

Dec. 30, 1952

W. P. AYERS

2,623,482

PRESSURE-RELIEF DOOR FOR HEATING UNITS

Filed Jan. 25, 1951

Fig. 1

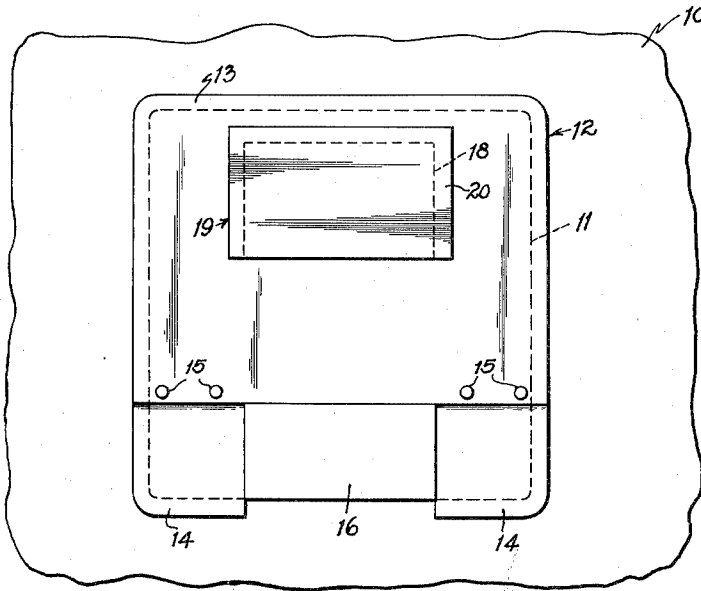


Fig. 2

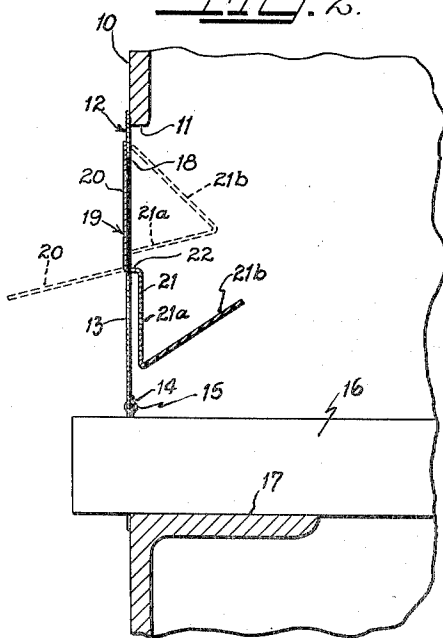
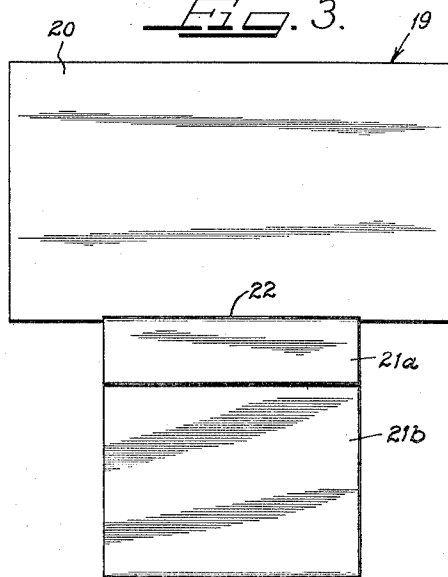


Fig. 3



Inventor
WILLIAM P. AYERS

Charles H. Redman Att.

UNITED STATES PATENT OFFICE

2,623,482

PRESSURE-RELIEF DOOR FOR HEATING
UNITS

William P. Ayers, Lombard, Ill.

Application January 25, 1951, Serial No. 207,751

3 Claims. (Cl. 110-173)

1

This invention relates to a heating unit door construction and more particularly is directed to a door device for furnaces, boilers, or the like, which is so constructed as to automatically relieve internal pressures developed therein, including explosions or the like.

