

July 13, 1965

C. B. MURTON
FURNACE DOOR

3,194,192

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2 Sheets-Sheet 1

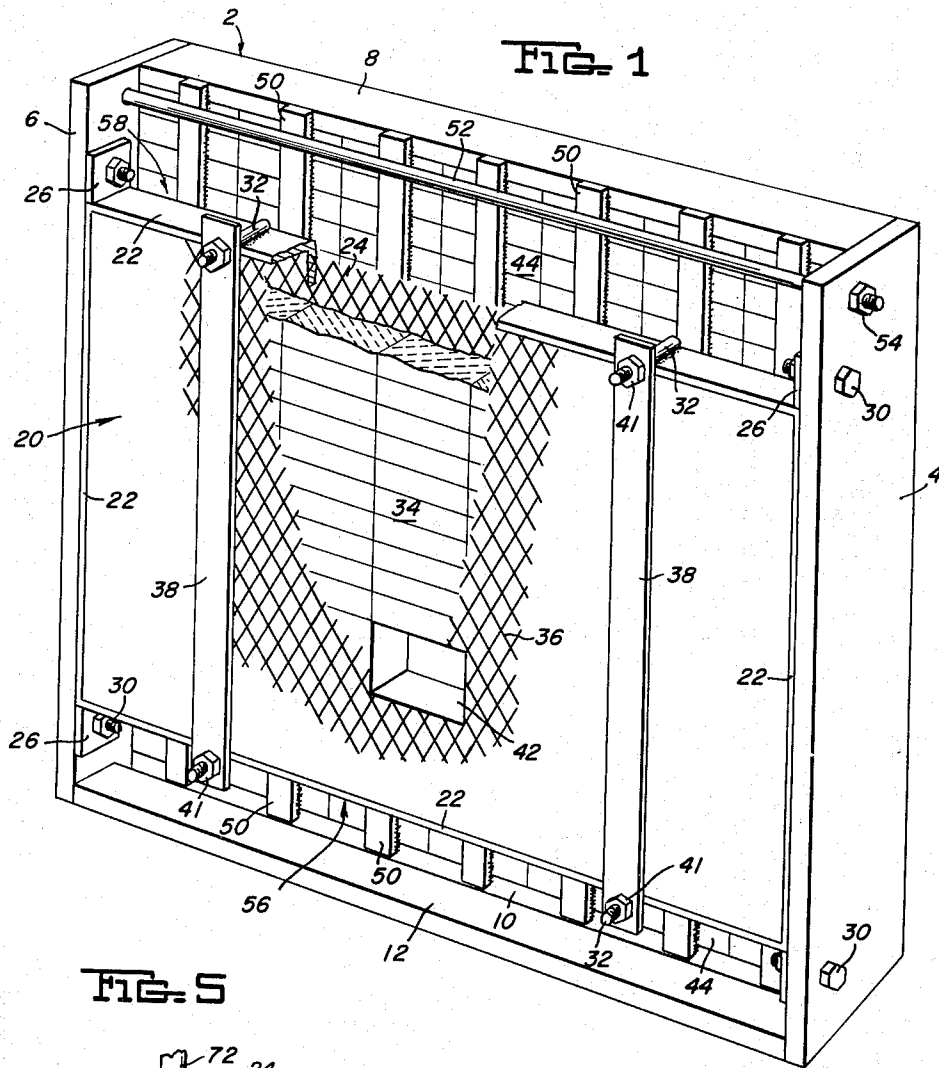


FIG. 1

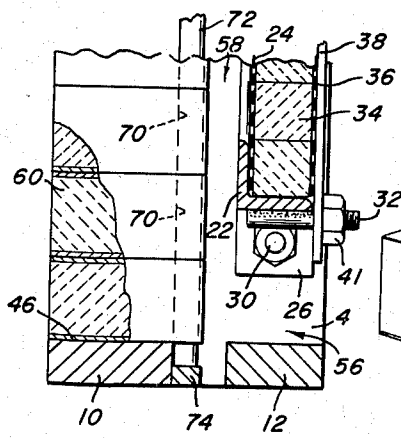


