

No. 631,479.

Patented Aug. 22, 1899.

O. THOST.
HOT AIR FIRE BRIDGE.

(Application filed Apr. 8, 1899.)

(No Model.)

Fig. 3.

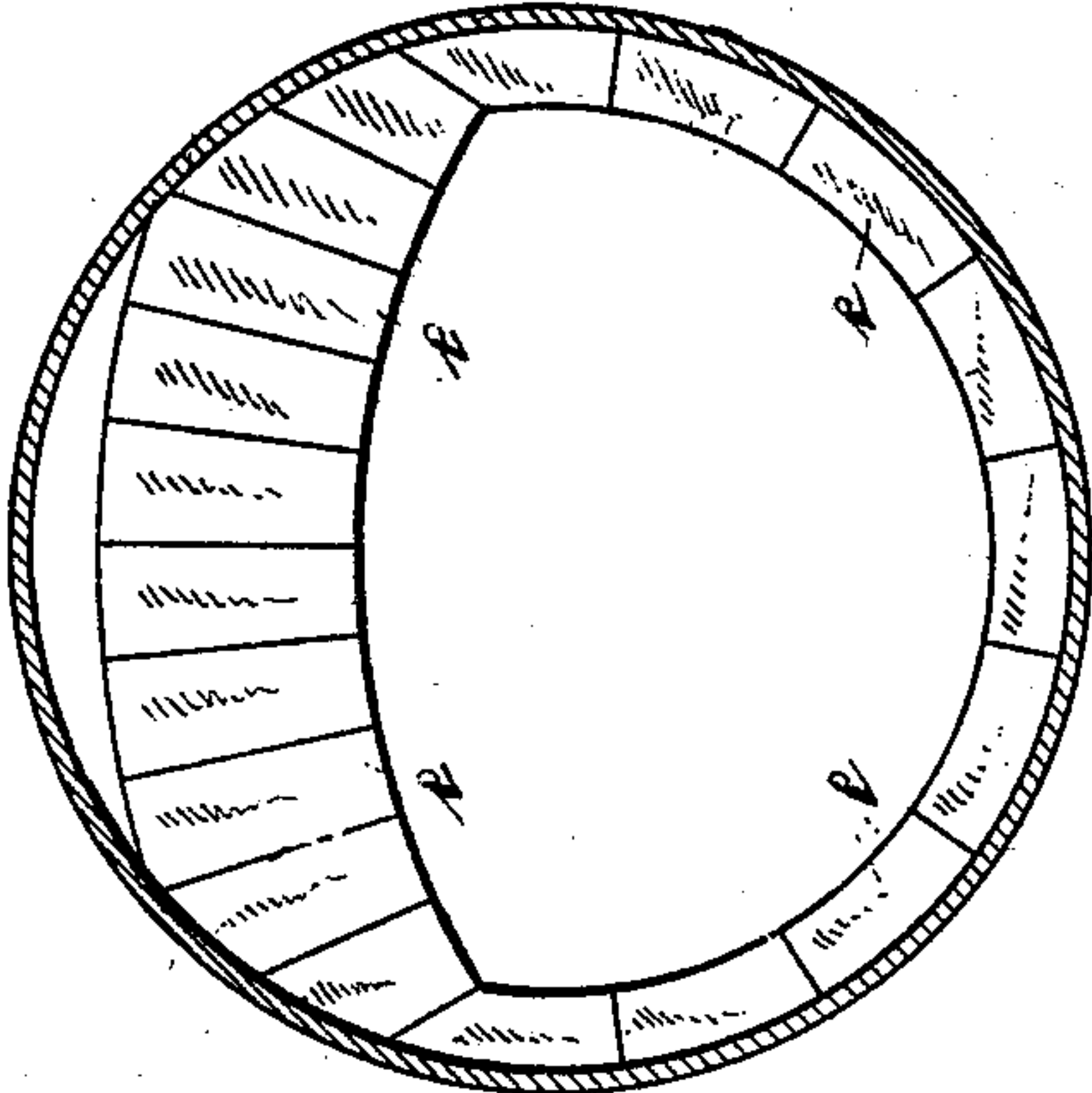


Fig. 1.

