

BRIDGE WALL FOR FURNACES.

944,753.


2 SHEETS—SHEET 1.

A detailed technical drawing of a mechanical assembly, likely a valve or a pump component, shown in a cross-sectional view. The drawing includes the following numbered parts:

- 1**: A wavy line at the top and bottom, possibly representing a fluid surface or a flexible seal.
- 2**: A vertical cylindrical component, likely a piston or a valve stem.
- 3**: A horizontal cylindrical component, possibly a connecting rod or a shaft.
- 4**: A small, rounded component at the bottom right, possibly a seal or a plug.
- 5**: A small, rounded component at the bottom left, possibly a seal or a plug.
- 6**: A horizontal cylindrical component on the left, possibly a connecting rod or a shaft.
- 7**: A small, rounded component at the top left, possibly a seal or a plug.
- 8**: A small, rounded component at the top right, possibly a seal or a plug.
- 9**: A large, curved component, possibly a valve or a piston head.
- 10**: A small, rounded component at the top right, possibly a seal or a plug.
- 11**: A small, rounded component at the top right, possibly a seal or a plug.
- 12**: A small, rounded component at the top right, possibly a seal or a plug.
- 13**: A small, rounded component at the top right, possibly a seal or a plug.
- 14**: A small, rounded component at the top right, possibly a seal or a plug.
- 15**: A small, rounded component at the top right, possibly a seal or a plug.
- 16**: A small, rounded component at the top right, possibly a seal or a plug.
- 17**: A small, rounded component at the top right, possibly a seal or a plug.

