

J. B. BERNHARD.

FURNACE GRATE.

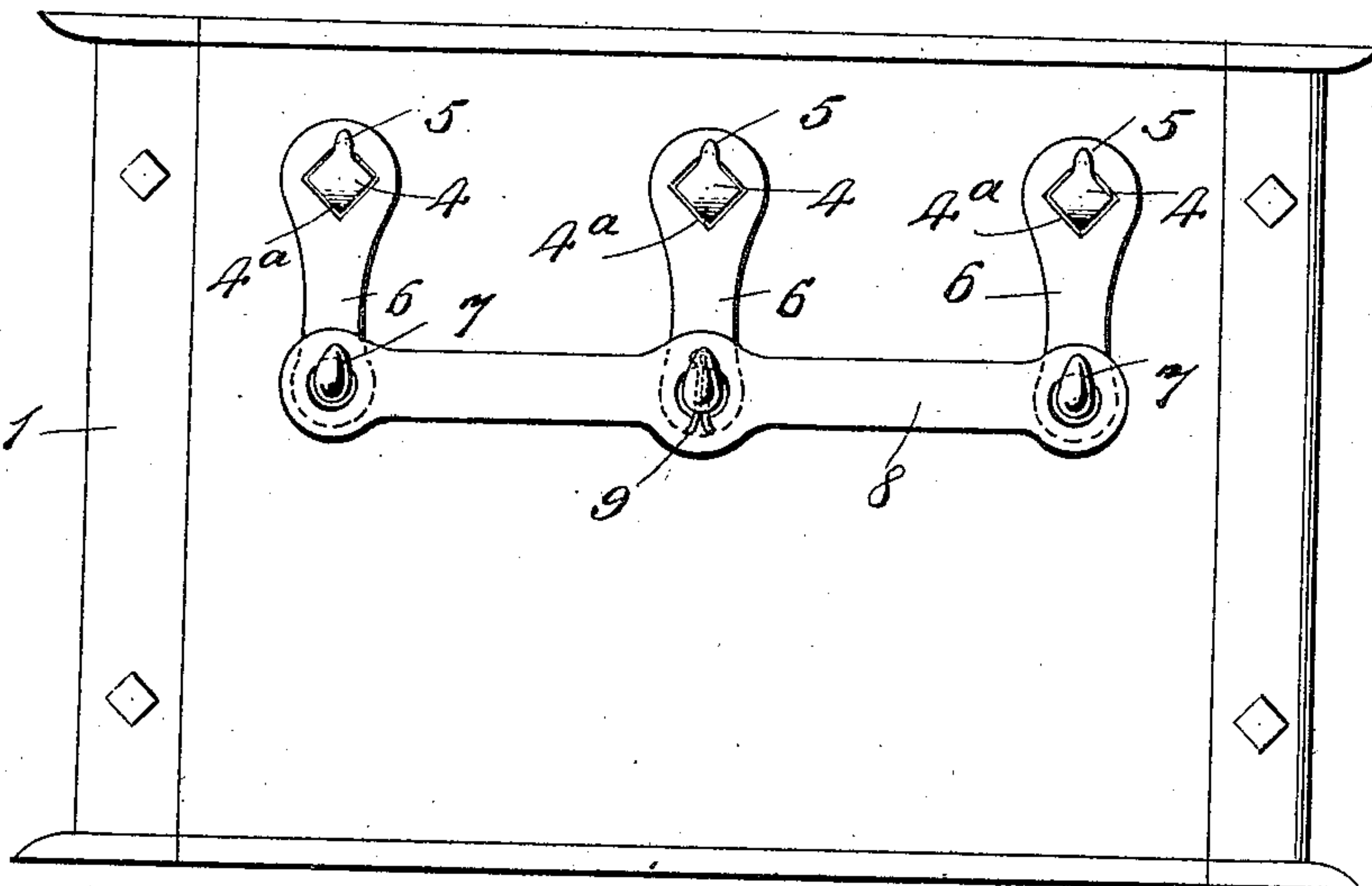
