



(22) Date de dépôt/Filing Date: 2007/02/13

(41) Mise à la disp. pub./Open to Public Insp.: 2008/08/13

(51) Cl.Int./Int.Cl. *F24F 7/007* (2006.01),
F24F 13/068 (2006.01)

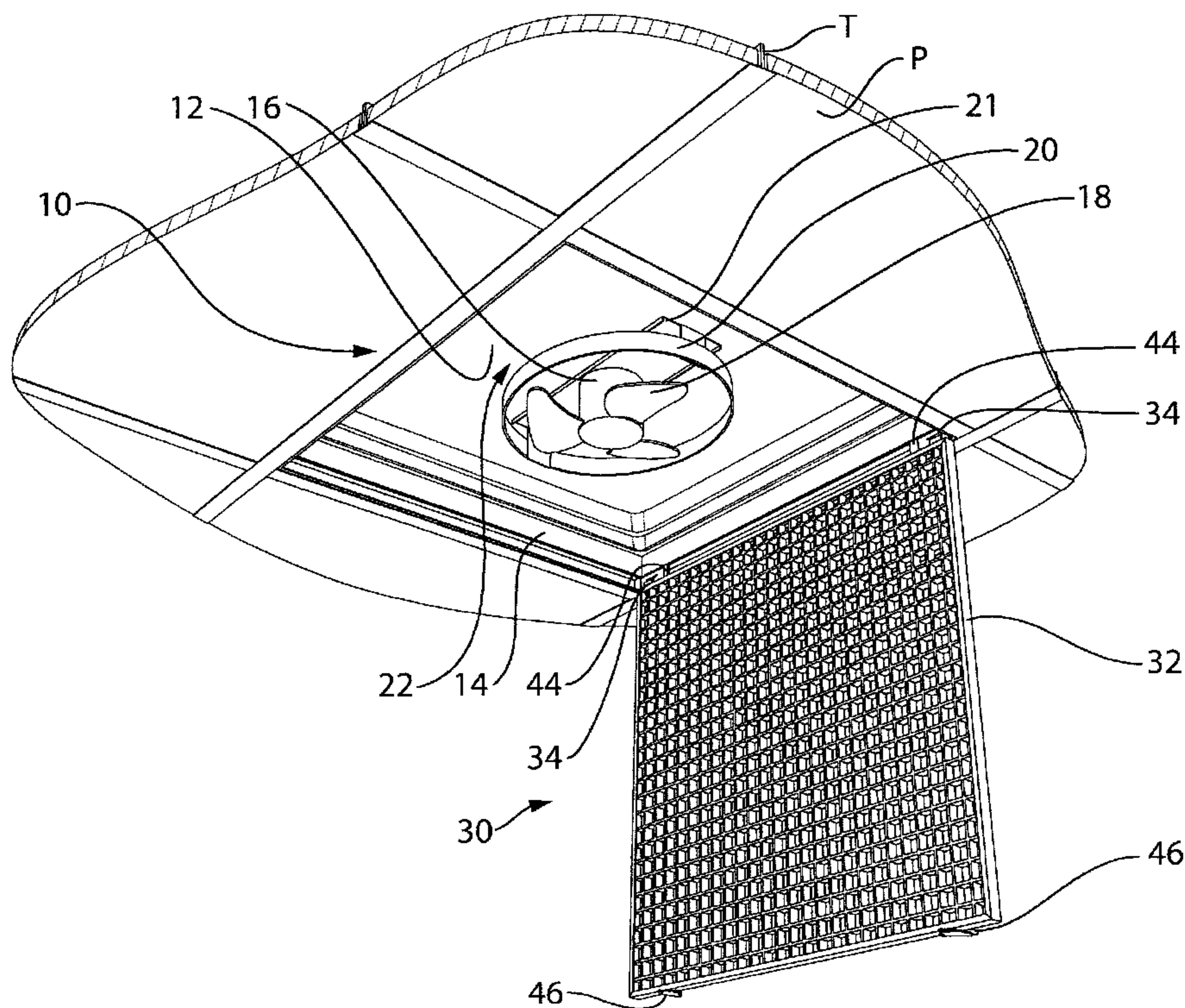
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(54) Titre : DISPOSITIF DE CIRCULATION D'AIR MUNI D'UN EVENT AMOVIBLE

(54) Title: AIR CIRCULATION WITH RELEASABLE AIR GRILLE



(57) Abrégé/Abstract:

A recirculating fan, for installation in an upper region of a building space, and having, a housing, a fan, an air vent ring defining an intake path and a discharge path, an air grille for the intake and discharge paths, the air grille being releasably attached to the housing and being moveable relative to the housing, and releasable fastening devices for releasably fastening the air grille to the housing

ABSTRACT OF THE DISCLOSURE

A recirculating fan, for installation in an upper region of a building space, and having, a housing, a fan, an air vent ring defining an intake path and a discharge path, an air grille for the intake and discharge paths, the air grille being releasably attached to the housing and being moveable relative to the housing, and releasable fastening devices for releasably fastening the air grille to the housing

FIELD OF THE INVENTION

The invention relates to a recirculating fan for recirculating air in an upper region of space downwardly, with a view to maintaining equal temperature throughout the space.

