June 9, 1931. M. LIPTAK 1,809,385

INSPECTION HOLE WALL STRUCTURE

Original Filed March 28, 1929 5 Sheets-Sheet 1

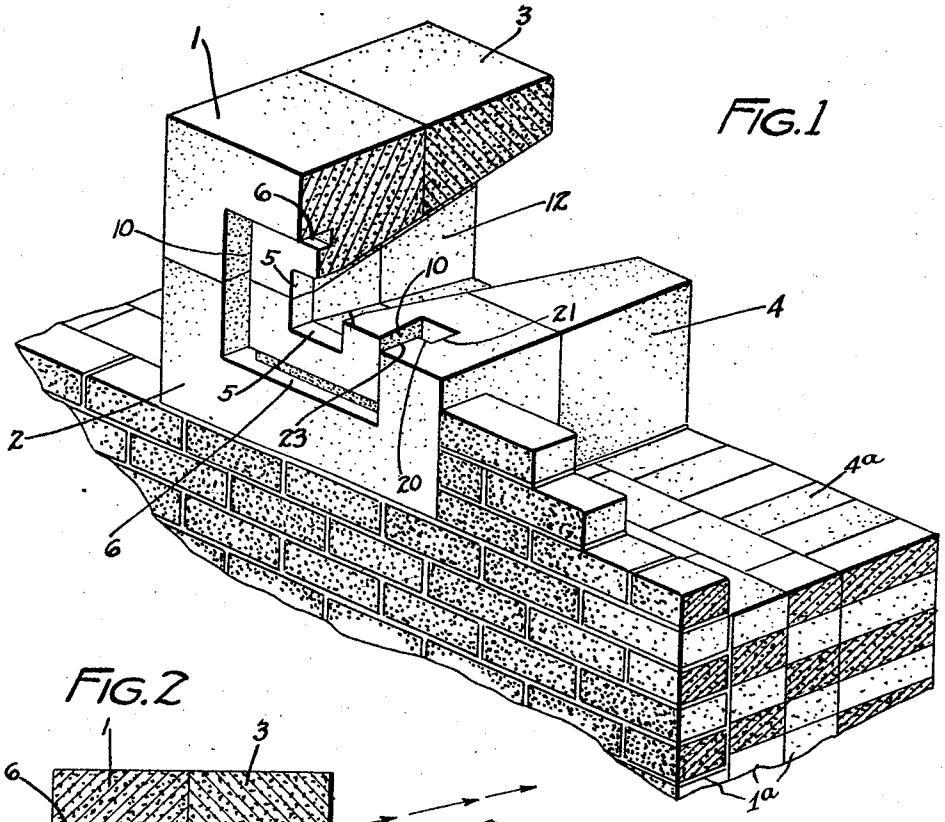


FIG. 1

FIG. 2

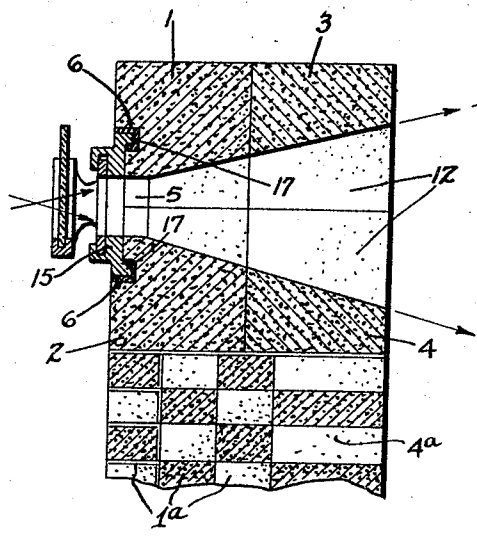
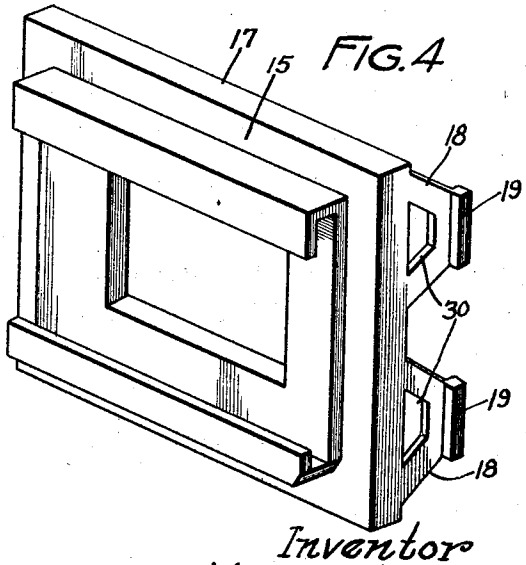