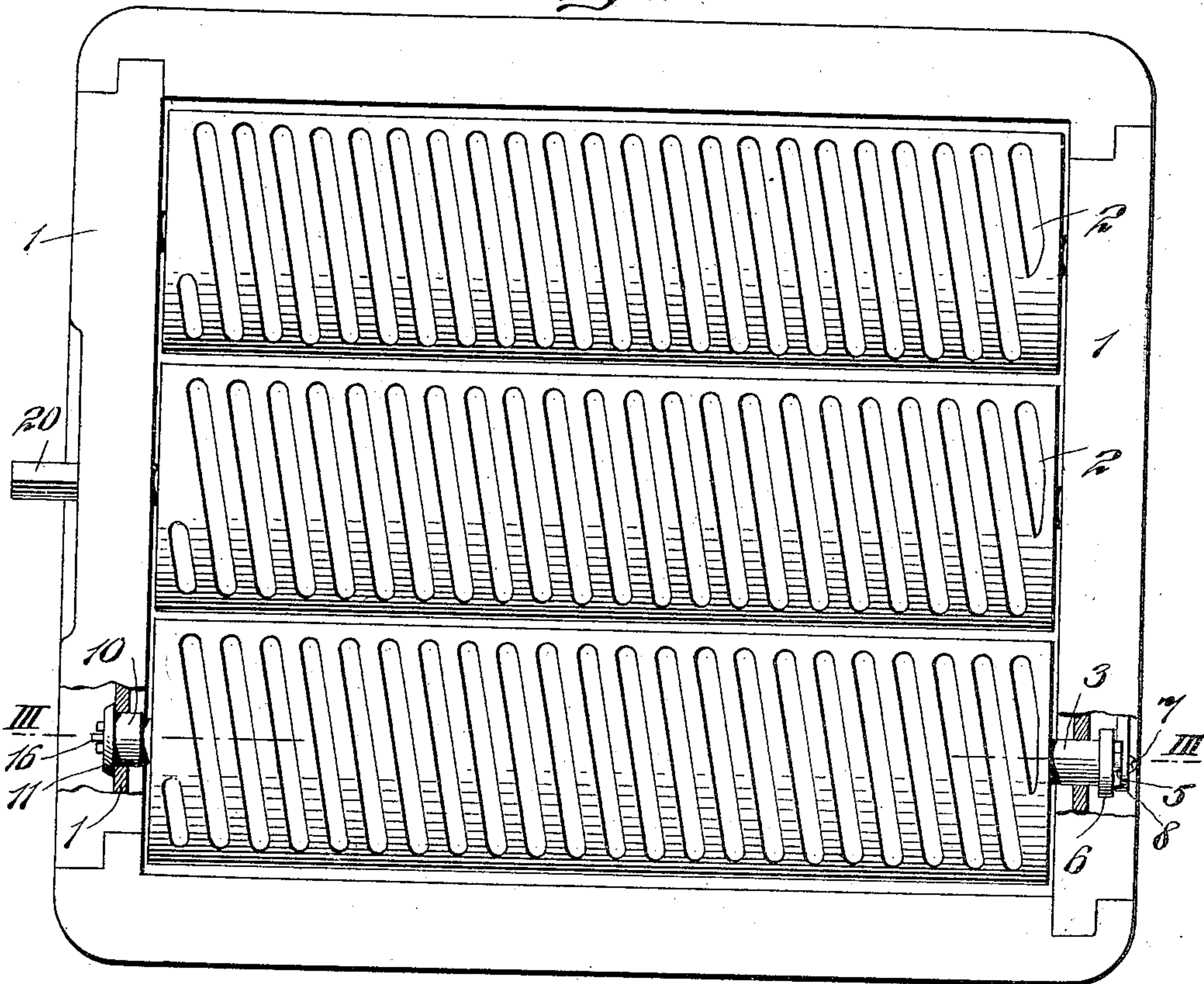
APPLICATION FILED SEPT. 28, 1908.

