

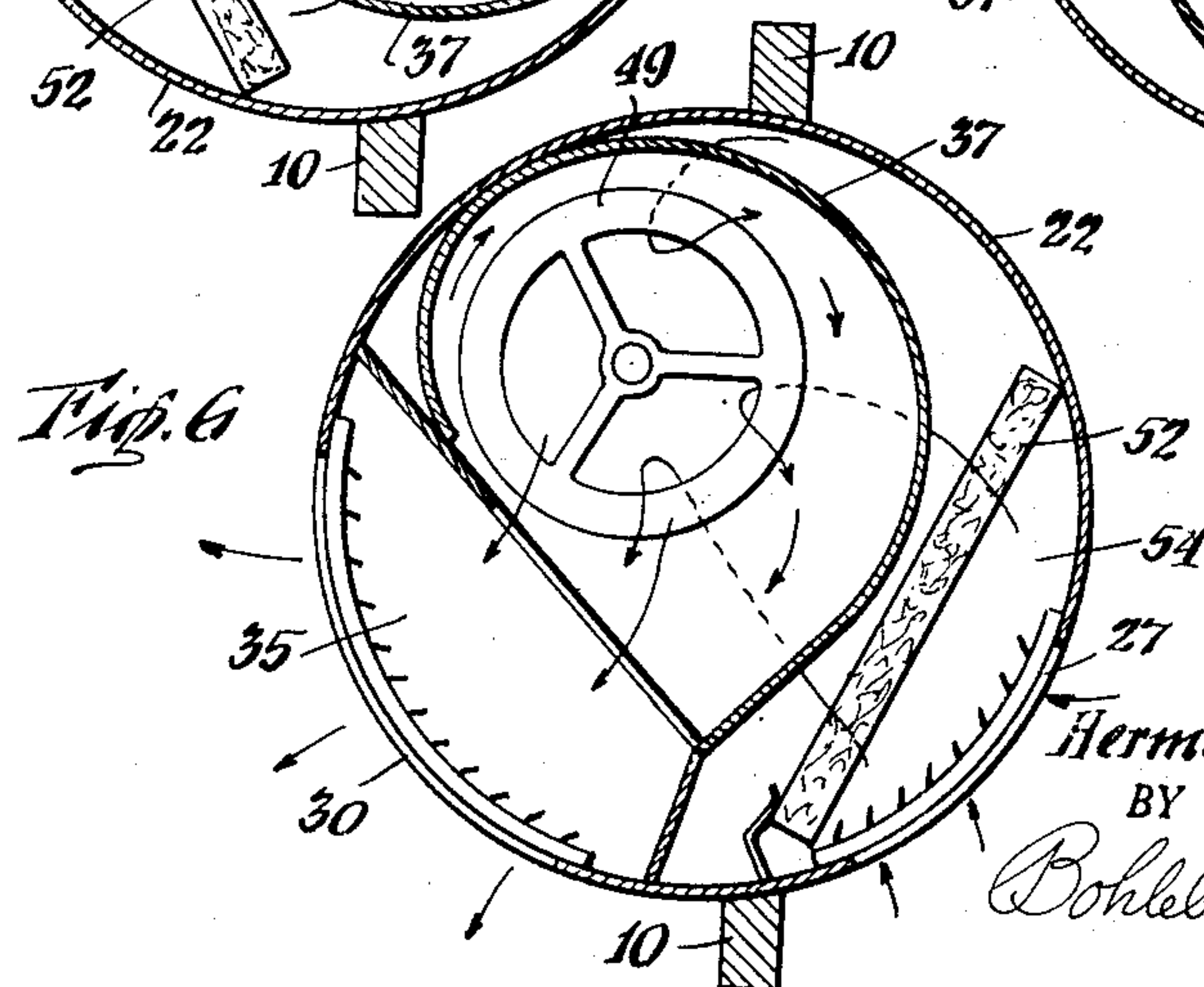
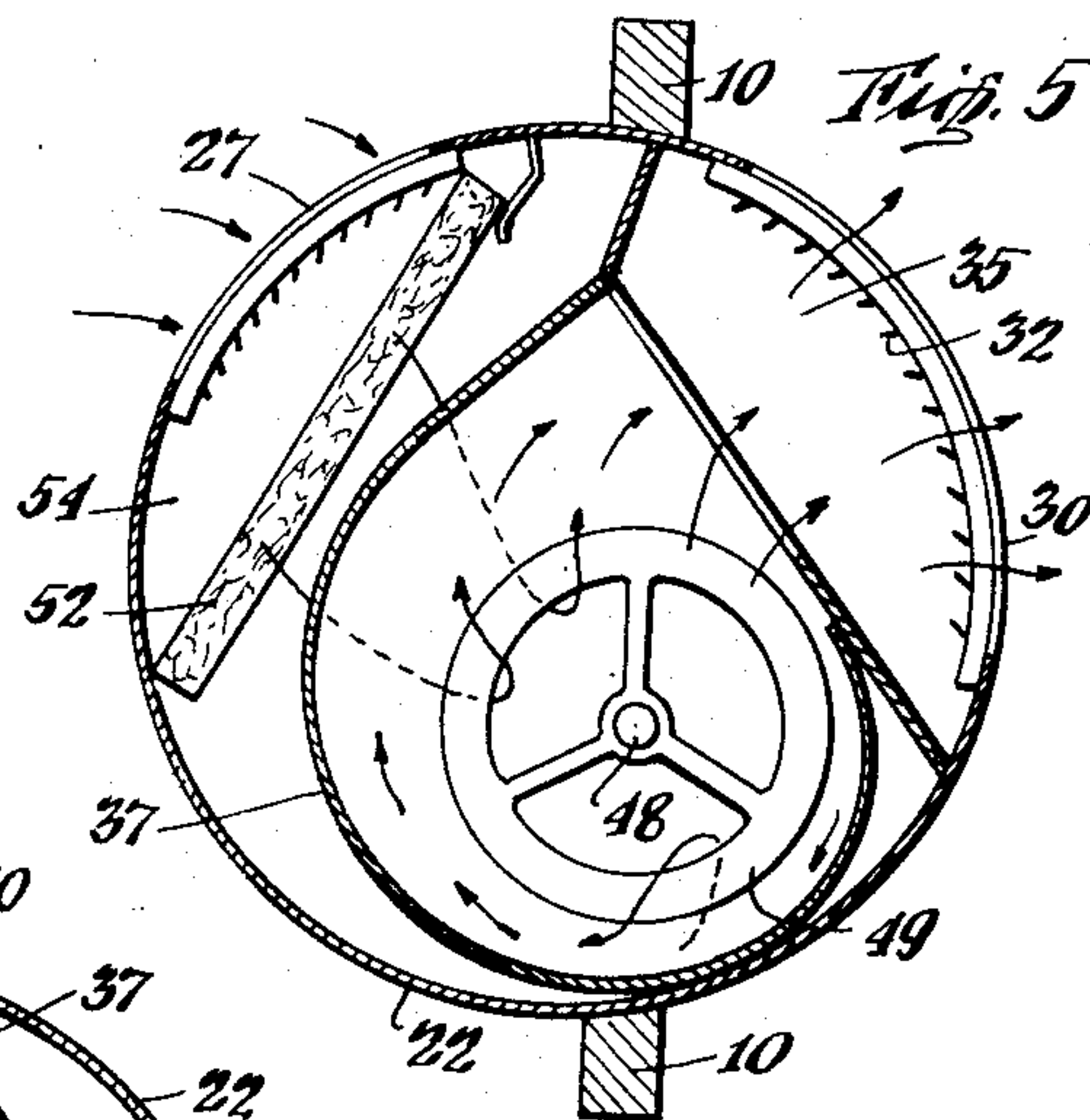
