G. H. CUSHING.

MOUNTING FOR FURNACE DOORS.

APPLICATION FILED NOV. 24, 1909.

980,764. Patented Jan. 3, 1911.

Fig. 1.

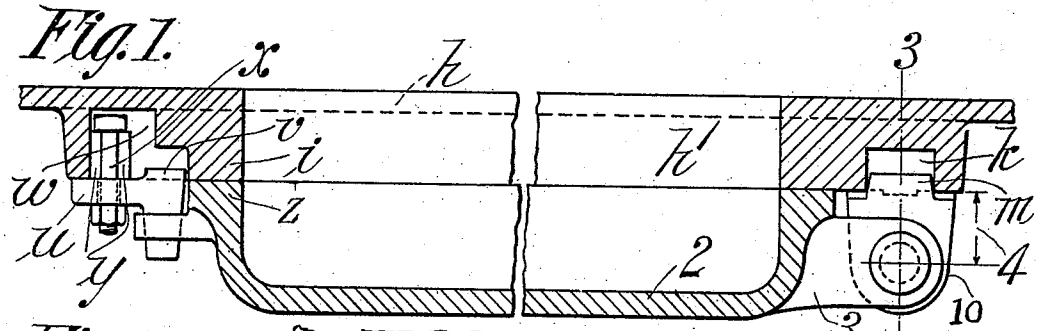


Fig. 2.

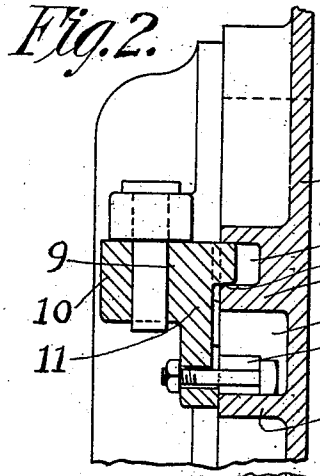


Fig. 3.

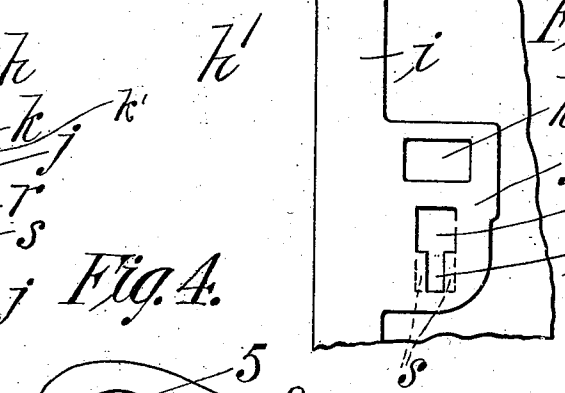
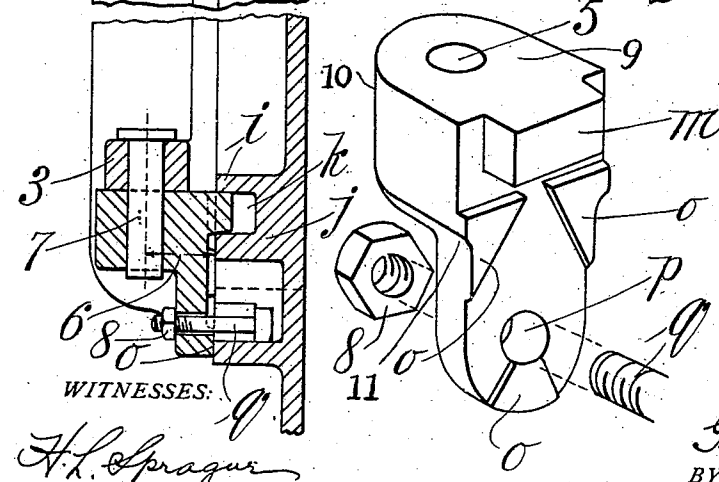


Fig. 4.



WITNESSES:

H. L. Sprague

Harry W. Bowers

INVENTOR,

George H. Cushing

BY

Chapin & Co.