917,406.

Patented Apr. 6, 1909.

2 SHEETS—SHEET 1.

Fig. 1.



Witnesses:
Julius H. Smith
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Fig. 2.

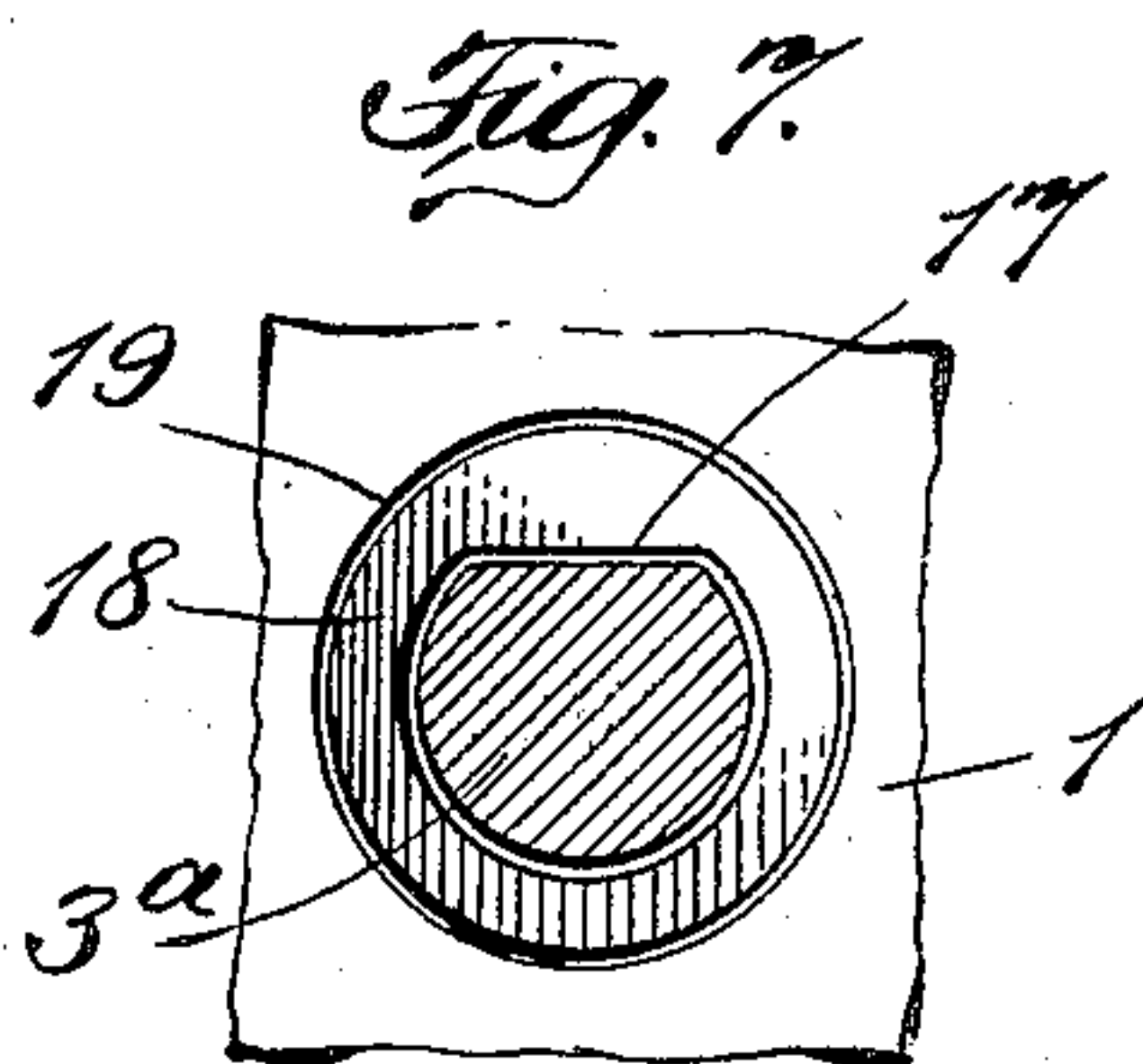
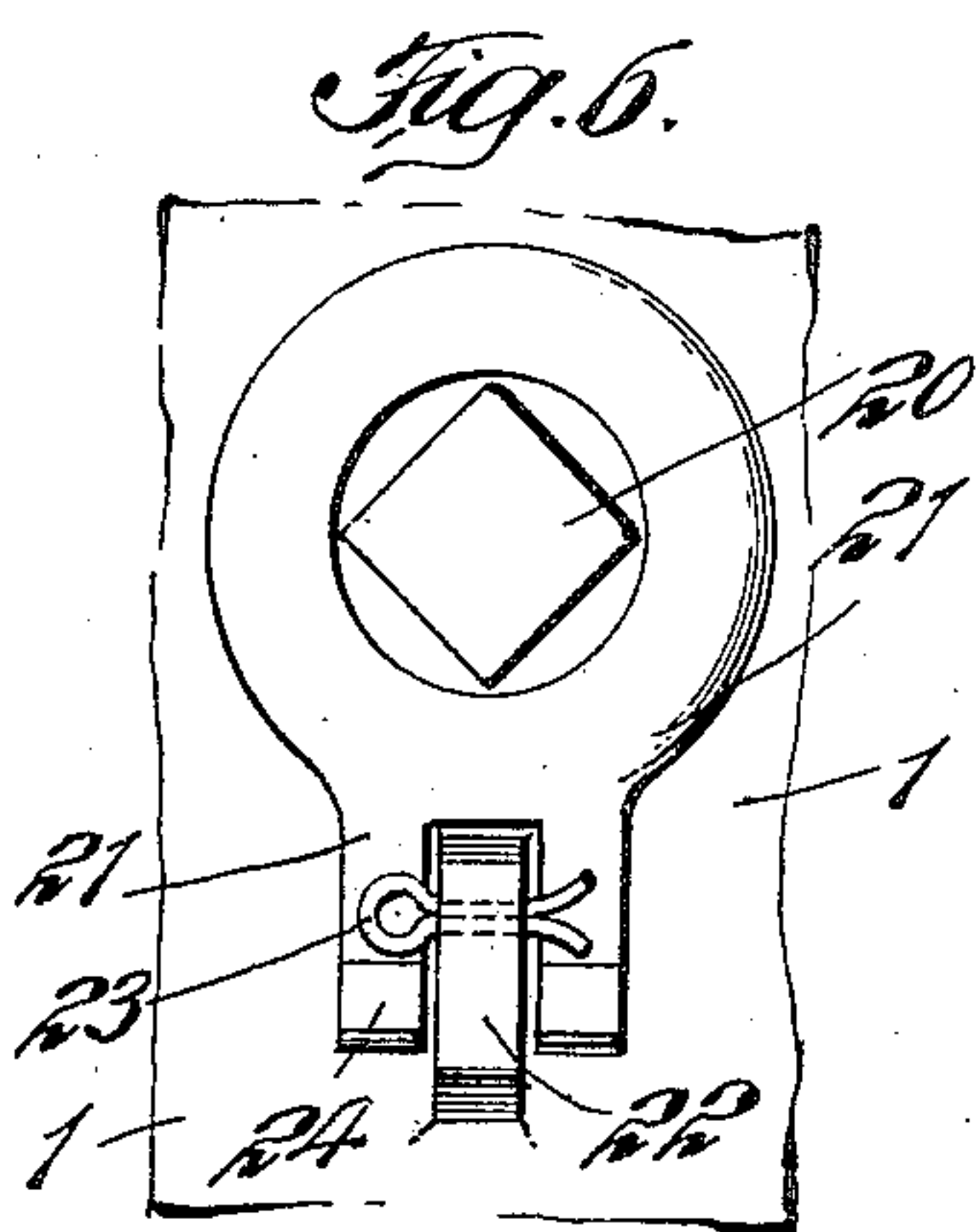