In the usual construction of a furnace, boiler, or other heating unit, a manually operated door is provided through which to view the interior or to supply fuel thereto. Generally, these doors are of the swinging type held in a closed position by friction or by a latch arrangement. Quite frequently, through improper firing or for other reasons, an explosion of gases occurs. Such explosions force the furnace door to an open position thereby relieving the suddenly generated pressure. Unless the door is immediately closed, additional gases and even flames flow out through the open doorway. As a result, occupants of the building are endangered either by asphyxiation or by fire.

This invention is directed to the elimination of these dangers by providing a door which swings open to relieve pressure and thereafter immediately and automatically returns to a closed position.

Briefly described, my invention consists of a covering shield to be applied over the open doorway of a furnace, boiler, or other heating unit. Should a heating unit such as a gas, oil or other burner be installed, an opening therefor is provided through the shield. Another opening for a doorway is also provided. In the latter opening is installed a door constructed according to the principles of this invention.

The door has an exterior opening covering portion and an offset counter-weight portion positioned within the heating unit. The offset acts as a fulcrum resting on the bottom ledge of the doorway. By locating the counter-weight portion below the covering portion and the fulcrum, the door is normally maintained in a closed position. A thrust resulting from gas or other pressure in the heating unit against the covering portion of the door either partially or completely overcomes the weight of the counter-weight portion thereby effecting rotation of the door on its fulcrum and an opening of the doorway to relieve the pressure. In this manner, the doorway is opened only to the extent necessary for relief and closed again by the weight of the counter-weight portion.

In the event of a sudden explosive thrust, the door is fully rotated with the counter-weight portion striking the interior of the shield just

2

above the doorway. With the pressure relieved from the interior of the heating unit, the counter-weight portion rebounds backwardly to move and maintain the covering portion over the doorway. By this construction, the doorway is automatically opened and closed to regulate the venting of pressure from the heating unit.

It is, therefore, an important object of this invention to provide an automatic pressure vent for the interior of a heating unit.

Another object of this invention is the provision in a heating unit of a vent which relieves internal pressure therefrom and automatically closes when the pressure is relieved.

A still further object of this invention is the provision in a heating unit of a rotatable door normally maintained in a closed position by a counter-weight.

Yet another object of this invention is the provision of a door disconnectedly mounted in a doorway for swinging movement therein.

Other and further objects of the invention will become apparent to those skilled in the art from the following detailed description of the preferred embodiment of the invention as disclosed in the accompanying drawing, in which:

Figure 1 is a fragmentary view of a portion of a heating unit illustrating the applied shield and pressure-relief door of this invention;

Figure 2 is a cross-sectional view, with parts in elevation, taken along a vertical plane through the center of the construction shown in Figure 1; and,

Figure 3 is an enlarged rear view in elevation of the door construction illustrated in section in Figure 2.

It is intended that the pressure relief device of this invention be applied to a heating unit such as a furnace, boiler, or the like. However, from the following description it will be apparent that the device may be applicable to any construction in which internal pressures are to be relieved and after relief to again seal the interior thereof.

In Figure 1, there is illustrated a portion of a sidewall or face 10 of a heating unit having a doorway 11 from which the customary door has been removed. In place of the door is provided a covering shield 12. This shield may be of one-piece construction. However, as shown it comprises an upper section 13 and a lower section 14. The lower section 14 is of the inverted U-shape construction the upper portion of which is connected by rivets 15, 15 or the like to the rear face of the lower portion of the upper sec-

tion 13. Both of the downwardly extending legs of the lower section are offset forwardly to engage the face of the heating unit at the sides and below the doorway. The opening between the legs is sized to receive therethrough a burner device 16 which rests on a ledge 17, either as the bottom of the doorway or provided as an inward extension thereof. This two-piece construction effects greater strength and ease in varying the burner mechanism opening by replacing only the lower section.

A doorway 18, in the upper portion of the shield section 13, receives therein a door 19. As best shown in Figures 2 and 3, the door 19 has a doorway covering portion 20 and an inwardly offset counter-weight portion 21. The counter-weight portion includes a downwardly extending leg 21a and an angularly upward extending leg 21b forming a V-shape. Joining the doorway covering portion 20 and the downwardly extending leg 21a is an offset fulcrum 22 the bottom surface of which is arranged to freely rest on the lower edge of the doorway opening 18.