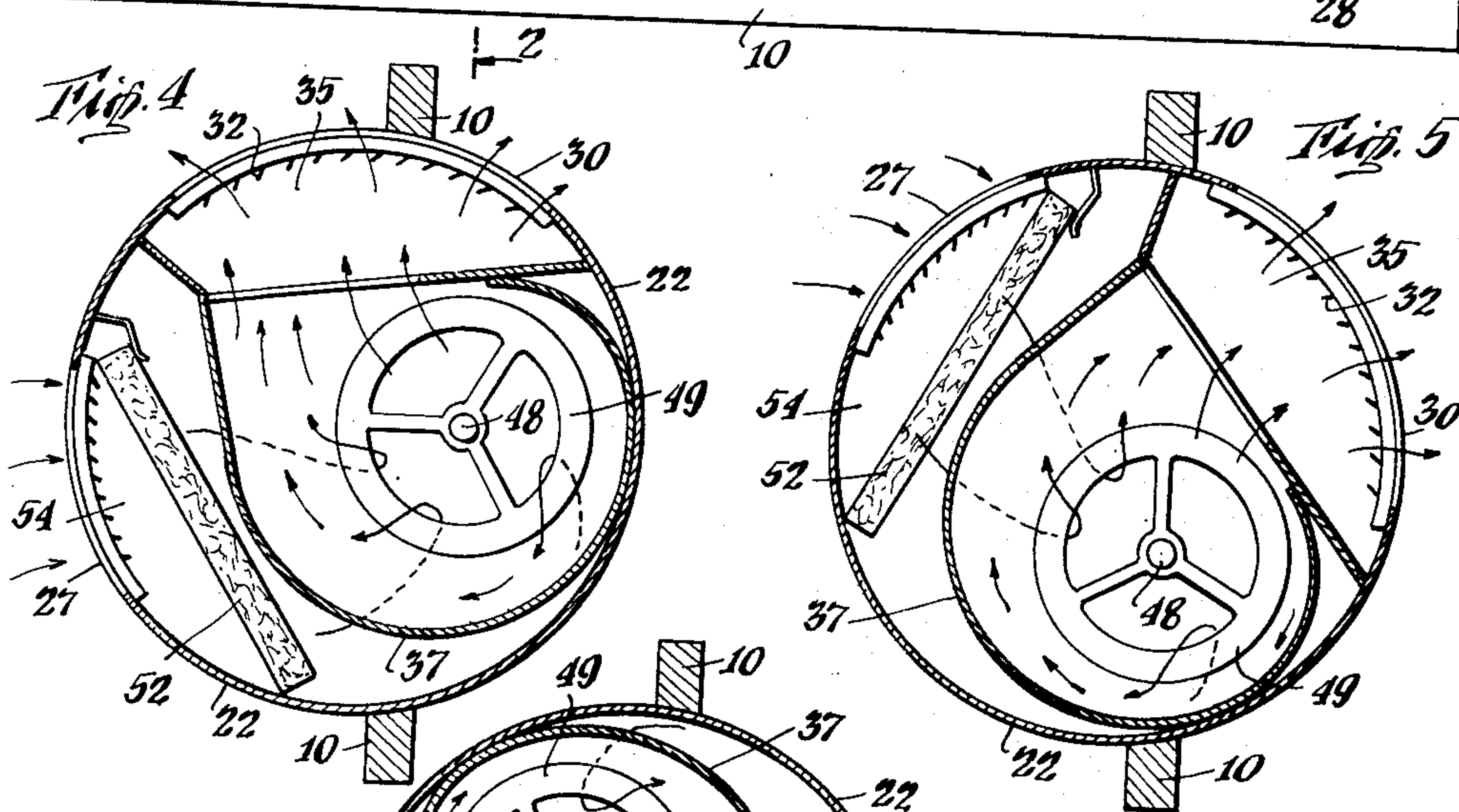
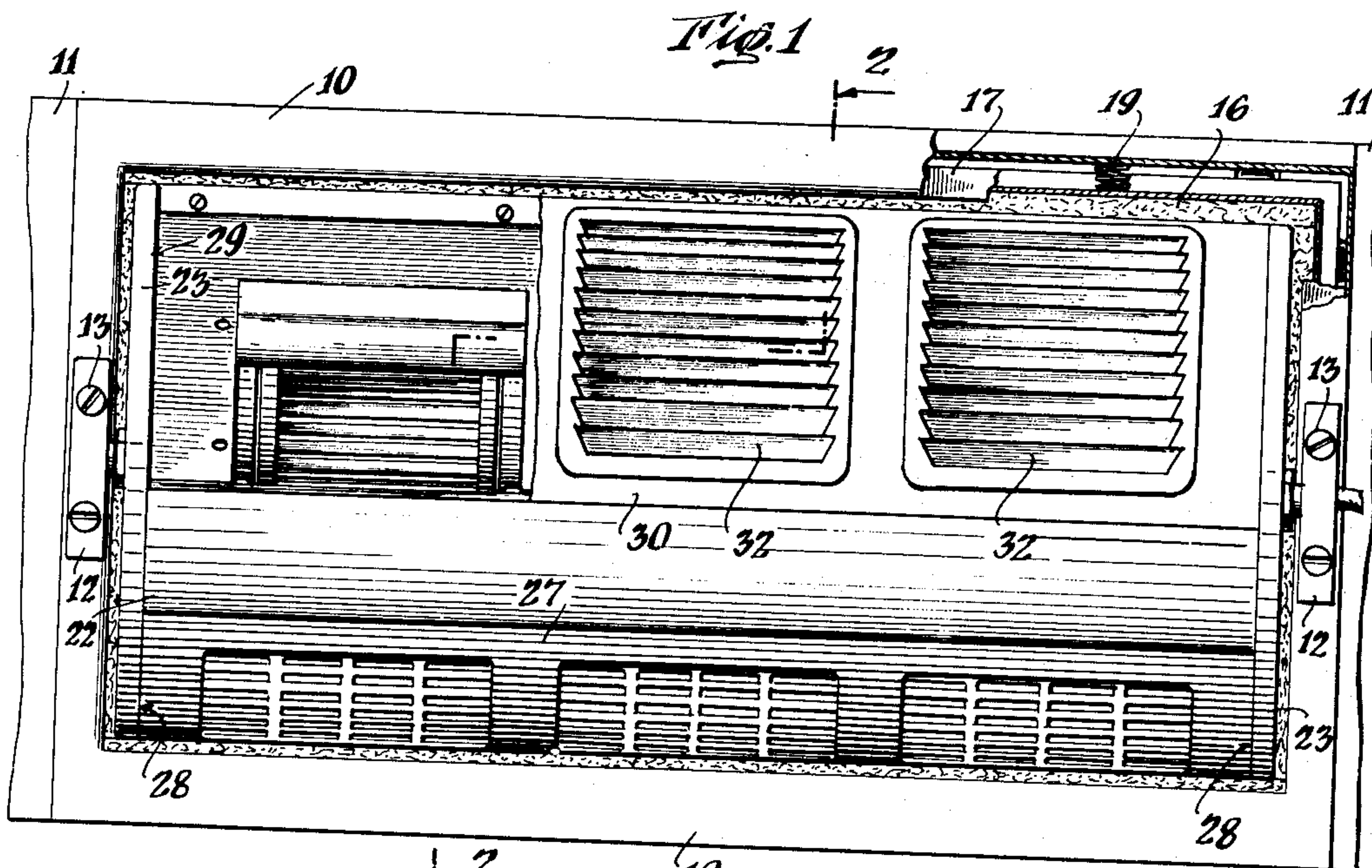
Nov. 17, 1953

