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J. SKIBISKI

2,733,707

VIEWING DEVICE FOR COMBUSTION CHAMBERS

Filed Jan. 11, 1955

2 Sheets-Sheet 1

FIG. 3.

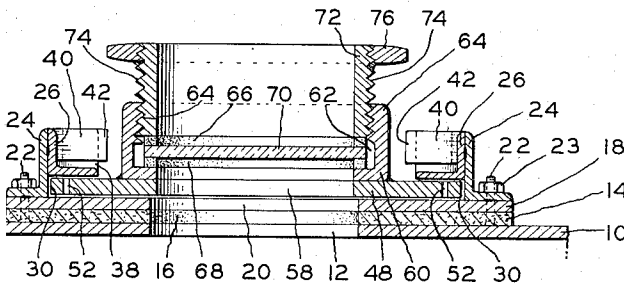


FIG. 1.

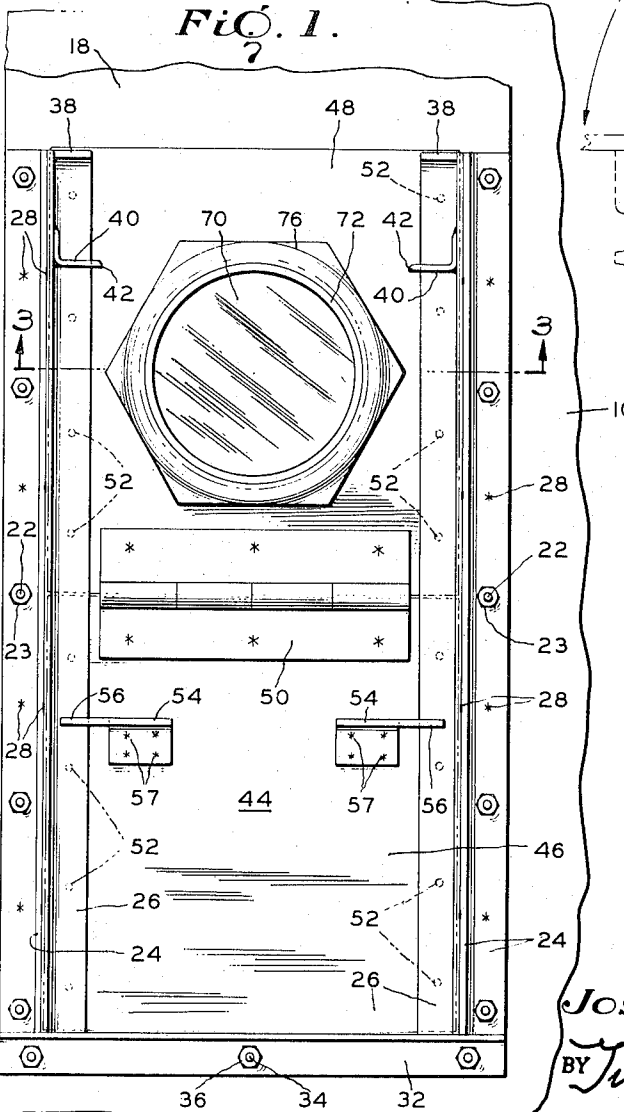
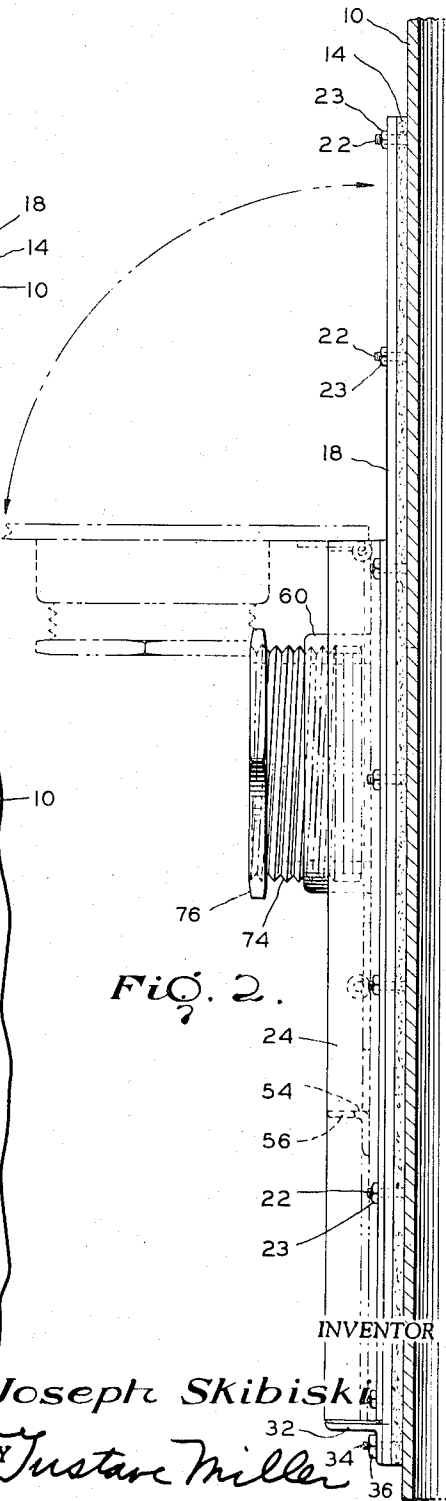