FIG. 4



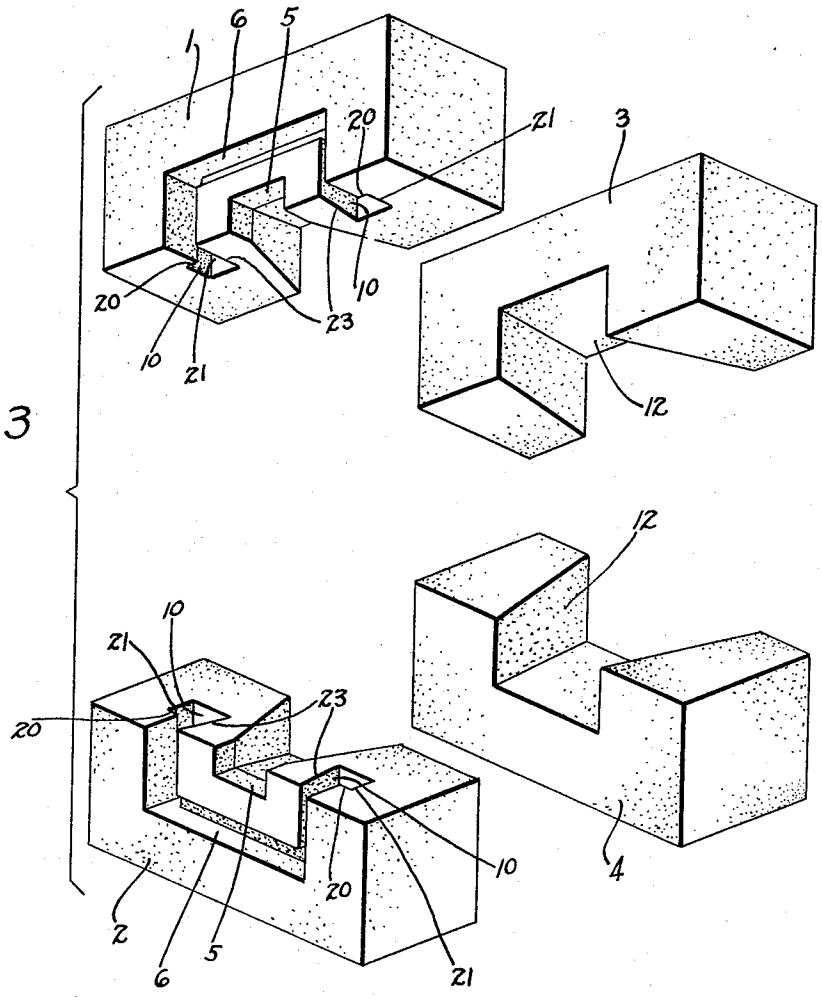
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INSPECTION HOLE WALL STRUCTURE

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FIG. 3



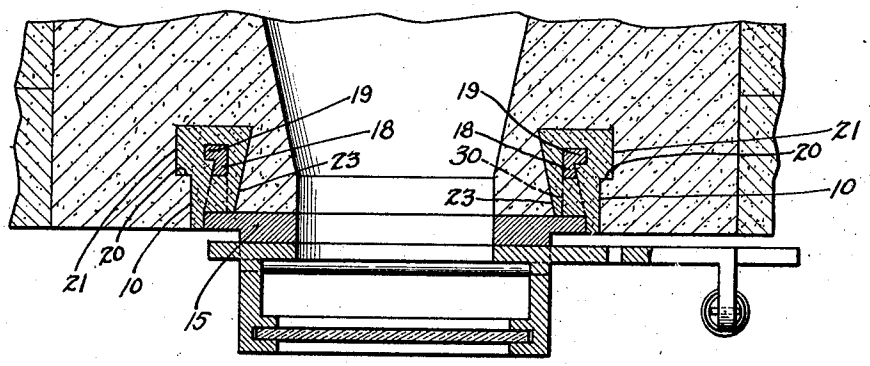
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INSPECTION HOLE WALL STRUCTURE