H. HERSPERGER
WINDOW VENTILATOR

2,659,294

Filed Jan. 2, 1948

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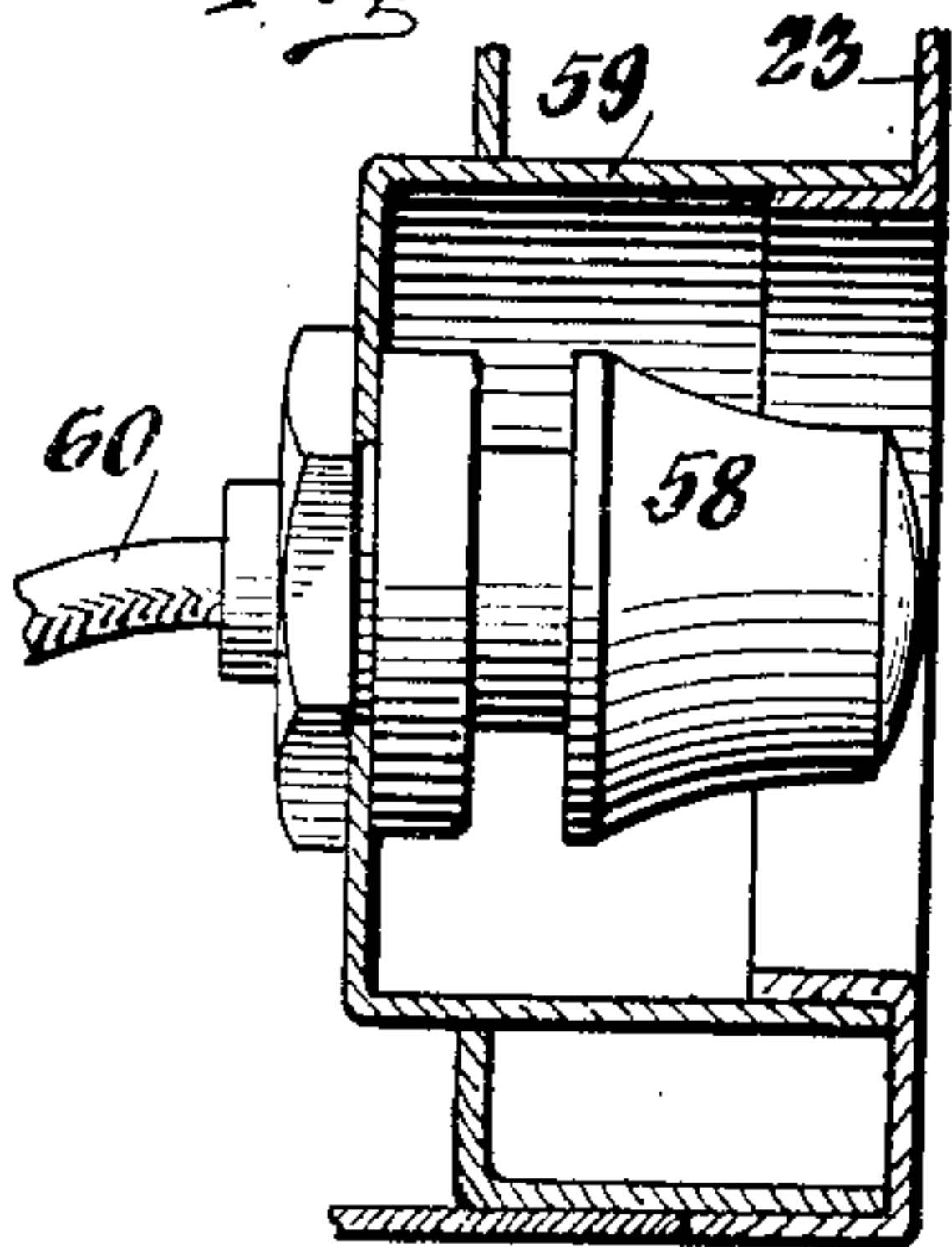