BACKGROUND OF THE INVENTION

It is well known that heat in a room rises to the ceiling, and that the lower region of the room may seem cool. In such conditions people in the room may demand additional heat whereas in fact the air in the upper region of the room is warm and does not require additional heat.

10 In hotter climates, it is a common practice to circulate air downwardly from upper regions of a room in order to create some air circulation within the space.

Various forms of air circulating fans are available. Typically such fans are large bladed devices often combined with ceiling mounted lighting fixtures.

Such devices have their uses, but also have disadvantages. Particularly if a space does not have sufficient height for mounting such a recirculating fan system, they are unsuitable for use. They may also be considered unsightly, and are drafty.

Such fans are also inefficient. Since there is no ducting there is a tendency for these fans to simply create turbulence without achieving much result.

Accordingly there have been developed recirculating fans which incorporate baffles
20 which act as ducting. These fans may be recessed within the ceiling, or in other cases may simply be mounted in an upper region of a space. Typically, if ceiling mounted, the ceilings would be a type of suspended ceiling, typically having ceiling panels

supported on a frame work of T shape metals strips. Such suspended ceilings or dropped ceilings are well known. Recirculating fans have been developed for use in such dropped or suspended ceilings.

Such fans may also be used in industrial space , where there is no dropped ceiling, but simply a roof. In these cases the fans can be suspended from any upper structure, such as a beam, in the building.

Examples are shown in US Letters Patent Number 4,730,551 and 6,974,381.

The recirculating fans shown in these patents and others, consists essentially of a rectangular housing, which is supported on the ceiling Tees. Within the housing a
 10 recirculating fan is provided. Around the edge of the fan, there are intake grilles or slots. Usually centrally aligned with the fan there are outlet grilles or slots, for directing the recirculating air downwardly.

Within the housing there are walls which direct outflowing air downwardly, and which cause induction of air through the surrounding intake slots.

Such systems have found wide acceptance, and have proved effective in use.

It is found however that in spite of the popularity of these systems, the systems will gradually accumulate dust, or may in fact require servicing for some other reason.

In the past this has usually required removing the unit, and disconnecting it from the electrical supply.

20 **BRIEF SUMMARY OF THE INVENTION**

With the view to overcoming some of these problems the invention comprises a recirculating fan, for installation in a recess in a ceiling, and providing an external lower profile which is level with the ceiling, and comprising a housing, a fan within the

housing, a vent ring and bracket within the housing defining an intake path and a discharge path of said housing, an air flow grille providing both an intake a discharge path of the housing, and a support frame for the air grille, the support frame being releasably attached to the housing and being moveable relative to the housing, and a releasable fastening device for releasably fastening the support frame to the housing.

Preferably, the invention further provides such a recirculating fan, wherein the support frame for the air grille is hinged to the housing along one side, and is swingable relative to the housing, for access to the interior of the housing.

10 Preferably, the invention further provides such a recirculating fan in which the vent ring in the housing is open and accessible whereby when said support frame and grille is moved away from said housing, access may be had to both air intake path and air discharge path within the housing for servicing.

Preferably, the invention further provides such a recirculating fan in which the frame has two hinge flanges, and in which the fan housing has two hinge slots, in which the hinge flanges can be inserted into and removed from the hinge slots, so that the entire grille frame, and air grille can be removed from the fan for servicing.

20 Preferably, the invention further provides such a recirculating fan in which the fastenings for the frame are sheet metal sections secured by pivots to the frame along its edges, and can swing up and down, and including fastening slots in the housing for receiving the fastenings, and tongue portions on the fastenings by which they can be operated.

Preferably, the invention further provides such a recirculating fan, in which the recirculating fan is mounted directly on a motor, and in which the motor is secured on a

bracket within the housing, thereby permitting access to the fan when the support frame and air grille are opened.

The various features of novelty which characterize the invention are pointed out with more particularity in the claims annexed to and forming a part of this disclosure. For a better understanding of the invention, its operating advantages and specific objects attained by its use, reference should be made to the accompanying drawings and descriptive matter in which there are illustrated and described preferred embodiments of the invention.

