

Aug. 15, 1944.

W. E. WILLEY

2,355,836

EXHAUST FAN

Filed Aug. 29, 1941

2 Sheets-Sheet 1

Fig. 1.

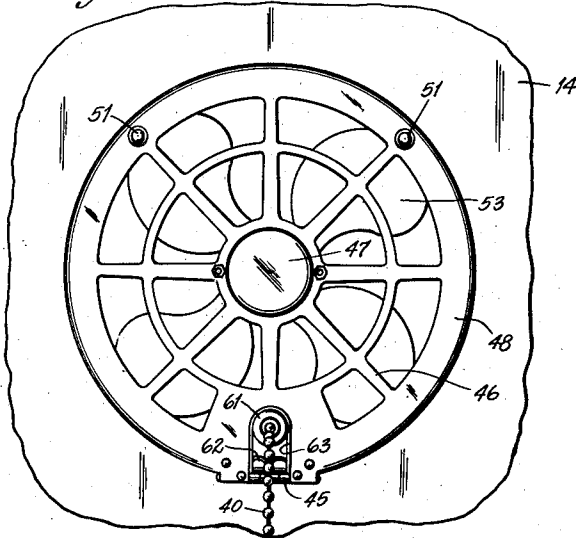


Fig. 2.

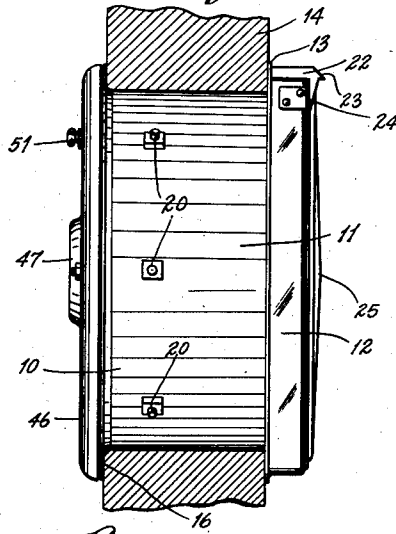


Fig. 3.

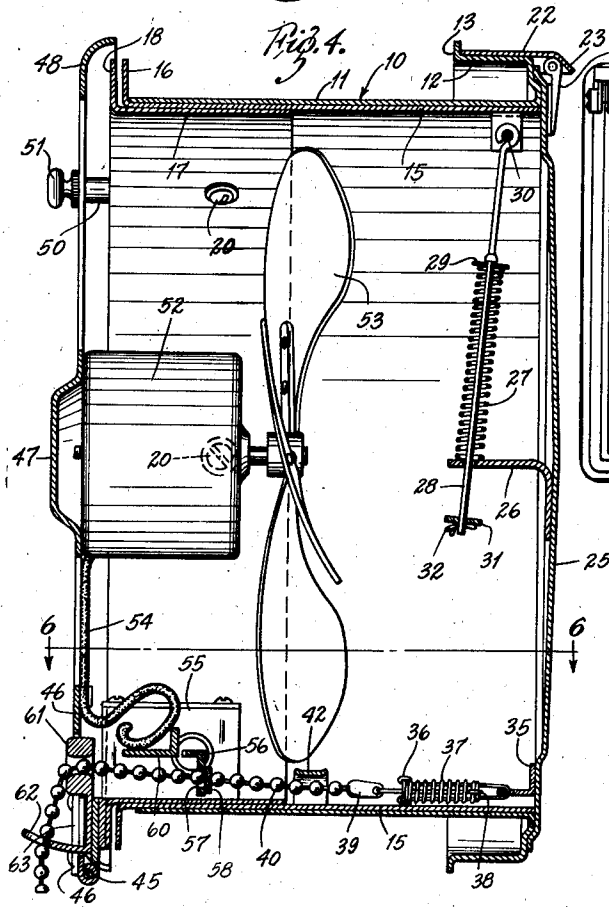
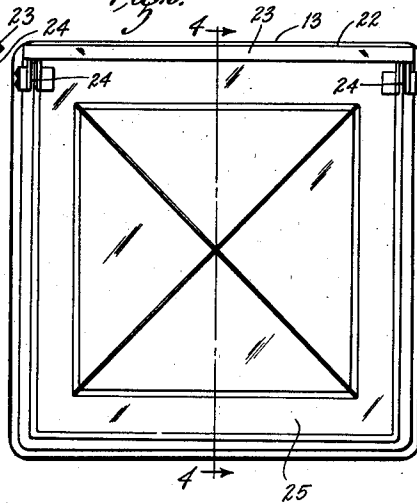


Fig. 3.