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FIG. 6



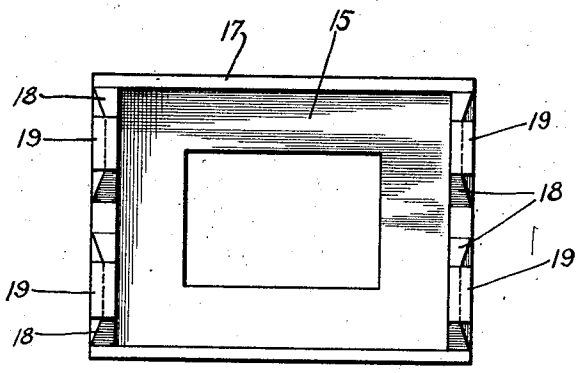


FIG. 5

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INSPECTION HOLE WALL STRUCTURE

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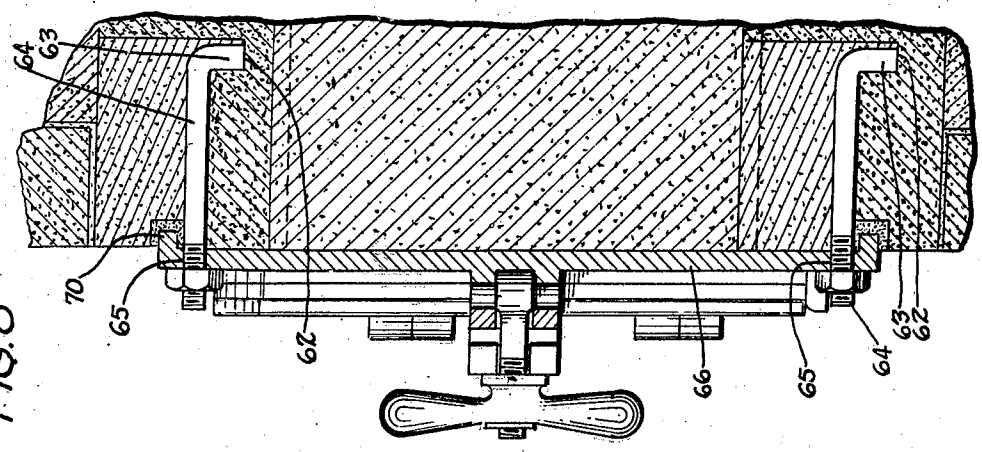


