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[54] FRESH AIR VENT

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[52] **U.S. Cl.** **98/41,** 251/286, 251/310

[51] **Int. Cl.** **F24f 13/08**

[58] **Field of Search**.....251/286, 304, 310, 251/309; 98/106, 406, 37, 41

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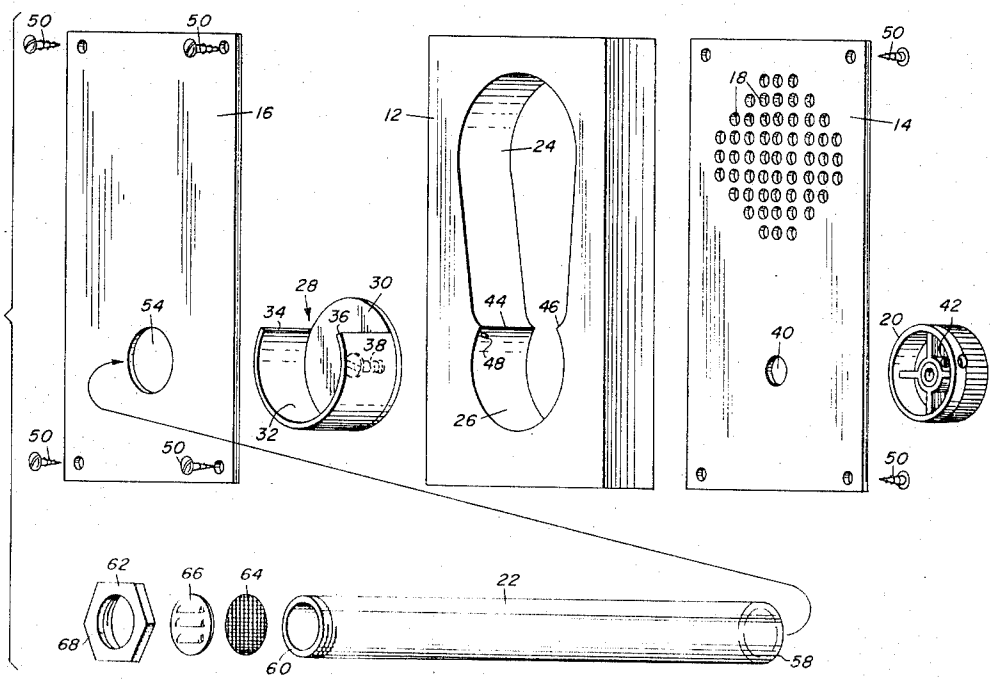
[57] **ABSTRACT**

A fresh air vent designed to allow fresh air to flow into a house at a controlled rate is disclosed. The vent consists of a rectangular box which can be inserted in or mounted on the interior surface of the wall of a room of the house, with the front panel of the vent being provided with an opening, which may be in the form of a plurality of small vent holes, which allows air to flow from the interior of the device into the room. On the back surface of the box there is located an opening which is adapted to receive the end of an air inlet tube, the tube extending through the exterior wall of the building to admit air into the vent box. A control valve is located within the box between the inlet and outlet openings, the valve being adjustable to regulate the flow of air through the box. This control valve is in the form of a slidable gate which may be moved across the opening to permit exact regulation of the air flow through the box.

