

July 18, 1961

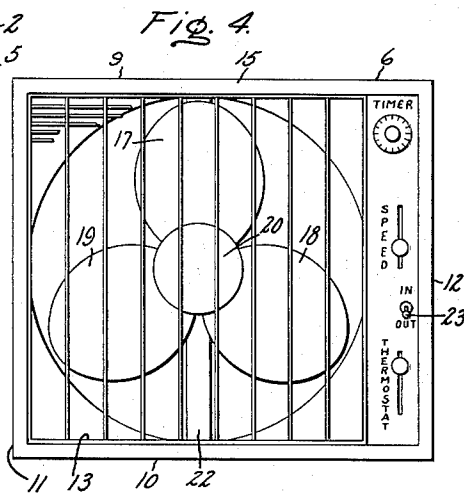
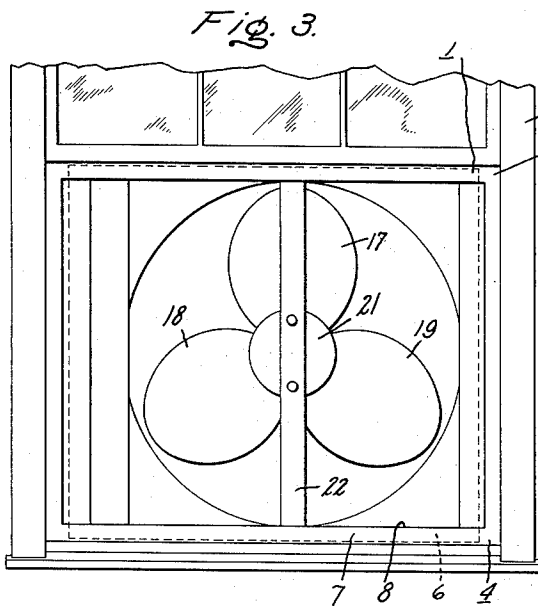
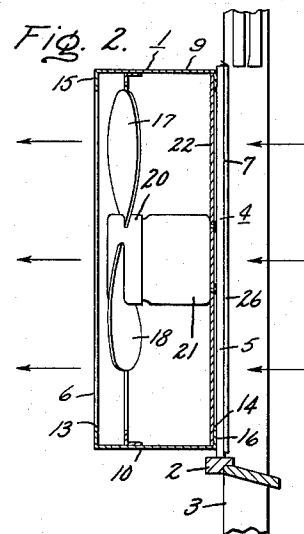
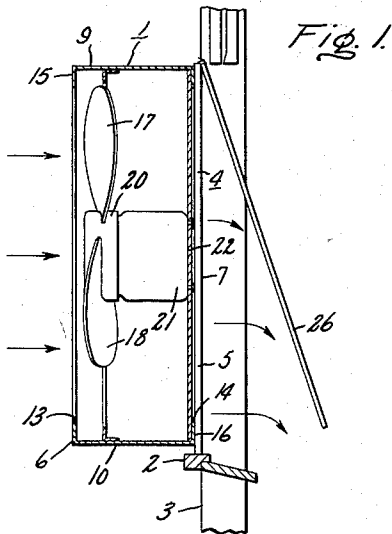
R. W. WHITE

