June 9, 1936. W. W. NORTON ET AL 2,043,808

GAS FURNACE

Filed Nov. 13, 1933

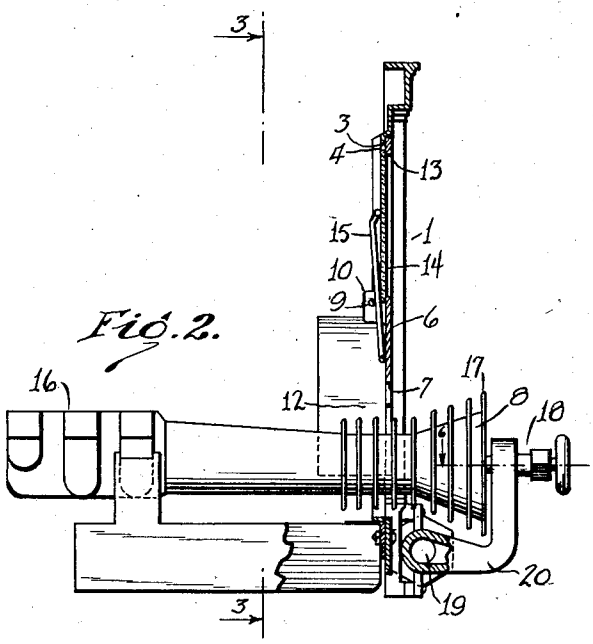


Fig. 2.

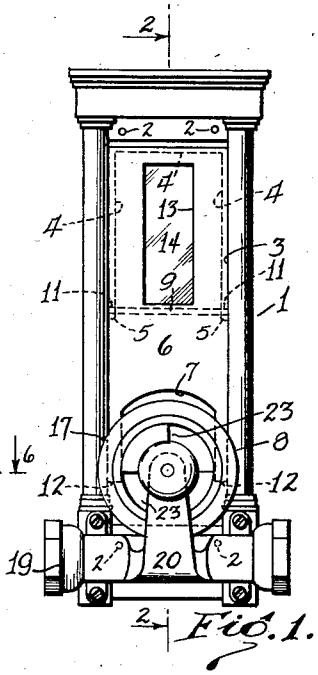


Fig. 1.

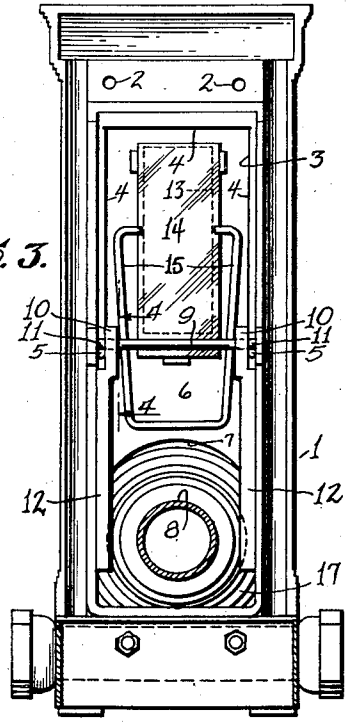


Fig. 3.

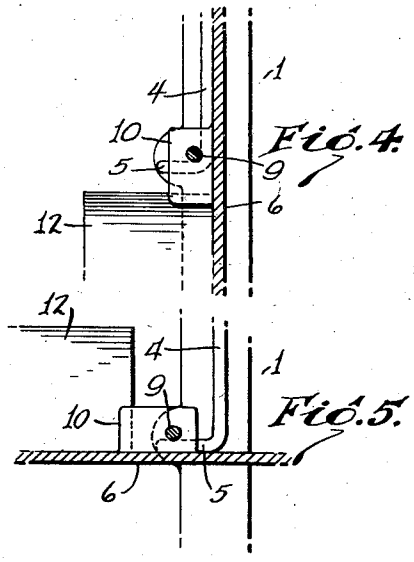


Fig. 4.

Fig. 5.

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Patented June 9, 1936 2,043,808

UNITED STATES PATENT OFFICE

2,043,808

GAS FURNACE

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Application November 13, 1933, Serial No. 697,820

3 Claims. (Cl. 110—173)

The present invention relates to improvements in gas furnaces, and the general object of the invention is to increase the general efficiency of the gas furnace. More particularly it is proposed to provide a door structure for a gas furnace with the door arranged in such a manner that it automatically opens in response to excess pressure within the furnace, and automatically closes as soon as the excess pressure ceases.

It is a further object of the present invention to provide a door structure of the character described, in which means are provided for yieldingly opposing the opening of the door in response to sudden pressures, such as gas explosions, whereby violent movements of the door are prevented.

It is a further object of the present invention to provide a novel hinging arrangement for a door which allows the latter to be easily locked in open position for giving ready access to the interior of the furnace.

It is a further object of the invention to provide a door structure which allows the entire door to be easily disconnected, and to be withdrawn through the door opening.

Further objects and advantages of our invention will appear as the specification proceeds.

The preferred form of the invention is illustrated in the accompanying drawing, in which

Figure 1 shows a front view of our furnace door and fuel feeding arrangement;

Figure 2 a vertical section taken along line 2—2 of Figure 1;

Figure 3 a vertical section taken along line 3—3 of Figure 2;

Figure 4 an enlarged detail view taken along line 4—4 of Figure 3; and

Figure 5 a similar detail view showing a door in a different position.