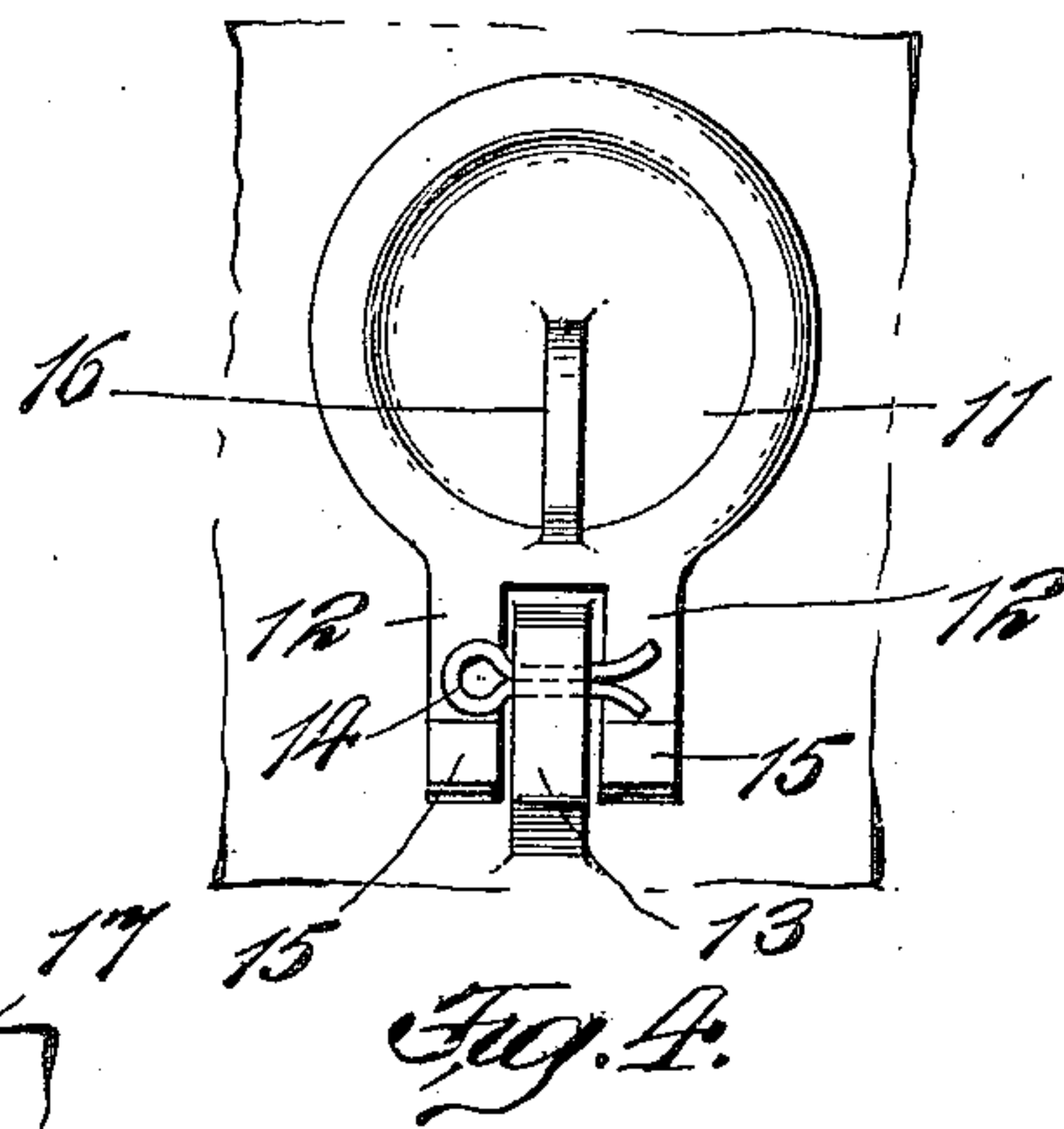
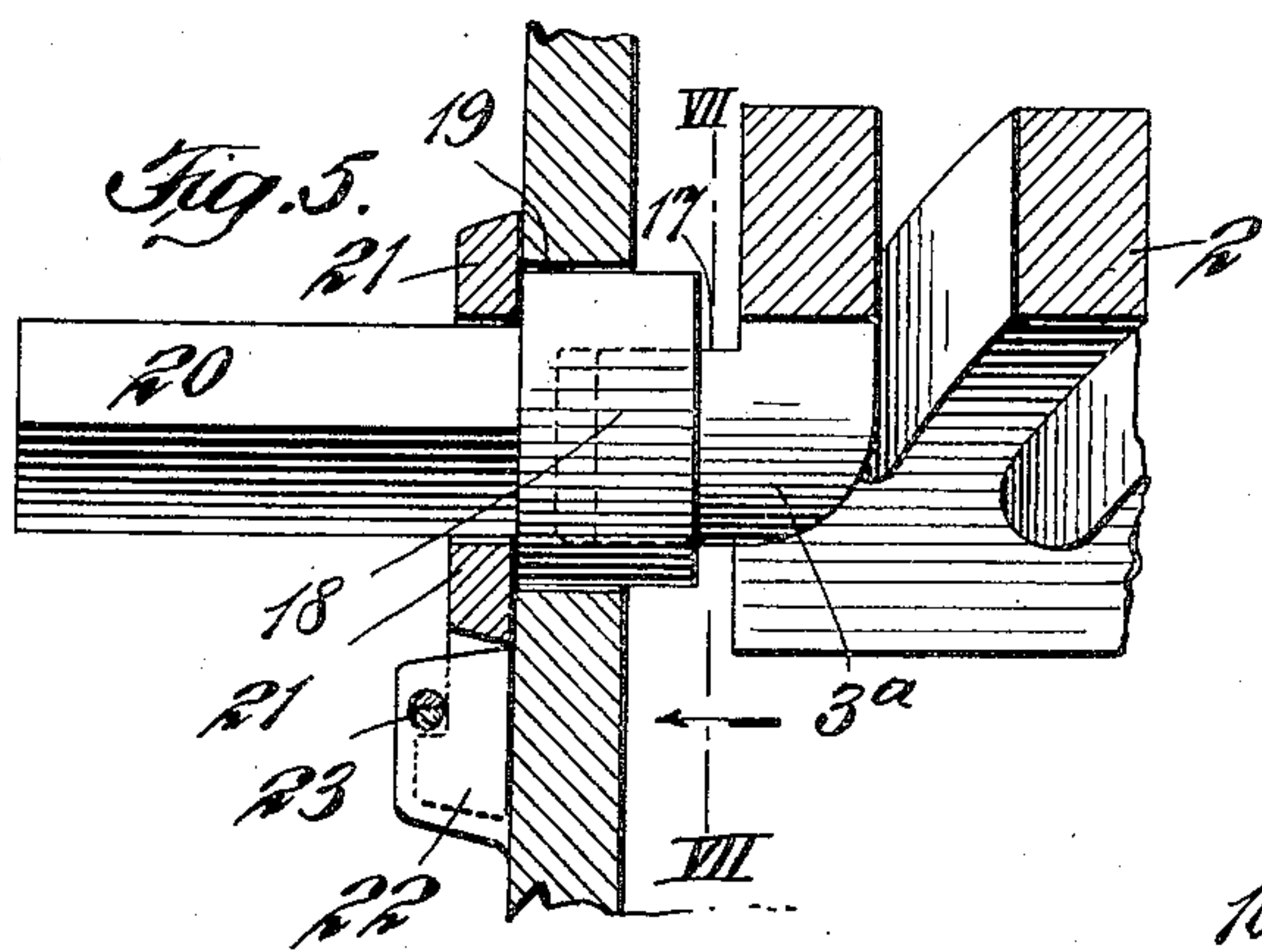