2,992,701

FILTER FAN

Filed Sept. 24, 1959

3 Sheets-Sheet 1



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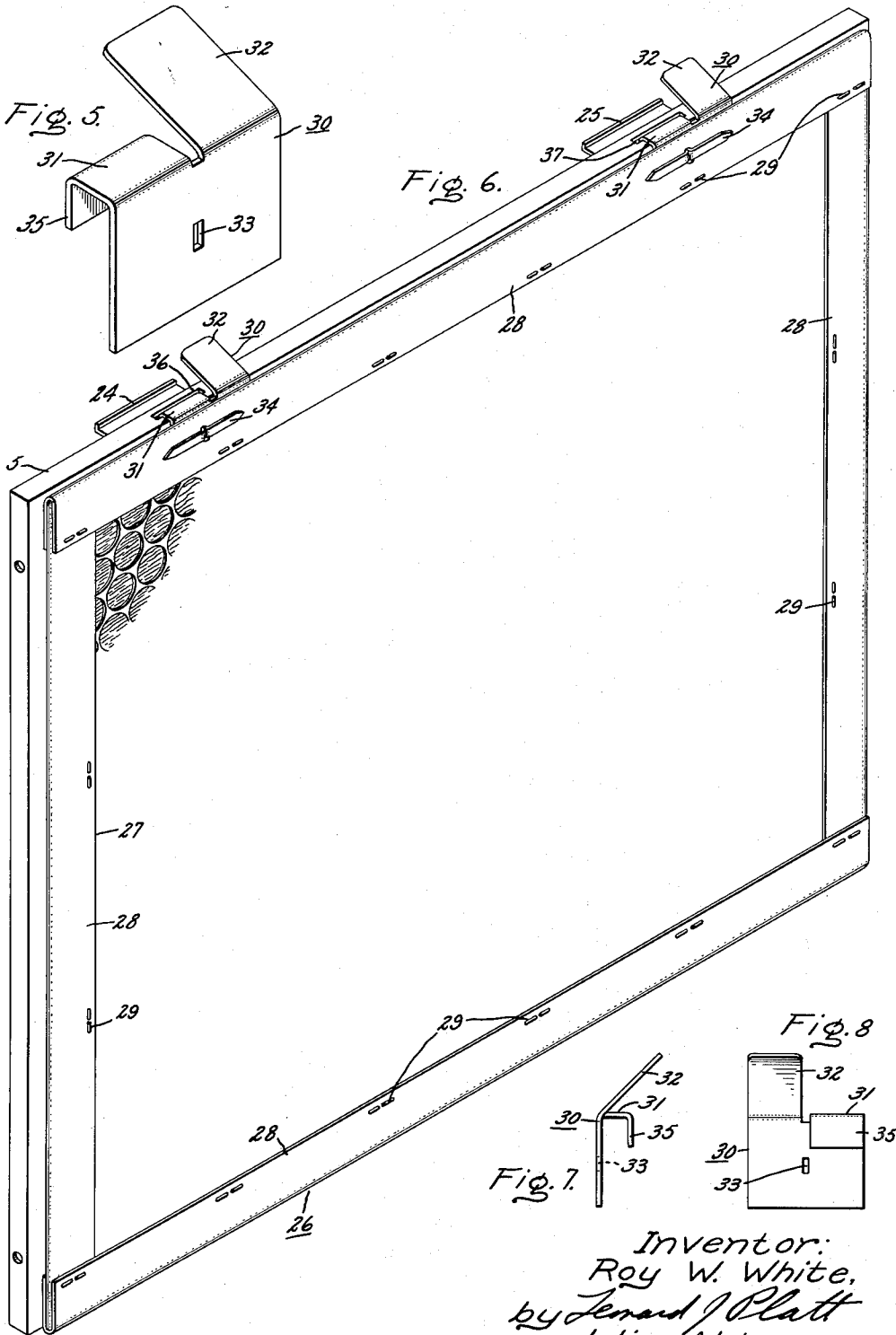
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3 Sheets-Sheet 2