ATTORNEY.

UNITED STATES PATENT OFFICE.

GEORGE H. CUSHING, OF WESTFIELD, MASSACHUSETTS, ASSIGNOR TO THE H. B. SMITH COMPANY, OF WESTFIELD, MASSACHUSETTS, A CORPORATION.

MOUNTING FOR FURNACE-DOORS.

980,764. Specification of Letters Patent. Patented Jan. 3, 1911.

Application filed November 24, 1909. Serial No. 529,677.

To all whom it may concern:

Be it known that I, GEORGE H. CUSHING, a citizen of the United States of America, residing at Westfield, in the county of Hampden and State of Massachusetts, have invented new and useful Improvements in Mountings for Furnace-Doors, of which the following is a specification.

This invention relates to improvements in mountings for furnace doors, the object of the invention being to provide a mounting that will maintain an air-tight joint between the door and the opening in the furnace section.

Heretofore, it has been a common practice in mounting furnace doors to employ a frame on which the door is hung, the joint between the faces of the door and frame being accurately planed or milled to a true surface, and the pin-holes in the hinge-lugs on both the frame and door being drilled in a jig. The frame is then bolted to the furnace front with a plaster or cement backing between the frame and the section. By carefully bolting the door-frame, practically an air-tight joint may be maintained between the joint faces of the door and frame but after a few years the cement backing gives way or the rust effects a change in the shape or position of the door-frame causing the air to leak into the furnace around the edge of the door and the frame, thus defeating the very purpose of an air-tight joint. While this method of mounting a door is practically an interchangeable one, it is far from being a satisfactory one.

Later practice has been to mount the furnace doors by employing hinge-lugs which are fitted to the furnace section by means of dovetail projections which fit into cored out openings in the section. This practice requires each hinge-lug to be accurately fitted to the particular door and marked with a prick punch, or other means, as the particular lug will only fit the particular opening cored out when the section is cast and to which it has been fitted. While this practice does away with the use of a door-frame and produces a fairly perfect tight joint, all idea of interchangeability of doors and lugs is lost.

My invention is to do away with door-frames and at the same time make both the hinge lugs and doors interchangeable, should occasion require, and at the same time maintain the joint between the edge of the door and the furnace opening air-tight.

Broadly stated, the invention consists in casting a raised surface or rim around the opening of the furnace section; also raised elevations or projections adjacent the door opening for affording seats for the hinge-lugs, the lugs being supported on these projections by means of suitable cored out openings for receiving dowels on the hinge-lugs and securing bolts located in receiving pockets or sockets in the projections, whereby the lugs may be securely attached to the furnace front, the raised rim and the projections for receiving the hinge-lugs being then milled to a true surface and the pin-holes in the hinge-lugs drilled for receiving a hinge-pin, the axis of which is accurately spaced from the bearing surface; then milling the edge of the door to a true surface and drilling the pin-holes in the door-lugs at a definite distance from this milled surface, whereby when the door is hung and the hinge-pins inserted, an air-tight joint will be produced between the raised rim and the edge of the door, and at the same time an interchangeable door mounting is produced without the use of frames, or in any way marking or designating the lugs, as will be fully described.

In the drawings forming part of this application,—Figure 1 is a horizontal sectional view through a portion of the furnace section showing the hinge and catch-lugs that are located in cored out openings in the furnace section and showing the finished air-tight joint between the raised rim around the opening and the edge of the door. Fig. 2 is a vertical sectional view on the line 3—3 of Fig. 1 through the axis of the hinge-pins for supporting the door and also illustrating the manner in which the hinge-lugs are bolted to the front of the furnace sections. Fig. 3 is a detail front elevational view showing one of the sets of the cored out recesses in the raised flange or rim for receiving the dowels on the hinge-lugs and the recessed sockets or bolt pockets for receiving the securing bolts. Fig. 4 is a perspective view of the detachable hinge-lug also indicating a portion of the bolt by means of which the

lug is secured in place on the front of the furnace section.

