May 3, 1949. F. B. SCANLON 2,469,082

DOOR OPERATED SAFETY DEVICE FOR OIL BURNING FURNACES

Filed July 9, 1946 2 Sheets-Sheet 1

Fig. 1.

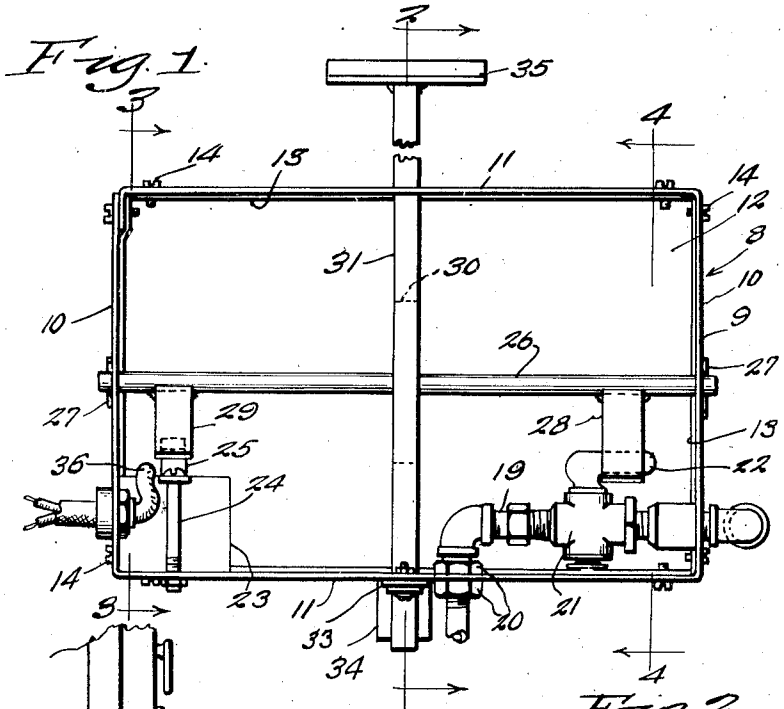
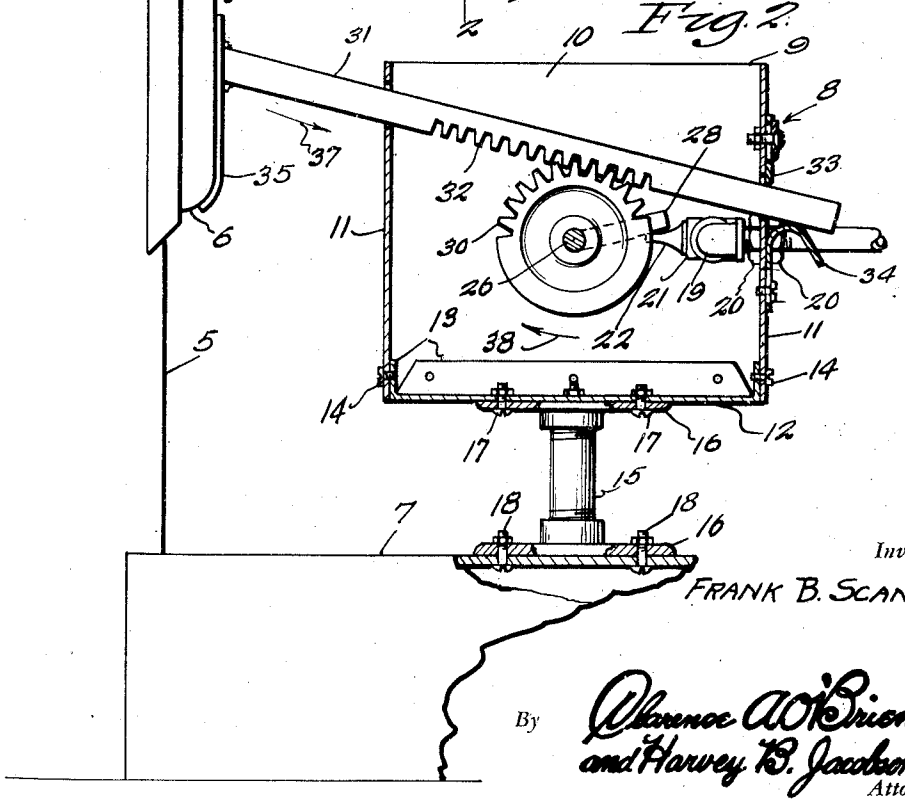


Fig. 2.