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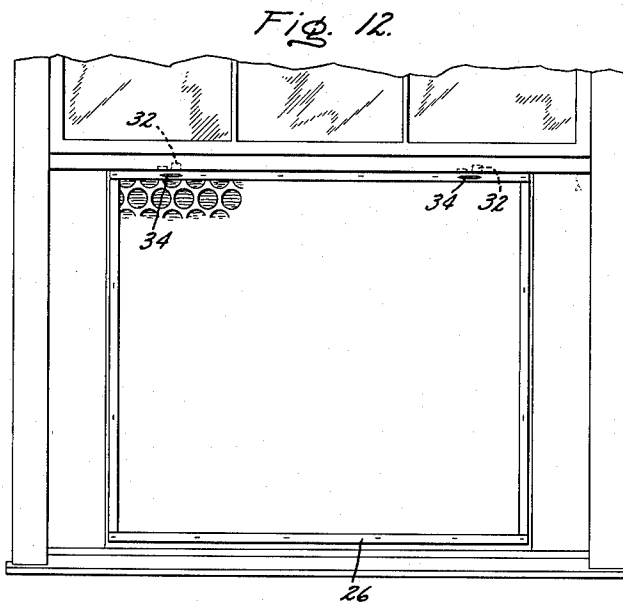
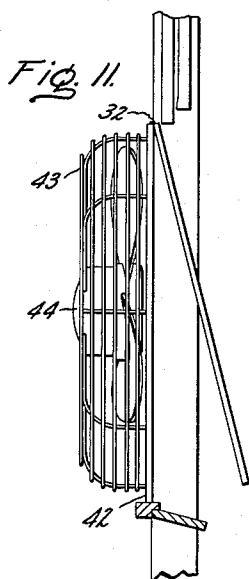
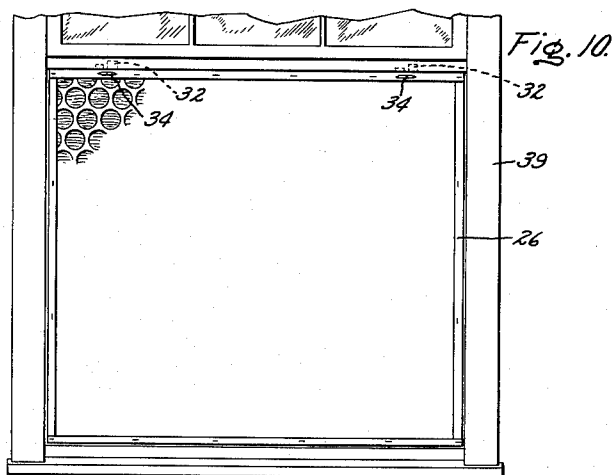
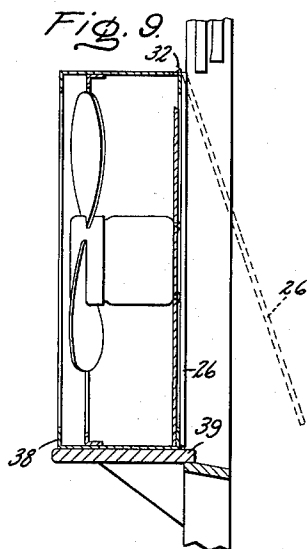
R. W. WHITE

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3 Sheets-Sheet 3



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## 2,992,701 FILTER FAN

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4 Claims. (Cl. 183-35)

This invention relates to window fans and more particularly to a window fan provided with an improved filter arrangement.

Reversible window fans for forcing air into a room or exhausting air from a room have been used extensively to make a room comfortable. Use of a filter in combination with such a fan is very valuable when it is desired to filter the air which is being forced into a room. However, when the air is being exhausted from a room by a window fan the use of a filter in the fan forced air stream is neither necessary nor desirable since a filter restricts the flow of air.

Accordingly, it is a primary object of this invention to provide a reversible fan with a filter which is fully positioned in the fan forced air stream when the fan is operating to blow air into a room but which may be bypassed by the fan forced air stream when the air is being exhausted from a room.

It is another object of my invention to provide a low cost means for readily removably mounting a filter on a fan.

In accordance with one aspect of this invention, a fan is provided with a supporting structure having a rear wall. The fan is fixed to the supporting structure and is selectively operable for providing inlet or exhaust operation. The rear wall of the supporting structure has an enlarged opening formed therein for functioning as an air inlet opening when the fan is rotated in one direction and an air discharge opening when the fan is rotated in the other direction. A filter is uniquely hinged on the rear wall of the fan supporting structure. By this arrangement, when the fan is rotated in one direction it sucks the filter against the rear wall to filter the incoming air and when the fan is rotated in the other direction it blows the filter outwardly away from the rear wall of the fan to permit the air exhausted by the fan to bypass the filter.

Other objects and attendant advantages of this invention will be apparent from the following description taken in connection with the accompanying drawing in which:

FIG. 1 is a cross-sectional view of the improved filter fan showing the fan exhausting air from a room;

FIG. 2 is a cross-sectional view showing the fan moving air into a room;

FIG. 3 is a rear elevational view of the fan with the filter removed;

FIG. 4 is a front elevational view of the fan;

FIG. 5 is an enlarged perspective view of a unique bracket for mounting the filter on the fan;

FIG. 6 is a perspective view showing the filter mounted on a fan supporting member;

FIG. 7 is a side elevational view of the bracket;

FIG. 8 is a plan view of the bracket;

FIG. 9 is a cross-sectional view of another embodiment of my filter fan arrangement;

FIG. 10 is a rear elevational view of the filter fan arrangement shown in FIG. 9;

FIG. 11 is a cross-sectional view of still another embodiment of my filter fan arrangement; and

FIG. 12 is a rear elevational view of the filter fan arrangement shown in FIG. 11.