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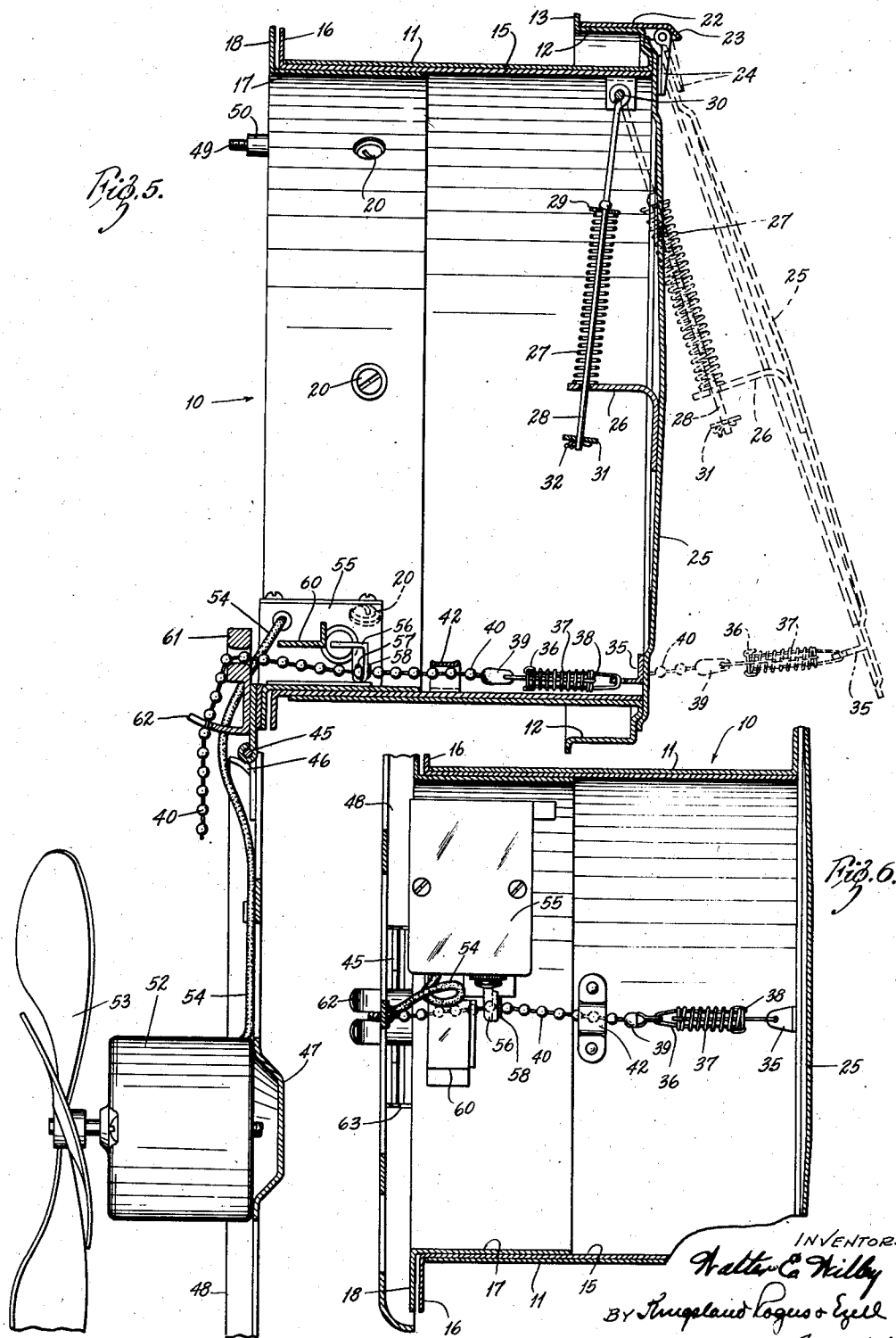
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2 Sheets-Sheet 2



