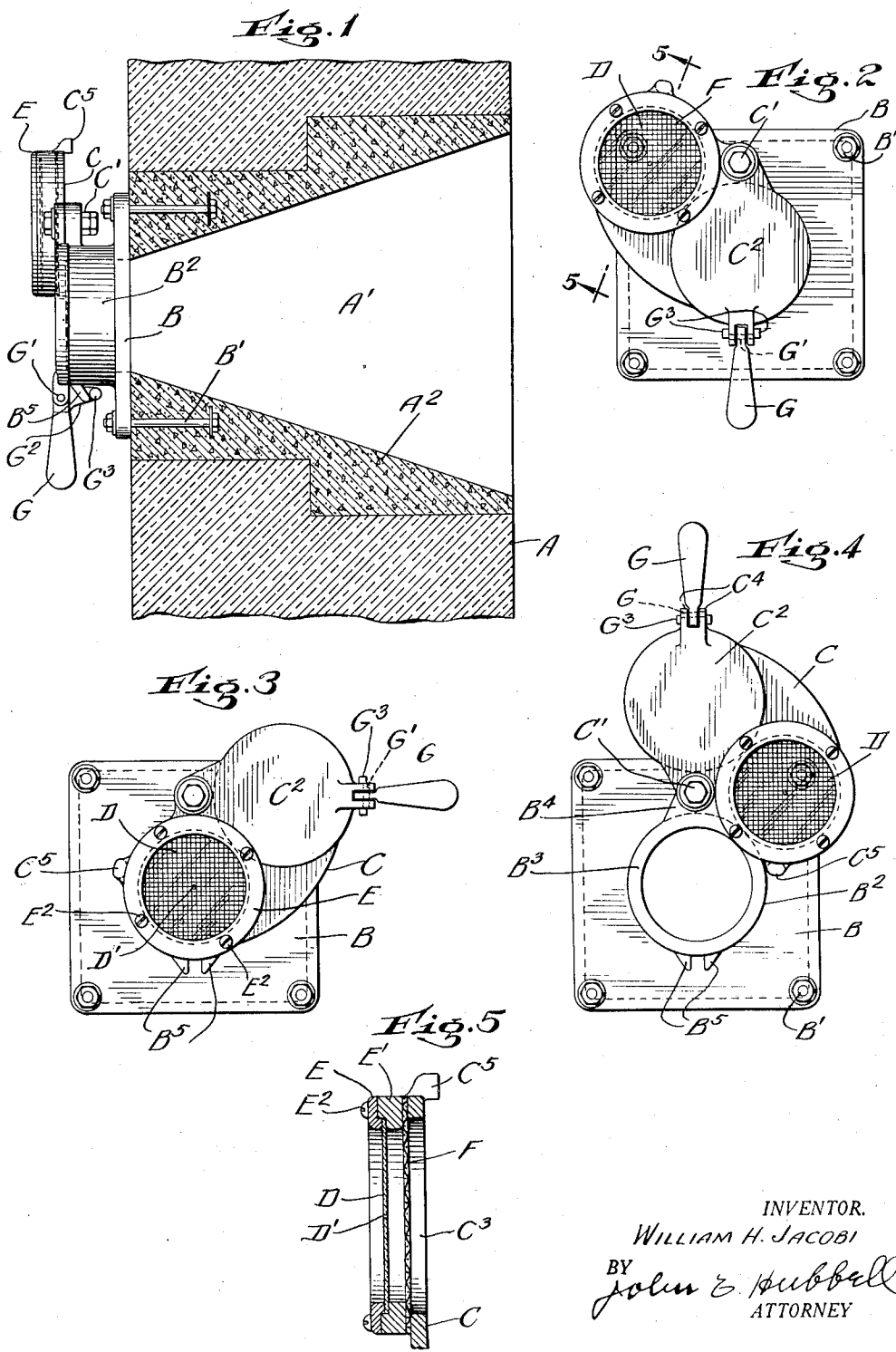


Sept. 11, 1934.

W. H. JACOBI
FURNACE PEEP SIGHT
Filed Feb. 20, 1930

1,973,171



UNITED STATES PATENT OFFICE

1,973,171

FURNACE PEEP SIGHT

William H. Jacobi, Keokuk, Iowa, assignor to
Springfield Boiler Co., Springfield, Ill., a cor-
poration of Illinois

Application February 20, 1930, Serial No. 429,918

6 Claims. (Cl. 126—200)

The general object of the present invention is the improvement of means provided to permit visual inspection of the interior of a furnace chamber, such as the combustion chamber of a boiler furnace, in which high temperatures are maintained. More specific objects of the invention are to provide simple and effective means for opening and closing a peep hole in a furnace wall, and for protecting an operator inspecting the interior of the furnace through said peep hole, against injury from furnace heat or glare and for preventing an objectionable influx of air or outflow of furnace gases through the peep hole while the interior of the furnace is being inspected.