Referring now particularly to Figs. 1 and 2 of the drawings, in which a portion of a furnace section is indicated at *h*, and the raised flange at *i*, around the door opening h^1, and the elevated or raised projections for securing the hinge-lugs at *j*. These projections, as shown in Fig. 3, are a continuation of the flange *i*, or a part of the same.

k indicates a cored-out recess for receiving the dowel or projection *m* of the detachable hinge-lug 9 shown in Fig. 4. Said hinge-lug 9 comprises a head portion 10 having the vertical pin-hole 5 and a rear vertical base portion 11 provided with three angularly disposed bearing pads *o*, the base portion 11 of the lug being also provided with a cored-out opening or bolt-hole *p*, for receiving the securing bolt *q* which, as shown in Fig. 2, is retained in a pocket *r* of the part *j*, the head of which is adapted to be inserted through the upper portion of the pocket and retained against displacement therein by means of the shoulders *s*, while the lower portion *t* of the pocket permits the bolt to project outward between the shoulders *s*, as indicated in Fig. 2. The door-catch is also mounted or secured to the furnace section in the same manner as the hinge-lug shown in Fig. 4. This catch is designated as a whole by the letter *u*. The dowel portion of the catch is shown at *v* and the bolt pocket at *w*. The shoulders for receiving the head of the bolt *x* are shown at *y*. The bolt extends through a flange portion of the catch, as indicated in Fig. 1.

The detail operation of producing an air-tight joint between the flange *i* of the door opening and the edge *z* of the door 2 is as follows: The flange or rib *i* and the projections *j* are first accurately milled to a true surface. The joint edge *z* of the door is next milled to a true surface, then the integral door-lugs 3, after the milling of the edge *z*, are drilled for the pin-holes in a jig a predetermined distance back from the milled edge *z*, as indicated by the numeral 4, Fig. 1. The detachable hinge-lugs shown in Fig. 4 are next placed in a jig and the pin-holes 5 are then drilled a predetermined distance back from the triangular disposed bearing pads or feet *o* of the base portion of the lug. This distance is indicated by the numeral 6 in Fig. 2, which distance corresponds to the distance 4, indicated in Fig. 1, whereby when the hinge-lugs are secured in place on the boiler section, and the pins 7 are inserted in the drilled holes in the lugs 3 and the drilled holes 5 in the detachable hinge-lugs, an air-tight joint is produced between the edge *z* of the door and the raised rim *i* of the furnace front, as shown in the assembled views in Figs. 1 and 2. In securing the hinge lugs in position on the front of the furnace section, it is only necessary to insert the bolts *q* in the bolt pockets *r*, as described and shown, and the dowel projections *m* in the cored out recesses *k*. The bolt *q* passes through the cored out opening *p*, and when the nut 8 is tightened up, the hinge lug is firmly secured in position.

It will be seen from this description, that I have produced a mounting for furnace doors in which the hinge-lugs are interchangeable on any furnace section and also the doors, and that should the pins and lugs of the door in time become so worn or out of place as not to produce an air-tight joint, it is only necessary to put a new set of lugs in place and a new set of hinge-pins, when the joint between the raised projection *i* and the edge of the door will be as tight as in a new furnace. The catches *u* are also interchangeable in the same manner as the hinge-lugs, shown in Fig 4.

Generally, the furnace sections are made so heavy that after the flange *i* and projections *j* have been once milled off, they do not change in shape so that the joint faces between the door and flange are always tight.

One of the principal features of my improvement lies in the fact that by casting the pads *o* on the base portion of the hinge-lugs, as shown in Fig. 4, there is no necessity of milling or machining in order to secure a good bearing surface of the lugs on the milled projections *j*. The three pads *o* will cause the hinge-lugs to firmly seat themselves on the projections *j* when the securing bolts *q* are tightened up. If the lugs are dispensed with, it is necessary to machine the base portions of the lugs, but by the use of pads the operation is avoided and the expense reduced. By constructing a hinge-lug as shown, the cost of production is very much lessened from the fact that no machine work, as stated, is required to be performed on the base portion of the lugs. The location of the dowel *m* may, if desired, be changed from that shown in the drawings to any suitable position on the base portion of the lug, and I do not limit myself to any particular shape or form of hinge-lug nor one which is adapted for use with two cored out recesses, as shown in Fig. 3, since these recesses may, if desired, be joined or connected as shown in Fig. 1 for securing the catch in place on the furnace section.