While we have shown only the preferred form of the invention, we wish to have it understood that various changes or modifications may be made within the scope of the claims hereto attached without departing from the spirit of the invention.

The door frame 1 which may be secured to the burner housing in any suitable way, as for instance, by means of screws passing through apertures 2 into the wall of the furnace housing, has a door opening indicated at 3, the upper portion of which is formed with an inwardly projecting flange 4 extending downwardly substantially halfway of the door opening and terminating at its lower end in rearwardly extending horizontal shelves 5. The door 6 is of substantially the same width as the door opening below the flange 4 so that the entire door may be passed through the door opening below said flange when the door is held in a substantially horizontal position. The door is formed with a large recess 7 in the bottom thereof for accommodating the Venturi tube indicated at 8, and the door is provided with a transverse pin 9 held in brackets 10 in spaced and parallel relation to the rear face of the door, the length of the pin corresponding to the width of the door, and the ends 11 of the pin which project beyond the brackets 10 serving as hinge pins.

These hinge pins are adapted to take bearing on the shelves 5 and the spacing of the hinge pins from the door is such that when the hinge pins are disposed on an intermediate portion of the shelves as in Figure 5, the door lies against the bottom faces of the shelves and the door is therefore locked in horizontal position. If the door is pulled outward from the position shown in Figure 5 to that shown in Figure 4, in which the hinge pins are disposed in the corner formed by the shelves 5 and the flanges 4, the door is adapted to be swung into the vertical position indicated in Figure 4. When the door is in vertical position it fills the door opening, and the edges of the upper section of the door lie against the flange 4, while the edges of the lower section of the door fit into the lower portion of the frame to substantially close the entire opening from side to side. The upper portion of the door, by which term is meant that portion above the hinge pin 9, is larger in surface area than the lower portion below the hinge pin, principally due to the fact that the recess 7 is provided in the lower portion. On the other hand, the lower portion has weights 12 secured thereto in the form of heavy flanges projecting rearwardly so that the weight of the lower portion of the door exceeds that of the upper portion, and the door is normally held in vertical position so as to fill the door opening. The recess 7 is such as to provide for a certain amount of space about the Venturi tube 8 for partial escape of gases formed in an explosion.

The upper portion of the door is preferably formed with a window opening 13 closed by the window 14, which is held in place by a spring 15 clamped between the inner face of the door and the pin 9.

The door as described thus far offers a number of advantages. In case an explosion takes place within the furnace, the recess 7 allows some of the excess gases to escape, while at the same

time the gases pressing against the door will swing the latter into horizontal position, the upper portion swinging outwardly, and the lower portion swinging inwardly due to the fact that the upper portion presents more surface to the gas pressure. The opening of the door, however, is not brought about violently since in opening the door the gas pressure has to overcome the resistance of the weights 12 so that the door movement is dampened, the response being sufficiently quick to allow the excess gases to be liberated, but at the same time being dampened sufficiently to prevent the door from going beyond an approximately horizontal position.

In operation the door is also very convenient. If access is desired to the interior of the furnace, it is merely necessary to push against the lower section of the door, and to pull down on the upper section until the door reaches a substantially horizontal position, whereupon the entire door is pushed back slightly as shown in Figure 5, and is automatically locked in horizontal position. For closing the door it is only necessary to pull forward on the door until the hinge pins reach the inner end of the shelves 5, whereupon the door will naturally swing into vertical position. If it is desired to remove the door altogether, the door is first swung into the position of Figure 5, and pushed back a little further until the hinge pins clear the shelves 5, whereupon the entire door may be withdrawn through the lower section of the door opening.

It will be noted that the entire structure is very simple, and particularly that separate hinge pins such as provided in conventional doors are avoided altogether, the entire hinge arrangement being formed integral with the door and the door frame respectively.

The Venturi tube extends through the opening 7 and is connected to the burner 16. A gas inlet pipe 19 has a branch 20 that carries the gas to a gas nozzle and valve indicated generally at 18. The gas passes from the nozzle and enters the Venturi tube.

We claim:

1. In combination, a door frame, a pair of horizontally disposed open bearing elements secured thereto and a door having horizontal hinge pins adapted to be removably received on the bearing elements, the bearing elements being constructed to allow the door to slide rearwardly thereon while the door is being held in a horizontal position, said door being held in a horizontal position after being moved rearwardly by the side edges of the door engaging with the under surfaces of the bearing elements.

2. In combination, a pair of spaced shelves, a pair of pins supported on the shelves and a door suspended from the pins and lying against the underfaces of the shelves for holding the door in horizontal position, the shelves having registering termination points allowing the door to swing into vertical position when the pins approach the termination points, and the shelves having registering flanges rising from their termination points to form stops for the pins and to serve as abutments for holding the door in vertical position.

3. In combination, a pair of spaced and alined angles, each having a horizontal leg and a vertical leg, and a door engageable with the outer and the bottom faces of the angles having hinge pins journaled in the corner of the angles whereby the door may be swung in either vertical or horizontal position and locked in one of said positions by advancing the pins on registering legs of the angles, the door being unbalanced for urging the door normally into vertical position.

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