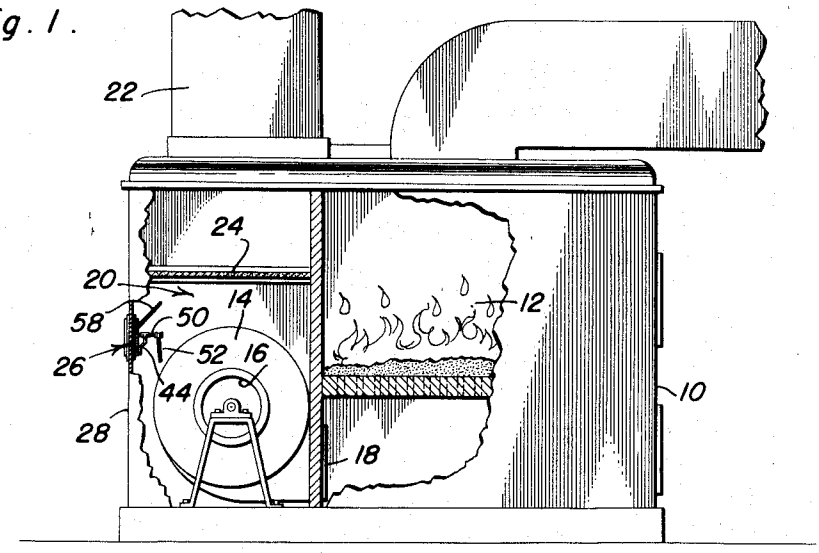
Sept. 26, 1950 O. C. NYSTUL 2,523,967

AIR PRESSURE RESPONSIVE SWITCH

Filed July 2, 1948

Fig. 1.



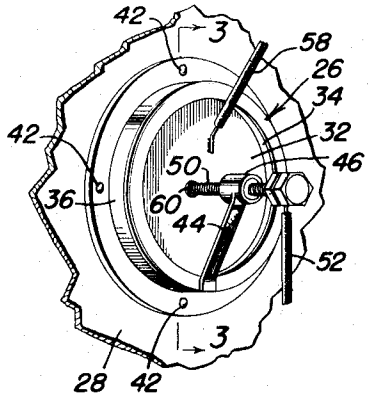


Fig. 2.

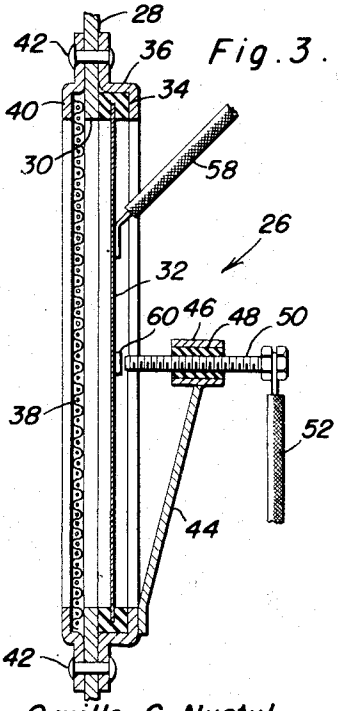
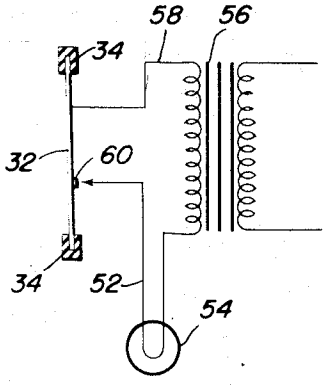


Fig. 3.

Fig. 4.



Orville C. Nystul
INVENTOR.

BY Clarence A. O'Brien and Harvey B. Jacobson
Attorneys

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AIR PRESSURE RESPONSIVE SWITCH

Orville C. Nystul, Fargo, N. Dak.

Application July 2, 1948, Serial No. 36,769

1 Claim. (Cl. 200—83)

1

This invention relates to new and useful improvements and structural refinements in furnaces such as are commonly employed for home heating purposes, and the like, and such as are equipped with fans or blowers for forcing air into the fire box for the purpose of increasing or enhancing combustion.

In such furnaces, a filter screen is usually provided for the purpose of preventing particles of foreign matter from gaining entry into the blower unit, but frequently the filter screen becomes obstructed and vacuum tends to form in the blower chamber, so that the purpose and function of the air blower are defeated.

It is, therefore, the principal object of the instant invention to eliminate this disadvantage, this being achieved by providing an alarm for warning the operator of the furnace as to the presence of obstructions in the filter screen, so that the operator may, in proper time, remove and clean the screen, thus assuring efficient operation of the furnace unit.

An important feature of the invention resides in the means for actuating the alarm, said means being responsive automatically to the presence of decreased air pressure within the blower chamber with respect to the pressure of the atmosphere.

An additional feature of the invention lies in the provision of means for adjusting the alarm actuating means, whereby the alarm is energized as soon as the air pressure in the blower chamber falls to a predetermined limit.