FIG. 2.



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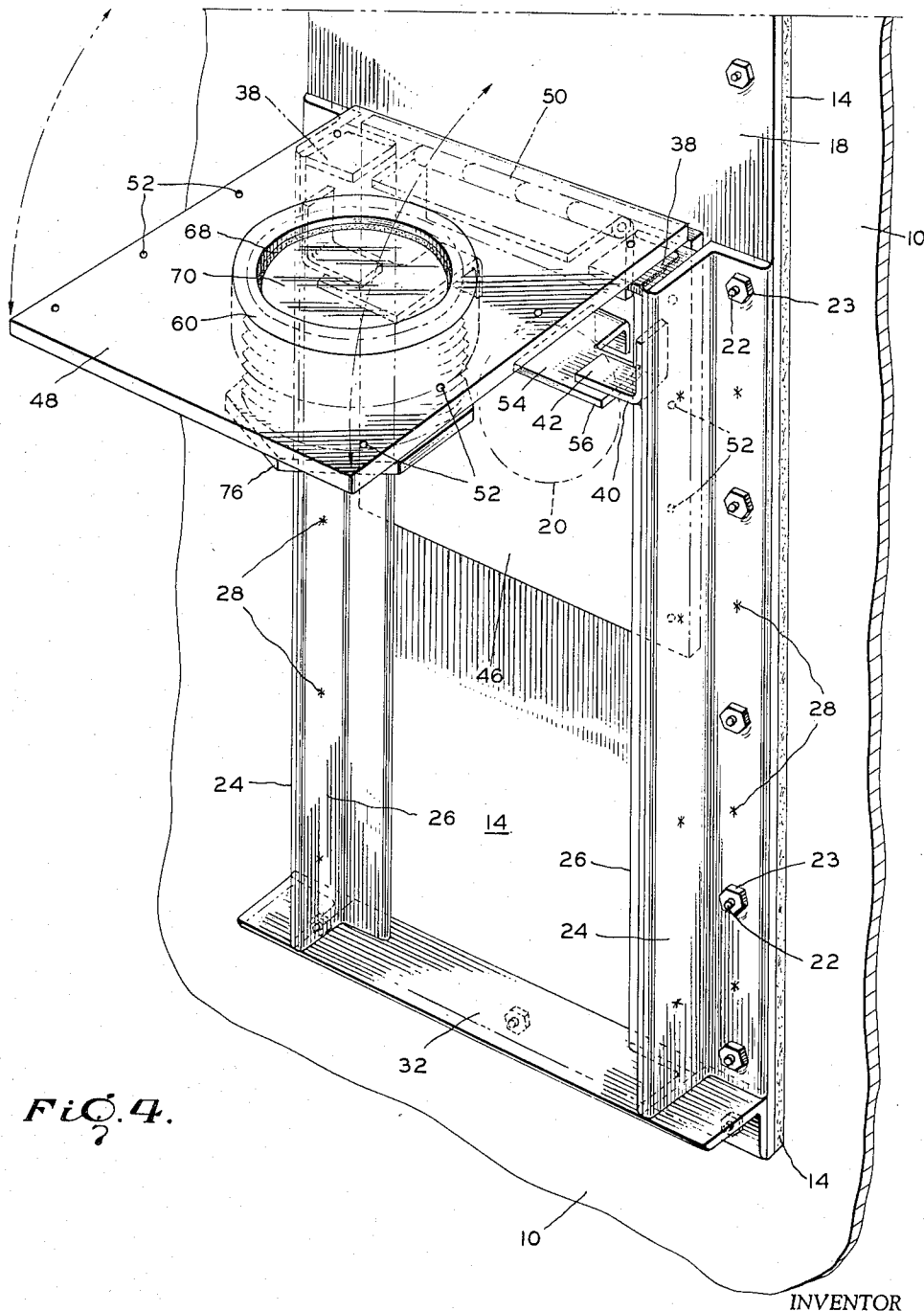
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2 Sheets-Sheet 2