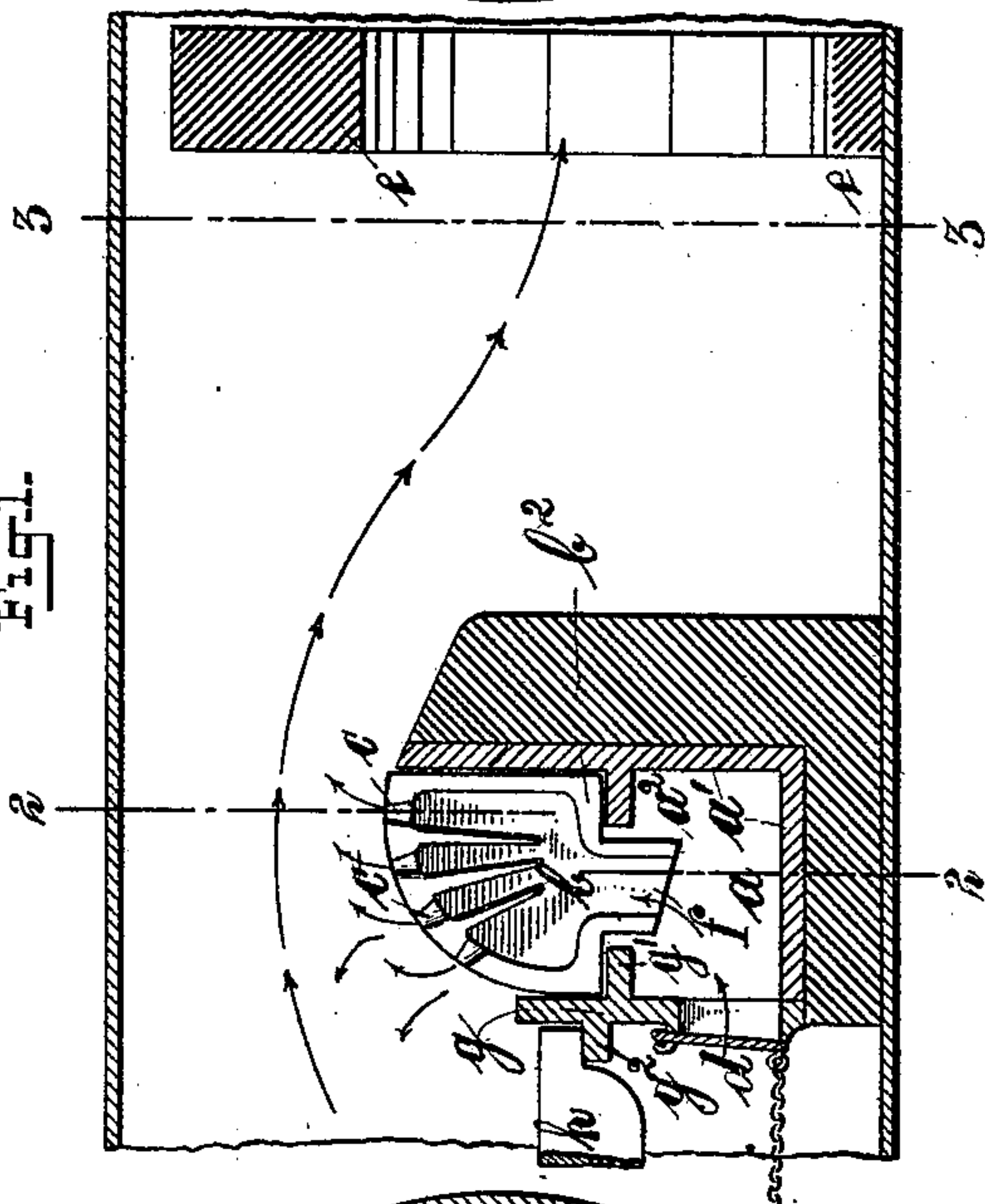