IN THE DRAWINGS

- 10 Figure 1 is a lower perspective illustration of a recirculating fan illustrating the invention with the air grille opened;
- Figure 2 is a section of the fan of Fig. 1;
- Figure 3 is a section of an alternate embodiment for use in a building without a dropped ceiling;
- Figure 4 is an enlarged detail of the hinge; and,
- Figure 5 is an enlarged detail of the fastening.

DESCRIPTION OF A SPECIFIC EMBODIMENT

- 20 As discussed above, the invention relates to a recirculating fan, for recirculating air from an upper region to a lower region within a building. Many such fans are for use in a recessed ceiling opening. In such a location, the fan and motor and

housing are all recessed within a recess in the ceiling so that the only visible portion of the recirculating fan is the air grille, and support frame .

Other such fans, (Fig 3), are used in buildings, typically industrial buildings, where there is no dropped ceiling.

When such fans require simple service such as cleaning, then in some cases it has been necessary to remove the entire fan and housing from its position. In other cases, the access to the interior of the housing is available only by removal of certain components using special tools, or the like.

10 Referring now to Fig. 1, it will be seen that the invention is illustrated there in the form of a recirculating fan (10), installed in a recess in a ceiling. The recess in a ceiling may be for example a rectangular recess in a plaster ceiling. In most cases the ceiling will be of the type known as ceiling panels (P), supported on a criss-cross framing of ceiling Tees (T). Such ceilings and others are well known to those in the art and require no illustration or further description. The ceiling tees (T) may be arranged to support square panels (P), or the panels (P) may be rectangular, in which case the ceiling tees define a rectangular pattern, all of which if well known.

The fan (10) has a shell or housing (12) of generally dome shape, attached to a lower four sided channel frame (14). Frame (14) is adapted to seat on the ceiling tees (T), and the fan (10) replaces either a complete panel (P) or a portion. If desired an extra
20 length of ceiling tee (T) may be placed in position to support the fourth side of the frame (14).

Within the housing (12) a motor (16) is secured, and operates a fan blade (18).

A guide wall or vent ring (20) is secured on downwardly angled bracket arms (21) which

are secured within housing (12). Wall or vent ring (20) defines a spacing between itself and housing (12), which separates wall or vent ring (20) from housing (12) thereby permitting air to flow upwardly into the housing (12) and around wall or vent ring (20) and be then directed downwardly by the fan. .

Wall or vent ring (20) is formed to define a central opening (22) of circular shape forming an air guide extending around fan blade (18).

Operation of the fan blade (18) will cause air to be inducted upwardly into the housing (see Figure 2). Air will flow between wall or vent ring (20) and housing (12) and will then flow downwardly through opening (22) into the building space beneath.

10 An air grille (30) is provided, typically being in the form of the generally honeycomb like structure shown. However numerous forms of air grilles are known, some of which have blades directing air flow in a predetermined direction. Others have several groups of adjustable blades or guides for directing air in various directions.

The grille (30) is supported in a grille border or frame (32). In this case the grille (30) and border (32) are rectangular, since this suits the configuration of the typical ceiling tile ceiling. However other configurations are known and could be used.

In order to give access to the fan for servicing, and for servicing the grille itself, hinge flanges (34) are provided on one side of border (32). Flanges (34) are of sheet metal, and are formed with rightangular bends (36) defining tongues (38). Edgewise
20 hooks (40) are formed on tongues (38) extending to one side .

Hinge slots (42) are formed in frame (14), along one side. Slots (42) are dimensioned to receive tongues (38) and hooks (40) of hinge flanges (34). By sliding the entire grille sideways the hooks (40) can engage the edges of the frame (14) adjacent the slot (42)

Hooks (40) provide an added measure of security to hold the tongues (38) in the slots. Spring plates (44) are secured to frame (14). Once the grille (30) is swung up into position, the spring plates (44) engage the grille and prevent vibration.

The tongues (38) can be completely removed from slots (42) by sliding the tongues sideways and releasing the hooks (40). This permits the entire air grille (30) and frame (32) to be removed for servicing.

Fastening of the grille (30) and frame (32) is provided by fastening segments (46) formed of sheet metal.

10 Hooks (48) are formed on segments (46), and tabs (50) are formed to permit simple operation by means of a tool such as a screw driver, or even by the fingers.

Fastening slots (52) are formed in frame (14) to receive segments (46). Hooks (48) fit over an adjacent portion of frame (14), and hold the grille (30) and frame (32) in position.

To service the fan, or the grille, the removal of the grille is a simple operation, which can be achieved by the fingers, or with a simple hand tool such as a screw driver. Once removed the grille can be serviced, or cleaned. The fan and housing are readily accessible .

