E. PANNENBORG.

MANHOLE AND BONNET FOR PIPES AND FURNACE CASINGS.

APPLICATION FILED MAR. 24, 1909.

934,751.

Patented Sept. 21, 1909.

2 SHEETS—SHEET 1.

Fig. 1.

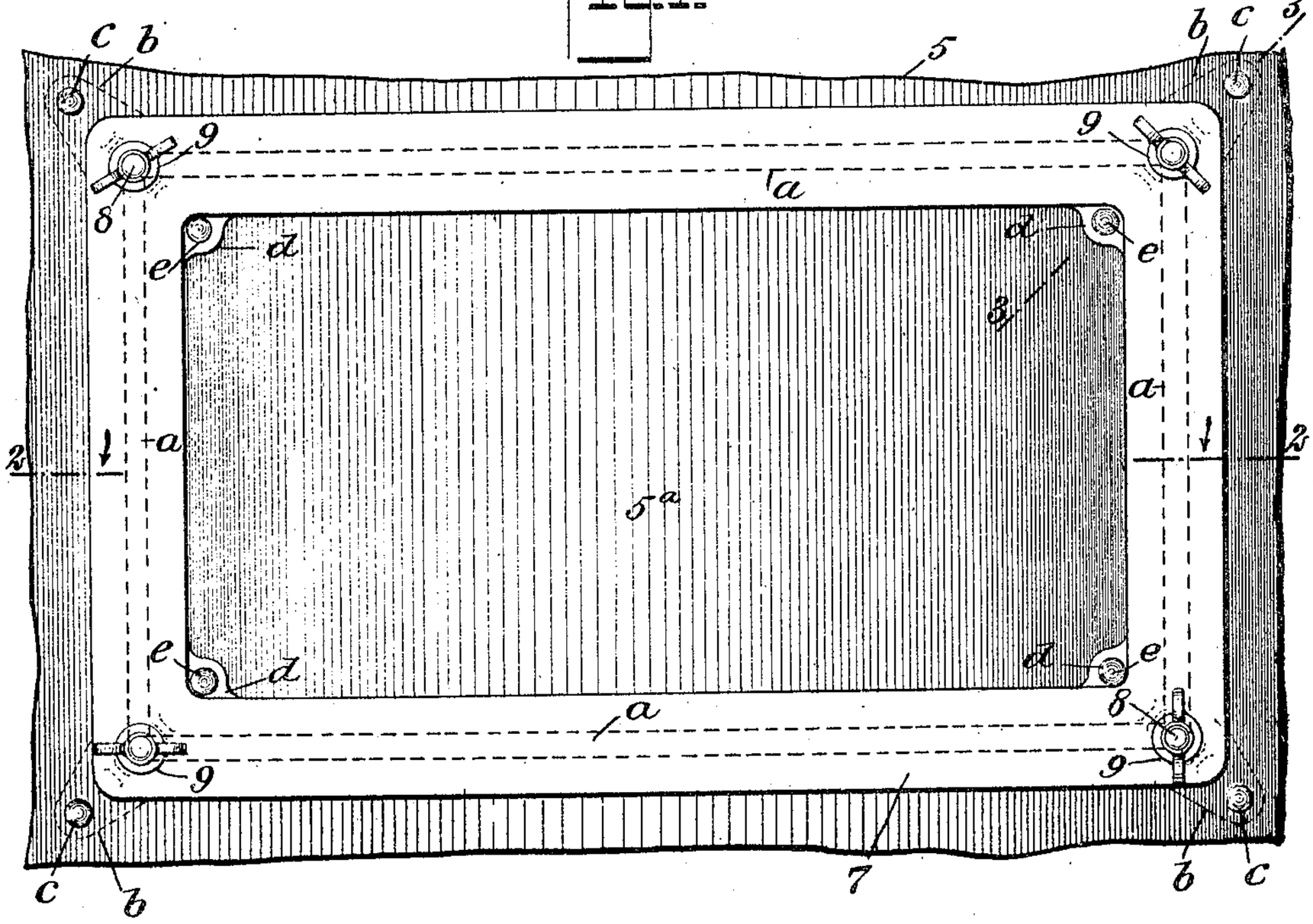


Fig. 2.