6 Claims, 4 Drawing Figures



Patented April 17, 1973 3,727,539

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FIG. 1

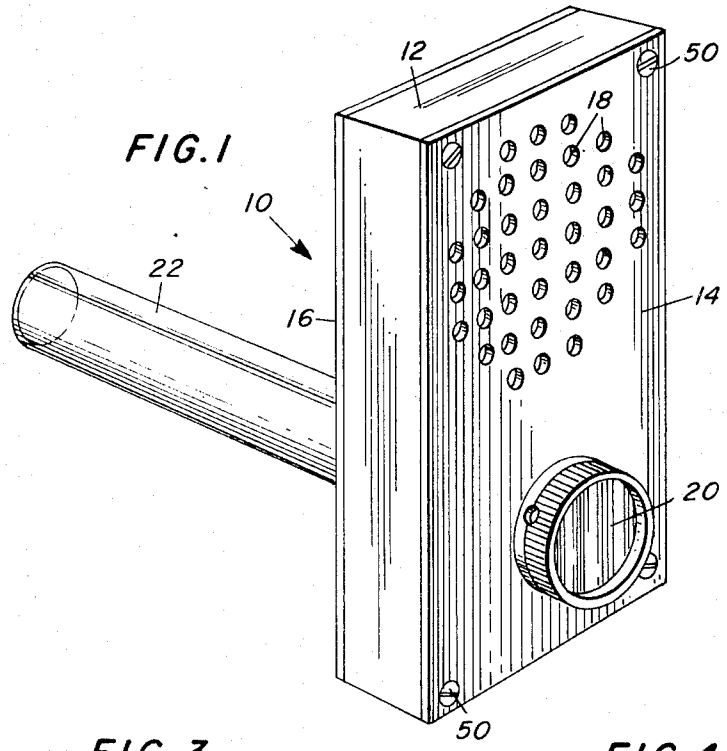


FIG. 3

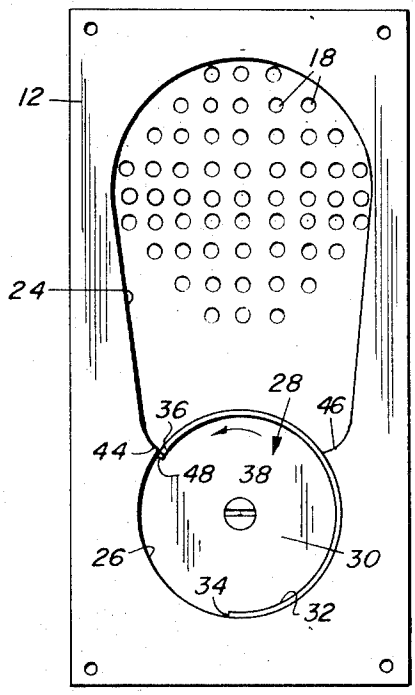
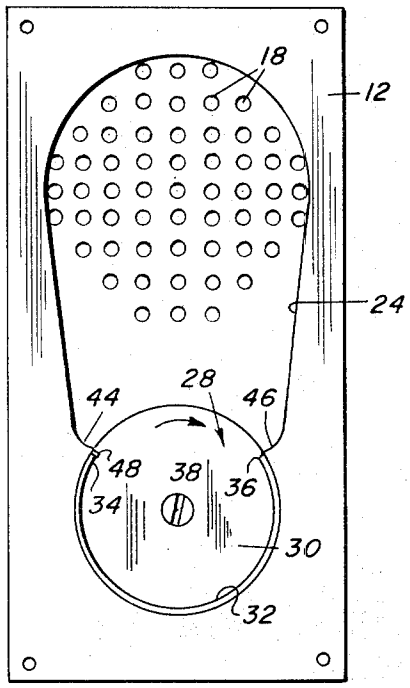