20 Figure 3 shows an alternate embodiment for use in a building, typically an industrial or commercial building, which does not have a dropped ceiling with ceiling tees and panels.

The air space within such buildings is usually open right up to the underside of the roof, or the underside of the next floor above, in a multistory building.

In this embodiment the housing (60) defines a circular central opening (62). There is an

annular air guide wall (64) surrounding the opening. The fan (66) is located in the opening (62) supported by brackets (68) attached with housing (60) surrounded by the wall (64). Operation of the fan will simply draw air down from the space above the fan and direct down into the lower region of the building.

The grille (66) is mounted as described above in the embodiment of Figs 1 and 2.

The foregoing is a description of a preferred embodiment of the invention which is given here by way of example only. The invention is not to be taken as limited to any of the specific features as described, but comprehends all such variations thereof as come within the scope of the appended claims.

THE EMBODIMENTS OF THE INVENTION IN WHICH AN EXCLUSIVE PROPERTY OR PRIVILEGE IS CLAIMED ARE DEFINED AS FOLLOWS;

1. A recirculating fan, for installation in a building , and comprising;
a housing;
a fan on the housing;
a vent ring wall defining an intake path and a discharge path of said housing;
an air grille registering with the discharge paths, the air grille defining a hinged side and an opening side ;
hinges along said hinged side; and
10 releasable fastening devices on said opening side for releasably fastening the air grille to the housing.
2. A recirculating fan as claimed in Claim 1 wherein the support frame is hinged to the housing along one side, and is swingable relative to the housing, for access to the interior of the housing.
3. A recirculating fan as claimed in Claim 1, and 2 wherein said vent ring wall defines an intake path and the discharge path, open to the air grille, whereby when said support frame is moved away from said housing, access may be had to both intake path and discharge path within the housing for servicing.
4. A recirculating fan as claimed in Claim 1, and 2 wherein the frame has two hinge
20 flanges, secured along one side, and in which the fan housing has two hinge slots formed along one side , in which the hinge flanges can be inserted into and removed from the hinge slots, so that the entire grille frame, and air grille can be removed from the fan for servicing.

5. A recirculating fan as claimed in Claim 4 wherein the hinge flanges are rightangular, and define tongue portions fitting into the slots, and hooks extending sideways from the tongue portions for security.
6. A recirculating fan as claimed in Claim 4 wherein the fastenings for the frame are sheet metal segments secured by pivots to the edges of the frame along its side opposite to the hinge flanges, and can swing up and down between locking and releasing positions, and including fastening slots in the housing for receiving the fastenings, and tongue portions on the fastenings by which they can be operated.
- 10 7. A recirculating fan as claimed in Claim 6 wherein the fastenings further define hook portions for engaging the housing adjacent to the slots, and tabs for manually operating the segments, to swing upwardly and downwardly.
8. A recirculating fan as claimed in Claim 6 and 7 in which the recirculating fan is mounted directly on a motor, and in which the motor is secured within the housing thereby permitting access to the fan when the support frame is opened.
9. A recirculating fan as claimed in Claim 6 including spring tongues extending between the frame and the air grille when the air grille is closed.
10. A recirculating fan as claimed in Claim 1 wherein the housing is formed with an upwardly extending ring defining an air intake opening, and acting as said guide.
- 20 11. A recirculating fan, for installation in a building, and comprising;
 - a housing;
 - a fan on the housing;
 - a vent ring wall defining an intake path and a discharge path of said housing;

an air grille registering with the intake and discharge paths, the air grille defining a hinged side and an opening side;
hinges along said hinged side; and
releasable fastening devices on said opening side for releasably fastening the air grille to the housing.

- 10
12. A recirculating fan as claimed in Claim 11 wherein the frame has two hinge flanges, secured along one side, and in which the fan housing has two hinge slots formed along one side, in which the hinge flanges can be inserted into and removed from the hinge slots, so that the entire grille frame, and air grille can be removed from the fan for servicing.
13. A recirculating fan as claimed in Claim 12 wherein the hinge flanges are rightangular, and define tongue portions fitting into the slots, and hooks extending sideways from the tongue portions for security.
14. A recirculating fan as claimed in Claim 11 wherein the fastenings further define hook portions for engaging the housing adjacent to the slots, and tabs for manually operating the segments, to swing upwardly and downwardly.