FIG. 8

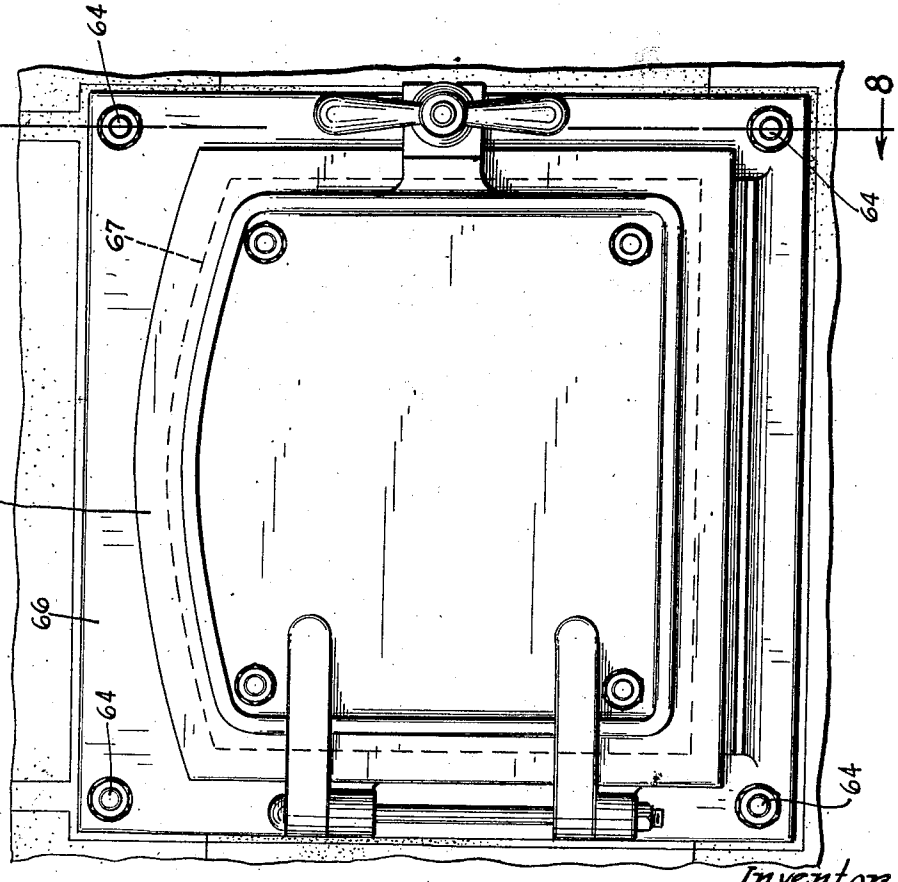


FIG. 7

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INSPECTION HOLE WALL STRUCTURE

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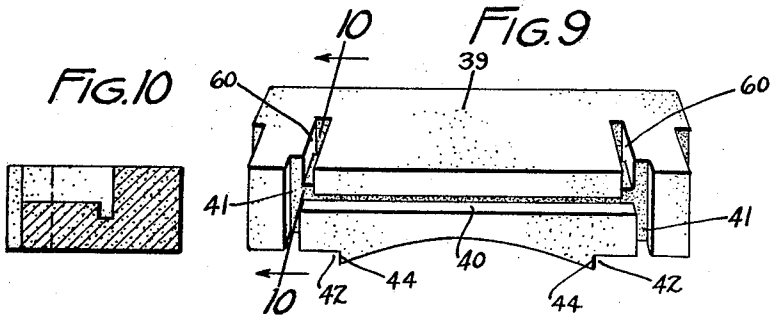


FIG. 9

FIG. 10

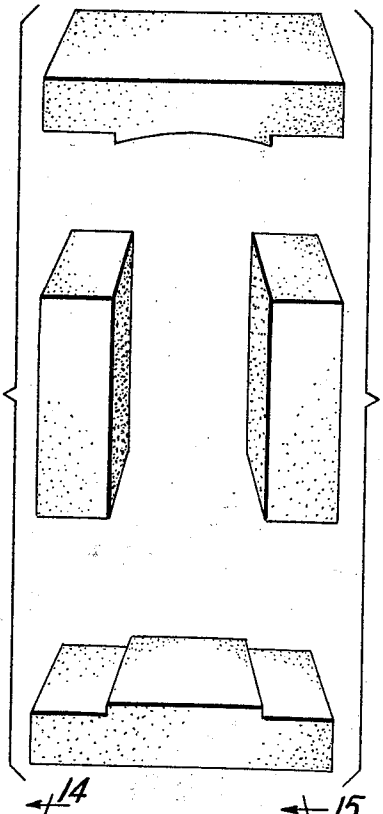


FIG. 16

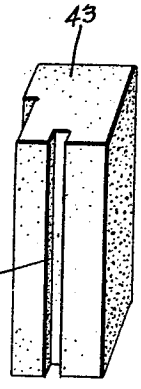


FIG. 11

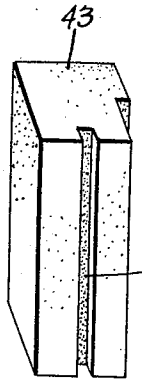


FIG. 12

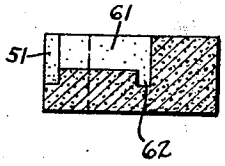


FIG. 14

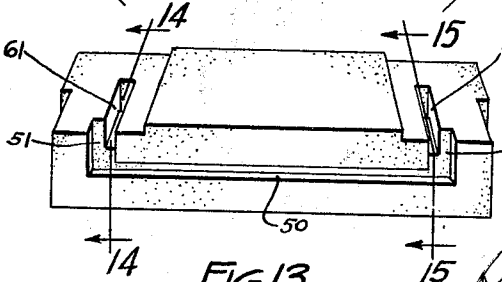


FIG. 13

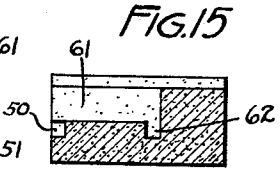


FIG. 15

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UNITED STATES PATENT OFFICE

MICHAEL LIPTAK, OF ST. PAUL, MINNESOTA

INSPECTION HOLE WALL STRUCTURE

Application filed March 28, 1929, Serial No. 350,642. Renewed February 10, 1930.