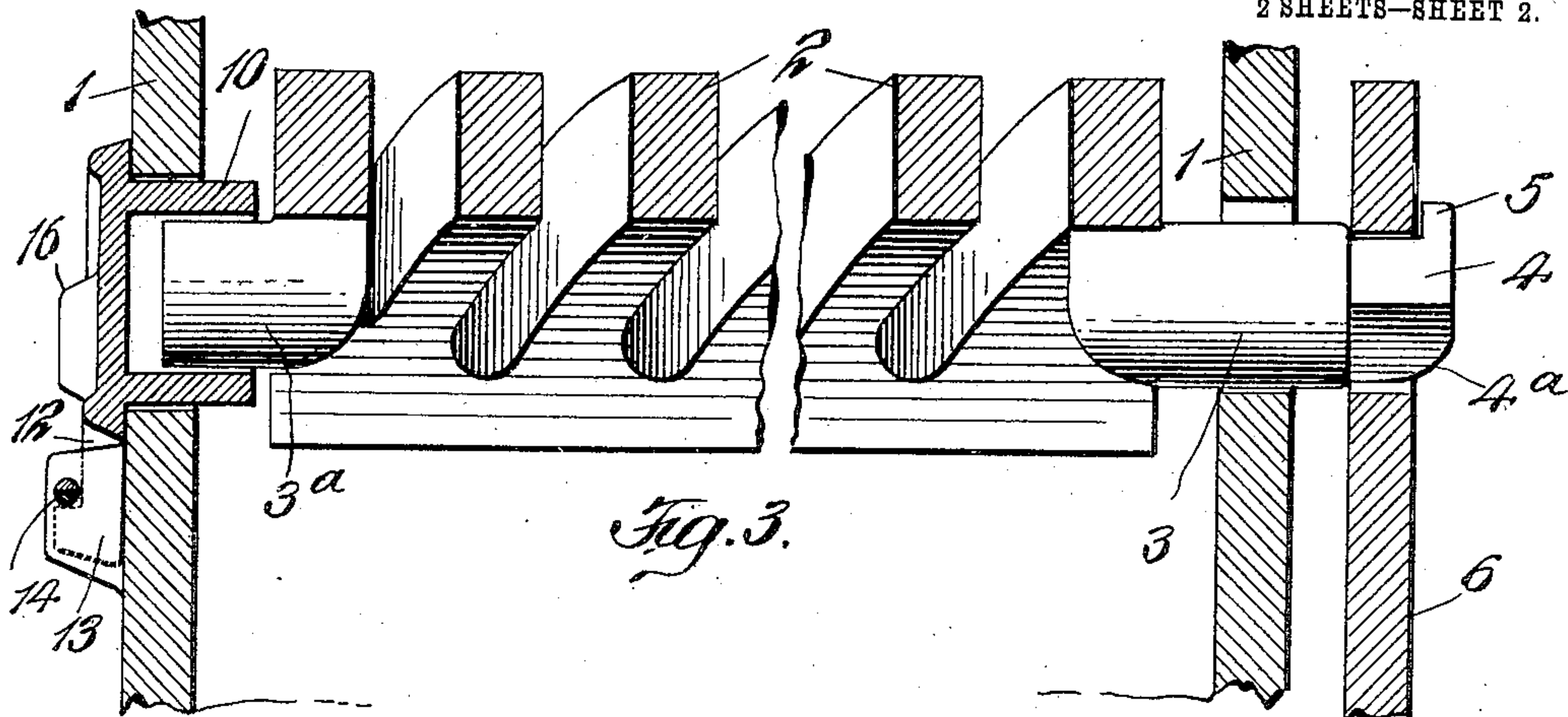
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2 SHEETS—SHEET 2.