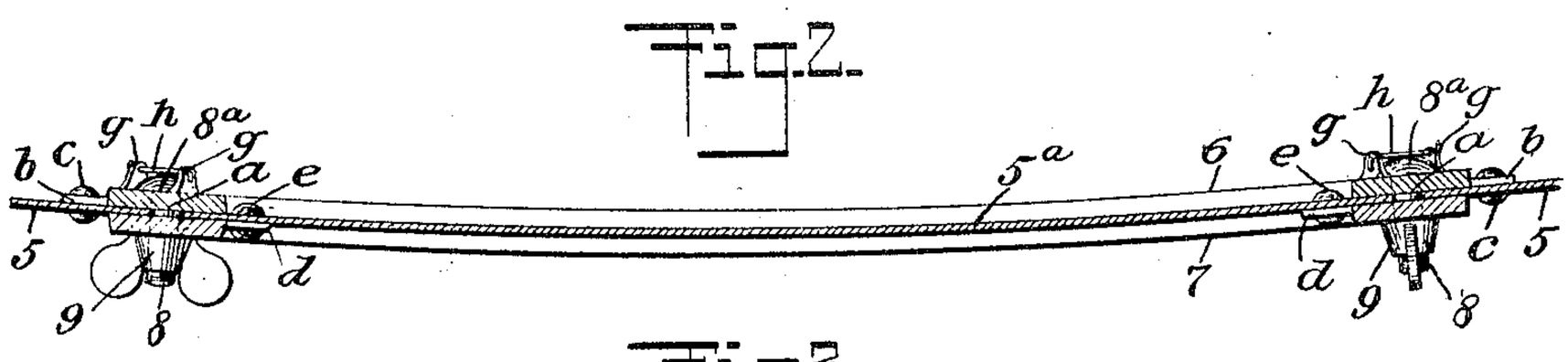
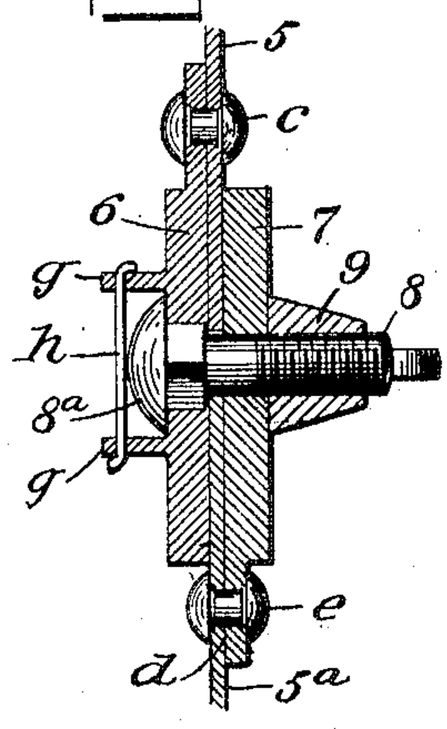


Fig. 3.



WITNESSES

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2 SHEETS—SHEET 2.

Fig. 4.