This invention relates generally to improvements in that portion of the furnace wall structure which includes the inspection opening.

Objects of the invention are to provide a structure which provides an inspection opening, which structure can be incorporated with other masonry elements of the wall during construction of the wall; to provide for anchoring a door supporting plate or its equivalent having an inspection opening in register with the inspection opening of the wall, so that there is a sealed relation between the plate and the outer face of the wall; to so fasten the plate that neither the plate nor its anchoring nor connecting elements are directly exposed to furnace heat or to such an extent as will cause deformation of the plate or of the anchoring elements, or to such an extent as will destroy the sealed relation; to avoid extension of any portions of the plate into the inspection opening of the fire wall or block, and thus protect the margins of the opening and the plate against injury by heat; to provide a sectional structure as a fire wall element providing an inspection opening and a groove circumscribing the opening, along with anchoring pockets leading off of the groove, and with each section providing a portion of such groove and pockets, and arranged in complemental relation, so that when the sections are placed together the grooves and pockets are completely formed; and to provide such a structure which can be conveniently molded by a simple coring method.

It will be understood that an important object of the invention is to prevent leakage around the inspection opening, which would interfere with combustion conditions within the furnace, by allowing entry of cold air or by allowing escape of heated gases.

Objects, features and advantages of the invention will appear from the description of the drawings forming a part of this application, and in said drawings

Figure 1 is a perspective view with parts broken away to show the construction of the fire wall element having the inspection opening, and showing its general arrangement in relation to the furnace or fire wall structure;

Figure 2 is a vertical section showing the bead of the plate sealingly arranged in the circumscribing groove of the wall;

Figure 3 shows a perspective view of the group of wall-forming elements, detached;

Figure 4 is a fragmentary detail perspective view of one form of face plate;

Figure 5 is a rear face view of the plate illustrating the circumscribing bead, and anchor elements associated with the bead;

Figure 6 is a horizontal section showing the relation of the anchoring elements to the circumscribing groove and anchoring pockets;

Figure 7 is a face view of a modification wherein hook bolts are used for securing the face plate;

Figure 8 is a vertical section substantially on line 8—8 of Figure 7;

Figure 9 is a perspective view illustrating a modified construction of an upper arch forming element of the wall structure;

Figure 10 is a vertical section on line 10—10 of Figure 9;

Figure 11 is a perspective view of the left hand pilaster;

Figure 12 is a perspective view of the right hand pilaster;

Figure 13 is a perspective view of the sill block;

Figure 14 is a vertical section on line 14—14 of Figure 13;

Figure 15 is a similar section on line 15—15 of Figure 13; and

Figure 16 is a view showing the elements of the inner portion of the wall-forming structure, these elements corresponding positionally to the elements 3 and 4 of the form, previously referred to, and shown in Figure 3.

An important feature of this invention is the means for sealingly anchoring the face plate in a manner to protect the anchoring elements and plate from undue exposure to furnace heat. It will be understood, of course, that by protection from exposure, means arranging them so that they will have a minimum exposure and so that gas cannot escape by passing between the plate and the block and through the anchoring region.

By this means extension of any portions of the plate or its connecting means into the inspection opening of the fire or block are limited and the margins of the plate opening are also protected. It will be understood that heretofore the plates have been connected by extensions entering or exposed to heat from the inspection opening.

Referring first to Figure 3, that portion of the wall which provides the inspection opening is composed of four sections, two front sections respectively indicated 1—2 and two rear sections respectively indicated 3—4. The sections 1—2 are the most important sections, while the sections 3—4 are used to give thickness to the wall and thus reduce heat conduction in direction of elements 1—2. In some installations, the elements 3—4 may be eliminated, depending on the thickness of the furnace or fire wall structure. By an inspection of Figure 3, it will be seen that the invention herein can be very easily applied as masonry sections during the construction of the wall. For this reason, there is no need to use the ordinary iron frame work, which must be held in position while the bricks are laid around it. All that is necessary in the present case is to lay the blocks of the present invention upon the top of the proper course and to build the wall around them.