A preferred embodiment of the present invention comprises a peep hole door adjustable to place either a transparent portion or a less frangible opaque portion of the door in register with the peep hole proper, and preferably adjustable also to move the door entirely out of register with the peep hole so that a slice bar, steam lance or like instrumentality may be inserted in the peep hole. The door and its supporting means are characterized by their mechanical simplicity and effectiveness, and by the easy and effective manner in which they may be mounted on a fire door, masonry or other portion of a furnace wall. The invention is further characterized by the provisions made for protecting the glass forming the transparent portion of the door against injury from the high temperature to which it is subjected when in register with the peep hole.

The various features of novelty which characterize my invention are pointed out with particularity in the claims annexed to and forming a part of this specification. For a better understanding of the invention, however, and the advantages possessed by it, reference should be had to the accompanying drawing and descriptive matter in which I have illustrated and described a preferred embodiment of the invention.

Of the drawing:—

Fig. 1 is a sectional elevation of a portion of a furnace wall provided with a peep hole;

Fig. 2 is an elevation of the peep hole door and doorway;

Figs. 3 and 4 are views taken similarly to Fig. 2 with the movable door shown in different positions; and

Fig. 5 is a partial section on the line 5—5 of Fig. 2.

In the drawing, A represents the wall of a furnace chamber, such as the combustion chamber of the boiler furnace, in which high temperatures

are maintained, and A' represents a peep hole opening formed in the wall proper. When the peep hole is formed in a masonry portion of the furnace wall, the peep hole is advantageously conical in form with its outer end smaller than its inner end. In such case also, the peep hole is advantageously provided with a lining A² formed of suitably shaped tiles or refractory cement.

Attached to the furnace wall at its outer side, as by means of bolts B' imbedded in the lining A², is a metallic peep hole door frame B. The latter is advantageously formed, as shown, with a plate-like body portion B having a hollow boss or tubular extension B² at its outer side, the axis of the passage in which is in line with the axis of the opening A'. The outer end of the hollow boss B² forms a seat B³ for a door member C shown as hinged by a pivot pin C' to a lug B⁴ formed on the tubular portion B² of the member B. The door member C comprises a portion C² of suitable thickness to insure durability, which normally engages the seat B³ and closes the peep hole as shown in Figs. 1 and 2. The door member C is formed with a window opening C³ which is brought into register with the peep hole when the member C is in the position shown in Fig. 3. The parts B and C may advantageously be formed of cast iron or steel, or of a more refractory metal alloy in some cases.

The door member C supports a transparent body or window pane D which extends across the opening C³. The window pane D is preferably in the form of a disc made of highly refractory glass, and the glass is advantageously colored to cut down the transmission of heat and light rays while leaving the glass sufficiently transparent. As shown, the glass D is held between annular clamping members E and E' secured to the body portion of the door C, as by screws E². To reduce the risk of overheating the glass D, I advantageously interpose a wire screen F between the glass D and the interior of the furnace. This screen F may be formed of Monel metal or other metal well adapted to withstand high temperatures. As shown, the screen F is clamped between the body of the door C at the margin of the opening C³ and the clamping ring E', so that the screen is in good heat conducting relation with the door and clamping rings. In consequence it will be maintained at a relatively low temperature, and partly by intercepting heat rays and partly by absorbing heat by radiation from the inner face of the glass D, the screen F is thus effective to prevent the glass D from attaining

an objectionably high temperature during the periods in which the glass is exposed to the heat of the furnace through the peep hole. As a further protection against injury of the glass when the latter is heated and cooled I advantageously form a small aperture D' in the glass at or about its center. This aperture serves, as I have found, to substantially reduce the risk of glass fracture as a result of its thermal expansion and contraction.

In the preferred construction illustrated the adjustment of the door C is facilitated by providing it with a handle G mounted on a pivot pin G' carried by ears C' formed for the purpose on the door. The handle G is advantageously provided with a tongue G² adapted to enter the space between a pair of lugs B⁵ formed on the boss B² when the door is in its normal or closed position of the apparatus as shown in Figs. 1 and 2. As shown, the tongue G² is formed with oppositely projecting portions G³ constituting lock bar parts which in the position of the parts shown in Figs. 1 and 2, are behind the lugs B⁵, so that the door is then snugly held in its closed position.

Advantageously and as shown, the door C is provided with a stop C⁵ which engages the boss B² when the parts are turned into the position shown in Fig. 3. It is contemplated that the door will be manually held in the position shown in Fig. 3 by the operator inspecting the furnace, during the inspection periods, and the stop C⁵ assists the operator in holding the door in proper position for inspection purposes. As appears from Fig. 4, the stop C⁵ may also serve the further purpose of holding the door member C in the position in which no portion of the door member C extends across the peep hole opening. When the door is in the position shown in Fig. 4, the action of gravity tends to maintain it in that position. Except when in the position shown in Fig. 4, gravity tends to hold the door in its normally closed position shown in Figs. 1 and 2.