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Fig. 3.

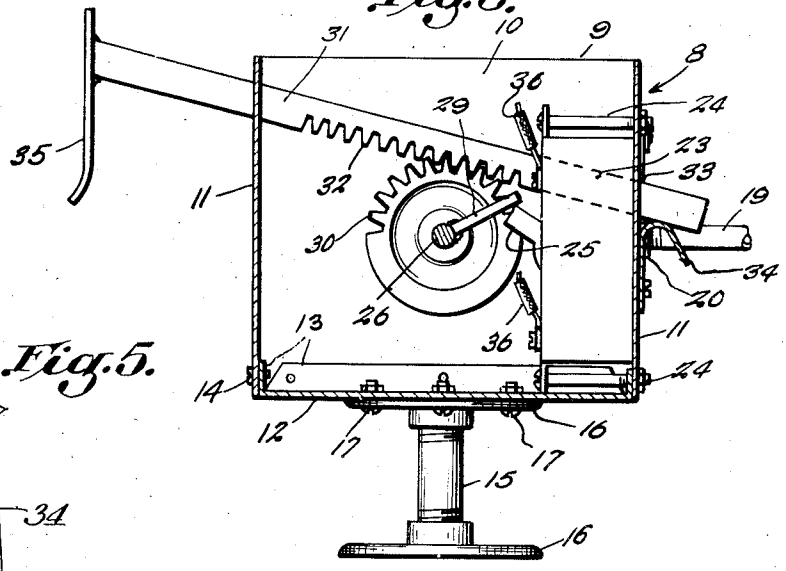


Fig. 5.



Fig. 4.

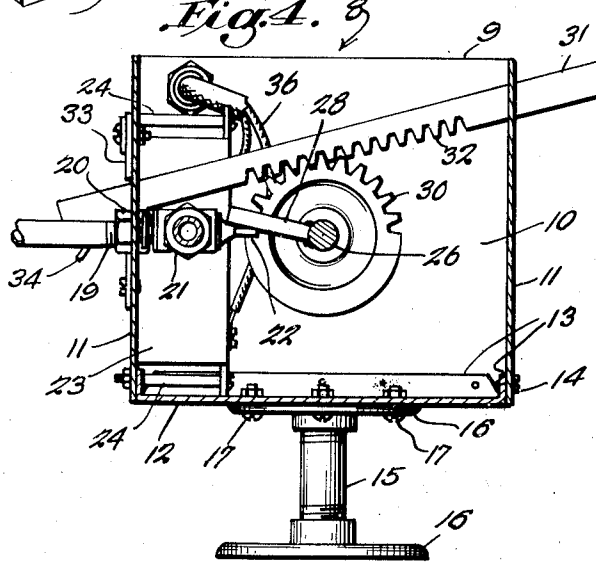
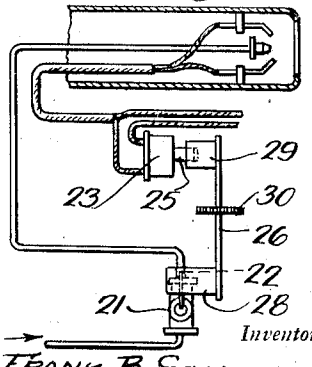


Fig. 6.



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Patented May 3, 1949

2,469,082

UNITED STATES PATENT OFFICE

2,469,082

DOOR OPERATED SAFETY DEVICE FOR OIL BURNING FURNACES

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Application July 9, 1946, Serial No. 682,409

6 Claims. (Cl. 158—42.1)

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This invention relates to new and useful improvements and structural refinements in safety devices, more specifically, an attachment for furnaces for simultaneously opening a switch controlling the igniting mechanism circuit and closing a valve regulating the fuel supply to a furnace. The primary object of the present invention is to provide a safety device of the character herein described, such as may be effectively and conveniently employed in association with oil burners, furnaces, and the like.