FIG. 5

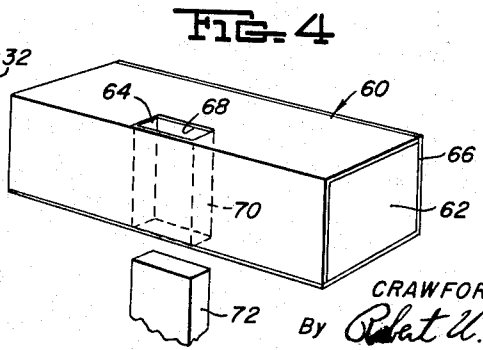


FIG. 4

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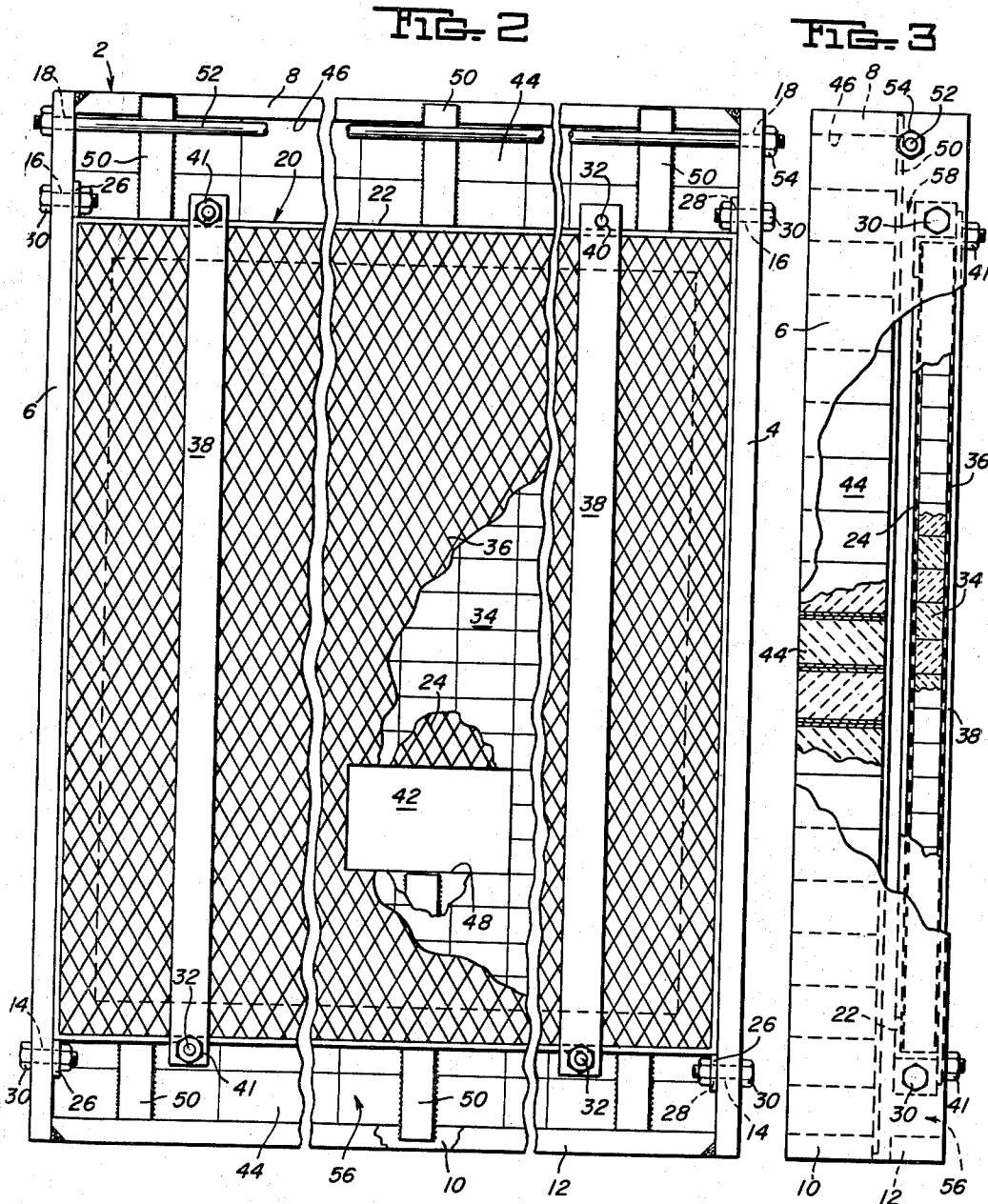
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2 Sheets-Sheet 2