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1

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VIEWING DEVICE FOR COMBUSTION CHAMBERS

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2 Claims. (Cl. 126—200)

This invention relates to a viewing device for observing the fire in a furnace or other combustion chamber without the necessity of opening the door of the furnace; and it more particularly relates to a viewing device assembly wherein the viewing device can be moved to a position where it is easily accessible for cleaning while the observation port of the furnace is maintained closed.

There have, heretofore, been various devices for attachment to a furnace or the like which were devised for the purpose of viewing the interior of the furnace without opening the furnace door. These prior devices have included both movable and non-movable viewing means. However, the non-movable devices have not been sufficient for the purpose since they could not be cleaned of accumulated soot and dirt deposits until the furnace was shut down. The prior movable devices have not been capable of being moved into a convenient cleaning position while still keeping the furnace closed and in operation. Furthermore, these prior devices were generally either so complex, unwieldy and expensive, both to install and maintain, that they proved to be economically infeasible, or they were not capable of being maintained in a sufficiently clean and efficient state throughout the operation of the furnace.

It is one object of the present invention, therefore, to provide a viewing device for combustion chambers wherein the viewer can be quickly and easily moved to a position for cleaning while the combustion chamber is still closed.

Another object of the present invention is to provide a viewing device for combustion chambers which consist of relatively few parts, and which is relatively simple and inexpensive.

Other objects of the present invention are to provide an improved viewing device for combustion chambers, of the character described, that is easily and economically produced, which is sturdy in construction, and which is highly efficient in operation.

With the above and related objects in view, this invention consists in the details of construction and combination of parts, as will be more fully understood from the following description, when read in conjunction with the accompanying drawings, in which:

Fig. 1 is a front elevational view of a viewing device embodying the present invention;

Fig. 2 is a side elevational view of the device of Fig. 1;

Fig. 3 is a cross-sectional view taken on line 3—3 of Fig. 1;

Fig. 4 is a perspective view of a portion of a combustion chamber showing the viewing device of Fig. 1 attached thereto, the viewer being shown in cleaning position.

Referring now in greater detail to the drawings, wherein similar reference characters refer to similar parts, there is shown a combustion chamber such as a furnace 10 which is provided with a port or opening 12, as best shown in Fig. 3. An asbestos sheet or pad 14 is placed to the furnace, this asbestos pad being in overlying rela-

2

tion to the port 12. The asbestos pad is provided with an opening 16 of similar size and shape as the port 12 and positioned in coinciding relation to port 12.

Overlying the asbestos pad 14 is a heavy metal plate 18 which is provided with an opening 20. This opening 20 is of the same general size and shape as the openings 12 and 16 and is positioned in overlying relationship thereto. The metal plate 18 is fixed over the asbestos pad 14 by stud bolts 22 and nuts 23, stud bolts 22 being welded to the furnace wall or door, so that they act to connect the asbestos pad and metal plate not only to each other but also to the furnace.

Also connected to the metal plate, preferably by the same bolts 22, are a pair of oppositely positioned, spaced, parallel angle-iron bars 24. Connected to the vertical webs of each of the angle-iron bars 24 is an angle-iron bar 26. The angle-iron bars 24 and 26 are connected to each other at their vertical web portions by any desirable means, the means being indicated in the drawings as spot welds, such as shown at 28. The angle-iron bars 26 are smaller than the bars 24 so that a groove or channel 30 is formed under each angle-iron bar 26 and is bounded at one side by the vertical web of the adjacent bars 24.

At one end of the metal plates 14 is provided a removable angle-iron bar 32, this bar being attached to the chamber as by stud bolts 32 and nuts 36, stud bolts 36 being welded to furnace or door. This removable end bar 32 is important in the assembly and disassembly of the unit, as will hereafter be seen.

Extending upwardly from the horizontal web of each angle-iron bar 26, at the end opposite the removable bar 32, is a stop 38. Also extending upwardly from the horizontal web of each bar 26, at a position adjacent to but spaced from the stop 38, is a stop 40. Each stop 40 extends not only upwardly but also slightly inwardly beyond the horizontal web of the bar 26, as at 42.