Such oil burners are usually provided with an electric igniting mechanism and it frequently occurs that this mechanism becomes temporarily inoperative while, at the same time, a supply of oil is being fed into the combustion chamber. When the operation of the igniting mechanism is restored, the excessive supply of oil combusts with considerable explosion which usually opens the fire door with which the furnace is provided.

The principal object of the invention is, therefore, to eliminate the disadvantages and particularly the danger arising from the operation of conventional burners as above outlined, this being accomplished by providing the herein described safety device, whereby the supply of fuel to the furnace is automatically discontinued and the supply of current to the igniting mechanism is simultaneously cut off, as soon as the opening of the fire door occurs.

A further object of the invention is to provide a safety device which is simple in construction and dependable in operation.

Another object of the invention is to provide a safety device which will operate for considerable periods of time without requiring servicing or other forms of attention.

An additional object of the invention is to provide a safety device which may be easily and conveniently reset.

A still further object of the invention is to provide a safety device which will readily lend itself to economical manufacture.

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

Figure 1 is a top plan view of the invention,

Figure 2 is a cross-sectional view, taken substantially in the plane of the line 2—2 of Figure 1,

Figure 3 is a cross-sectional view, taken substantially in the plane of the line 3—3 of Figure 1,

Figure 4 is a cross-sectional view, taken substantially in the plane of the line 4—4 of Figure 1,

Figure 5 is a group perspective view of the guide brackets used in conjunction with the present invention for the rack bar, and

Figure 6 is a diagrammatic view showing the

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present invention applied to the igniting mechanism, fuel line and circuit switch of a furnace.

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

Referring now to the accompanying drawings in detail, the invention is associated with an oil furnace of conventional design, the same being illustrated in part and designated by the reference character 5 and including a fire door 6. The combustion chamber 5 is usually also provided with an enclosure 7 which serves as a housing for some of its component parts.

The essence of the invention resides in the provision of a safety device designated generally by the reference character 8, the same embodying in its construction a box-like housing 9, formed by the side walls 10, 11 and the bottom 12.

The bottom 12 is provided with upturned flanges 13, whereby it may be conveniently secured to the side walls 10, 11 by means of suitable screws or rivets 14. The entire housing 9 is supported on a standard 15 consisting of a short length of pipe provided with the flanges 16. One of these flanges is secured by the bolts 17 to the underside of the bottom 12, while the remaining flange is mounted upon the aforementioned housing 7 and is secured thereto by means of further screws or bolts 18.

An oil conduit 19 passes through the housing 9, and consists of suitable lengths of pipe, nipples, etc., as will be clearly apparent from the accompanying drawings. The conduit passes through suitable apertures provided in the housing walls 10 and 11, and is rigidly secured in position by means of locked clamping nuts 20. It will be noted that the conduit includes a shut-off valve 21 operated by the wing 22, the purpose thereof being hereinafter more fully explained.

An electric switch 23 of conventional design is also mounted within the housing 9, being secured thereto by means of suitable clamping bolts 24. The switch 23 is operated by the flip arm 25, which will also be hereinafter more fully referred to.

A shaft 26 is rotatably journaled in the walls 10 of the housing and is retained in position therein by the cotter pins 27. A pair of laterally projecting actuating arms 28, 29 are welded or otherwise similarly secured to the shaft 26 in a spaced relationship, as is best shown in the accompanying Figure 1. It will be observed that the actuating arm 28 is adapted for operative engagement with the wing 22 of the valve 21, while the actuating arm 29 is similarly adapted for operative engagement with the flip arm 25 of the switch 23. The shaft 26 also carries a gear, more specifically, a toothed segment 30.

A push rod 31 is slidably positioned in suitable openings provided in the side walls 11 of

the housing 9, the end portions of the rod projecting from the housing and the mid-portion, that is, the portion of the rod disposed in the housing, being formed with a rack 32. This rack engages the aforementioned gear 30 and it will be apparent that the sliding of the rack will effect rotation of the shaft 26.