A further feature of usefulness of the lug *m* is that it materially aids in supporting the door, since the lower edge of this lug rests on the lower edge of the recess *k*, as shown at k^1 in Fig. 2.

My invention entirely does away with the use of the frame construction and also produces a detachable hinge-lug that does not require any marking to designate its place on any particular furnace section, and at the

same time it is an improvement, as it produces an air-tight mounting for doors that are interchangeable.

What I claim, is:—

1. A mounting for furnace doors, comprising in combination with a furnace section having a door-opening, an upstanding flange formed around said opening, offset projections disposed around said flange, and each having a dowel-recess and a bolt socket, and hinge-lugs mounted upon said projections, said hinge-lugs each consisting of a base-portion having a bolt-hole disposed centrally of its lower end, a plurality of upraised pads spaced around said hole and from one another to form a three-point bearing, a dowel projecting rearwardly from said base-portion and spaced from said pads, said dowel being entered in said dowel recess in its respective projection, a head-portion and a bolt passed through said bolt-hole and caught in said bolt socket below said dowel-recess.

2. A mounting for furnace doors, comprising in combination with a furnace section having a door-opening, an upstanding flange formed around said opening, offset projections formed on said flange and each having a dowel recess and a bolt socket, and hinge and catch lugs secured in said projections, said lugs each consisting of a head-portion a base-portion depending from said head-portion and having a centrally disposed bolt-hole, a rearwardly projecting dowel extended from the base-portion behind said head and occupying said recess in its respective projection, a plurality of pads surrounding and spaced from said bolt-hole, to form a three point bearing, and means extending through said bolt-hole and engaging in said bolt-socket.

3. A mounting for furnace doors, comprising in combination with a furnace section having a door-opening, a flange formed around said opening and offset projections adjoining said flange, said offset projections having a dowel-recess and a socketed bolt recess, a catch lug and hinge-lugs provided on said projections, each of said lugs comprising a head portion, a downwardly extending base formed on the back of said head portion, a rearwardly extending dowel member corresponding to said dowel-recess and resting therein, a bolt extending through said downwardly extending base portion and engaging said recess and means formed on said base whereby said bolt is surrounded by a three point bearing.

4. A furnace section having an opening therethrough, a door for the opening, said door having integral hinge-lugs, a flange and projection members provided on said furnace section and surrounding the door opening, the projection members having recesses therein, the outer surface of said flange and projection members being in the same plane, the flange member being adapted to abut the edge portion of the door, detachable hinge-lugs, means for securing and positioning the same upon the projection members and comprising a dowel on the lugs and a securing bolt for entering the recesses in the projection members, the distance from the bearing surface of the lug to the pin-receiving opening therein corresponding to the distance from the edge portion of the door to the pin-receiving opening in the door hinge-lug, whereby the joint faces between the flange members and the door will coincide throughout.

5. A furnace section having an opening therein, a door therefor, mountings for the door comprising a flange portion provided on the furnace section, with which the edge of the door engages, hinge-lugs detachably supported on the flange for supporting the door, said lugs being provided with bearing pads, and an opening therethrough, the opening being adapted to receive a securing bolt, and a dowel on the base portion of the hinge-lugs for positioning said lugs, the pin-hole in the hinge-lugs being spaced at a definite distance from the pads, substantially as described.

6. In a furnace door mounting, an apertured furnace section having a projection, and a lug carried by said projection, said lug consisting of a head, a base extending below said head, a dowel loosely entering said projection to position said lug, a means socketed in said projection and securing said lug in position, and means interposed between said base and said projection and providing a three point bearing for said base.

GEORGE H. CUSHING.

Witnesses:

WILLIAM T. SMITH,

R. C. HODGE.