Blocks 1 and 2 are complemental, and substantially identical in construction. Each has a portion of an opening 5, the portions being registrable when the blocks are brought together as shown in Figure 1 to form the complete inspection opening. In this instance the opening is shown to be divergently flared toward the inner side of the wall. Each block also has a portion of a groove in its front face or in that face perpendicular to the axis of the opening. This groove portion is represented at 6, and as will be seen in Figure 1 when the blocks are laid a continuous groove is provided which circumscribes the opening. The groove is in this instance rectangular but there is no intention to be limited to the shape, except for that feature of the invention which includes the arrangement enabling formation by coring. For the latter purpose, the arrangement of said anchoring pockets are provided in those portions of the groove which are perpendicular to the meeting faces of the blocks. These anchoring pockets lead off of the main grooves 6 and are indicated 10. It will be seen they are vertically arranged and will register to form continuous pockets. Each element 4 is provided with a portion of an opening 12 which registers to form a complete inspection opening when one block is superposed upon the other, the opening also registering with the openings 5 to form an inwardly flared inspection opening, when all of the blocks are registered as shown in Figures 1 and 2.

The face plate is a feature of the invention, see Figure 5. This plate 15 is provided with an inspection opening 16 and a bead 17 circumscribes this opening. In this instance, the bead is arranged at the extreme margin of the plate but this is not necessary. However, it should be placed so as not to be substantially exposed to furnace heat passing outwardly through the inspection opening. This bead 17 corresponds to the circumscribing groove 6 and is adapted to fit therein substantially in the manner shown in Figures 2 and 6. The plate 15 has anchoring extensions indicated at 18. These anchoring extensions in this instance are rearward extensions of the beads and they are arranged to extend into the pockets which lead inwardly off of the circumscribing groove, see Figure 6. Each has a lateral extension 19 as a stop which corresponds to the shoulder 20 formed by the lateral extension 21 of the pocket 10. The shoulder however is not of sufficient length to interfere with the free introduction of the anchoring extensions into the pockets, sufficient clearance being provided as clearly shown in Figure 6. However, the effect of these shoulders is to increase the anchoring effect after the groove and pockets have been filled with cement, and after the bead and anchoring elements have been embedded therein. Those walls of the pockets 10 which lie nearest each other are beveled as shown at 23 so that two walls converge toward one another in direction toward the inner side of the furnace. This is a feature of the invention included in the shape of the pockets which increases the anchoring efficiency of this particular means. By inspection of Figure 6, it will be seen that by slanting the walls as at 23 and by providing the lateral extensions to form the shoulders 20, an increased anchoring effect is obtained. It will further be seen that by embedment of the bead and extensions complete sealing is obtained.

As shown in Figures 4 and 6 the anchoring extensions are provided with openings 30 through which the cement passes, to further assist in the anchoring function.

In that form of the invention illustrated in Figures 7 to 16 inclusive, that part of the wall including the separable sections which may be combined in the wall structure to provide an inspection opening, are also of a structure which permits moulding or casting, the arch and sill block portions of this sectional portion of the wall being formable by simple coring, which is of considerable advantage in this art.

Referring first to Figures 9 to 15 inclusive. The arch block 39 is provided with a horizontal face groove 40 and communicating vertical face grooves 41. Recesses 42 are provided in the lower surface of the block to receive the upper ends of the pilasters 43, which are identical in construction except that they

are made in rights and lefts. Each recess 42 provides a shoulder 44 against which one side of the pilaster engages when the blocks are set up. Each pilaster has a face groove 47 which registers with the groove 41. The sill block is also provided with a horizontal face groove 50 connecting at each end with lateral face grooves 51 corresponding to and registrable with face grooves 47 of the pilasters. When the device is set up it will be understood that a circumscribing face groove is provided about the inspection opening in exactly the same manner as shown in the first described form of the invention. However, whereas in the first described form, vertical anchoring pockets were provided, in this instance horizontal pockets are provided respectively in the arch and sill blocks and communicate with the face grooves. The arrangement is such that a hook-bolt can be dropped into place, after being inserted in a horizontal direction and after passing through the face groove. The pockets in the arch block are each indicated by numeral 60, while those in the sill block are each indicated by the numeral 61. For convenience the pockets are aligned vertically, but this is not necessary. Each of the pockets 60—61 is provided with a downward extension indicated at 62, (see Figures 8, 10, 14 and 15) to receive the hook portion 63, see Figure 8 of the bolt 64. Each bolt 64 passes through suitable opening 65 in the face plate 66 and the face plate is of course provided with an inspection opening 67 indicated in dotted lines in Figure 7. A suitable door or other closure 68 is provided for the opening 67.