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3 Sheets-Sheet 2



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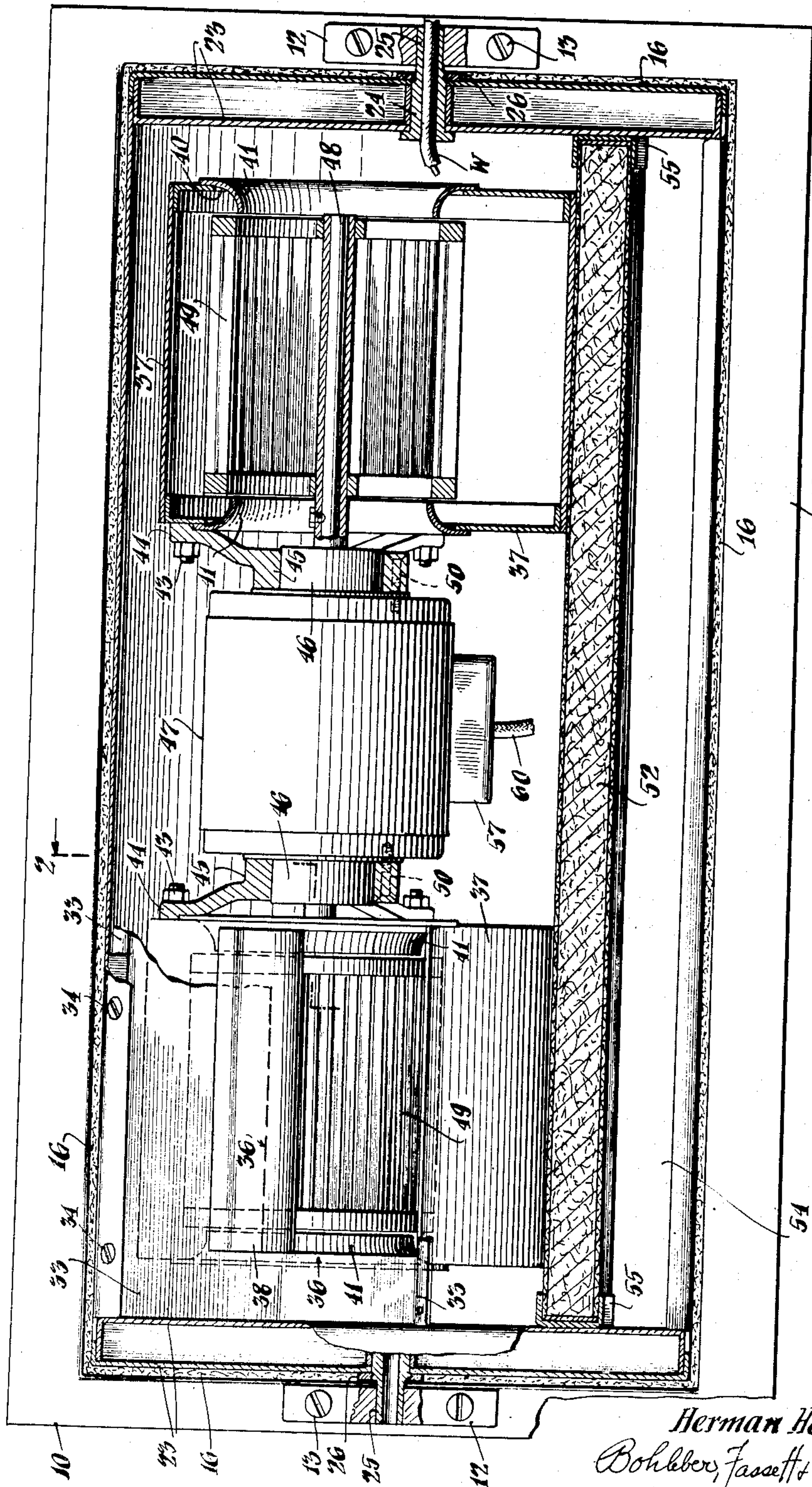


Fig. 3

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WINDOW VENTILATOR

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The invention relates to a ventilator such as may be inserted in a window opening between the sill and the raised lower sash of a double hung window. The ventilator includes motor driven blower means and is constructed to recirculate the air within a room or to draw in all or some fresh air from the outside or to expel some or all of the air within a room to the exterior. The invention relates particularly to a new and novel ventilator in which the casing is rotatable in order to secure any proportion of recirculation, air intake or air outlet as desired.