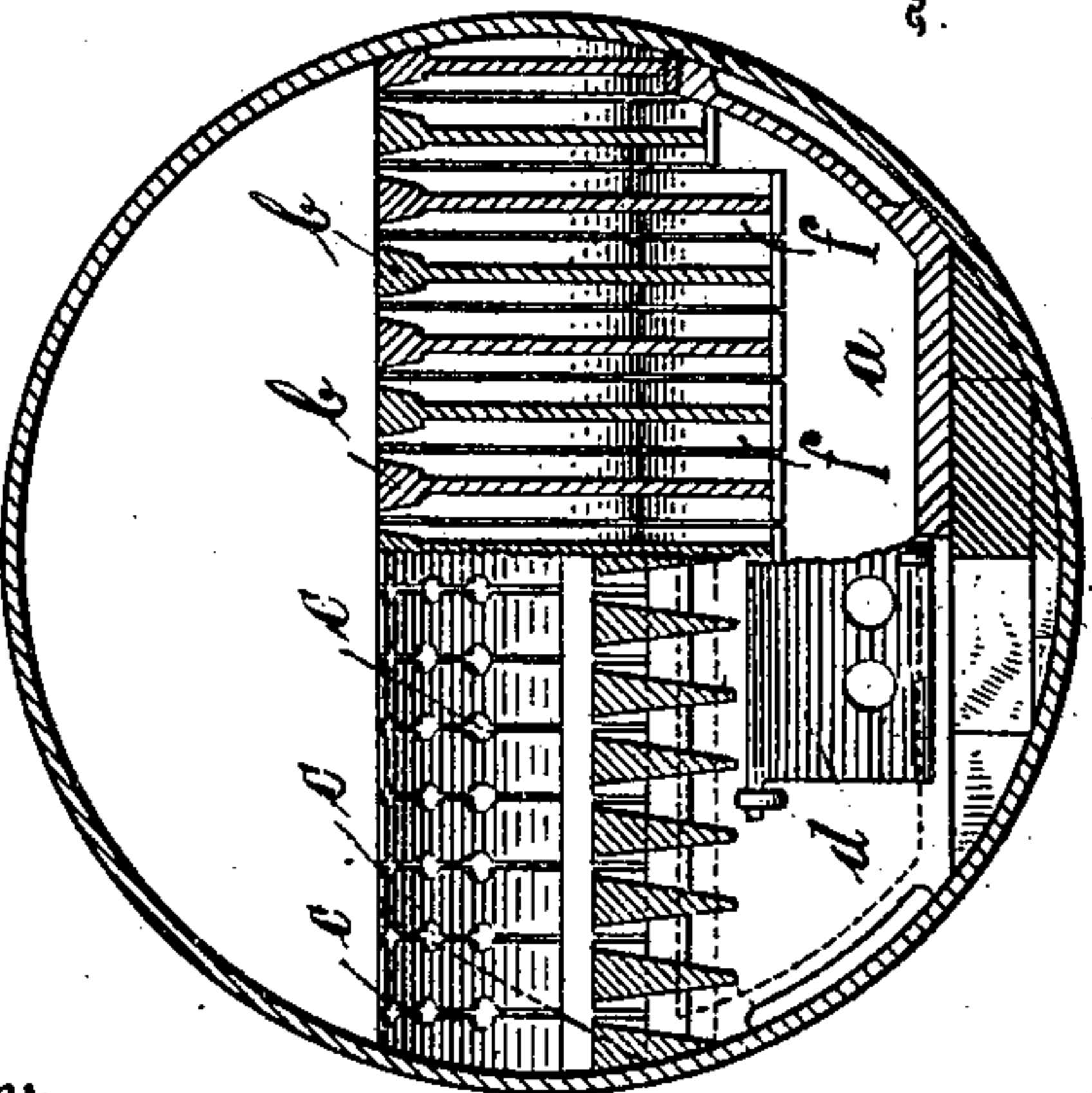