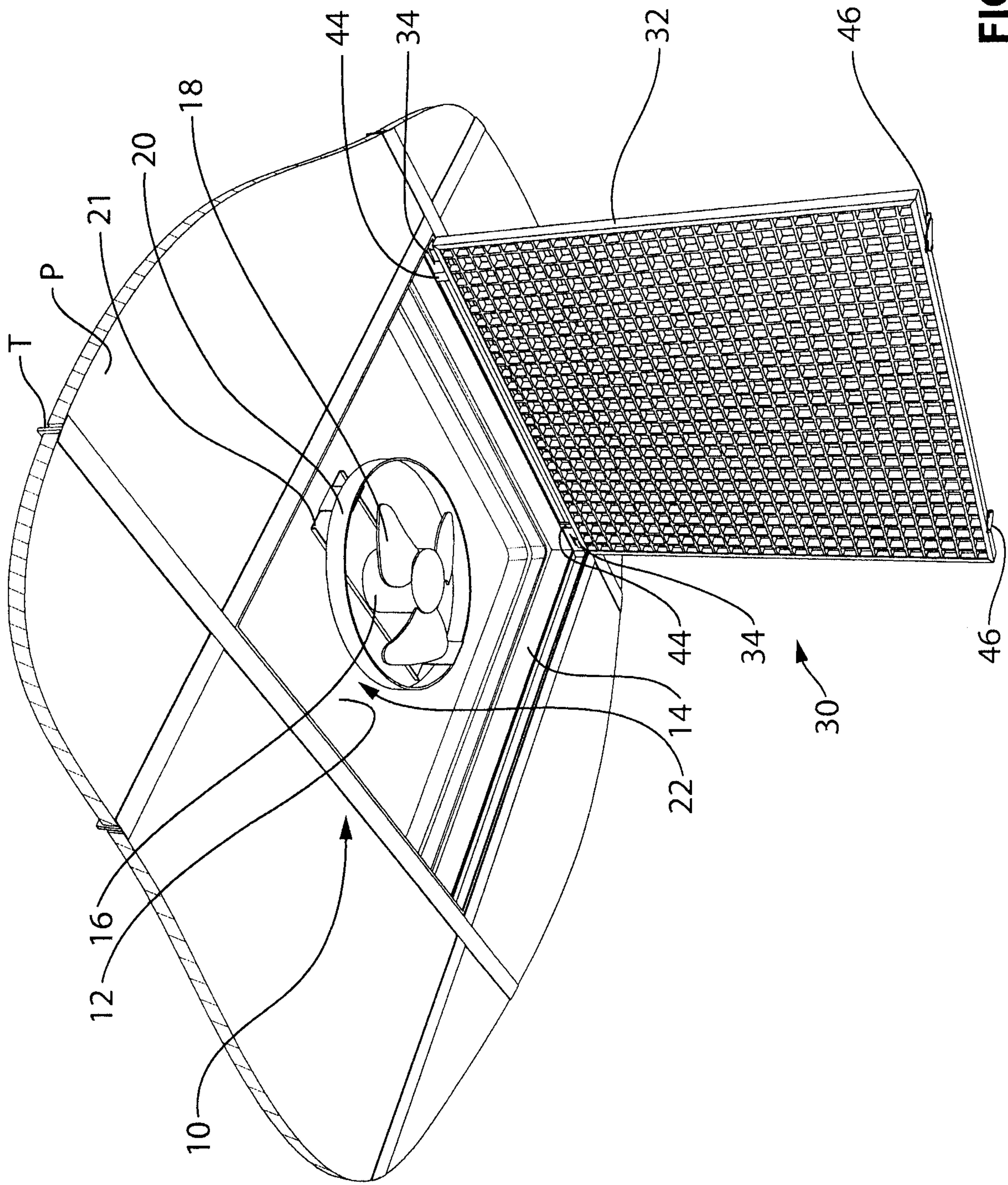


FIG. 1