The principal object of the invention is to construct a ventilator for a window and the like having an inlet opening and an outlet opening, which is rotatable in a window opening so that at least one of the openings therein can be brought to the other side of the window to change the circulation of air within the room.

Another object of the invention is to construct a ventilator for a window and the like having a cylindrical casing with inlet and outlet openings therein which is mounted for rotation so that the outlet or inlet opening may be projected to the exterior whereby the casing serves as its own valve or baffle means or regulator for securing any proportion of ventilation desired.

Another object is to construct a ventilator by which any degree of circulation or recirculation may be obtained with a mechanism that is very simple and inexpensive to manufacture.

A still further object is to construct a window-ventilator which dispenses with adjustable dampers or baffles, yet provides any proportion of ventilation desired.

Other objects of the invention will be more apparent from the following description when taken in connection with the accompanying drawings illustrating a preferred embodiment thereof in which:

Figure 1 is a plan view of the inside or front face of the ventilator with portions thereof broken away to show the sealing means between the rotatable casing and the frame.

Figure 2 is a cross section through the ventilator taken on line 2—2 of Figure 1 or Figure 3.

Figure 3 is a longitudinal section through the casing and a portion of a blower housing taken generally on line 3—3 of Figure 2.

Figure 4 is a diagrammatic cross section through the ventilator showing the position of the casing for recirculating some of the air in the room and expelling some of the room air to the exterior.

Figure 5 is a diagrammatic cross section

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through the ventilator showing the position of the casing for expelling all of the air to the exterior.

Figure 6 is a diagrammatic cross section through the ventilator showing the casing rotated to a position such that all of the air blowing therethrough is taken from the exterior.

Figure 7 is a partial section of reduced size taken on line 7—7 of Figure 2 showing a recess or pocket in the side wall of the casing.

The ventilator may include a rectangular frame 10 of any suitable construction that particularly illustrated being formed of members which are H-shaped or channel shaped in cross section. The lower end of this frame contacts the sill S of a window and the upper edge is engaged by the bottom of the open lower sash WS of the window. The frame is preferably made for a relatively narrow window so that one ventilator will fit any greater width of window merely by inserting, attaching or filling in with a side or window panel 11 of proper width on one or both ends of the frame so that the window opening is closed. These window panels may be a part of the frame or the frame may be made in varying widths for different sizes of windows. The frame carries a removable bearing W bracket 12 upon each side edge thereof which is secured to the frame in any suitable fashion such as by the screws 13.

Means are provided to seal the space between a rotatable casing, to be described, and the frame 10 which seal may be of any desired construction that illustrated including a felt 16 carried by a bracket 17 shown as H-shaped which is slidable inwardly with respect to the frame 10. The felt may be U-shaped initially but preferably is flat and takes a U form in cross section when secured to the felt bracket by bolts 18. Spring means of any kind propels the felt bracket and hence the felt inwardly of the frame, the spring means shown being a plurality of coil springs 19 positioned between the cross piece of the H-shaped frame 10 and the cross piece of the H-shaped felt bracket. The sealing means extends around the entire inner periphery of the frame.

The frame is not an essential part of the ventilator, however, means are provided to rotatably mount the casing, as will appear more fully hereinafter, and means are provided to seal the ventilator casing within the window opening. These two functions and the structure to provide them are more conveniently secured with a frame as described.

A ventilator casing 22 is mounted within the frame or an open window or the like and has

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a cylindrical surface, preferably around its entire periphery, and end walls 23. The end walls shown are double walled for increased rigidity and strength although this is not essential. Suitable means are provided to rotatably mount the casing within the frame or window opening. The mounting means shown includes a shaft 24 preferably secured to each end wall upon the center of the cylindrical casing by a nut 26. Each shaft carries an extension 25 which is in effect a part of the shaft which extension is received in the bearing 12 carried upon each edge of the frame 10. It is immaterial whether the shaft is secured to or gripped by the bearing and the casing rotatable upon the shaft or a reverse construction as preferred in which the shaft is secured to the casing and the extension rotates in the bearing. The casing may be conveniently constructed of a semicircumferential section which is secured to the end walls and to a channel cross piece 21.

By unscrewing the screws 13 the casing and the bearings or brackets 12 are removed from the frame whereupon the bearings 12 may be removed or slid off from the shaft extensions 25. This provides a very simple construction for mounting the cylindrical casing within the frame. The cylindrical casing is purposely mounted off center with respect to the frame so that an effective seal can be maintained between the frame and the casing around the entire inner periphery of the frame without interference from the casing bearing mounting and without any interruption of the sealing means at the bearing as would be the case if the center of rotation of the casing were in the plane of the frame.

The casing has an inlet opening 28 in which there is a panel 27 having suitable grill work in the openings therein. The panel can be opened such as by hinging on hinge means 31. Three grilled inlet openings are shown in the panel. The casing also has an outlet opening 29 in which there is a panel 30 having grilled outlet openings. The grill preferably is formed of vanes 32 within the outlet openings to direct the air emitted from the casing. The vanes 32 may be adjustable so that the air may be directed as desired. The panel 30 may be opened in any way for access into the casing, the panel being shown as hinged upon hinge pins 30a. The inlet and outlet opening are shown in the cylindrical periphery of the casing although they need not be so located. Both panels may be secured or held in closed position against inadvertent opening.