Fig. 2.



Witnesses:

Geo. W. Kaylor
J. H. Mager

Fig. 5.

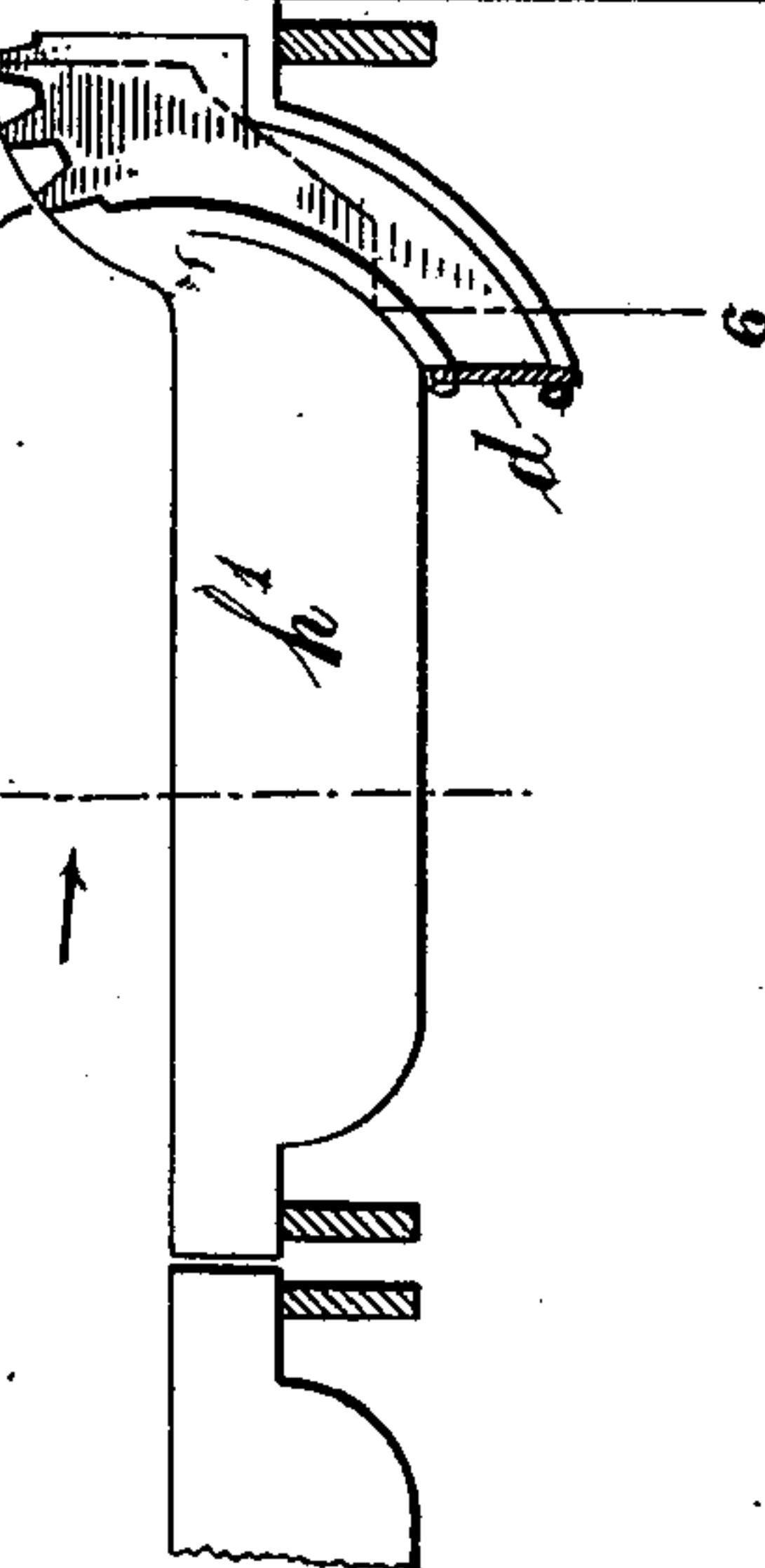


Fig. 4.