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UNITED STATES PATENT OFFICE.

JOHN B. BERNHARD, OF NEWARK, NEW JERSEY, ASSIGNOR TO THATCHER FURNACE COMPANY, OF NEWARK, NEW JERSEY, A CORPORATION OF NEW JERSEY.

FURNACE-GRATE.

No. 917,406.

Specification of Letters Patent.

Patented April 6, 1909.

Application filed September 28, 1908. Serial No. 455,071.

To all whom it may concern:

Be it known that I, JOHN B. BERNHARD, a citizen of the United States, residing in the city of Newark, county of Essex, and State of New Jersey, have invented certain new and useful Improvements in Furnace-Grates, of which the following is a specification, reference being had therein to the accompanying drawings, in which—

Figure 1 is a plan view of the grate and its supporting frame; Fig. 2 a side elevation; Fig. 3 vertical sectional view of one of the grate bars and a portion of the supporting frame; Fig. 4 a detail side elevation showing one of the bearing thimbles for the grate bars; Fig. 5 a detail vertical sectional view of one end of one grate bar showing the means for attaching the crank-receiving portions of the grate bar; Fig. 6 a detail end elevation of the part shown in Fig. 5; and Fig. 7 a transverse vertical sectional view on the line VII—VII of Fig. 5.

One of the main objects of this invention is to provide a grate wherein the securing means may be manipulated entirely from the exterior of the grate-supporting frame. The purpose of this is to simplify the construction of the grate so that it may be quickly and readily installed, or removed from the furnace. Another purpose of this construction is to protect, as far as possible, the grate-operating parts and the grate bar supporting means from the heat of the fire.

Another object of the invention is to so construct the grate bars and their supporting means that the grate may be installed or removed from the furnace without disturbing any of the parts of the fire box or the grate-supporting frame.

A further object of the invention is to so construct the grate bars that the grate bar rocking means is outside of the ash pit, said means being so constructed that it may be readily disconnected from the grate bars at any time when it may be desired to remove the grate bars from the furnace.

Other objects of the invention, relating more particularly to the construction of the grate bar supporting means, will appear hereinafter.

Referring to the various parts by numerals, 1 designates the grate supporting frame which, in the construction shown in the drawings, constitutes the ash pit of the fur-

nace. A series of grate bars 2 extend horizontally across the supporting frame, and are provided at one of their ends with journals 3 which extend through openings in the supporting frame. The ends of the journals 3 which extend beyond the supporting frame are squared, as at 4 in Fig. 3, the extreme outer end of the squared portion being provided with an upwardly extending retaining lug 5.

Engaging the squared portion 4 of each grate bar is a depending link or crank-arm 6, said link being formed with a square opening to receive the squared portion of the journal. The lug 5 of each bar prevents the accidental displacement of the link 6. The lower corner of the squared portion 4 is rounded off as shown at 4^a in Fig. 3 to permit the link 6 to be swung outwardly and upwardly to disconnect it from the squared portion by lifting it over the lug 5. Each link 6 is provided at its lower end with an upwardly and outwardly extending hook 7; and engaging all of these hooks is a connecting bar 8, as shown clearly in Fig. 2. The bar 8 is held in engagement with the hooks 7 by means of a cotter pin 9 passing through one of the hooks 7. It will be readily understood that by removing the cotter pin the connecting bar may be detached from the hook 7 and that the links 6 may then be swung upwardly and outwardly to disconnect them from the squared portions 4 of the grate bars. It is obvious that when one of the grate bars is rocked, by means hereinafter described, all of said bars will be rocked in unison by means of the connecting bar 8 and the links or cranks 6.

The grate bars at their other ends are formed with short cylindrical journals 3^a which are adapted to be mounted in bearing thimbles 10. These thimbles are each formed with a face plate 11 which bears against the outer side of the frame 1, and is provided with two downwardly extending arms 12. These arms receive between them the outwardly extending lug 13 formed integral with the supporting frame, as shown clearly in Figs. 3 and 4. The tubular portion of each thimble extends inwardly through an aperture in the supporting frame and receives within it the journal 3^a of one of the grate bars. To secure the thimble and its face plate detachably in position on the

supporting frame, cotter pins 14 are passed through the lugs 13 and bear against the outer faces of the arms 12. To prevent the thimble moving vertically, the lower ends of the arms 12 are formed with outwardly extending lugs 15 which engage the under side of the cotter pin and prevent the thimble and face plate rocking or lifting on the supporting frame during the operation of the grate. Each face plate is formed with a lug 16 designed to be grasped when it is desired to move the face plate and bearing thimble from the supporting frame.