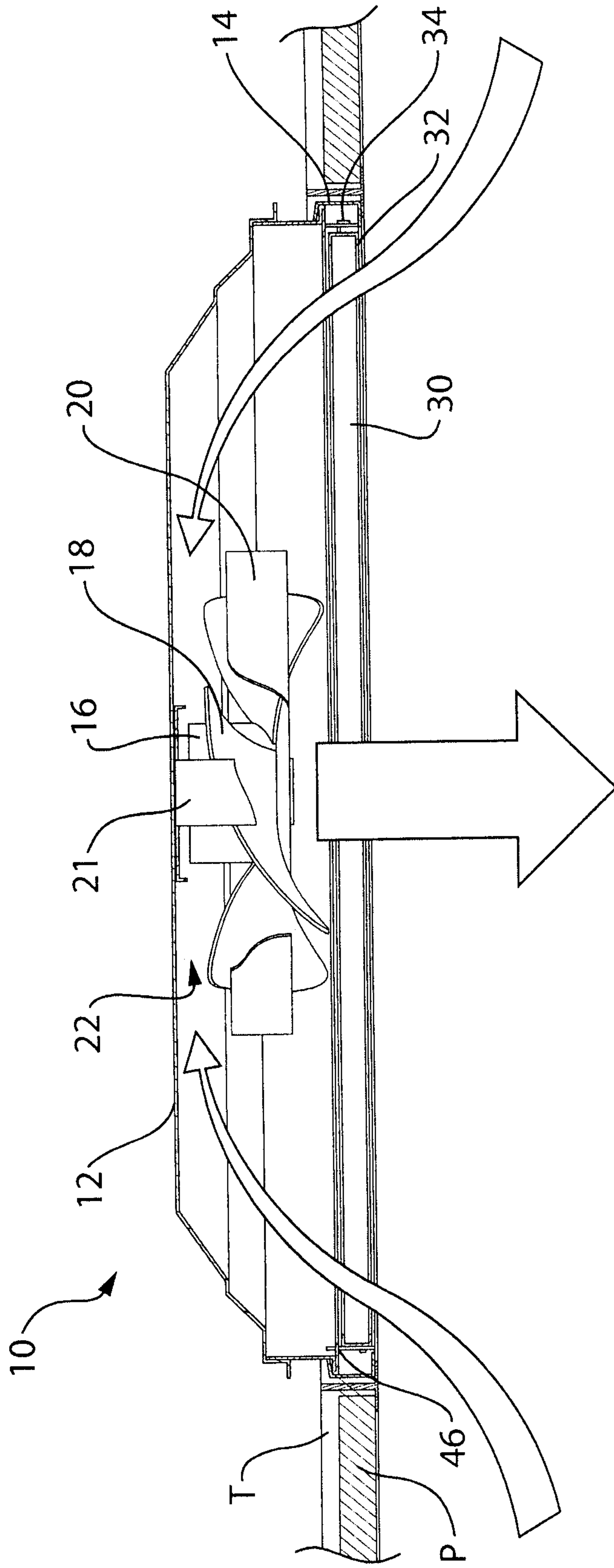


FIG. 2

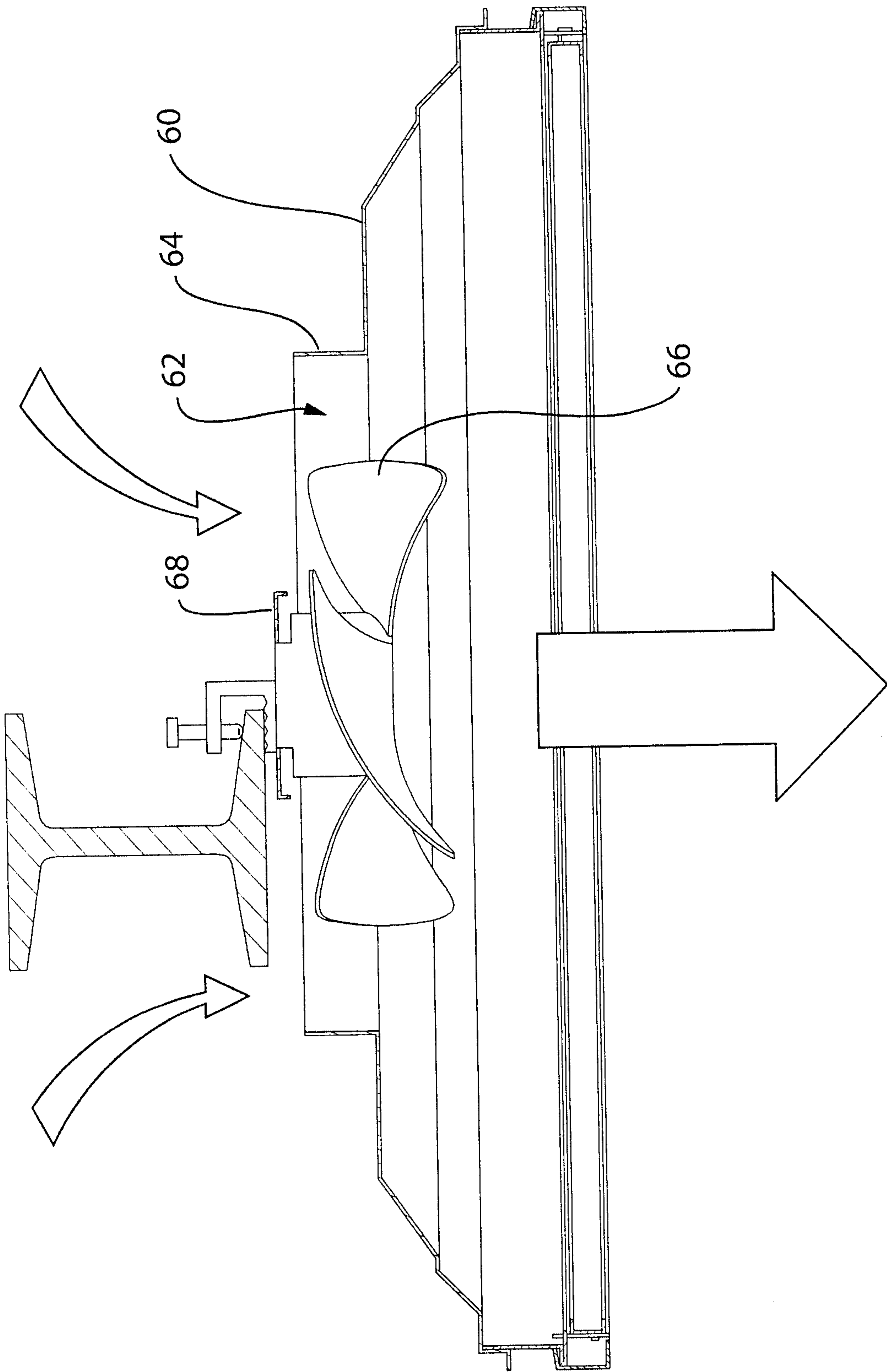