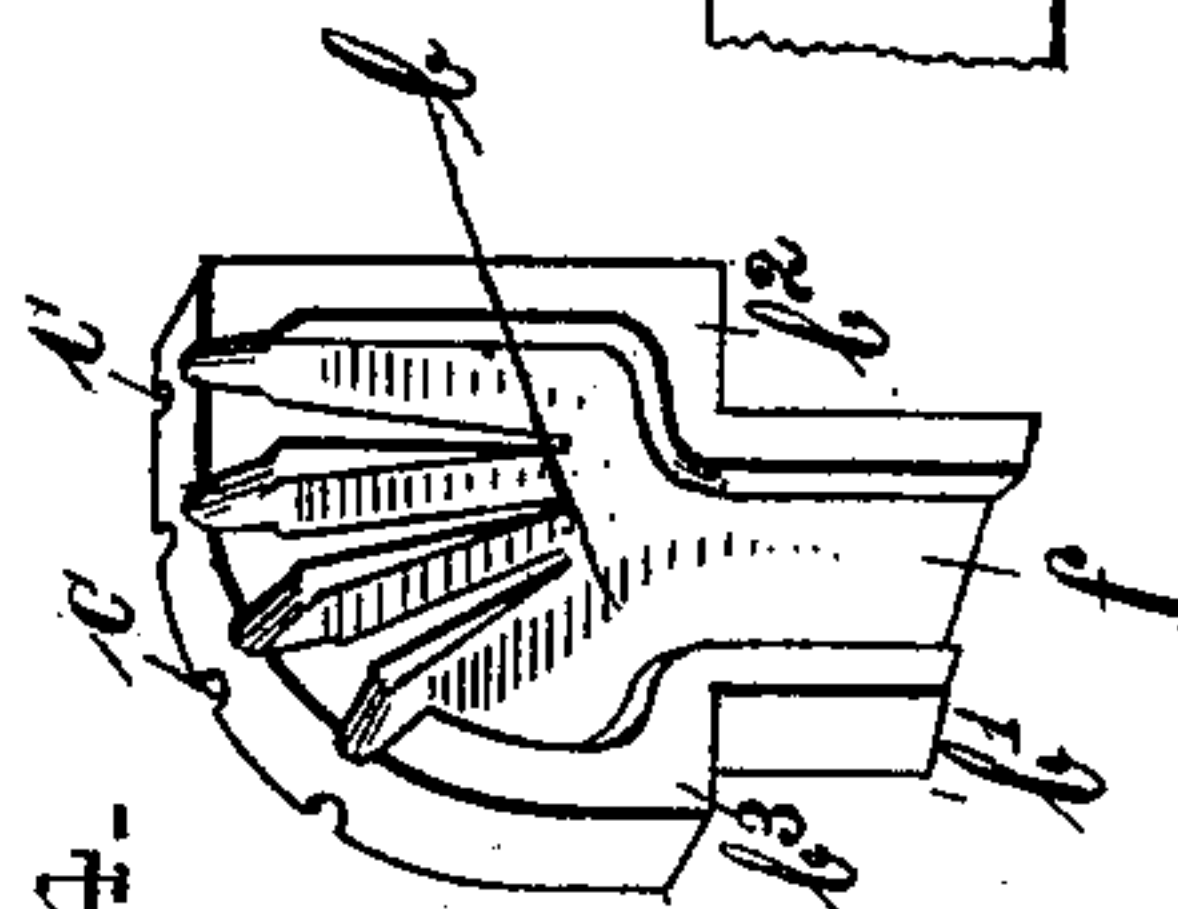