The journal 3^a of one of the grate bars is formed with a flattened upper portion 17, as shown clearly in Fig. 7. This irregularly shaped journal 3^a fits into a similarly shaped bearing socket 18, said socket being cylindrical on its exterior and adapted to rotate in an opening 19 in the supporting frame. The socket is formed with an outwardly extending squared portion 20 which is adapted to receive an operating crank by which the grate may be rotated. To hold the socket in engagement with the grate bar journal a retaining ring 21 is provided. This ring is adapted to fit over the squared portion 20 and against the supporting frame, and is broad enough to bridge the joint between the socket 18 and the supporting frame, to thereby prevent the outward removal of the socket. The retaining ring is formed with two depending arms 21 suitably spaced apart and adapted to receive between them an outwardly extending lug 22 formed on the supporting frame. A cotter pin 23 locks the retaining ring in place; and outwardly extending lugs 24 formed on the lower ends of the arms 21 engage under the cotter pin and prevent any upward movement of the retaining ring.

It will be readily seen that by removing the cotter pins 14 the bearing thimbles 10 may be removed and that by removing the cotter pins 23 the retaining ring 21 and the socket 18 may be removed, thus freeing one end of each of the grate bars. By removing the cotter pin 9 the connecting bar 8 and the crank arms or links 6 may be removed thus freeing the other ends of the grate bars. When the ends of the grate bars are thus freed they may be readily removed without disturbing any portions of the furnace frame.

From the foregoing it is evident that I provide a grate which may be readily installed in a furnace or removed therefrom; and in which the operating means is wholly exterior to the ash pit. The advantages of thus constructing a grate bar supporting means are manifest.

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

1. The combination with a supporting frame of a grate bar formed with a journal at

each of its ends, the supporting frame being formed with apertures to receive the grate bar journals, a bearing thimble adapted to be inserted in one of the apertures in the supporting frame and to receive one end of the grate bar and form a bearing therefor, a face plate formed on the bearing thimble and adapted to engage the outer face of the supporting frame, a radial arm formed on said face plate adapted to bear against the supporting frame, a lug formed on the supporting frame, and means passing through the lug and adapted to engage the radial arm to hold the bearing thimble in the supporting frame and to prevent its accidental disconnection from the grate bar.

2. A furnace grate comprising a supporting frame, a series of grate bars therein, each of said bars being formed with a journal at one end adapted to extend beyond the wall of the supporting frame and at its other end with a short cylindrical journal terminating within the supporting frame, a portion of the said projecting journal being angular in cross section, a depending link mounted on the angular portion of each of said journals, whereby the link and the grate bar will move together, an upwardly extending lug on the end of each journal to prevent the accidental disconnection of the link from the journal, an upwardly extending hook at the lower end of each link, a connecting bar loosely engaging all of said hooks, means for detachably connecting said bar to said hooks, and means for connecting a rocking device to one of the grate bars.

3. The combination of a grate bar formed with a journal, a supporting frame, a bearing thimble formed with a face plate adapted to fit against the outer side of the supporting frame and with a socket adapted to extend inwardly through the supporting frame and to receive the journal of the grate bar, a pair of depending arms formed on the face plate, a lug formed on the supporting frame and extending outwardly between said arms, forwardly extending lugs formed on said arms at the lower ends thereof and a pin extending through the lug on the supporting frame and engaging the arms and the lugs formed thereon to hold the bearing thimble against vertical movement and against an outward movement.

4. A furnace grate comprising a supporting frame, a series of grate bars therein, means connecting said grate bars to move said bars in unison, one of said bars being provided with a short non-cylindrical journal, a bearing socket to receive said journal and adapted to rotate in an opening in the supporting frame, a non-cylindrical crank-receiving part formed on said bearing socket, and a retaining ring on the outer side of the supporting frame and engaging the bearing socket to hold it in engagement with the

grate bar journal, a lug on the supporting frame, and means engaging the lug and the retaining ring to hold the ring in position.

5 5. A furnace grate comprising a supporting frame, a series of grate bars therein, means connecting said grate bars to move said bars in unison, one of said bars being provided with a short non-cylindrical journal, a bearing socket to receive said journal
10 and adapted to rotate in an opening in the supporting frame, a non-cylindrical crank-receiving part formed on said bearing socket,

a bearing ring formed with depending arms, a lug on the supporting frame fitting between said arms, and detachable means engaging 15 the arms and the lug to hold the ring in place.

In testimony whereof I hereunto affix my signature in the presence of two witnesses this 25th day of Sept. 1908.

JOHN B. BERNHARD.

Witnesses:

FREDERICK SCHARRINGHAUSEN.

WALTER G. SPEER.