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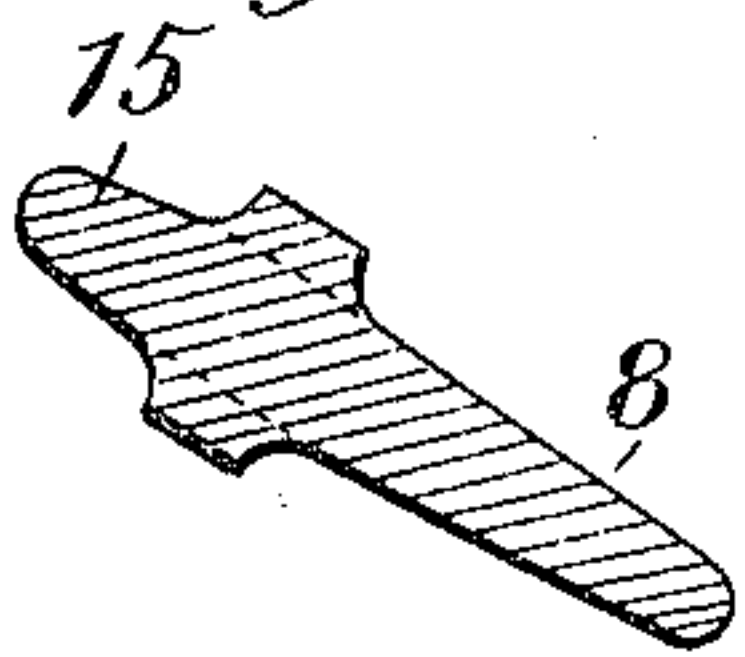
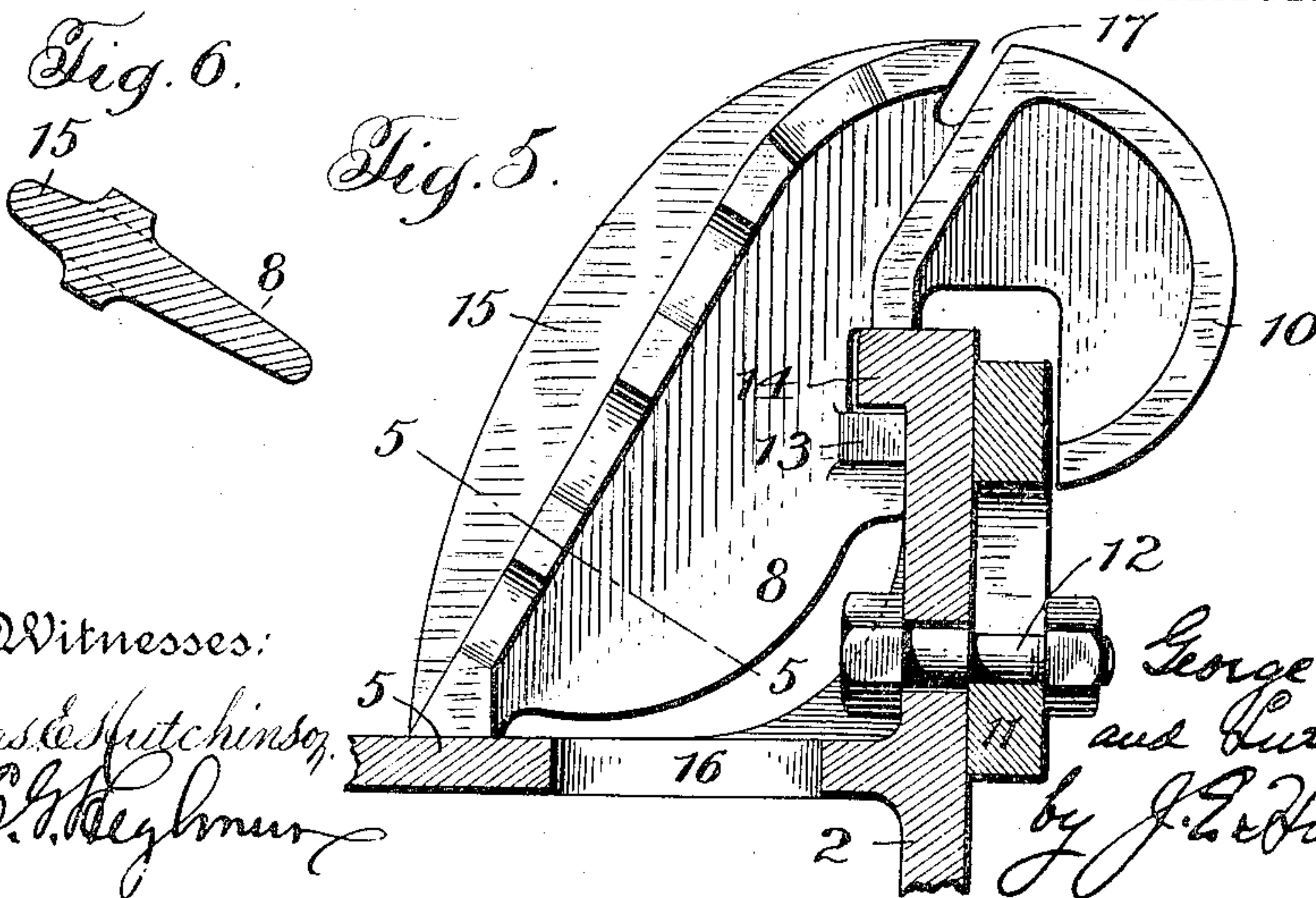