Referring now to FIGS. 1 and 2, there is shown a preferred embodiment of my filter fan arrangement 1 mounted in a window frame 2 set in an outside wall 3 of a room. A fan supporting structure designated generally

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by numeral 4 includes a mounting panel 5 and a fan casing 6. The mounting panel 5 is conventionally formed with a generally flat rear wall 7 having an enlarged opening 8 formed therein for functioning as an air inlet opening when the fan is moving air in one direction and an air discharge opening when the fan is moving air in the other direction. The panel 5 may be secured in the window frame 2 in any suitable manner.

As shown in FIGS. 1, 3 and 4, the casing 6 is substantially rectangular in shape and has relatively flat top, bottom and side walls 9, 10, 11 and 12, respectively. Enlarged rectangular openings 13 and 14 are formed in the front and rear walls 15 and 16, respectively.

In the embodiment illustrated in FIGS. 1, 2, 3 and 4 an electrically reversible fan is supported within casing 6. The fan includes a plurality of blades 17, 18 and 19 mounted on a hub 20 and driven by a reversible electric motor 21. The motor 21 is conveniently supported within the casing structure 6 by means of a generally vertical mounting bracket 22 which extends from the inside of top wall 9 to the inside of bottom wall 10.

Referring now to FIG. 4, it can be seen that a switch 23 is mounted at the middle right portion of the fan casing for controlling the speed and direction of rotation of the reversible electric motor 21. With this arrangement, the switch 23 may be moved to the "In" position to cause the fan motor to rotate in one direction to blow air into the room or it may be moved to the "Out" position to cause the fan motor to rotate in an opposite direction to exhaust the air from the room.

Any suitable means may be provided for securing the fan casing 6 to supporting panel 5. As shown in FIGS. 1 and 6, this may be readily accomplished by forming two forwardly extending hangers 24 and 25 on the panel 5. Thus, the fan casing 6 may be simply hung on the hangers 24 and 25 with the hangers extending through the enlarged opening 14 formed in the rear wall 16 of the fan. With this arrangement, the weight of the fan casing holds the bottom portion of the rear wall thereof in engagement with the bottom portion of panel 5.

My improved arrangement for filtering the air which is blown into a room by the fan while allowing the filter to be bypassed when the fan is being operated to exhaust stale air from the room will now be more particularly described. As shown in FIGS. 1 and 6 this is accomplished by hinging a generally flat filter 26 onto the rear wall of panel 5. The filter itself may be formed of glass fiber or other suitable material, and may be mounted in a generally rectangular cardboard frame 27. As shown in FIG. 6, the frame sections 28 may be connected to each other and to the filter material by means of staples 29.

A unique low cost, easily formed bracket 30 is provided for removably mounting the filter onto the fan supporting panel 5. As shown more particularly in FIG. 5, this bracket comprises a generally rectangular piece of sheet metal which is stamped and formed to the shape illustrated. As shown, it is slotted to provide two generally parallel portions 31 and 32. One of the portions 31 is shaped into the form of an inverted U for providing a hanger hinge while the other portion 32 is bent outwardly and upwardly for functioning as a gripping or holding tab. A hole 33 is stamped into the unique bracket for enabling the bracket to be fixed to the filter 26. Thus, readily available flathead paper fasteners 34 may be passed through the hole 33 formed in bracket 30 and through a hole formed in the cardboard mounting frame 27 for fixing the bracket 30 to the filter. With this arrangement, the filter 26 may be connected to the fan supporting structure by gripping holding tabs 32 and inserting the depending arms 35 of the hinge portion 31

of bracket 30 within slots 36 and 37 formed in the rear wall of the panel.

In operation, when the switch 23 is turned to the "In" position, the fan is rotated to force air into the room and the filter is sucked against the rear wall of the panel 5 as shown in FIG. 2 to provide maximum filtration of the incoming air. However, when the switch is moved to the "Out" position, the fan is rotated to force air out of the room and the force of this air flow causes the filter 26 to swing away from panel 5 on the hinge portion 31 of bracket 30. As shown in FIG. 1 the air passing out through the enlarged opening 8 formed in the rear wall of panel 6 bypasses the filter 26 and flows out around the bottom and sides of the filter 26. Thus, the air flow is not restricted and a maximum volume of stale air is exhausted from the room.