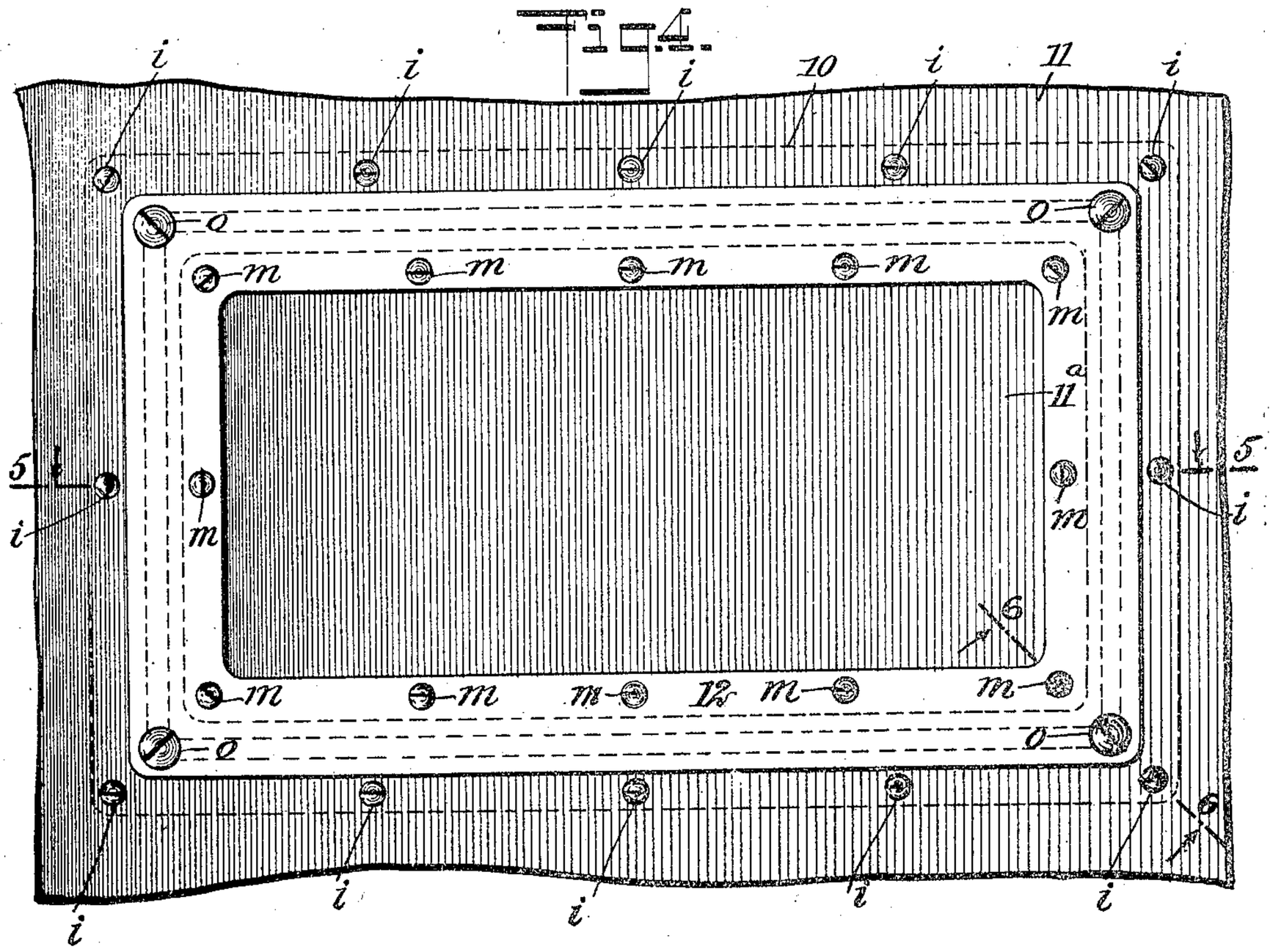


Fig. 5.