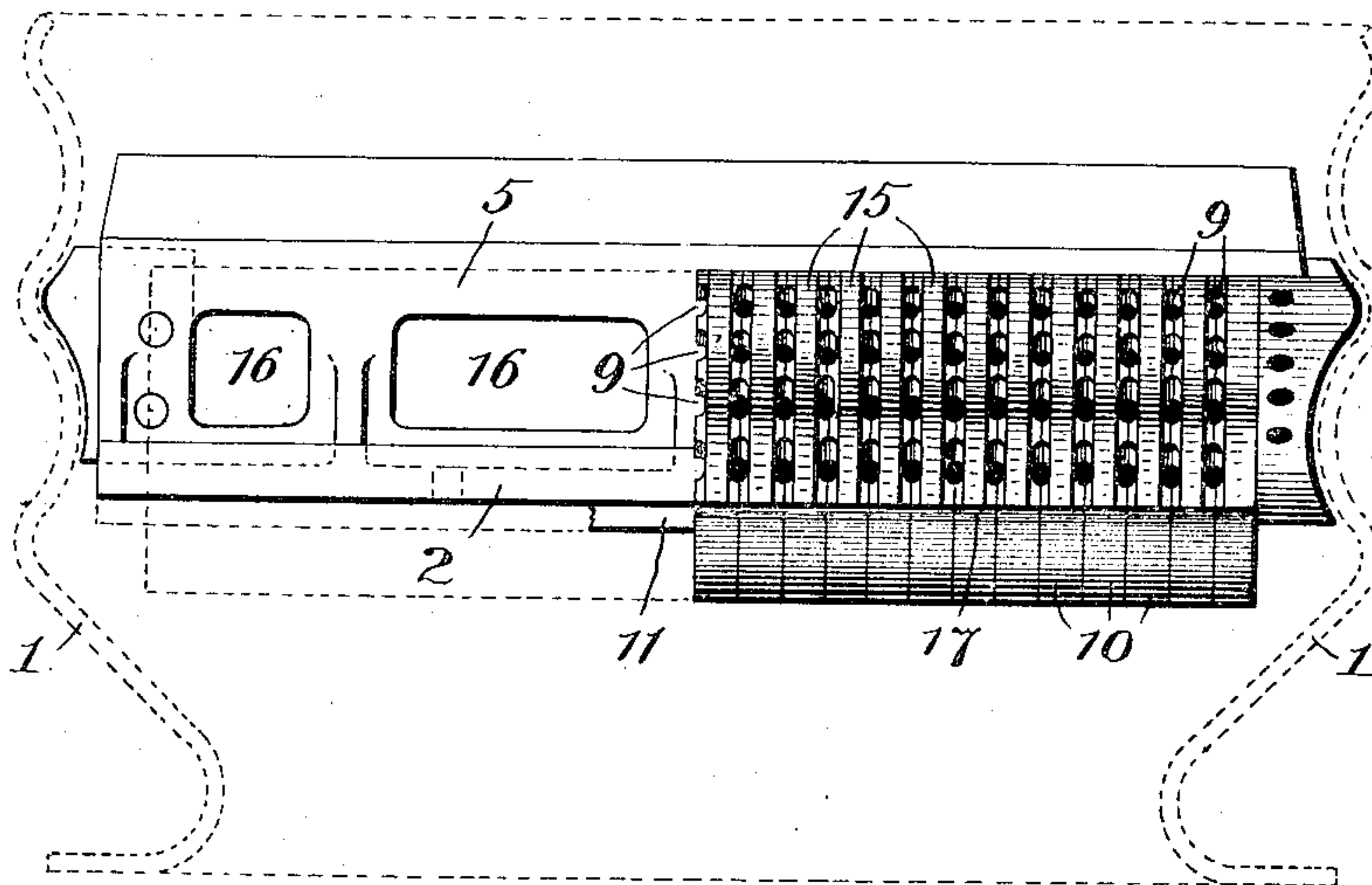
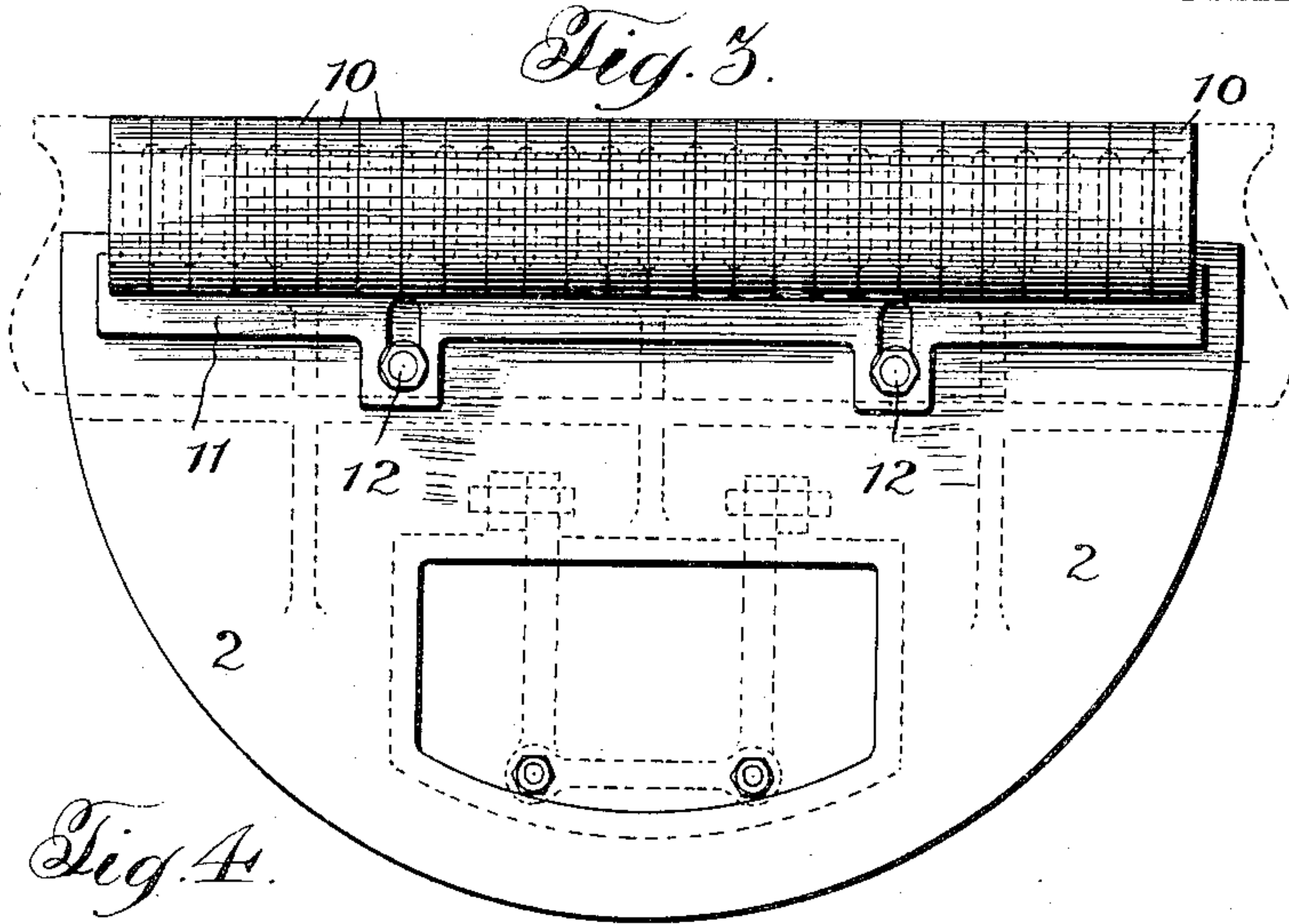
BRIDGE WALL FOR FURNACES.