Within the casing are mounted blower means including one or more fans or impellers driven by an electric motor. The casing is shown with two such blowers which draw the air through the inlet opening 28 or the openings in the panel 27 and expels the same through the outlet opening 29 or the openings in the panel 30.

A partition 33 extends lengthwise of the interior of the casing and is secured therewithin in any suitable fashion such as by the screws 34. This partition divides the interior of the casing into two sections or chambers in which the chamber 35 is an outlet chamber connecting with the outlet opening 29. A blower opening 36 is provided in the partition for each blower. Two blowers are provided in the ventilator or casing each of which includes a blower housing 37 whose outlet is mounted at a blower opening 36 in the partition. The blower housing may have a silencing extension 38 if desired. The blower hous-

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ing is of scroll shape, which is suitable for a centrifugal blower, and is shown as secured to the partition and the casing such as by screws 39. Each blower housing has a center inlet 40 in each side wall thereof in which may be mounted a curved inlet orifice 41.

Adjacent ends of each blower housing have a bracket 44 secured thereto such as by bolts 43 which bracket carries a collar 45. A cylindrical portion 46 is provided upon each end of a motor 47, each of which receives the collar 45 of the bracket 44 and is secured in place by bolts 50. A shaft 48 projects from each end of the motor and a fan or impeller 49 is secured to each shaft with the impeller free to rotate within its respective blower housing 37. It will be noted that the entire blower unit including blowers and motor are secured within the casing by the blower housings being fastened to the partition and the casing and the motor being secured to each blower housing through the brackets 45. The motor therefore is supported upon and between the blower housings.

With the construction described, the entire blower unit or means can be assembled together and secured to the partition outside of the casing. The partition with the blower unit attached is then inserted into the casing through the outlet opening 29 and the partition secured in place. The additional securing screws 39 may then be inserted into the blower housing. This construction makes a very convenient method of assembling the blower unit within the casing.

The wire W to the motor may conveniently pass into the casing and to the motor through a bore extending through the hollow shaft 24 and the extension 25 so that the wire is on the center of rotation of the casing and therefore a minimum or no twisting of the wire occurs when the casing is turned upon its bearing means.

A filter or pad 52 extends across a chord of the interior of the casing and one end or edge of the filter is held against a partition or shield 53. The filter may be supported in place by U-shaped bracket means 55 secured to each end wall of the casing. This filter extends the length of the interior of the casing and thereby divides the casing into an inlet chamber 54 for the inlet opening 28. The filter is held in place in any suitable manner U brackets 55 secured to each end wall being shown and is removable for replacement or cleaning by opening or removing the panel 27 in the inlet opening 28.

With the motor energized and driving the impellers air is drawn into the casing through the inlet opening 28 into the inlet chamber 54. All of the air passes through the filter 52 into the interior of the casing proper. The air then divides into four paths and passes around both ends of each blower housing, through the blower inlet openings 41 into the center of each blower housing and the impeller blows the air to the outer circumference of the inside of the blower housing and is expelled through the openings 36 in the partition 33 into the outlet chamber 35 from which it passes through the vanes 32 or the outlet opening into the room.

The entire casing has been described as preferably being cylindrical and that it is rotatable within the frame 10 through approximately 180°. This extent of rotation of the casing permits wide inlet and outlet openings in a circumferential direction and also permits either opening to be positioned completely on the outer side of the window or the frame 10. The yieldable sealing

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means 16 between the frame 10 and the ventilator casing 22 permits the casing to be rotated freely and any opening or crack between the casing and the frame is sealed thereby. The sealing means therefore permits relatively wide latitude in the dimensions of the casing and frame.

In the position of the casing illustrated in Figure 2 a recirculation of the air within the room is created, the air of course being filtered in the process. In this position the entire inlet opening 28 or the grilled openings in the panel 27 and the entire outlet opening 29 or the grilled openings in the panel 30 of the casing is inside of the room or on the inner side of the frame 10. If the casing is rotated to a position as shown in Figure 4, in which a portion of the outlet opening 29 is outside of the frame 10, the air from the room is partially recirculated within the room through that portion of the outlet opening 29 which is within the room or to the left of the frame 10 and a portion is expelled to the outside through that portion of the outlet opening 29 which is on the outside of the window or on the outer side of the frame 10.

The casing 22 may be rotated to the position shown in Figure 5 in which position the entire outlet opening 29 is on the outer side of the window or frame 10. In this position all of the air from the room is expelled to the exterior. It is clear that any portion of the outlet opening may be positioned upon the outer side of the frame 10 so that any desired proportion of expulsion and recirculation of the air within the room may be provided.

By rotating the casing in the other direction to the position shown in Figure 6, the entire inlet opening 28 may be positioned upon the outer side of the window and frame 10. The outlet opening 29 in the casing is on the inner side of the partition. In this position all of the air passing through the ventilator is drawn in from the outside and expelled into the room. The air within the room leaks out through door and window openings. In this position a complete fresh supply of outside air is brought into the room. It is clear that the inlet opening 28 may be positioned so that any desired portion thereof is on the inner side of the frame 10 and the balance being on the outer side of the frame 10 so that any desired proportion of air may be recirculated from within the room and exterior air combined therewith and blown into the room through the outlet opening 29 or grill work 30.

The ventilator described provides a casing which serves as its own valve or baffle in controlling the ventilation of a room. As a consequence no separate closing baffles, valves or doors need be provided within the casing for adjustment of the kind and amount of recirculation or expulsion of air from the room or drawing in of outside air into the room.

Means may be provided for turning the casing to the desired ventilating position. This means may be of a recessed pocket or cup 59 forming a hand hole in each end wall of the casing into which the fingers may be inserted to turn the casing in either direction.

A rheostat 57 may be carried anywhere within the casing and connected with the motor for controlling the speed of the motor and hence the speed of the blowers or impellers 49. A rheostat adjusting knob 58 is connected with the rheostat such as by a flexible connecting wire 60. The knob is within the recess or pocket 59 in one of the end walls of the casing and below the outer

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surface of the end wall of the casing so that it is protected thereby.