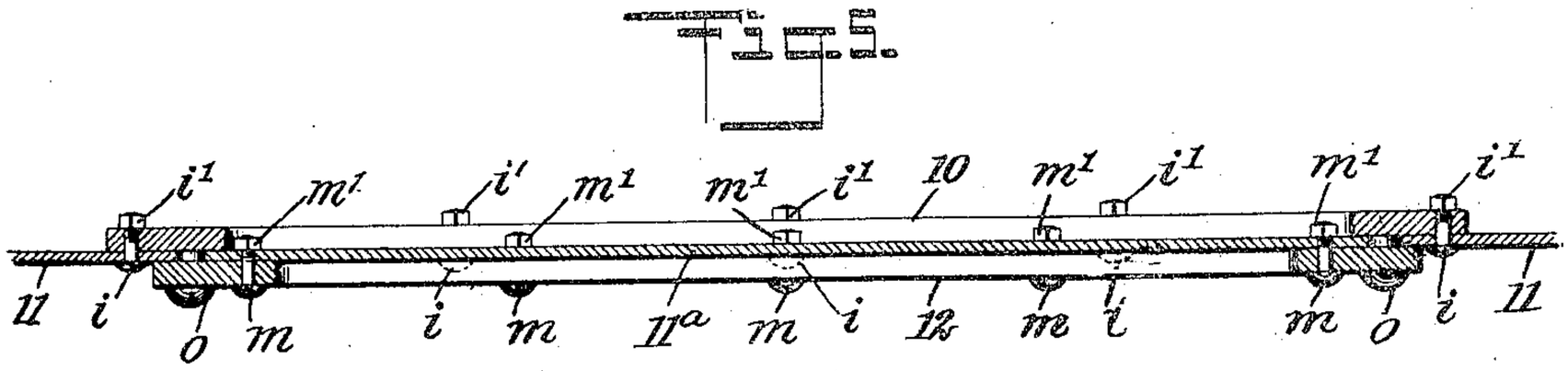
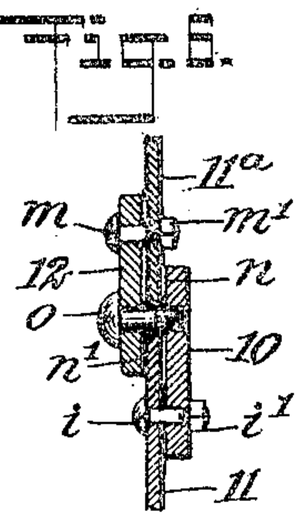


Fig. 6.



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MANHOLE AND BONNET FOR PIPES AND FURNACE-CASINGS.

934,751. Specification of Letters Patent. Patented Sept. 21, 1909.

Application filed March 24, 1909. Serial No. 485,483.

To all whom it may concern:

Be it known that I, ERICH PANNENBORG, a subject of the Emperor of Germany, and a resident of Syracuse, in the county of Onondaga and State of New York, have invented a new and Improved Manhole and Bonnet for Pipes and Furnace-Casings, of which the following is a full, clear, and exact description.

It is well known that in the use of hot air furnaces and hot air conveying pipes therefor, fine ashes and dust accumulate therein, that must be removed at times, to permit the proper heating of inducted air and the free flow of the heated air to points of discharge therefor. Ordinarily, the means for affording access to hot air spaces that intervene between the exterior casing and inner wall of the furnace, is restricted to small hand holes, and the work of cleaning out the ashes or dust is difficult. Further, to remove such accumulations from heat conveying pipes, their complete removal from the furnace casing is required, at an expenditure of considerable time and labor to detach and replace them.

The purpose of my present invention is, to provide novel details of construction for the formation of an ample inlet into hot air spaces in a furnace or a hot air conveying pipe, and for a bonnet for closing such an inlet, which will completely seal the same; and a further object of the invention is to so construct the cover or bonnet for closure of an opening formed in a hot air furnace wall or a hot air pipe, that the material removed in the formation of such an opening will be used in the production of a bonnet or cover therefor, and thus economize material.

The invention consists in the novel construction and combination of parts, as is hereinafter described and defined in the appended claims.

Reference is to be had to the accompanying drawings forming a part of this specification, in which similar characters of reference indicate corresponding parts in all the views.