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3 Claims. (Cl. 110-173)

This invention relates to a door and more particularly to a furnace door. The side of said door adjacent the furnace heating chamber is generally termed the hot face and the side away from the heating chamber the cold face. The hot face of the door is subject to high temperatures and tends to deteriorate. For that reason furnace doors of which I have knowledge have a water chamber for providing cooling water. This has various disadvantages. Supplying water is always expensive and it is often difficult to connect the supply and drain lines without interfering with the operation of surrounding equipment. Another disadvantage is that the water supply lines or water chamber may clog up or there may be a failure of water supply. In either case there is grave danger that the door will be damaged or destroyed.

It is therefore an object of my invention to provide a structure for closing a furnace opening which can withstand high heat without the use of cooling water.

Another object is to provide a furnace door which is air cooled.

Still another object is to provide a special metal clad brick for use with my improved door.

These and other objects will be apparent after referring to the following description and attached drawings, in which:

FIGURE 1 is a perspective view of my improved door with parts broken away;

FIGURE 2 is an elevation of the door locking toward its cold face;

FIGURE 3 is an end view of the door with parts broken away;

FIGURE 4 is a perspective view of a special brick; and

FIGURE 5 is a fragmentary view of a modified door utilizing the brick of FIGURE 4.

Referring to FIGURES 1, 2 and 3 of the drawings reference numeral 2 indicates the outside frame of the door which is preferably made up of two steel side plates 4 and 6 connected at their top on the hot face by means of a steel plate 8 welded thereto. Bottom plates 10 and 12 at the hot and cold faces respectively extend between and are welded to plates 4 and 6. Holes 14, 16 and 18 are provided in plate 4 in alignment with similar holes in plate 6. An inside frame 20 is made up of angles 22 arranged with one leg forming the outer wall of the frame 20 and the other leg forming a backing for receiving a sheet of expanded metal 24. Lugs 26 with holes 28 therein are provided on each corner of the frame 20. The width of the frame 20 is substantially equal to the distance between plates 4 and 6 so that it can be received therebetween on the cold face thereof. Bolts 30 passing through holes 14, 16 and 28 fasten the frame 20 to frame 2. Threaded studs 32 are welded to the top and bottom of the frame 20 and extend toward the cold face. Insulating brick 34 are placed in the frame 20 against metal sheet 24 and a second expanded metal sheet 36 is fastened to the cold face of the frame 20 by means of bars 38 having holes 40 therein for receiving studs 32. Nuts 41 secured to studs 32 hold the bars in position. An opening 42 is provided through sheets 24 and 36 and insulating bricks 34. Metal clad high duty refractory bricks 44 are received in opening 46 at the hot face of frame 2 with an opening 48 therethrough in alignment with opening 42. Bars 50 are welded to

the metal cladding of bricks 44 and the assembly is held in place by a threaded rod 52 passing through holes 18 with nuts 54 being threaded on the ends thereof. If desired at least some of the bricks 44 may be welded together to make a stronger assembly.