Slidably positioned on the plate 18 is a heavy metal plate, generally designated 44. This plate 44 consists of two sections 46 and 48, the section 48 being pivotally connected to the section 46 through a hinge connection 50. The plate 44 is slidable, at its edge portions, within the oppositely positioned channels 30. Adjacent each of these edge portions, the slide plate 44 is provided with a series of small apertures 52. These apertures are provided for the purpose of picking up small bits of grime or soot particles which tend to accumulate in the slide channels and which would, otherwise, tend to build up to the point where they would interfere with the full movement of the slide plate 44.

On the section 46 of the slide plate 44, there are provided a pair of oppositely positioned brackets 54 which are spot welded or otherwise fixed at 57 to the plate. The brackets 54 are each provided with laterally outwardly extending stop flanges 56 which overlap the horizontal webs of the angle-iron bars 26.

On the section 48 of the slide plate 44 there is provided an opening 58 corresponding generally in size and shape to the openings 12, 16 and 20. A metal collar 60 is welded or otherwise secured to the section 48 around the opening 58. This collar is provided with an internal peripheral groove 62 above which are provided internal threads 64. Positioned between a pair of asbestos gaskets 66 and 68, within the groove 62, is a lens 70. This lens 70 is constructed of a sufficient thickness of heat-resistant glass of a type well known in the art. The lens 70 is releasably held in position by an adjustable hollow bushing 72; the bushing 72 is externally threaded at 74 to mate with the internal threads on the collar 60. A polygonal flange 76 is provided on the top of the bushing 72, this flange being adapted to serve as a handle for rotating the bushing 72 within the collar 60.

3

The slide plate 44 and the entire assembly mounted thereon is assembled between the angle-iron bars 26 by removing the bar 32 and sliding the plate 44 within the channels 30 until it is in the position shown in Fig. 1. The bar 32 is then replaced to keep the slide plate from falling out.

Ordinarily, when the parts are in the position shown in Fig. 1, one can merely peer through the lens 70 and through the openings 12, 16, 20 and 58 to see the inside of the furnace. However, it is, of course, not possible, when the lens becomes dirty, to clean the inside of the lens while it is in position over the port 12 and while the furnace is in operation. It is, however, merely necessary, in such case, to slide the plate 44 up until the stops 56 contact the stops 42, as shown in Fig. 4. In this position, the top section 48 may either be pulled down or will automatically fall, by gravity, on its hinge, to the horizontal position shown in Fig. 4. In this position, the section 48 rests on the stops 38 which act not only to limit the pivotal movement of the section 48 to the horizontal position, but also act to prevent the entire plate 44 from being pulled back down by gravity to the position shown in Fig. 1. It should be noted that when the section 48 is in the horizontal position of Fig. 4, the section 46 is in a position to cover the open port 12 of the furnace. In this manner, there is no danger of having the furnace open while the lens is being cleaned.

The metal parts of the device are preferably made of a heat-resistant metal such as Monel. The parts may also be either straight, spot or plug welded, or may be connected to each other in various other ways. Furthermore, although the device embodying the present invention has been illustrated as attached directly to the wall of the furnace, it may also be mounted on a hollow box extension which extends out from the furnace walls so that the heat from the interior of the furnace does not directly contact the lens or any of the parts.

In another modification, the device may be mounted on the furnace door instead of on the body of the furnace itself.

The device has here been illustrated as mounted on a furnace. However, it is not limited in its use to a fur-

4

nace but may equally as well be used in conjunction with a boiler, a reactor, or any other type of combustion chamber.

Although this invention has been described in considerable detail, such description is intended as being illustrative rather than limiting, since the invention may be variously embodied, and the scope of the invention is to be determined as claimed.

The invention claimed is:

1. A viewing attachment for combustion chambers comprising a vertical guide means adapted to be connected to the exterior of a combustion chamber adjacent an opening in said chamber, a slide movably positioned within said guide means, said slide having an observation means hingedly connected to the upper edge thereof, said observation means being movable from a position coinciding with the opening in said chamber to an extended position remote therefrom, said observation means being pivotally movable to an angular position relative to said slide when it is in extended position remote from said opening, said slide being positioned in the former position of said observation means to cover said opening when said observation means is in its extended position, a first stop on said guide means, a second stop on said slide, said first stop being positioned to contact said second stop upon predetermined movement of said slide within said guide means, said observation means, due to its hinged connection with the upper edge of said slide plate, being automatically pivotable into said angular position when it is in said extended position, and means to support said observation means in said angular position.

2. The attachment of claim 1 wherein said slide is provided with self-cleaning means for cleaning said guide means of soot and other particles as said slide moves therein.

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