My improved filter arrangement may be used with various other window fan arrangements. For example, when it is used with a window fan having a non-reversible electric motor reversibility of the fan may be achieved by simply physically removing the fan casing 6 from the mounting panel hangers 24 and 25 and reversing the position of the casing on the panel so that the back 16 becomes the front and the front 15 becomes the back. With this arrangement, when the fan is exhausting air the filter will be blown away from the rear wall of the panel 5 while when the fan is drawing air into the room the filter will be forced against the rear wall of the panel as shown in FIG. 2.

A further embodiment of my invention is illustrated in FIGS. 9 and 10. As shown in these figures the fan support merely includes a fan casing 38 which is fixed in a window frame 39 without the use of a panel member. With this fan arrangement, my improved filter may be hinged directly to the rear wall of the fan support 38 by simply forming two slots in the support for receiving depending arms 35 of hinges 31.

As illustrated in the FIGS. 11 and 12, my improved filter arrangement may also be used in combination with a fan which is permanently fixed to a panel supporting structure 42. As shown, a unique wire guard arrangement 43 is permanently fixed to the support 42 for securing a fan and its electrically reversible motor 44 on the panel. With such a fan, two slots are formed in the upper portion of the panel for receiving the depending arms 35 of hinges 31.

It will be seen from the foregoing that my improved filter arrangement is characterized by its simplicity and ease of manufacture and assembly. To remove the filter from the rear wall of any of the aforementioned fan supporting structures for cleaning or replacement, it is merely necessary to grip the filter by tabs 32 and pull arms 35 out of the slots in the rear wall of the fan support. Then the filter may be lifted over the fan and into the room.

While there has been shown and described particular embodiments of this invention, it will be obvious to those skilled in the art that various other changes and modifications can be made therein without departing from the invention, and therefore it is aimed in the appended claims to cover all such changes and modifications as fall within the true spirit and scope of the invention.

What I claim as new and desire to secure by Letters Patent of the United States is:

1. A window filter fan comprising, a supporting structure having a rear wall, a fan mounted on said supporting structure, said fan being selectively operable for providing air inlet or exhaust operation, said rear wall having an enlarged opening formed therein for function-

ing as an air inlet opening when said fan is moving air in one direction and an air discharge opening when said fan is moving air in the other direction, and a filter hinged on said rear wall whereby when said fan is moving air in said one direction it sucks the filter against the rear wall to filter the inlet air, and when the fan is moving air in the other direction it blows the filter outwardly away from the rear wall to permit the exhausted air to bypass the filter.

2. A window filter fan comprising, a supporting structure having a generally flat rear wall, a fan mounted on said supporting structure, said fan being selectively rotatable in a clockwise or in a counterclockwise direction for providing air inlet or exhaust operation, said rear wall having an enlarged opening formed therein for functioning as an air inlet opening when said fan is rotated in one direction and an air discharge opening when said fan is rotated in the other direction, and a flat filter hinged on said rear wall whereby when said fan is being rotated in said one direction it sucks the filter against the rear wall to filter the inlet air, and when the fan is moving air in the other direction it blows the filter outwardly away from the rear wall to permit the exhausted air to bypass the filter.

3. A window filter fan comprising, a supporting structure having a generally flat rear wall, a fan mounted on said supporting structure, said fan being selectively operable for providing air inlet or exhaust operation, said rear wall having an enlarged opening formed therein for functioning as an air inlet opening when said fan is moving air in one direction and an air discharge opening when said fan is moving air in the other direction, two slots formed in the rear wall of said fan supporting structure, a flat filter having an upper end, two brackets fixed to the upper end of said filter, each of said brackets including an inverted U-shaped hinge portion having a depending arm for insertion within the slots formed on said rear wall, said depending arms of said hinge portions being inserted in said slots whereby when the fan is exhausting air the filter is blown outwardly by the air and is pivoted about the rear supporting wall on the hinge portion of said bracket.

4. A window filter fan comprising, a supporting structure having a generally flat rear wall, a fan mounted on said supporting structure, said fan being selectively operable for providing air inlet or exhaust operation, said rear wall having an enlarged opening formed therein for functioning as an air inlet opening when said fan is moving air in one direction and an air discharge opening when said fan is moving air in the other direction, two slots formed in the rear wall of said fan supporting structure, a flat filter having an upper end, two brackets fixed to the upper end of said filter, each of said brackets including an inverted U-shaped hinge portion having a depending arm for insertion within the slots formed on said rear wall, and a forwardly and upwardly extending tab formed integrally with each of said brackets whereby the tabs may be gripped for readily removing the filter from said supporting structure.

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