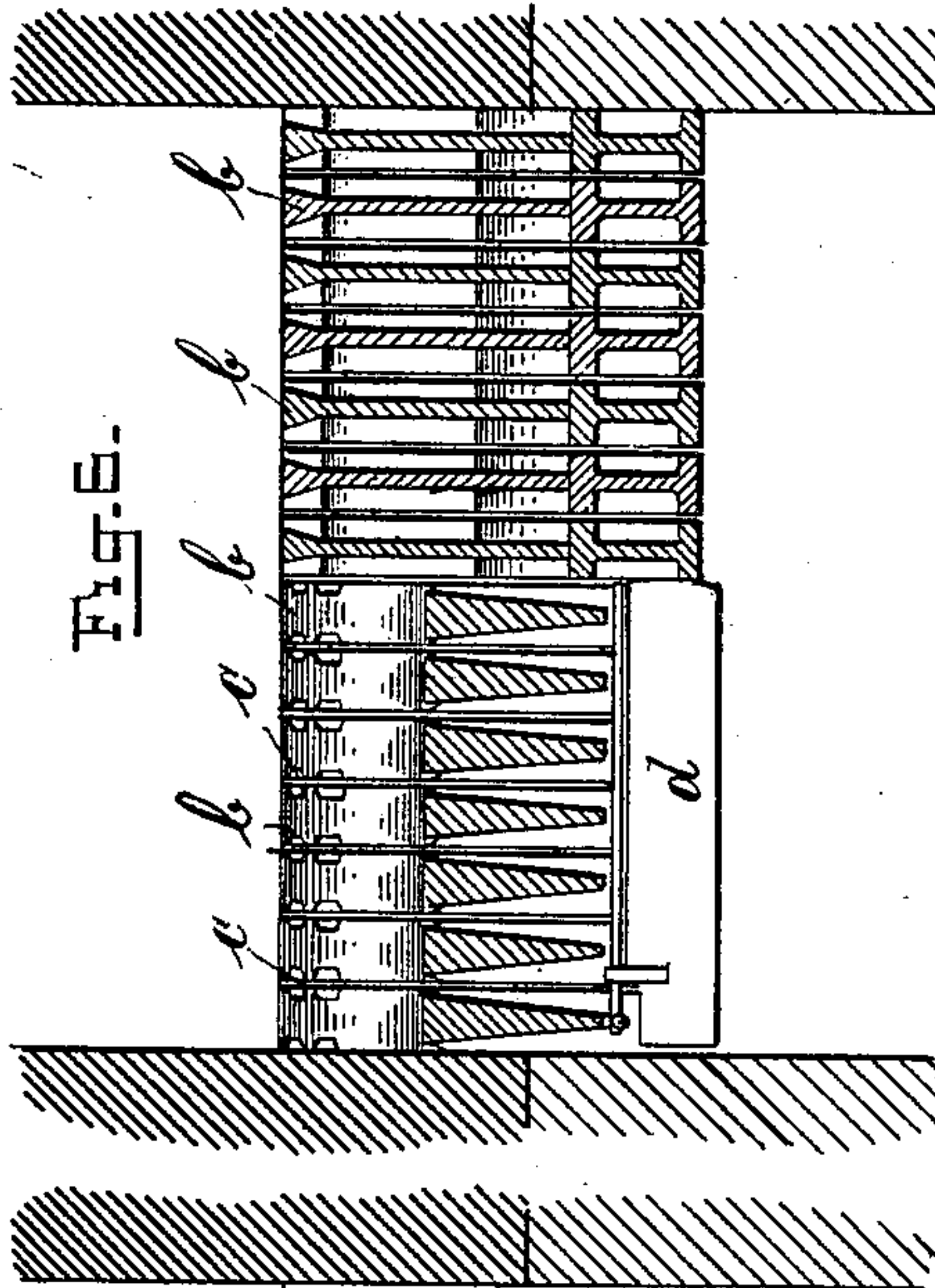