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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

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BRIDGE-WALL FOR FURNACES.

944,753.

Specification of Letters Patent.

Patented Dec. 28, 1909.

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To all whom it may concern:

Be it known that we, GEORGE WARRINGTON, a citizen of the United States, residing at Washington, District of Columbia, and LUTHER D. LOVEKIN, a citizen of the United States, residing at Overbrook, Philadelphia, in the county of Philadelphia and State of Pennsylvania, have invented certain new and useful Improvements in Bridge-Walls for Furnaces, of which the following is a specification, reference being had therein to the accompanying drawing.

This invention relates to bridge walls for boiler furnaces and the like, and one of the primary objects thereof is to provide an efficient construction for admitting air in a heated state to the fire-box of the furnace so that a substantially complete and perfect combustion will be obtained of all the combustible constituents of the material employed for the fuel, thereby securing great economy in the use of fuel with high efficiency, avoiding the escape of smoke, and preventing the passage of cinders through the boiler-tubes.

A further object of the invention is the provision of a bridge wall structure for the purpose specified which is constructed of a plurality of bridge bars, any one of which being capable of easy removal from its support when desired.

Another object is to provide said bridge bars with heat abstracting ribs or fins which when the bars are assembled upon their support within the furnace, present a corrugated bed or surface to the fuel and thus prevents any clinker adhering to the bridge bars.

A still further object of the invention is to construct the bridge bars with a narrow slot across the top of each bar so that when the bars are assembled the bridge wall will be provided with a continuous slot the whole length of said bridge wall, whereby a sheet of air may be delivered into the fire-box through the top of the bridge wall.

The objects of the invention will appear and the many advantages thereof be appreciated as the same is more fully described.

To effect the ends sought, the invention includes the combination and arrangement of component parts and the details of construction to be hereinafter described, and particularly pointed out in the claims.