UNITED STATES PATENT OFFICE

2,355,836

EXHAUST FAN

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Emerson Electric Mfg. Company, St. Louis, Mo.,
a corporation of Missouri

Application August 29, 1941, Serial No. 408,697

2 Claims. (Cl. 98—116)

The present application relates to an exhaust fan.

In general the fan includes a tubular casing or conduit adapted, for instance, to be disposed within and passing through a wall of a building. Preferably this conduit is telescopic.

At the outer end of the conduit is located a door or louvre normally springable outwardly to open position. On the inner end of the conduit is fastened a grill having mounted thereon a fan motor and a fan. This fan motor is connected to a switch. A chain which controls the opening of the outer door likewise controls the operation of the switch.

Among the objects of the invention is to provide a fan of this kind having a conveniently disposed switch and a control member therefor, together with a door or louvre, which door or louvre is also controlled by the control member. Further objects include the desirable mechanism for carrying out the foregoing broader objects.

It is also an object of the invention to provide an exhaust fan having a fan at one end, preferably mounted on a hinged grill with a manually controlled outer door, particularly wherein the control means for the said door operates the switch for the fan.

A further object is to provide a fan of this kind wherein the fan and motor may be withdrawn to a servicing position without requiring disconnection of the power lines.

In the drawings:

Fig. 1 is an inside elevation of the fan;

Fig. 2 is a side elevation;

Fig. 3 is an outside elevation;

Fig. 4 is a vertical section on the line 4—4 of Fig. 3;

Fig. 5 is a vertical section similar to Fig. 4, but with the grill shown open; and,

Fig. 6 is a section on the line 6—6 of Fig. 4.

The fan includes a casing generally indicated at 10. This casing is made up of an outer shell 11 having at its outer end an upwardly and backwardly extending flange 12. The portion 11 is cylindrical, but the portion 12 is square in the preferred design. The portion 12, in turn, has a flange 13 that is brought up against the outer surface of the wall 14.

An inner telescopic shell portion 15 is open at its outer end and is provided with a flange 16 at its inner end that is adapted to engage against the inside surface of the wall 14. Within the inner shell 15 is a shorter cylindrical shell 17 having a flange 18 extending adjacent thereto. The several telescopic shells are adjustably secured to-

gether by suitable bolts 20. These bolts may operate in slots to provide telescoping.

Above the upper surface of the outside flange 12 is a strip 22 having a slight overhang 23. Hinges 24 support a louvre or door 25 on the ledge 22. This door is shaped to cover the outside of the casing 10, and for appearance is preferably made square to cover the entire outer surface of the fan enclosure.

A bracket 26 is located on the inner surface of the door 25 and provides means to receive a spring 27 for normally urging the door 25 open. The spring surrounds a rod 28 and abuts a washer 29 on the rod. The spring is put under compression between the bracket 26 and the washer. The rod is pivoted at 30 to the inner surface of the shell 15. Its outer end is provided with a washer 31 held by cotter pin 32, which acts as a safety limit upon the opening movement of the door.

An additional bracket 35 is secured to the inner surface of the door 25 adjacent to the bottom of the casing. A wire clip 36 passes through an opening in the bracket 35 and holds a coil spring 37 against movement toward the inside end of the fan. A similar clip 38 is threaded from the opposite direction to engage the spring at its other end and, in turn, is linked to end 39 of a chain 40. The clip mechanism and chain are guided by an eye bracket 42 secured to the bottom of the inside surface of the shell 15. It provides resilience in the connection between the chain and the door, especially to insure operation of the switch as will be described.