FIG. 3

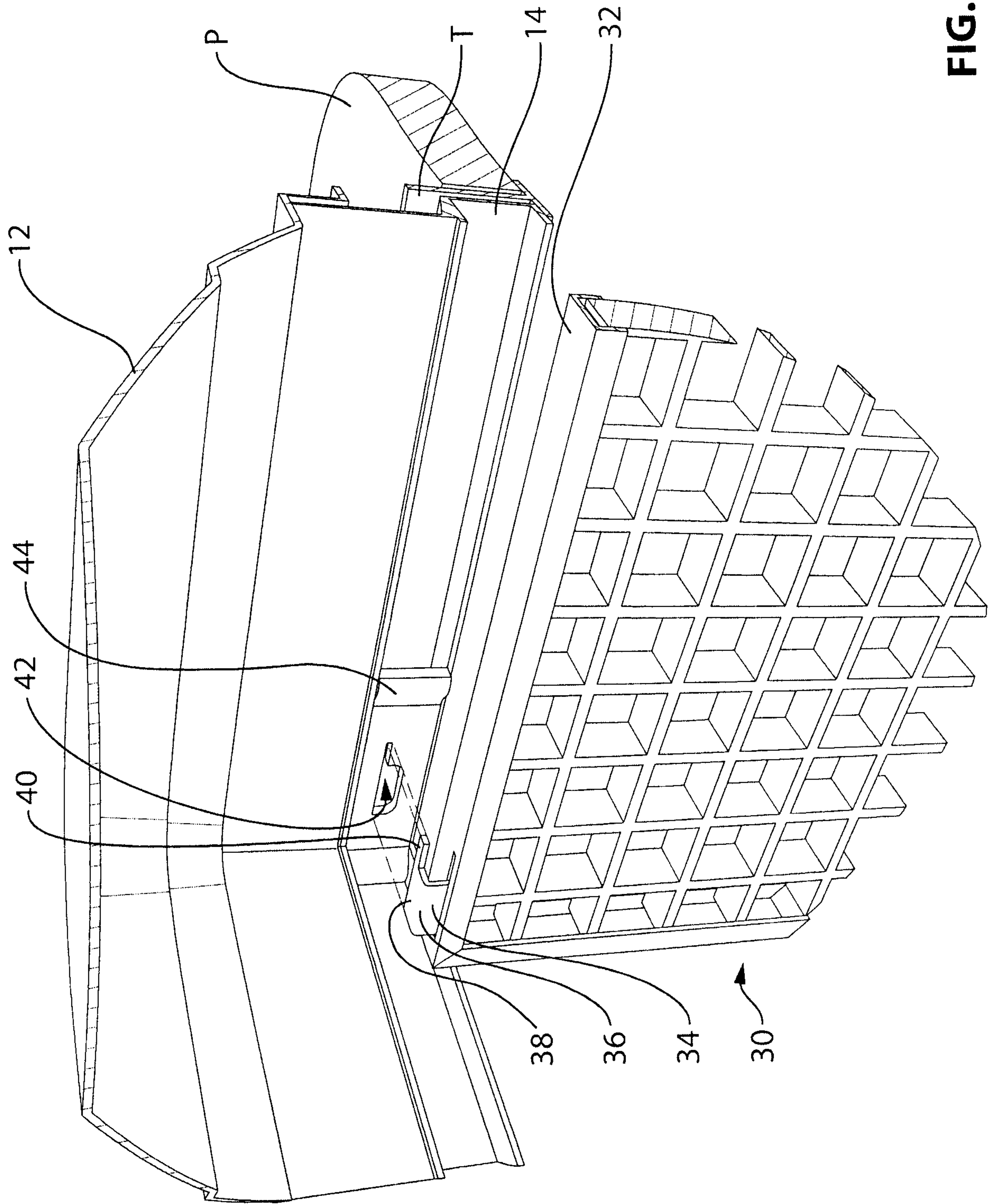