FIG. 4



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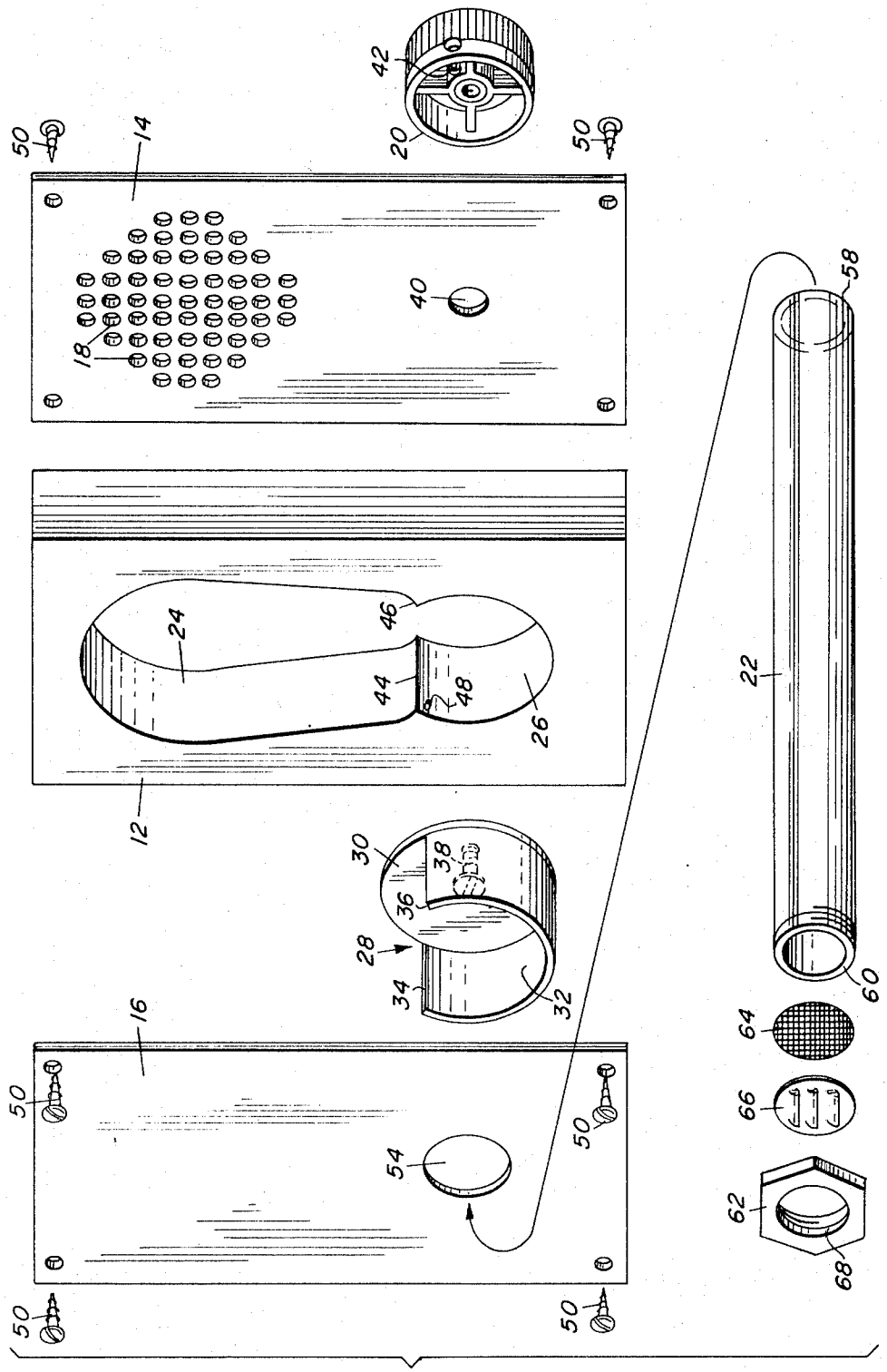

FIG. 2

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FRESH AIR VENT

BACKGROUND OF THE INVENTION

The present invention relates, in general, to air vents, and more particularly to a controllable vent opening that may be installed in the wall of a house in order to permit regulated amounts of fresh air to enter the building.

During the winter months, particularly in northern climates, it becomes necessary to carefully seal the doors and windows in a house in order to prevent the entry of excessive amounts of cold air. As a result, the air within the house can become stale and unpleasant in a relatively short time. In addition, the relative humidity within a house sealed tightly in this manner can vary from the optimum, with an increase in the humidity causing condensation on windows and exterior wall surfaces that can damage the house and a decrease in humidity producing uncomfortable living conditions. A house that is sealed against the cold in this manner will normally include storm windows, storm doors and the like that will cut down the natural inflow of air into the house, and in such a situation the opening of a window may not be sufficient to provide the ventilation required to overcome these problems, for storm windows will prevent an appreciable inflow of air. Further, opening a window or a door does not provide the controlled inflow of air that is necessary to prevent chilling of the house or the creation of uncomfortable drafts.