The casing preferably is cylindrical throughout its periphery; however, the extent of the circular periphery need be only sufficient to enable enough rotation of the casing in order to bring at least one of the openings, either the inlet or outlet opening to the outer side of the window or frame 10. The extent of the cylindrical surface is dependent upon the extent of cylindrical surface covered by the openings and the degree of selectivity in ventilation desired. In such case the casing need be cylindrical at the outlet and inlet openings and diametrically opposite thereof. Likewise if it is desired to bring one only of the outlet or inlet openings to the outer side of the frame 10 or window, a lesser extent of cylindrical surface is required namely at that opening and on the diametrically opposite side. In other words, it is only when the outlet opening or grilled openings in the outlet opening panel 30 and the inlet opening or the grilled openings in the inlet panel 27 are relatively wide circumferentially of the casing and when it is desired, as in the preferred construction, to bring both openings to the outer side of the frame 10 or window, that a completely cylindrical casing is necessary. The latter construction gives the maximum of selectivity in the circulation of air within a room as described hereinbefore and illustrated in the figures of the drawings.

The ventilator described permits every desirable ventilating condition to be secured and the number of parts to be manufactured and assembled is substantially reduced by the construction. This necessarily reduces the cost of manufacture as well. Again servicing of the ventilator is easy and convenient since the entire blower unit attached to the panel 33 can be removed, through the outlet opening 29 after removal of the grill 30, without opening the window. In order to seal the frame 10 with the window sash WS and the sill S, the outer channel of the frame 10 may be filled with soft sealing material 62 such as felt.

The construction described has another important advantage in that it is an easy matter to reverse the ventilator casing so that the inlet opening 28 is in the upper quadrant of the casing and the outlet opening 29 is in the lower quadrant. This change is accomplished merely by unscrewing the screws 13, removing the bearings 12, reversing the casing and refastening the bearings in place. This position of the casing is desirable in the winter time since the casing can be adjusted to bring the inlet opening partially or fully to the inner side of the frame and the outlet opening now being directed downwardly, and aided by adjusting the vanes 32, blows the room air over the radiator located beneath the window and thereby materially increases the efficiency of the radiator.

This invention provides an improvement in a window ventilator. It is understood that various modifications in structure, as well as changes in mode of operation, assembly, and manner of use, may and often do occur to those skilled in the art, especially after benefiting from the teachings of an invention. This disclosure illustrates the preferred means of embodying the invention in useful form.

What is claimed is:

1. A ventilator for air circulation adapted to be inserted in an open window and the like and comprising a rectangular frame of a thickness

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approximately a window frame having a rectangular opening therein to form horizontal and vertical sides, sealing means carried by the frame around the inner edges of the frame opening, a casing having end walls, means carried by the vertical sides of the frame and casing rotatably mounting the casing within the frame openings with the sealing means engaging the casing, the casing having a cylindrical periphery and at least one inlet opening and at least one outlet opening within 180° of the cylindrical periphery of the casing and the remainder being closed, the casing having a cylindrical periphery to enable the casing to be rotated within the frame opening to bring each opening to the other side of the frame; and blower means secured within the casing including at least one blower housing having an inlet connected with the inlet opening in the casing and an outlet connected with the outlet opening in the casing, a motor, and a blower for said housing and connected with the motor so as to be driven thereby.

2. A frame for a rotatable ventilator casing to be inserted in a window or the like comprising an open frame having horizontal and vertical sides, inwardly directed channels on each side thereof and the channels in the vertical sides being continuous for the length thereof, the vertical sides having inner faces, sealing means carried in the channels through the length thereof and projected inwardly of the opening, and a bearing removably carried by each inner face of the vertical sides of the frame and spaced from the channel therein.

3. A frame for a ventilator as in claim 2 in which the sealing means includes a channel member slidable in the channels of the frame, spring means projecting the channel members inwardly of the frame opening, and felt carried by the channel members.

4. A ventilator for air circulation adapted to be inserted in an open window and the like and sealed around the edges of the window comprising a casing having end walls, means rotatably mounting the casing upon the end walls thereof, the casing having a cylindrical periphery and at least one inlet opening and at least one outlet opening, the inlet and outlet openings being located within 180° of the cylindrical periphery of the casing and the remainder being closed, the casing to be rotated to bring each opening to the inner or outer side of the window; blower means secured within the casing including at least one blower housing having an inlet connected with the inlet opening in the casing and an outlet connected with the outlet opening in the casing, a motor, and a blower for said housing connected with the motor so as to be driven thereby; a partition extending the length of the interior of the casing between the end walls thereof and between spaced points of the peripheral wall of the casing, the partition having an outlet opening for said blower housing, and the blower means being secured immovably to at least one of the parts including the partition and the casing.

5. A ventilator as in claim 4 including a filter extending the length of the interior of the casing between the end walls thereof and between the peripheral walls of the casing and over the inlet opening of the casing.

6. A ventilator as in claim 4 including the outlet opening being large enough to pass the partition with the blower means attached thereto into the casing.

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7. A ventilator for air circulation adapted to be inserted in an open window and the like and sealed around the edges of the window comprising a casing having end walls, means rotatably mounting the casing upon the end walls thereof, the casing having a cylindrical periphery and at least one inlet opening and at least one outlet opening, the inlet and outlet openings being located within 180° of the cylindrical periphery of the casing and the remainder being closed, the casing to be rotated to bring each opening to the inner or outer side of the window; and blower means secured within the casing including at least one blower housing having an inlet connected with the inlet opening in the casing and an outlet connected with the outlet opening in the casing, a motor, and a blower for said housing connected with the motor so as to be driven thereby; a pocket recessed in each end wall of the casing forming a hand hole, a rheostat within the casing, and a rheostat adjusting knob secured within the pocket and connected with the rheostat.