Fig. 6.



Inventor

By his Attorney
O. Thost
Dr. L. C. Föhl.

UNITED STATES PATENT OFFICE.

OTTO THOST, OF ZWICKAU, GERMANY.

HOT-AIR FIRE-BRIDGE.

SPECIFICATION forming part of Letters Patent No. 631,479, dated August 22, 1899.

Application filed April 8, 1899. Serial No. 712,234. (No model.)

To all whom it may concern:

Be it known that I, OTTO THOST, a subject of the King of Saxony, and a resident of Zwickau, in the Kingdom of Saxony, German Empire, have invented new and useful Improvements in Hot-Air Fire-Bridges, of which the following is a specification.

This invention has reference to hot-air fire-bridges by means of which highly-heated air is passed into the space where further combustion of the fuel-gases takes place, so that the same are completely burned up, whereby a perfect consumption of the fuel and the fuel-gases is effected.

An essential feature of my invention is a novel device, specially constructed for the purpose, whereby the fire-brick bridge heretofore necessarily employed in similar furnaces is dispensed with. This novel device I prefer to call a "bridge-bar," it being of peculiar form. The novel bridge-bars rest upon an iron construction behind the grate, forming with these bars an air-chamber provided with a device for regulating the admission of air. These bars may also be directly cast on the common grate-bars, and these may easily replace old grate-bars in ordinary and reverberatory furnaces.

The invention is illustrated in the accompanying drawings, in which—

Figure 1 represents a vertical section through the body of the furnace. Fig. 2 shows a cross-section on line 2 2 of Fig. 1. Fig. 3 represents a cross-section on line 3 3 of Fig. 1, showing an inside lining of the furnace made of fire-brick. Fig. 4 is a detail perspective view of the new bridge-bar. Fig. 5 shows the novel bridge-bar cast on a common grate-bar in front elevation, while some brickwork is shown in section; and Fig. 6 represents a cross-section of Fig. 5 on line 6 6, partly in elevation.

Similar letters of reference denote like parts in all of the drawings.

The construction of the novel bridge-bar *b* is plainly shown in Fig. 1 and in detail perspective view in Fig. 4. In side elevation the bar resembles a quadrant provided with a narrower downward extension *b'*, cut off slantingly. Both sides of the bar are hollowed out, so that if two bars are laid to-

gether in congruity there is formed a channel *f*, serving as an air-passage. On the arc of the quadrant there are provided small orifices or openings *c*, of which four are shown in Figs. 1 and 4. These openings *c* are relatively small in comparison to air-channel *f*. The bars *b* are made of iron, preferably cast of fireproof material or hardened by a suitable process.

The bridge-bars *b* form the top part of an air-chamber *a*, located behind the space through which the ashes fall. This air-chamber is formed by enlarging the fire-bridge, as shown in Fig. 1. The inside walls *a'* of the air-chamber *a* are preferably made of iron, and the vertical wall has about in its center an extension upon which rests the rectangular shoulder *b²* of the bar *b*. An iron girder *g*, with extensions on both sides, serves by its inside extension *g'* as a support for the rectangular shoulder *b³* of bar *b*, while the outside extension *g²* acts as a support for the ends of the common grate-bars *h*. The air-chamber *a* has in front a device for regulating the admission of air. This device may be of any suitable construction. In Fig. 1 a plain door-like cover is shown, whose top part is attached to the lower portion of the girder *g*, while the bottom part is provided with a chain, so that the admission of air may be regulated from outside.

As is plainly shown in Fig. 1, the bridge-bars *b* are so mounted that they extend considerably higher up than the usual bars *h*, forming in this manner the fire-bridge, which in former constructions is made of brickwork, thus entirely dispensing with the latter here. This arrangement has the advantage that the air issuing from the openings *c* enters the space of combustion where the fuel-gases are actually compressed—that is, in the place where air is most needed.