In assembly, the metal clad bricks 44 with the bars 50 welded thereto are placed in position and the rod 52 passed through holes 18 to hold the bricks 44 in position on the hot face of the door. Sheets 24 and 36 and bricks 34 are positioned in inner frame 20 and held in place by bars 38. The inner frame 20 may be attached to outer frame 2 either before or after assembly of the parts therein. It will be seen that a horizontal opening 56 is provided adjacent the bottom of the door from the cold face thereof and that a vertical opening 58 extends upwardly from opening 56 to the top of the door. Thus, air can circulate through the door to cool the hot face to an extent that will protect it from damage while the insulating bricks 34 prevent excessive heat from passing to the cold face of the door, thus protecting workmen from being burned. Aligned openings 42 and 48 provide the usual peep hole. Fittings for raising and lowering the door are provided for the door in the usual manner.

In the embodiment of FIGURES 4 and 5 a special metal clad brick 60 is provided. Brick 60 includes a basic or other high duty refractory body 62 having a recess 64 in one side thereof and metal cladding 66 around the periphery thereof. The cladding 66 may be made in two pieces as shown or in one piece. In either case openings 68 are provided therein in alignment with recess 64 so that a hole 70 is provided through the brick 60. The bricks 60 are laid in opening 46 in a plurality of vertical courses with the openings 70 in the bricks of each vertical course in alignment on the cold face of the bricks. The bricks 60 also extend toward the cold face beyond the inner edge of plate 8. A bar 72 passes downwardly through each set of aligned openings 70 with the top of the bars bearing against the cold face of plate 8 and the bottom of the bars bearing against plate 10. Suitable means such as a lug 74 welded to plate 10 below the top thereof prevent the bars 72 from falling downward.

In either of the above embodiments it will be understood that installation may be provided around the inside periphery of the frame 2 to protect the metal from excessive heat. The high duty refractory in the opening 46 may be provided in other forms than that shown. For example, the high duty refractory may be applied in whole or in part as a castable slab, or the metal cladding may be omitted from all or part of the bricks.

Other embodiments and modifications may also be made within the scope of the attached claims.

I claim:

1. A furnace door having a hot face and a cold face, said door comprising an outside frame having two generally vertical sides connected at their top by a generally horizontal member at the hot face and at their bottom by a generally horizontal member at the hot face so as to provide an opening at the hot face, a plurality of metal clad refractory bricks in said opening, means fastening said metal clad bricks together, means holding said assembly of said metal clad bricks in said opening, an inside frame extending between and fastened to said outside frame at the cold face, said inside frame having two generally vertical sides connected by top and bottom members so as to provide an opening, insulating bricks in said last named opening, a plate on the side of said insulating bricks adjacent said metal clad bricks, a plate on the side of said insulating bricks adjacent said cold face, means holding said insulating bricks and plates in assembled

relationship in said inner frame in spaced relationship with said metal clad refractory bricks to provide a vertical opening, the bottom member of said inside frame being spaced from said bottom member of said outside frame at the cold face so as to provide an opening therebetween whereby air will pass through said last named opening and said vertical opening to remove heat from the metal clad refractory bricks.

2. A furnace door having a hot face and a cold face, said door comprising an outside frame having two generally vertical sides connected at their top by a generally horizontal member at the hot face and at their bottom by a generally horizontal member at the cold face, said sides and top and bottom members providing an opening at the hot face, a plurality of metal clad refractory bricks in said opening, a plurality of generally vertical bars welded to said metal clad bricks at the side toward said cold face and extending above and below said opening, a rod extending between and fastened to said vertical sides in engagement with said bars on the side thereof toward said cold face, an inner frame extending between and fastened to said outside frame at the cold face, the bottom member of said inner frame being spaced from said bottom member of said outside frame at the cold face so as to provide a generally horizontal opening therebetween, said inner frame having a vertical wall of insulating bricks therein between generally vertical plates, the insulating bricks and plates being spaced from said metal

clad bricks so as to provide a substantially vertical opening in communication with said horizontal opening whereby air will pass through said horizontal opening and said vertical opening to remove heat from said metal clad refractory bricks.

3. A furnace door according to claim 2 including means detachably connecting said inner frame to said vertical sides of said outside frame.

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