FIG. 4

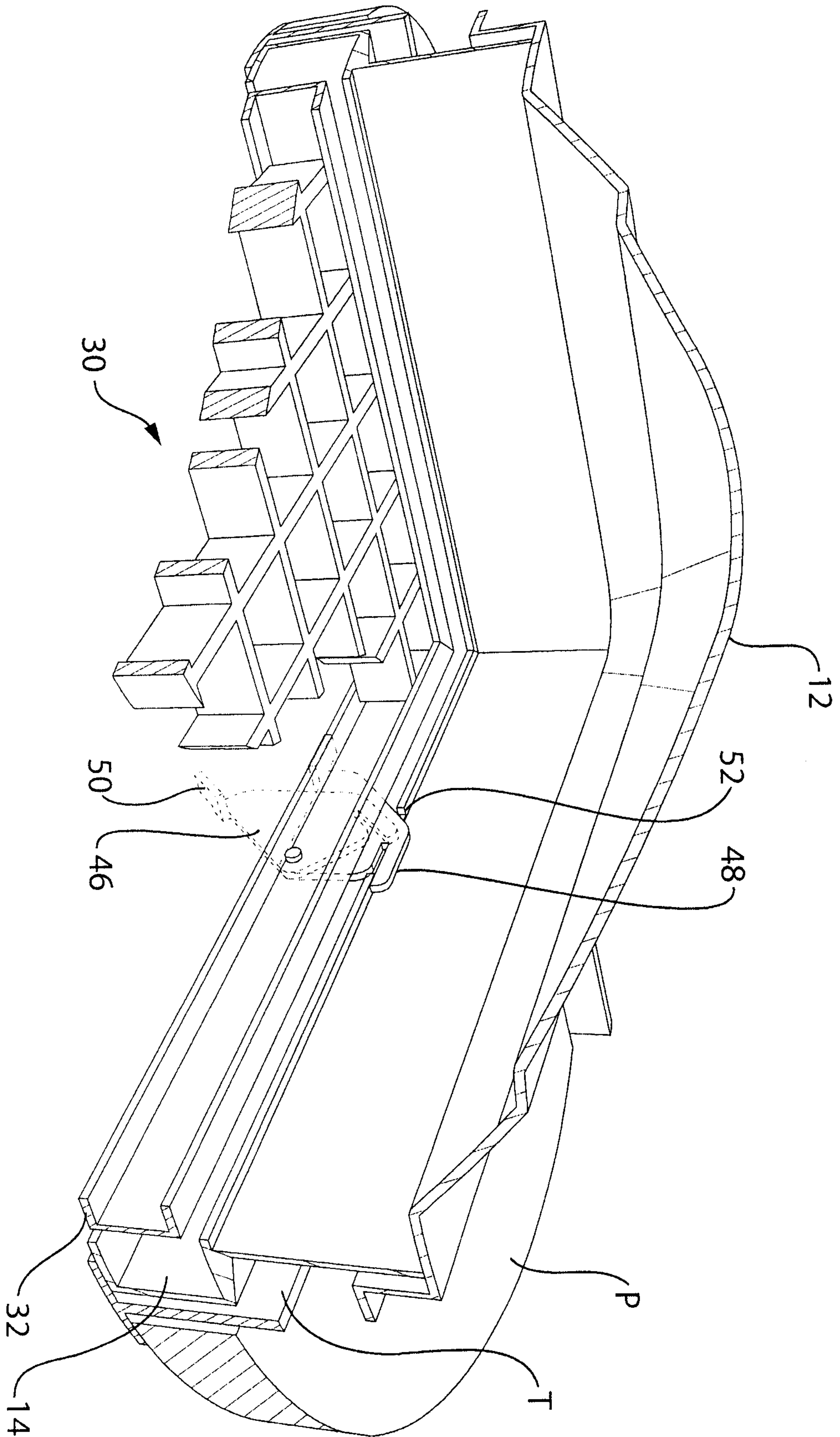


FIG. 5