Figure 1 is a front view of one example of construction of the improvement applied for closure of an opening in a furnace casing or the like: Fig. 2 is a longitudinal sectional view, taken substantially on the line 2—2 in Fig. 1; Fig. 3 is an enlarged transverse sectional view of details substantially on the line 3—3 in Fig. 1; Fig. 4 is a front view of the improved closure as applied, showing a slightly modified construction thereof; Fig. 5 is a longitudinal sectional view, substantially on the line 5—5 in Fig. 4; and Fig. 6 is a transverse sectional view of details substantially on the line 6—6 in Fig. 4.

In the construction shown in Figs. 1, 2 and 3, 5 indicates a portion of a hot air furnace casing or exterior wall thereof, said portion being represented as a segment of a cylinder, but it is to be understood that the improvement is applicable to or upon a flat wall if this is desired. As is indicated in Fig. 1, a preferably elongated rectangular aperture is formed in the casing wall 5, by cutting a correspondingly shaped portion 5^a loose therefrom, substantially on the dotted line *a*, *a*, in said figure, thus permitting free access into the annular space that is formed between the cylinder or fire chamber side wall, not shown, and the outer casing thereof. A rectangular metal frame 6, cast or forged into shape constitutes a half section of the improved closure for the opening in the casing 5, it having such dimensions as permit it to lap evenly upon the marginal portion of the casing wall defined by the line *a a*, when said frame is inserted within the rectangular opening and is seated on said border portion of the casing, having its convex side engaged with the corresponding concave inner surface of said casing. As shown by dotted lines in Fig. 1, an ear *b* is formed on each corner of the rectangular frame 6, and projects diagonally therefrom, these ears having a lapped engagement with the inner surface of the casing wall when the frame is placed in position thereon. The ears *b* and the casing wall 5 are oppositely perforated and receive rivets *c* that are passed through the casing and are upset so as to firmly secure the inner border frame upon the casing 5, surrounding the opening therein. An outer frame 7, similar in form and dimensions to the frame 6 is provided as a border portion for a closure or bonnet, that when in place seals the opening in the casing. The outer frame 7 is concaved on the inner side, so as to closely fit upon the exterior surface of the casing 5, and at each

of the inner corners of said outer frame an inwardly projecting ear *d* is formed thereon. The opening in the outer frame 7 is of such relative dimensions that a border portion thereof will lap upon the corresponding portion of the rectangular cover plate that was cut loose from the casing 5, in the formation of an opening therein. The inner concave surface of the outer border frame 7 conforms to the convex outer surface of the cover plate 5ª, so that a tight joint will be formed between said surfaces where they are secured together. In the ears *d* and cover plate 5ª, alined perforations are formed when the border frame 7 is seated on the cover plate so that it laps evenly at its edges thereon, and in said perforations, rivets *e* are secured, thus completing the cover or bonnet for closure of the opening in the casing 5. Near each corner of the outer border frame 7, a perforation is made that is disposed opposite a similar perforation in the inner border frame 6 and the casing wall 5, each of said through perforations receiving a bolt 8. The perforation for the bolt 8, in each corner of the inner border frame 6, is rectangular, and under the head 8ª of each bolt 8, a corresponding square portion is formed on the bolt body, as is shown in Fig. 3, so that when each bolt is inserted in a respective perforation from the inside outwardly, the threaded outer end thereof will project sufficiently for the reception of a preferably winged nut 9. Two opposite projections *g* are formed on the inner side of the border frame 6, at each corner thereof, the pair of projections at each corner being disposed at opposite points near the head 8ª of an inserted bolt 8, and in said projections that are oppositely perforated, a resilient wire rod *h* is inserted and secured, said keepers by their engagement with the bolt heads preventing an accidental displacement of the same. It will be seen that the bolts 8, when in position, project beyond the outer surface of the casing 5, far enough to pass through the perforations in the respective corners of the outer frame 7, after which the screwed engagement of the nuts 9, with the threaded bodies of the bolts, will firmly clamp the cover plate 5ª in position and seal the opening in the casing 5, the keeper rods *h* holding the bolts in place when the outer border frame is mounted thereon.

