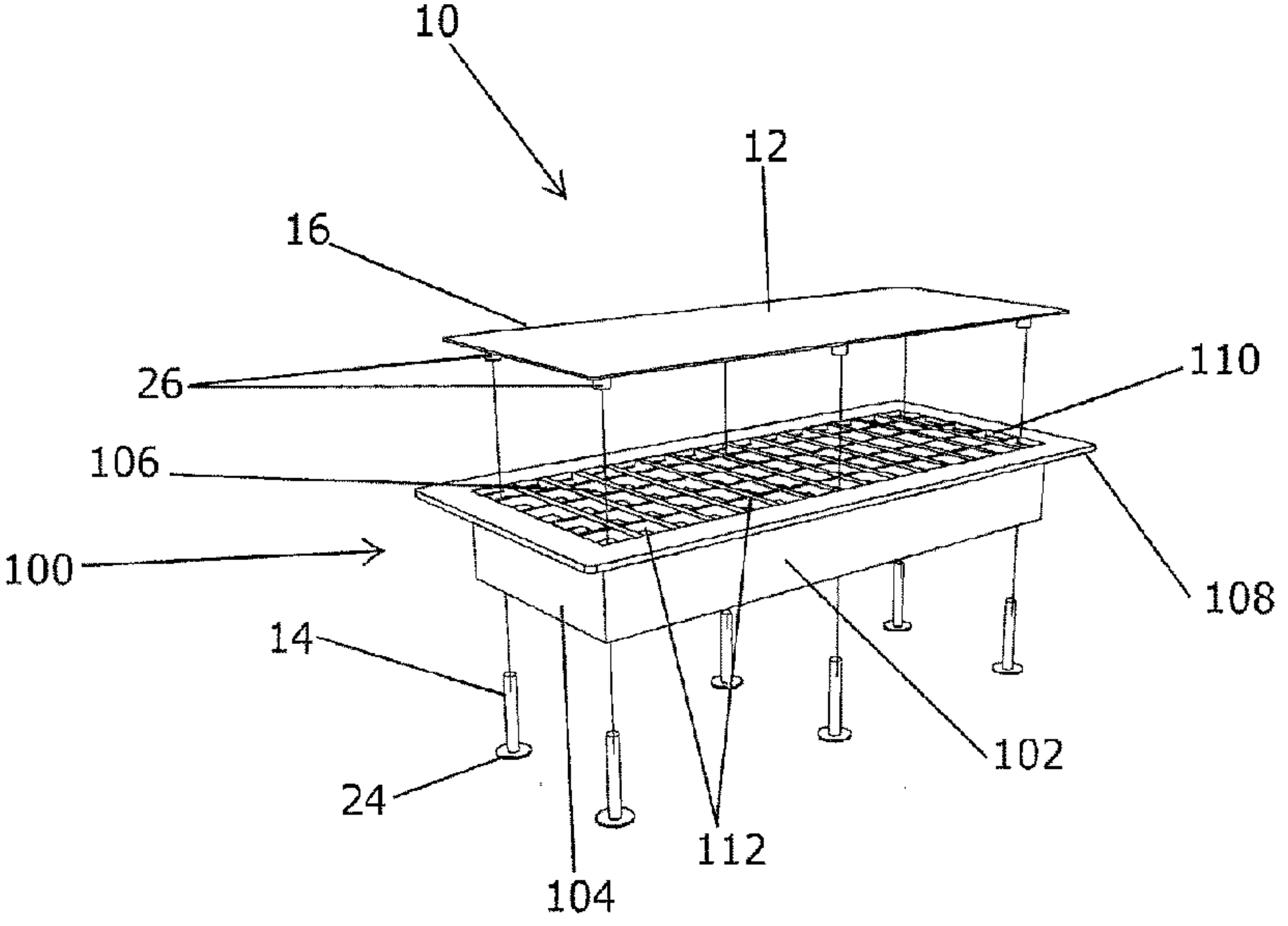

24
14
100
12
106
10
24
14
108
104

Fig. 12


10
12
16
26
110
106
100
108
14
102
24
112
104