One of the advantages of the invention lies in its simplicity of construction and in its convenience of installation in furnaces of various sizes and types.

With the above more important objects and features in view, and such other objects and features as may become apparent as this specification proceeds, the invention consists essentially of the arrangement and construction of parts as illustrated in the accompanying drawings, in which:

Figure 1 is an elevational view of a furnace, partially broken away so as to reveal the invention in situ therein;

Figure 2 is a perspective view of the invention;

Figure 3 is a cross-sectional view, taken substantially in the plane of the line 3—3 in Figure 2; and

Figure 4 is a wiring diagram of the electrical components used in the invention.

Like characters of reference are employed to designate like parts in the specification and throughout the several views.

2

Referring now to the accompanying drawings in detail, the reference character 10 designates generally a furnace including a firebox 12, the latter being supplied with air under pressure by means of a suitable blower 14 having an inlet 16 and an exhaust 18, as will be clearly apparent.

The blower 14 is usually disposed in a chamber 20 with which the furnace unit 10 is formed, air from the atmosphere being drawn into the chamber 20 through a suitable duct 22 and a suitable air filter 24 being provided in the chamber 20 between the duct 22 and the blower 14, as is shown in Figure 1.

The invention resides in the provision of an alarm designated generally by the reference character 26, the same preferably being mounted in one wall 28 of the chamber 20 which wall is formed with a substantially circular opening 30, indicated in Figure 3.

A thin, metallic diaphragm 32, mounted in a circumferentially extending gasket 34 of insulating material, is secured to the inner surface of the wall 28 by means of an annular retainer 36, the configuration of the latter being clearly apparent from the accompanying drawings. It is to be noted that the diaphragm 32 covers the opening 30 in the wall 28, and a foraminous protector assuming the form of a screen 38 also covers the opening 30 but is disposed exteriorly with respect to the wall 28, while the diaphragm 32 is disposed interiorly with respect to the wall, as is best shown in Figure 3. The screen 38 is held in position by means of a further, annular retainer 40, the two retainers 36, 40 being secured to the respective inner and outer surfaces of the wall 28 by common rivets, or the like 42.

A radially extending arm or bracket 44 is secured at the outer end thereof to the retainer 36, the inner end of the arm or bracket 44 being formed with a boss 46 which, in turn, is provided with a screw-threaded insulating insert 48 accommodating an adjustable contact screw 50. This screw is electrically connected by means of a suitable conductor 52 to a signaling device 54 such as a bell, a lamp, or the like, the latter, in turn, being in circuit with one pole of the secondary winding of a step-down transformer 56. The remaining pole of the secondary winding of this transformer is connected by means of a conductor 58 to the diaphragm 32, substantially as shown.

A contact point 60 is provided substantially at the center of the diaphragm 32, being engageable by the shank of the screw 50 which thus constitutes a coacting contact point, the two contact

points providing what may be referred to as a normally open switch. That is to say, when the blower **14** draws air through the screen **24** in the normal manner, the contacts **60**, **50** are separated and current does not flow through the conductors **52**, **58**, as will be clearly apparent.

However, when the screen **24** becomes obstructed, partial vacuum is created in the chamber **20**, and atmospheric pressure on the outer surface of the diaphragm **32** causes the contact point **60** to engage the screw **50**, thereby completing the electric circuit through the switch formed by the two contacts and energizing the signaling means **54**. In this manner, the operator of the furnace is warned to the effect that the screen **24** requires cleaning.

Needless to say, the adjustment of the screw **50** in the insulated bushing **48** facilitates setting of the alarm mechanism so that it becomes actuated when the air pressure in the chamber **20** falls to a certain limit with respect to atmospheric pressure, and the purpose of the screen **38** is, of course, to protect the diaphragm from possible external injury or damage.

It is believed that the advantages and use of the invention will be clearly understood from the foregoing disclosure and accordingly, further description thereof at this point is deemed unnecessary.

While in the foregoing there has been shown and described the preferred embodiment of this invention, it is to be understood that minor changes in the details of construction and arrangement of parts may be resorted to without departing from the spirit and scope of the invention as claimed.

Having described the invention, what is claimed as new is:

In an air pressure responsive switch, the combination of a frame adapted for mounting in an opening in a wall and including inner and outer annular members rigidly secured together, an annular gasket of insulating material supported by the inner frame member and provided with an internal annular slit, a metallic diaphragm having its marginal edge portions secured in said slit and having an electric conductor connected thereto, an inwardly extending radial arm secured at the outer end thereof to the inner frame member and provided at its inner end with a tubular boss substantially coaxial with said diaphragm, an internally screw-threaded bushing of insulating material mounted in said boss, an adjustable contact screw provided in said bushing and having a second electric conductor connected thereto, a contact point provided on said diaphragm for engagement with said screw to close an electric circuit through said conductors, and a protective screen mounted in the outer frame member in spaced relation to said diaphragm.

ORVILLE C. NYSTUL.

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