Even in warmer climates it may be desirable to provide means for allowing fresh air to enter a house or a single room in a controlled manner in order to freshen the air in the house, to provide a cooling effect on a single room, or to adjust the air quality in a room to meet the needs of an individual who is not satisfied with the overall control provided by central heating or air conditioning units. Such needs are not exclusive to houses located in cold climates, but may be equally needed wherever a house is tightly and effectively sealed against the entry of outside air, and where it is desired to provide a controlled flow of fresh air into a room. However, no effective yet inexpensive and easy-to-install device is presently available for accomplishing these purposes.

SUMMARY OF THE INVENTION

Accordingly, it is an object of the present invention to provide a unique air vent device which will permit a controlled flow of air through a wall opening to the interior of a building.

It is another object of the present invention to provide an air vent device which provides a diffused flow of air to the interior of a room and which may be controlled to permit easy adjustment of the rate of flow.

It is another object of the present invention to provide an air vent device which may be installed in existing wall structures at a minimum of cost and without disturbing the structural integrity of the wall to thereby provide means for allowing a selected amount of air to flow into the interior of the building.

It is an additional object of the present invention to provide a simple, inexpensive, easily installed air vent device for providing a flow of fresh air into the interior of a building or room thereof.

The various objects of the present invention are carried out by the provision of an air vent device which is

adapted to be installed in the wall of a building and which provides a valved air flow passageway from the exterior of the building to the interior. The vent device comprises an air chamber which may be in the form of a rectangular box and which is adapted to be mounted on the interior surface of a wall or in a recess formed in the wall. The surface of the chamber facing the interior of the room is provided with a plurality of small apertures through which air flows in a diffused manner into the room. A passage, which preferably is in the form of a tube, extends from the back surface of the chamber through the wall to the exterior surface thereof. Exterior air may then flow in through this passage to the air chamber, and thence through the apertures to the interior of the room. An adjustable valve mechanism is provided within the air chamber between the air passage and the outlet apertures and means are provided to open and close this valve to regulate the flow of air. The device is simple in construction, inexpensive, and may be installed either by attaching the air chamber to the surface of the wall or insetting it so that its front surface is flush with the surface of the wall, and then drilling a hole through to the exterior of the wall to accommodate the air passage, which may preferably be in the form of a tube. The front panel of the chamber may consist of a face plate which extends beyond the edges of the chamber to cover any hole made in the wall and to provide a finished appearance. Upon opening of the adjustable valve, exterior air will flow into the room, or interior air will flow out through the vents to the exterior, thereby effecting a change in the air within the room and permitting an adjustment of the temperature and humidity levels as well as a freshening of the air within that room.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing and additional objects, features and advantages of the invention will become apparent from the following detailed description of a preferred embodiment thereof, taken in conjunction with the attached drawings, in which:

FIG. 1 is a perspective view of an air vent made in accordance with the present invention;

FIG. 2 is an exploded view of the air vent of FIG. 1;

FIG. 3 is a plan view of the back of the device of FIG. 1 with the back cover removed to illustrate the valve in its closed position; and

FIG. 4 is a view similar to that of FIG. 3, but showing the valve in the open position.

DESCRIPTION OF A PREFERRED EMBODIMENT

Referring now to FIG. 1, an air vent **10** made in accordance with the present invention is illustrated as being in the form of a rectangular box. The box is made up of a housing **12**, a front plate or cover **14** defining the interior surface of the box which faces the room or area to be ventilated, and a back cover **16** which closes the back of the box and which faces the exterior of the room to be ventilated. The front wall carries a plurality of small apertures **18** which permit air to flow from the interior of the air vent device to the room to be ventilated, the size, spacing and number of apertures providing a diffused flow of air that reduces drafts and helps to prevent an excessive flow of air. Also mounted on the front panel or cover **14** is a control knob **20** which

is connected to an adjustable air flow control valve to permit selection of the rate of air flow. Extending from the back panel of the vent is a tube **22** which defines an air passage leading from the interior of the air vent **10** to the exterior surface of the wall, thereby providing communication between the exterior and interior of a room through the wall thereof.