After the bolts have been dropped into position shown, the grooves and pockets 60, 61, 40, 41, 47, 51, 50 are filled with cement, and while the cement is soft the face plate is applied. As described for the first form of the invention the face plate 66 is provided with a continuous bead 70 which is of less area than the continuous groove formed by the face grooves of the various elements, and is embedded in the cement, thus forming a sealed joint.

Features are therefore to seal and anchor, and thus to seal against gas leaks; to arrange the plate and anchoring elements protectingly and with minimum exposure to furnace heat; and to avoid extensions of any portions of the plate into the inspection opening of the wall or block, and thus protect the margins of the opening of the plate against heat.

Another feature of the invention clearly shown in Figures 1 and 2 is the securing of the sections 1 and 2 together by means of a face plate which has projections embedded in the groove 6 formed in these two block sections. Another feature is that of having the fastening means embedded in a depression (or in depressions) which extends only a relatively short distance inwardly from the face of the block, so that the block is not weakened and so that, therefore, there is little likelihood of splitting of the block, due to high temperatures to which it is submitted.

Another feature is that of securing the face plate to the block by means which includes projections from the plate into the block along with cement in which the projections are embedded.

Another feature is the embedment of projections of a plate in depressions which extend inwardly from the front face of the block. In this case it is not absolutely necessary to use the lateral projections or pockets 21 (see Figure 6) or to form shoulders 20, or to provide slanting surfaces 23. The openings 30 accomplish the anchoring function, because cement adheres strongly to the roughened surface of the walls 10 of the groove or depressions in the front face of the block.

In the ordinary practice, a door plate is attached by anchor bolts which are secured by embedment, during formation of the walls. It has been necessary to secure the face plate or door plate by wires to keep it in plumb while the brick work was built up around the anchor bolts. Also the door with the anchoring bolts wired or attached was shipped and these anchoring devices were often lost in transit. The device herein, as a unit, can be put into a wall at a cost of fifteen cents by unskilled labor. The cost of putting in the ordinary door plate is at least $2.50, and if the flared opening has to be built in the wall by the use of bricks it costs at least $10.00. Moreover, inasmuch as the anchor bolts have to be so near the inspection opening, mortar is used in place of brick. Altogether the result is a rickety job, and continual door movements soon loosen the anchoring means so that the door plate is pulled away from the wall, in a manner to allow heat leakage.

In the present invention, the block, sectional or solid, is built as a unit directly into the wall and includes the inspection opening as well as the fastening-receiving depressions or grooves or pockets and these pockets do not extend through the blocks transversely. In any event they do not pass entirely through the wall, or entirely through both sets of blocks 1 and 3, or 2 and 4. If fastening devices are passed entirely through blocks 1 and 2 (or through a single block the equivalent of these two block sections) the blocks 3 and 4 or an equivalent single piece block protects the ends of the bolts. The block sections 1 and 2, and 3 and 4 represented in Figure 1, respectively form part of the permanent wall 1^a and replaceable wall 4^a which walls are connected against transverse separation by means not herein shown.

I claim as my invention:

1. A fire wall element having an inspection

opening, a groove in the face of the element circumscribing the opening, a face plate having an opening registered with said inspection opening and having a continuous bead projecting into said circumscribing groove, and cement filling said groove and embedding said bead.

2. A fire wall element having an inspection opening, a groove in the face of the element circumscribing the opening, a face plate having an opening registered with said inspection opening and having a continuous bead projecting into said circumscribing groove, and cement filling said groove and embedding said bead, said plate being flatly arranged against that surface in which the circumscribing groove is formed.

3. A fire wall element having an inspection opening, a groove formed in the face of the element and circumscribing the opening, said wall element being formed in two sections, each carrying a portion of said groove, each groove portion also opening on the meeting face of its block, and being in register when the blocks are in operative relation.