The air enters the air-chamber *a* through the regulating device *d* and passes into the channels *f* and the hollow portions of the bars *b* and issues into the space of combustion through the openings *c*. Since the bars *b* are always glowing during the operation of the furnace, the air is overheated within them and passes in this condition into the space of combustion, mixing there with the fuel-gases and

igniting same, so that they burn as a clear long body of flame, whirling on in the continuation of the flue. Since the openings *c* are relatively small in comparison to the air-channel *f*, the overheated air passes through them or, rather, is blown through as soon as a good draft is established, and by the many openings it is well distributed and mixed with the fuel-gases.

10 In order to effect a further mixing of overheated air with the fuel-gases, the flue may be provided at a small distance from the fire-bridge with a lining *e* of fire-brick, (chamotte.) (See Figs. 1 and 3.)

15 In places where the construction of the air-chamber *a* is impossible or inconvenient for want of room or other reasons I prefer to use grate-bars *h'*, having the novel bar *b* cast directly on the usual bar, forming then an integral part thereof. (See Figs. 5 and 6.) Only the last or inside section of the grate adjoining to the brickwork fire-bridge where the hot-air fire-bridge is to be formed need be composed of such bars, Fig. 5. The usual bars composing the last section are in this instance simply replaced by these novel bars, which can be done at moderate expense. The ends of the bars *h'* embodying the novel feature form the same air-channels and hollow spaces and have the same openings *c* as above described if mounted side by side in congruity. For the purpose of regulating the admission of the air in this instance two bars *h'* are cast, each with a hook on which a cover *d* is suspended, Fig. 5. By means of this cover the admission of air is regulated, as above described. It is plainly seen that with this arrangement the combustion of the fuel-gases is also effected.

40 Thus I have produced a hot-air fire-bridge which effects the combustion of the fuel-gases and dispenses with the brickwork fire-bridge. Having now described my invention, I claim—

45 1. A bridge-bar for hot-air fire-bridges resembling in side elevation a quadrant hollowed out on both sides, a central downward extension integral therewith hollowed out on both sides, forming with the base of the quadrant one left and one right rectangular shoulder and cut off slantingly at the bottom leaving the longer end on the inside of the furnace, and small discharge-orifices on the out-

side end lines of the arc of the quadrant, substantially as described. 55

2. A hot-air fire-bridge constructed without bricks, located at the inside end of the grate and composed of bridge-bars mounted side by side in congruity, so that the top portion of the bridge extends considerably higher up than the grate, the bars composing the bridge resembling in side elevation a quadrant hollowed out on both sides and provided with a central downward extension integral therewith and hollowed out on both sides forming with the base of the quadrant one left and one right rectangular shoulder and cut off slantingly at the bottom, leaving the longer end on the inside of the furnace, small discharge-orifices on the outside end lines of the arc of the quadrant, an iron girder between the side walls of the furnace having extensions on both sides, of which one serves as a support for the grate and on the other rest the left rectangular shoulders of the bars composing the bridge, an inside wall with a central horizontal extension acting as support for the right rectangular shoulder of the bridge-bar, and an air-chamber below the bridge issuing into the space below the grate, as specified. 60 65 70 75 80

3. In a furnace the combination of a grate with a hot-air fire-bridge, formed without bricks, at the inside end of the grate extending above same and composed of bridge-bars mounted side by side in congruity and resembling each in side elevation a quadrant provided with a downward extension integral therewith and hollowed out on both sides, hollow air-spaces between each pair of bars, air-channels formed by the downward extensions and small discharge-orifices on the outside end lines of the arc of the quadrant, an air-chamber formed by enlarging the fire-bridge downwardly, having on its inside vertical wall a horizontal extension acting as a support for the bridge-bars, and a front cover for regulating the admission of the air into the air-chamber, as specified. 85 90 95

In testimony whereof I have hereunto set my hand in the presence of two subscribing witnesses. 100

OTTO THOST. [L. S.]

Witnesses:

PAUL SEYFERT,
MARY L. SAUTER.