In the position of the door shown in Fig. 4, a slice bar, steam lance or analogous instrumentality may extend into the furnace chamber through the peep hole and be manipulated to trim the fuel bed, or remove furnace dust, etc. as conditions may make desirable from time to time. As the door is moved in the counter-clockwise direction from the position shown in Fig. 4 toward the position shown in Fig. 2 the screen F and glass D are brought into position above the boss B² to permit the removal of furnace dust accumulating on the door parts and impairing the transparency of the glass D. While the present invention may be used in connection with peep holes of various sizes, it has been found convenient and desirable in the use of the present invention to make the minimum diameter of the peep hole approximately five inches, as a hole of such size is convenient and suitable not only for inspection purposes, but also for the insertion and manipulation of a slice bar, steam lance or like instrumentality.

As those skilled in the art will readily understand, the construction illustrated is simple, durable and effective, and is relatively inexpensive to manufacture and install. It can be readily attached to a furnace fire or inspection door as well as to brick work, and may be mounted on the brick work of the furnace without requiring objectionable modification of such brick work. The provision of a suitable inspection opening or openings facilitated by the use of the present invention, contributes to efficiency in furnace op-

eration and maintenance. The ease with which the peep hole may be opened and closed by the use of the present invention encourages desirably frequent inspections of furnace conditions, and the use of the glass member D by protecting the eyes of the operator against the furnace glare and heat, permits and encourages suitably thorough study of furnace linings and operating conditions.

While in accordance with the provisions of the statutes, I have illustrated and described the best form of embodiment of my invention now known to me, it will be apparent to those skilled in the art that changes may be made in the form of the apparatus disclosed without departing from the spirit of my invention as set forth in the appended claims and that in some cases certain features of my invention may be used to advantage without a corresponding use of other features.

Having now described my invention, what I claim as new and desire to secure by Letters Patent is:—

1. A furnace peep hole door construction comprising a door frame member adapted to be attached to a substantially vertical wall of the furnace and formed with an outwardly projecting boss having a peep hole passage therethrough, a door member pivotally connected to said frame member to freely turn with respect thereto in a vertical plane about an axis at one side of said passage into one or another of three positions and comprising a transparent portion in register with said passage in one of said positions and an opaque portion in register with said passage in another of said positions, said door member being out of line with said passage in the third position, a projection carried by said door member and engaging said boss when the door member is in said third position, said members being so relatively arranged that when the door member is in said third position gravity tends to maintain the door member in said position and when in said first position gravity tends to move the door member into said second position.

2. A furnace peep hole door construction comprising a door frame member adapted to be attached to the wall of the furnace and formed with an outwardly projecting boss having a peep hole passage therethrough, a door member pivotally connected to said frame member to turn with respect thereto in a vertical plane about an axis at one side of said passage into one or another of three positions and comprising a transparent portion in register with said passage in one of said positions and an opaque portion in register with said passage in another of said positions, said door member being out of line with said passage in the third position, said members having cooperating positioning parts positively indicating when said door member is in any one of said three positions.

3. The combination with a substantially vertical wall of a furnace chamber having a peep hole extending through said wall, of a structure at the outer end of said peep hole comprising a frame formed with an opening substantially registering with said peep hole, and a door mounted for angular movements in a vertical plane parallel to the plane of said opening, a transparent member mounted in said door and arranged to register with said opening in one position of said door, and a small central aperture in said member for the passage of cooling air to the furnace side thereof.

4. The combination with a substantially vertical wall of a furnace chamber having a peep hole extending through said wall, of a structure at the outer end of said peep hole comprising a frame formed with an opening substantially registering with said peep hole, and a door arranged to be swung in a vertical plane parallel to the plane of said opening to a plurality of operating positions, a transparent member mounted in said door and arranged to register with said opening in one position of said door, a small central aperture in said member for the passage of cooling air to the furnace side thereof, and a wire screen mounted in said door at the furnace side of said member and in good heat conducting relation with said door.

5. A furnace peep hole door structure including a transparent member of colored glass having one side exposed to the interior of a furnace and its other side to atmosphere and mounted in a movable part of said door structure, said member being formed with a small central aperture for the passage of cooling air to the furnace side of said member.

6. A furnace peep hole door construction comprising a door frame member adapted to be attached to a substantially vertical wall of the furnace and formed with an outwardly projecting boss having a peep hole passage therethrough, a door member pivotally connected to said frame member to turn with respect thereto in a vertical plane about an axis at one side of said passage into one or another of three positions and comprising a transparent portion registering with said passage in one of said positions and an opaque portion registering with said passage in another of said positions, said door member being out of register with said passage in the third position, a projection carried by said door member and engaging said boss when the door member is in said first and third mentioned positions, said members being so relatively arranged that when the door member is in said third position gravity tends to maintain the door member in said position and when in said first position gravity tends to move the door member into said second mentioned position, and means for locking said door member in said second position.

WILLIAM H. JACOBI.