The legs of the counter-weight portion, being positioned below the fulcrum of the door, rock the door on its fulcrum to a position in which the portion 20 normally covers the doorway opening. It will be observed that both the fulcrum and the counterweight portion are narrower in width than either the doorway or the doorway covering portion. This arrangement permits ease of assembly by merely inserting the counter-weight portion through the doorway until the fulcrum rests on the bottom edge thereof. The doorway is thereby closed as shown in Figure 2.

When a pressure builds up within the interior of the heating unit and exerts a thrust against the inner face of the doorway covering portion 20 sufficient to overcome the weight of the counter-weight portion, the door rotates on its fulcrum to vent the pressure to the exterior. Should the pressure build up suddenly as by an explosion, the thrust exerted against the door forces it to a position illustrated by dotted lines in Figure 2. In this position the doorway is entirely opened until the end of the leg 21b strikes the shield just above the doorway 18. The legs 21a and 21b so extend from the fulcrum 22 that the space between the free end of leg 21b and the fulcrum is greater than the height of the doorway thereby insuring the striking of the shield by the counter-weight portion and limiting the rocking of the covering portion away from the doorway. Venting is still possible between the sides of the narrower counter-weight portion and the sides of the doorway when the door has been moved to a fully open position.

The force of striking the shield effects a rebounding of the counter-weight portion and a closing of the doorway. To the degree that the counter-weight portion is effective will depend the opening of the doorway for venting of the interior of the heating unit.

It will be observed that the shield is so constructed as to be rotated 180° should it be desirable to place the burner unit above the venting doorway. Although no fastening means are shown for attaching the shield to the heating unit any of the well-known means may be employed, such as rivets, bolts, or the like.

The invention has been described herein more or less precisely as to details, yet it is to be understood that the invention is not to be limited thereby, as changes may be made in the arrange-

ment and proportion of parts, and equivalents may be substituted, without departing from the spirit and scope of the invention.

The invention is claimed as follows:

1. In a heating unit having a doorway, a closure member for said doorway comprising a door portion, a counterweight portion normally extending below and away from said door portion, and an intermediate offset connecting said portions and being arranged to rest and fulcrum on an edge of the doorway to position said portions on opposite sides thereof, the door portion being rockable on said offset to positions covering and uncovering said doorway, and said counterweight portion normally maintaining said door portion in covering position and being narrower in width than the doorway for insertion therethrough with its free end being spaced from the fulcrum at a distance greater than the height of the doorway thereby limiting movement of the door portion away from the doorway.

2. In a heating unit having a doorway, a closure member for said doorway comprising a door portion, a counterweight portion having one leg normally extending below said door portion and another leg extending upwardly and away from said one leg, and an intermediate offset connecting said portions and being arranged to rest and fulcrum on an edge of the doorway to position said portions on opposite sides of the doorway, the door portion being rockable on said offset to positions covering and uncovering said doorway, and said counterweight portion normally maintaining said door portion in covering position with the free end of said another leg being spaced from the fulcrum at a distance greater than the height of the doorway whereby to strike the top of the doorway when the closure member is rocked on the fulcrum to limit movement of the door portion in an uncovering direction.

3. In a heating unit having a doorway, a closure member for said doorway comprising a door portion, a counterweight leg extending in opposed parallel relation to said door portion, an offset fulcrum connecting said door and leg, and another leg on said counterweight extending angularly upward from the first leg and terminating at a distance from the fulcrum greater than the height of the doorway, said fulcrum being arranged to rest on the lower edge of the doorway to position the door and counterweight on opposite sides of the doorway, said counterweight normally maintaining the door portion in covering position over the doorway and when the closure member is rocked on the fulcrum away from the doorway the end of said another leg striking the top of the doorway to limit movement of the door portion in an uncovering direction.

WILLIAM P. AYERS.

REFERENCES CITED

The following references are of record in the file of this patent:

UNITED STATES PATENTS

Number	Name	Date
123,252	Eldridge	Jan. 30, 1872
518,624	Olsen	Apr. 24, 1894
1,574,711	Steele	Feb. 23, 1926
1,783,418	Field	Dec. 2, 1930
2,004,948	Irsch	June 18, 1930
2,160,262	Engles	May 30, 1939
2,193,274	Eckman	Mar. 12, 1940