In the accompanying drawings:—Figure 1 is a partial longitudinal section through a boiler furnace, illustrating the bridge wall in proper position. Fig. 2 is a cross sectional view of the support for the bridge bars and the locking means therefor, one of said bridge bars being shown in position to be lifted and removed from the support. Fig. 3 is a front elevation of the bridge wall and its support. Fig. 4 is a plan view of the same. Fig. 5 is a similar view to that of Fig. 2, illustrating the bridge bar in locked position; and, Fig. 6 is a cross sectional view of one of the bridge bars, taken on the line 5—5 of Fig. 5, and illustrating clearly the shape of the rib or fin.

Referring to the drawings, 1 denotes a fragmentary part of a boiler furnace, and 2 the supporting plate for the bridge wall bars, said supporting plate being suitably secured to the interior of the furnace structure, and adjacent the furnace grate, by means of the angle iron 3 to which it is bolted, cement being used as indicated at 4 for the purpose of making an air tight joint between the supporting plate and the furnace structure. Extending from the plate and at a right angle thereto, is a supporting shelf 5 upon which the lower ends of the bridge bars are adapted to rest, said supporting shelf being preferably made integral with the plate 2. This shelf 5 also serves as a support for the grate bars 6 of the furnace grate, said grate bars resting upon a beveled surface as indicated at 7.

The bridge bars are indicated at 8, and the same are formed preferably of a shape substantially as shown in the drawings, it being an important feature of the invention to make said bars of considerable depth so as to enable the same to store up heat for the purpose of thoroughly heating the air admitted between the bridge bars from the ash pit. Furthermore the bridge bars are formed with recesses or notches 9 upon opposite sides thereof so that when the bars are assembled the bridge wall shall have the requisite area of draft openings. It is also to be noted that the bridge bars are provided with a hooked upper end 10 which enables the bars to be supported or hung from the upper end of the plate 2, said bars resting at their lower ends upon the shelf 5 as heretofore explained.

The bridge bars are shown in Figs. 1 and 5 as in normal and operative position, the same being locked in such position by a lock-bar 11 movably secured to the plate 2 by means of the securing bolts 12, said bolts serving to retain the lock-bar in either its locked or unlocked position. As will be seen on reference to the drawings, the lock-bar when in locked position will be interposed between the hooked end of the several bridge bars and the plate 2, and owing to the fact that a lug or projection 13 is formed on the bridge bar adjacent the hooked end thereof and adapted to engage the under side of a projecting ledge 14 upon the upper end of the supporting plate 2, it will be readily understood that it will be impossible to remove any one of the bars from its support when the lock-bar is in locked position.

To remove any one of the bars from its support, (and it is to be understood at this point that this may be accomplished without disturbing the other bridge bars), it is only necessary to unscrew the nuts on the bolts 12 and allow the lock-bar to drop into the position substantially shown in Fig. 2, which will permit the bridge bar to be moved into a position as shown in said Fig. 2, and thus allow the projection 13 to clear the ledge 14 on the plate 2 when the bridge bar is lifted from its support. It will be readily understood that the lock-bar 11 is used for locking all of the bridge bars to their support, and that when said lock-bar is lowered to unlocked position as heretofore described, any number of the bridge bars may be removed as desired. It is to be further noted with reference to the construction of these bridge bars that they are formed with a rib or fin 15, which ribs, when the bars are assembled, present practically a corrugated bed or surface to the fuel, and it has been found that such corrugated bed absolutely prevents any clinker adhering to the several bridge bars.

In addition to the main purpose of the ribs or fins 15, it will be understood that these ribs give to the bridge bar a greater depth than they would otherwise have, and thus an efficient heating of the air which passes between the bars is provided for. In this connection, it is to be noted that the air from the ash pit is admitted to the bridge bars through the air-apertures 16 formed in the supporting shelf 5, and then passes between the bars and through the openings formed by the recesses 9 when the bars are assembled, thus permitting the introduction of heated air from the ash-pit through the bridge wall to be discharged at a point over the fire in the fire box, and readily combine with the fuel gases and products and assure a complete and perfect combustion of the same.

Each of the bridge bars are further constructed with narrow slots 17 which when

the several bars are assembled form one continuous slot the whole length of the bridge wall, and it is to be noted that air from the ash pit is also admitted into the fire box through this slot, so that a sheet of air is thus forced through the top of the bridge wall.