In the exploded view of FIG. **2**, wherein like reference numerals designate like parts, it will be seen that the main housing **12** defines a first interior opening **24** which constitutes an air chamber or plenum, with a second interior opening **26** being connected to the first and defining a valve chamber adapted to receive the air flow control valve. The shape of air chamber **24** may take many forms, but it is basically designed to provide a plenum for receiving air from the exterior of the room by way of the control valve and feeding it through apertures **18** of the front cover **14** into the interior of the room. Similarly, valve chamber **26** may take many forms, depending upon the type of valve arrangement provided, with the chamber being so shaped as to form a valve seat which cooperates with the movable valve to provide the required flow. In the present embodiment, a rotary flow control valve **28** is provided which cooperates with the chamber to form a gate that is movable across the passage between the valve chamber and the plenum. This valve consists of a disc **30** forming a base on which is mounted a semi-cylindrical valve body **32**. The body **32** defines a wall which extends perpendicularly from the base **30** and extends around a major portion of it periphery. The cylindrical wall terminates at **34** and **36**, these end portions defining an opening in the wall through which air can flow into air chamber **24** when the valve is open, but which is blocked by the wall of valve chamber **26** when the valve is turned to the closed position. The base **30** is mounted on a shaft **38** for rotation therewith, the shaft being adapted to extend through an aperture **40** in face plate **14** and to receive the control knob **20**. The control knob may be secured to shaft **38** by means of a set screw **42** or the like, in conventional manner, whereby rotation of the control knob effects rotation of the air flow control valve **28**.

The air flow control valve **28** fits snugly in valve chamber **26**, and is rotatable therein in order to align the valve body opening with the passageway between the valve chamber **26** and the air plenum **24**. The valve is also rotatable within the valve chamber to move the wall of valve body **32** across this passageway in the manner of a gate valve in order to close off the air flow. FIGS. **3** and **4** illustrate the manner in which the valve body fits within chamber **26**, FIG. **3** showing the valve in the closed position, and FIG. **4** showing the valve in the open position. As may be seen in these two Figures, the air chamber **24** joins the valve chamber **26** at a passageway defined by shoulder portions **44** and **46** which form a valve seat, the wall portion of the valve body **32** cooperating with the valve seat to form a sliding rotary gate valve. Shoulder portion **44** carries or is formed with a protrusion **48** which extends into the opening defined by the ends **34** and **36** of the valve wall **32**. This protrusion acts as a valve stop to limit the rotation of the valve body, the end portion **36** of valve **32** striking the stop when the valve has reached its closed position (FIG. **3**) and the end portion **34** striking stop **48** when the valve has reached its fully open position (FIG. **4**). The valve stop may, of course, take numerous other forms.

In the disclosed embodiment, the valve body **32** is generally cylindrical in shape and, therefore, the valve chamber **26** is similarly shaped but of slightly larger diameter. In this form, the valve is easily rotatable between its closed and open positions and by providing a snug fit the valve body will remain in a selected position to permit regulation of the size of the opening through which air can flow, and thus to permit regulation of the amount of air entering a room through the vent.

Referring again to FIG. **2**, it will be seen that the front panel **14** may be secured to the vent housing **12** by means of suitable fasteners **50**; in similar manner, the back cover **16** may be secured to the back of the housing **12** by suitable fasteners **52**. In the illustrated embodiment, the front and back covers enclose the air flow valve, the valve chamber and the air chamber, the rear cover including an aperture **54** by means of which air may be admitted into the housing. Aperture **54** preferably is aligned with the axis of cylindrical valve **32** and communicates with the interior thereof so that the flow of air into the housing is first into the valve body, then through the opening in the valve into air chamber **24**, with the angular position of valve **32** determining the width of the valve opening through which air can flow.