8. A ventilator for air circulation adapted to be inserted in an open window and the like and sealed around the edges of the window comprising a casing having end walls, means rotatably mounting the casing upon the end walls, the casing having a cylindrical periphery and at least one inlet opening and at least one outlet opening, the inlet and outlet openings being located within 180° of the cylindrical periphery of the casing and the remainder being closed, the casing to be rotated to bring each opening to the inner or outer side of the window; blower means secured within the casing including at least one blower housing having an inlet connected with the inlet opening in the casing and an outlet connected with the outlet opening in the casing, a motor, and a blower for said housing connected with the motor so as to be driven thereby; a shield extending inwardly from the casing adjacent to the edge of the inlet opening in the casing, a filter extending the length of the interior of the casing between the end walls thereof and between spaced points of the peripheral wall of the casing and over the inlet opening of the casing, the filter engaging the shield and insertable through the inlet opening of the casing.

9. A ventilator for air circulation as in claim 7 including a grilled panel mounted in the inlet opening of the casing for opening of the grilled panel to replace the filter.

10. A ventilator for air circulation adapted to be inserted in an open window and the like and comprising a rectangular frame having a rectangular opening therein, sealing means carried by the frame around the inner edges of the frame opening, a casing having end walls, means carried by the frame and the end walls of the casing rotatably mounting the casing within the frame opening with the sealing means engaging the casing, the casing having a cylindrical periphery and at least one inlet opening and at least one outlet opening within 180° of the cylindrical periphery of the casing and the remainder being closed, the casing having a cylindrical periphery to enable the casing to be rotated within the frame opening to bring each opening to the other side of the frame; and blower means secured within the casing including at least one blower housing having an inlet connected with the inlet opening in the casing and an outlet connected with the outlet opening in the casing,

a motor secured to said blower housing, a blower for said housing and connected with the motor so as to be driven thereby, and the blower housing secured within the casing.

11. A ventilator for air circulation adapted to be inserted in an open window and the like and comprising a rectangular frame having a rectangular opening therein, sealing means carried by the frame around the inner edges of the frame opening, a casing having end walls, means carried by the frame and the end walls of the casing rotatably mounting the casing within the frame opening with the sealing means engaging the casing, the casing having a cylindrical periphery and at least one inlet opening and at least one outlet opening within 180° of the cylindrical periphery of the casing and the remainder being closed, the casing having a cylindrical periphery to enable the casing to be rotated within the frame opening to bring each opening to the other side of the frame; and blower means secured within the casing including a pair of blower housings each having an inlet connected with the inlet opening in the casing and an outlet connected with the outlet opening in the casing, the blower housings being secured to the casing, a motor located between the blower housings and secured thereto, and a blower for said housing and connected with the motor so as to be driven thereby.

12. A ventilator for air circulation adapted to be inserted in an open window and the like and comprising a rectangular frame having a rectangular opening therein, sealing means carried by the frame around the inner edges of the frame opening, a casing having end walls, means carried by the frame and the end walls of the casing rotatably mounting the casing within the frame opening with the sealing means engaging the casing, the casing having a cylindrical periphery and at least one inlet opening and at least one outlet opening within 180° of the cylindrical periphery of the casing and the remainder being closed, the casing having a cylindrical periphery to enable the casing to be rotated within the frame opening to bring each opening to the other side of the frame, a partition extending the length of the interior of the casing between the end walls thereof and between spaced points of the peripheral wall of the casing; and blower means secured within the casing including at least one blower housing having an inlet connected with the inlet opening in the casing and an outlet connected with the outlet opening in the casing, a motor secured to said blower housing, said blower housing being secured to the partition and casing, and a blower for said blower housing and connected with the motor so as to be driven thereby.

13. A ventilator for air circulation adapted to be inserted in an open window and the like and comprising a rectangular frame having rectangular opening therein, sealing means carried by the frame around the inner edges of the frame opening, a casing having end walls, means carried by the frame and casing rotatably mounting the casing within the frame opening with the sealing means engaging the casing, the casing having a cylindrical periphery and at least one inlet opening and at least one outlet opening

within 180° of the cylindrical periphery of the casing and the remainder being closed, the casing having a cylindrical periphery to enable the casing to be rotated within the frame opening to bring each opening to the other side of the frame; and blower means secured within the casing including at least one blower housing having an inlet connected with the inlet opening in the casing and an outlet connected with the outlet opening in the casing, a motor, and a blower for said housing and connected with the motor so as to be driven thereby; a pocket recessed in each end wall of the casing forming a hand hole, a rheostat secured within the casing and connected with the motor, and an adjusting knob within a pocket and connected with the rheostat.

14. A ventilator for air circulation adapted to be inserted in an open window and the like and comprising a rectangular frame having a rectangular opening therein, sealing means carried by the frame around the inner edges of the frame opening, a casing having end walls; means carried by the frame and casing rotatably mounting the casing within the frame opening with the sealing means engaging the casing including a removable bracket carried by each side edge of the frame and shaft means secured to one of the parts including the casing and the bracket and rotatable in the other; the casing having a cylindrical periphery and at least one inlet opening and at least one outlet opening within 180° of the cylindrical periphery of the casing and the remainder being closed, the casing having a cylindrical periphery to enable the casing to be rotated within the frame opening to bring each opening to the other side of the frame; and blower means secured within the casing including at least one blower housing having an inlet connected with the inlet opening in the casing and an outlet connected with the outlet opening in the casing, a motor, and a blower for said housing and connected with the motor so as to be driven thereby.

15. A ventilator as in claim 14 in which the shaft means is secured to each end wall of the casing and rotatable in the bracket.

16. A ventilator as in claim 14 in which the sealing means is continuous across the end walls of the casing, and the bracket is carried upon the inner face of each side edge of the frame whereby the mounting means for the casing is spaced from the sealing means.

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