4. A fire wall element having an inspection opening, a groove in the face of the element circumscribing the opening, pockets leading off of said groove, a face plate having an opening registered with said inspection opening and having a continuous bead projecting into said circumscribing groove, anchor elements connected to the plate and projecting into said pockets, and cement in said grooves and pockets embedding said bead and anchor elements.

5. A fire wall element having an inspection opening, a groove in the face of the element circumscribing the opening, pockets leading off of said groove, a face plate having an opening registered with said inspection opening and having a continuous bead within said circumscribing groove, anchor elements within said pockets and connecting with the plate and cement in said grooves and pockets embedding said bead and anchor elements, said block being formed in two sections, each having a portion of said groove and of said pockets, the arrangement being such that said pockets and groove portions also open on the meeting faces of the blocks, and register when the blocks are in operative relation.

6. A door frame comprising a block having an opening therethrough, and provided in one face with a groove circumscribing the opening, pockets leading inwardly from said groove each provided with an abutment, means having an abutment engaging the pocket abutment in a manner to prevent withdrawal, cement filling the grooves and pockets, and a facing plate having a bead extending into the groove and buried in the cement, said plate being connected to said pocket-engaging means.

7. A door frame composed of blocks including arch, sill and jamb blocks, each having a groove in one face with the grooves being arranged to form a groove circumscribing the door opening, and a face plate having an opening in substantial register with the inspection opening and having projections extending into said groove, and cement in said groove in which the projections are embedded.

8. A fire wall element having an inspection opening, depressions in the face of the element arranged laterally of the opening, a face plate having an opening in substantial register with said inspection opening and having projections extending into the depressions, and cement in the depressions embedding the projections.

9. A fire wall element having an inspection opening, a face plate having an opening in substantial register with the inspection opening, and means connecting the plate to the fire wall element, said means extending through the front face of the block but not through the block.

10. An inspection door unit comprising a block adapted to be built into a wall and having an inspection opening therethrough, a face plate having an opening in substantial register with the inspection opening and engaging the face of the block, and means securing the face plate to the block including depressions in the face of the block and projections from the plate into the depressions and cement in said depressions in which the projections are embedded.

11. An inspection door unit comprising a block of refractory material adapted to be built into a fire wall and having an inspection opening therethrough, a face plate also having an opening in substantial register with the inspection opening, and means securing the face plate to the face of the block which means extends from the face plate into the block only a short distance.

12. A device of the class described composed of two sections formed and engaged to provide an inspection opening, said sections having depressions in one face which are continuous across the division line between the sections, a face plate having an opening in substantial register with the inspection opening and having projections which enter the depressions, and cement in said depressions in which said projections are embedded.

13. A fire wall element having an inspection opening, shallow depressions in the face of the element arranged laterally of the opening, a face plate having an opening in substantial register with the inspection opening and having projections extending into corresponding depressions, said projections having openings therethrough, and cement in the

depressions embedding the projections and passing through said openings.

14. A fire wall element having an inspection opening, shallow depressions in the face of the element arranged laterally of the opening, a face plate having an opening in substantial register with the inspection opening and having projections extending into corresponding depressions, and cement in the depressions embedding the projections.

15. A fire wall element having an inspection opening, a face plate having an opening in substantial register with the inspection opening, means connecting the plate to the fire wall element, including projections which extend into openings in the block, said projections having openings, and cement embedding the projections and passing through the openings.

16. A fire wall element having an inspection opening, depressions in the face of the element arranged laterally of the opening, the face plate having an opening in substantial register with the inspection opening and having means entering the depressions, and cement embedding said means in the depressions.

17. A fire wall element as a unit adapted to be built into a wall, having an inspection opening, grooves in the face of the element arranged laterally of the opening, the face plate having an opening in substantial register with the inspection opening, and having means entering the grooves and cement embedding said means in the grooves.

18. A fire wall element as an article of manufacture adapted to be built into a wall, having an inspection opening, shallow depressions in the face of the element arranged laterally of the opening, a face plate having an opening in substantial register with the inspection opening, and having projections extending into corresponding depressions, and cement in the depressions embedding the projections.

In witness whereof, I have hereunto set my hand this 25th day of March, 1929.

MICHAEL LIPTAK.