The construction of the improvement as represented in Figs. 4, 5 and 6, is substantially similar to that hereinbefore described, the difference as shown, consisting in the employment of screw bolts and nuts *i*, *i'* for securing the inner border frame 10, upon a furnace casing 11, the bolts being preferably inserted in alined perforations formed at intervals in the casing and border frame from the outer side, and the nuts screwed in contact with the inner surface of the inner border frame, as is clearly shown in Fig. 5. A rectangular opening is formed in the casing 11 by removal of a plate 11ª. The outer border frame 12 is of such dimensions that when in position its edges will have clearance from the heads of the bolts *i*, said frame at its inner edge overlapping the plate 11ª cut from the casing 11, and covering a marginal portion thereof sufficiently to permit the insertion of screw bolts *m*, through alined perforations in the plate and frame. The inserted screw bolts pass inward first through the border frame 12, and then through the cover plate 11ª near its edges, and receive nuts *m'* that by proper adjustment firmly secure the border frame and cover plate together. In some cases it may be essential that an airtight joint be formed between the casing 11 and inner border frame 10, and likewise between the outer border frame 12 and the cover plate 11ª; to this end, a thin asbestos joint-ring *n* may be placed between the opposed surfaces of the frame 10 and casing 11, and a similar ring *n'* between the outer frame 12 and the cover plate 11ª, the screw bolts that pass therethrough binding the plates and frames upon the joint rings so as to render the joints airtight. The joint ring *n*, may be extended at its inner edge so that the edge portion of the cover plate 11ª will be seated thereon. The bonnet for closure of the opening in the casing 11, which consists of the plate 11ª and border frame 12, is preferably detachably secured on the casing 11, by four screw bolts *o*, that are inserted through perforations in the outer border frame 12, and in alined perforations in the casing near each corner of the frame 12, these screw bolts engaging opposite threaded perforations in the corners of the inner border frame 10, as shown in Fig. 6. It is to be understood that if more than four clamping screws *o*, are necessary, for the formation of air or fluid tight joints, between the border frames and a casing or the like that receives said closing means for an opening therein, any suitable number are to be provided.

I do not desire to limit the application of the improvement to the closure of openings in furnace casings, as the same may be applied for the closure of openings in water or oil tanks, and other vessels wherein openings are formed, and I wish to reserve the right to apply the improved closure wherever it may be done with advantage.

The accumulations in hot air conveying pipes consist mainly of carpet sweepings and dust from hall floors and rooms, that enter through registers and form coatings on the inner sides of such pipes, and impede the flow of hot air from the furnace. By the provision of the improved removable bonnets for such pipes, an ample opening is provided upon the removal of a bonnet, so

that the dust may be cleaned out from time to time and the pipes rendered clean within, thus destroying microbes that may be harbored and multiplied in the heat-conveying pipes 11.

Having thus described my invention, I claim as new, and desire to secure by Letters Patent:

1. The combination with a casing or the like, and a cover plate cut from the casing forming an opening therein, of an inner border frame having ears thereon secured to the casing wall, an outer border frame having ears secured upon the cover plate, a sealing joint ring between the cover plate and outer border frame, a sealing joint ring between the inner side of the casing wall and the inner border frame, and bolts and nuts thereon adapted for detachably securing the outer border frame and cover plate upon the outer side of the casing wall.

2. The combination with a casing or the like having an opening therein, of a frame encircling the opening on the inner side of the casing and secured thereto, the inner edge of the frame projecting beyond the edge of the opening, a cover fitting within the opening, a frame secured to the edge of the cover and extending therebeyond and lapping on the edge of the opening, and means for detachably securing the frames together.

In testimony whereof I have signed my name to this specification in the presence of two subscribing witnesses.

ERICH PANNENBORG.

Witnesses:

PAUL WOLTER,

FRANKLIN H. CHASE.