Where the thickness of the wall in which the vent is installed is greater than the depth of the housing **12**, an inlet passage communicating with the aperture **54** and leading to the exterior surface of the wall in which the device is installed may be provided. Such an inlet passage may be in the form of a tube **22** having an inner end **58** which engages aperture **54** and which may be held therein by friction, a suitable adhesive, by a threaded fastener, or the like. The outer end **60** of the tube extends through the exterior surface of the wall and may be secured there by a threaded fastener **62** or by other suitable means. Preferably, the outer end of tube **22** carries a fine mesh screen **64** to prevent the entry of insects and foreign matter into the tube, as well as a louvred cover **66** which prevents the entry of water into the tube. The screen **64** and louvred cover **66** may be held against the end **60** of the tube by means of a shoulder **68** formed in the threaded fastener **62**.

The air vent **10** may be conveniently installed either on or recessed in a wall in any room which is to be ventilated. If the device is to be mounted on the surface of the wall, the back cover **16** may be secured to the wall, with the housing **12** extending out therefrom. If the device is to be mounted in the wall, a recess is cut therein sufficiently large to accommodate the outer dimensions of housing **12**. The housing is then secured in the opening so formed, and the front cover **14** is fastened to the housing. In this latter case, it is desirable to make the cover plate of slightly larger dimensions than the face of the housing **12** so that the cover will hide the opening cut in the wall. In either mode of installation, a hole is drilled completely through the wall to accommodate the air passage tube **22** which may then be inserted in the drilled hole and fastened at its inner end to the back cover **16** and at its outer end to the exterior wall surface by a fastener such as **62**. In-

stallation of cover plate **14** and connection of control knob **20** to shaft **38** then completes the installation. Rotation of the control knob in a clockwise direction as viewed in FIG. **1** serves then to bring end portion **36** of the valve into contact with shoulder **44** and projection **48**, closing the valve and preventing the flow of air through the vent device. Rotation of the knob in the opposite direction opens the valve progressively until the opening in the valve body corresponds in size to the passage between valve chamber **26** and plenum **24**, the end portion **34** then coming into contact with stop **48** to prevent further rotation. At this point, the valve is fully open.

Thus there has been disclosed a unique, simple and inexpensive air vent which may be used to admit fresh air into a room at a controlled rate of flow. Although the invention has been described in terms of a preferred embodiment, it will be apparent that changes may be made in the particulars of its structure without departing from the true spirit and scope of the invention as set forth in the following claims.

What is claimed is:

1. An air vent for installation in the exterior wall of a building for directing a controlled flow of air into a room in the building, comprising:

a housing defining an air chamber, a valve chamber, and a passage joining said chambers, said passage including shoulder means defining a valve seat;

manually adjustable valve means within said valve chamber for regulating the flow of air through said vent, said valve means being a rotatable gate-type valve having a semi-cylindrical wall section moveable across said passage and cooperating with said valve seat to open and close the passage, thereby to regulate the flow of air through said air vent;

air inlet means for said valve chamber for communicating with the exterior of said building and bringing air into said air vent, said air inlet means including a rear panel for said housing, an aperture in said panel aligned with said valve, and an air inlet passage secured to said rear panel, said air inlet passage being substantially coaxial with said semi-cylindrical wall section of said valve whereby air enters axially into said valve;

air outlet means for said air chamber adapted to communicate with the interior of said room, said outlet means including a front panel having aperture means leading to said air chamber;

control shaft means for said valve, said valve being connected to said control shaft for rotation therewith, said control shaft extending through said front panel whereby the shaft can be manually rotated to adjust the angular position of the valve and thereby regulate the flow of air from said inlet through said valve chamber and air chamber to said outlet.

2. The air vent of claim **1**, wherein said shoulder means carries a valve stop which abuts one end or the other of said cylindrical wall section to limit the motion of said valve.

3. The air vent of claim **1**, wherein said air inlet passage comprises tube means secured to said rear panel.

4. The air vent of claim **1** wherein said semi-cylindrical valve wall defines a valve opening which is adapted for alignment with said passage joining said air and valve chambers.

5. The air vent of claim **4**, wherein said passage is substantially perpendicular to the axis of said air inlet means and to the axis of said valve means.

6. The air vent of claim **5**, wherein said valve is mounted coaxially on said control shaft for rotation therewith.

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