The structure herein described is one that can be fitted into any furnace of the nature mentioned, without requiring the furnace to be altered in any particular, and owing to the novel manner of forming the several bridge bars, heated air from below the bars may be conducted between and discharged from the same in such a direction and at a point to intercept the liberated gases and unconsumed smoke, soot, particles of coal, etc., to insure perfect and complete combustion before the same shall have passed from the furnace, as it otherwise would, in an unconsumed state.

The construction and operation of our invention will be readily understood upon reference to the foregoing description and accompanying drawings, and it will be appreciated that the parts and combinations recited may be varied within a wide range without departing from the spirit and scope thereof.

What we claim is:—

1. A bridge wall for furnaces, comprising a fixed supporting member, a plurality of bars carried by said member, and a movable element for simultaneously locking the bars in position.
2. A bridge wall for furnaces, comprising a fixed supporting member, a plurality of bars carried by said member, and an element movable relative to the bars for simultaneously locking all the bars in position.
3. A bridge wall for furnaces, comprising a fixed supporting member, a plurality of bars carried by said member, and a movable element independent of the bars for simultaneously locking all the bars in position.
4. A bridge wall for furnaces, comprising a fixed supporting member, a plurality of detachable bars carried by said member and having air spaces between them, and a movable lock-bar for simultaneously locking all of the bars in place and permitting any one of the same to be removed without disturbing the others.
5. A bridge wall for furnaces, comprising a plurality of bridge bars, each bar having a rib or fin extending from the front face of said bar and projecting into the fire-box of the furnace, said ribs when the bridge bars are assembled forming a corrugated bed or surface for the fuel.
6. A bridge wall for furnaces, comprising a plurality of bridge bars, arranged side by side and formed to provide air openings through the bridge wall, and an anti-clinking rib or fin formed on each of the bars.

7. A bridge wall for furnaces, comprising a vertically disposed supporting plate, a supporting shelf extending at an angle to said plate, a plurality of bridge bars supported at their upper ends by the supporting plate and at their lower ends by the supporting shelf, and a lock-bar adapted when in locked position to be interposed between the supporting plate and a portion of the upper ends of all of the bridge bars.

8. A bridge wall for furnaces, comprising a vertically disposed supporting plate having a ledge projecting at an angle thereto, a plurality of bridge bars supported by said vertical plate, each of said bars being provided with a lug or projection adapted to engage the underside of the projecting ledge when the bridge bars are in locked position but capable of clearing the ledge when in unlocked position, and a locking means for all of the bars.

9. A bridge wall for furnaces, comprising a supporting plate having a locking ledge formed thereon, a plurality of bridge bars supported by said plate, each of said bars being provided with a lug or projection adapted to engage beneath the locking ledge when the bars are in locked position but capable of clearing the ledge when in unlocked position, and a lock-bar adapted to engage between the supporting plate and a portion of the several bridge bars for holding the lugs or projections in engagement with the locking ledge and thus preventing the removal of the bridge bars.

10. A bridge wall for furnaces, comprising a vertically disposed supporting plate having a locking ledge formed thereon, a plurality of bridge bars having hooked ends which straddle the plate for supporting the

bridge bars, each of said bars being provided with a lug or projection adapted to engage the said locking ledge when the bars are in locked position but capable of clearing the ledge when in unlocked position, and a lock-bar adapted to be interposed between the hooked end of all of the bridge bars and the supporting plate for holding the lugs in engagement with the locking ledge.

11. A bridge wall for furnaces, comprising a plurality of bridge bars each of which is provided with a transverse slot so formed that when the bars are assembled a continuous elongated slot is provided in the bridge wall for permitting a sheet of air to be passed through the same.

12. A bridge wall for furnaces, comprising a vertically disposed supporting plate having a supporting shelf extending at an angle to said plate and provided with air apertures, a plurality of bridge bars having air spaces between the same and supported at their upper ends by the supporting plate and at their lower ends by the supporting shelf, and a lock-bar adapted when in locked position to be interposed between the supporting plate and a portion of the upper ends of all of the bridge bars.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE WARRINGTON.

Witnesses:

HENRY E. COOPER,

FLORENCE E. POPKINS.

In testimony whereof I affix my signature in presence of two witnesses.

LUTHER D. LOVEKIN.

Witnesses:

MARY I. BRADLEY,

JAMES J. BRADY.