A hinge 45 has one plate attached to the inner flange 18 at the bottom thereof. The other plate of the hinge is attached to a grill 46 having a central portion 47 and an outer rim 48 with open-work between. The grill 46 swings on its hinges up across the inner end of the assembled casing 10, and engages over screws 49 and against spacer 50 around the screws. Thumb nuts 51 engage the screws outside the grill to secure the grill in its upper position.

The grill has mounted on its center portion 47 a motor 52 operating a fan 53. A flexible power connection 54 leads from the motor to a switch box 55 secured to the inner surface of the short shell 17. The switch in the switch box has an operating arm 56 extending from one end thereof. This switch operating arm is normally urged to pivot toward the outer end of the casing in which position it closes the switch to put the fan in circuit. Of course, a suitable power connection is provided into the switch. The switch operating arm has a hole 57 through it, through which hole

passes the chain 40. The chain, in turn, is provided with a disc 58 incapable of passing through the hole 57.

An L flanged bracket 60 extends from the end of the switch casing 55 over the chain into the surface of the shell 17. A bracket 61 with an eyelet to receive the chain, and a fork 62 to hook the chain, is secured to the fixed plate of the hinge 45. The movable plate of the hinge and the grill are cut away at 63 to permit opening of the grill.

The fan is installed by fitting the outer shell 10 into a hole in the wall 14 from the outer surface thereof until the flange 13 fits tightly against the wall. The shell 15 is then telescoped into the outer shell from the inside wall surface. The shorter shell 17 is then located so as to provide any necessary spacing to accommodate the grill against the wall. The switch wire is connected to a power source.

With the grill in its closed position as shown in Fig. 4, a user draws the chain 40 out of the notch 62 in the bracket 61 so that the spring 28, by forcing the door 25 open, draws the chain outwardly. This immediately withdraws the disc 58 from the switch arm 56 so that the switch functions to start the fan during the first part of movement of the chain. The door may move to its maximum open position limited by the washer 31 or to an intermediate position obtained by rehooking the chain in the notch 62 as shown in Fig. 5. The fan thereupon operates to exhaust air from within the building to the outside through the door 25.

To service the fan, the nuts 51 are removed, and the grill 46 swings downwardly to the position of Fig. 5. This does not alter the condition of the switch, which may remain off with the door 25 closed. Consequently, no disconnecting of wires is required for the servicing. Of course, the chain may be loosened to start the motor during test, but as the chain is behind the grill when the latter is open, this cannot happen inadvertently to cause damage.

It will be seen that there has been provided a simple and sturdy exhaust fan having means to accomplish the objective set forth.

What is claimed is:

1. In a fan mechanism, a conduit adapted to pass from an inner surface to the outer surface of a wall, and a door hinged to said conduit at the upper edge of the outer portion thereof, spring means to urge the door into open position, a chain, means yieldingly connecting one end of the chain to the bottom of the door whereby upon drawing the chain toward the inner end of the conduit the door may be closed against its spring, a bracket on the inner end of the conduit having means to engage the chain to limit displacement thereof, a fan within a conduit, a switch for the fan, a switch arm for the switch movable in the direction of displacement of the chain for opening and closing the door, said switch arm being movable between its operating position through a distance a fraction of the distance the lower part of the door moves between its open and closed positions, a member on the chain engageable with the switch arm to hold the same in one position when the door is closed, said member being adapted to release the switch arm during the first part of the movement of the door so that the switch can close and the fan may start as soon as the door is substantially open.

2. A fan mechanism including a fan support, a conduit and a door at one end thereof, means supporting the door for movement outwardly and inwardly from the conduit, a fan and a motor for the fan, a switch for controlling the motor, a flexible operating device connected to the door and extending back through the conduit, means urging the door toward open position, means to engage the operating device and hold the same to maintain the door closed, means biasing the switch into position to energize the motor, an operating member for the switch extending adjacent the flexible operating device between the door and the engaging means, means on the flexible operating device to engage the operating member as the door is closed, and to displace the same to deenergize the motor.

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