Suitable guide brackets 33, 34 are provided on the housing for the purpose of adjusting the alignment and spacing of the rack 32 with respect to the gear 30 and include slots for receiving fasteners carried by the housing.

An arcuate plate 35 is welded or otherwise secured to one projecting end of the rod 31, this plate being adapted to engage the aforementioned fire door 6, as is best shown in Figure 2. It will be noted that the push rod 31 is inclined at the proper angle, to facilitate effective engagement of the plate with the door.

When the invention is placed in use, one end of the oil conduit 19 is connected to the source of supply, while its remaining end communicates with the combustion chamber 5. Similarly, the switch 23 is in circuit through the medium of the conductors 36 with the igniting mechanism of the furnace, the latter not forming a component part of the instant invention and therefore, not being illustrated in the accompanying drawings.

The valve 21 is, of course, normally open and the switch 23 is normally closed, so that the burner may function in the conventional, well-known manner. If, as has been outlined in the opening paragraphs of this specification, the combustion chamber explodes and causes the opening of the fire door 6, the latter will automatically cause the push rod 31 to slide in the direction of the arrow 37 whereby the shaft 26 will be rotated in the direction of the arrow 38. Simultaneously, the actuating arms 28, 29 will actuate the wing 22 and the flip arm 25 of the valve 21 and the switch 23 respectively, thereby concurrently shutting off the source of oil and electricity to the burner and igniting mechanism of the furnace. It will be apparent that in this manner, the device will eliminate the previously experienced danger of subsequent explosions while the fire door 6 is open and the advantages of the invention become clearly apparent.

It will be also noted that the length of the toothed segment 30 with respect to the toothed rack 32 will provide an effective stop for restricting the sliding movement of the push rod 31. The device may be conveniently and quickly reset by simply sliding the push rod 31 to its original position adjacent the closed fire door, opening the valve 21 and closing the switch 23.

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 considered 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, combination and arrangement of parts may be resorted to without departure from the spirit and scope of the invention as claimed.

What I claim as my invention is:

1. In combination with an oil burning furnace having a closure, an igniting mechanism, and a fuel line; a safety device comprising a framework, an oscillatory member carried by the framework, a switch carried by the framework, a circuit for the igniting mechanism of the furnace including said switch, a valve carried by the framework for controlling the fuel line for the furnace, a pair of actuating members carried by the oscillatory member, one of said actuating members operatively engaging the switch, the other of said actuating members operatively engaging the valve, and means operatively connecting the oscillatory member to the closure for simultaneously opening the switch and closing the valve upon opening of the closure.

2. The combination of claim 1, wherein said means includes a pusher element adapted to engage the closure and connected to the oscillatory member.

3. The combination of claim 2 wherein said pusher element includes a rack bar.

4. In combination with an oil burning furnace having a closure, an igniting mechanism, and a fuel line; a safety device comprising a framework, a rotatable member carried by the framework, a switch carried by the framework, a circuit for the igniting mechanism of the furnace including said switch, a valve carried by the framework for controlling the fuel line for the furnace, a pair of actuating members fixed on the rotatable member, one of said actuating members operatively engaging the switch, the other of said actuating members operatively engaging the valve, means adapted to engage the closure for actuating the rotatable member, and means carried by the rotatable member for engaging the rotatable member actuating means, said switch being opened and the valve closed upon opening of the closure.

5. The combination of claim 4 wherein said rotatable member actuating means includes a rack bar, and said means carried by the rotatable member for engaging the rotatable member actuating means includes a gear fixed on said rotatable member.

6. In combination with an oil burning furnace having a closure, an igniting mechanism, and a fuel line; a safety device comprising a framework, a shaft rotatably carried by the framework, a pair of actuating members carried by the shaft, a switch carried by the framework, a circuit for the igniting mechanism including said switch, a valve carried by the framework for controlling the fuel line, one of said actuating members operatively engaging the switch, the remaining actuating member operatively engaging the valve, a rack bar adapted to engage the closure and slidably carried by the framework, and a gear fixed on the shaft for engaging the rack bar, said switch being opened and the valve closed upon opening of the closure.

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