

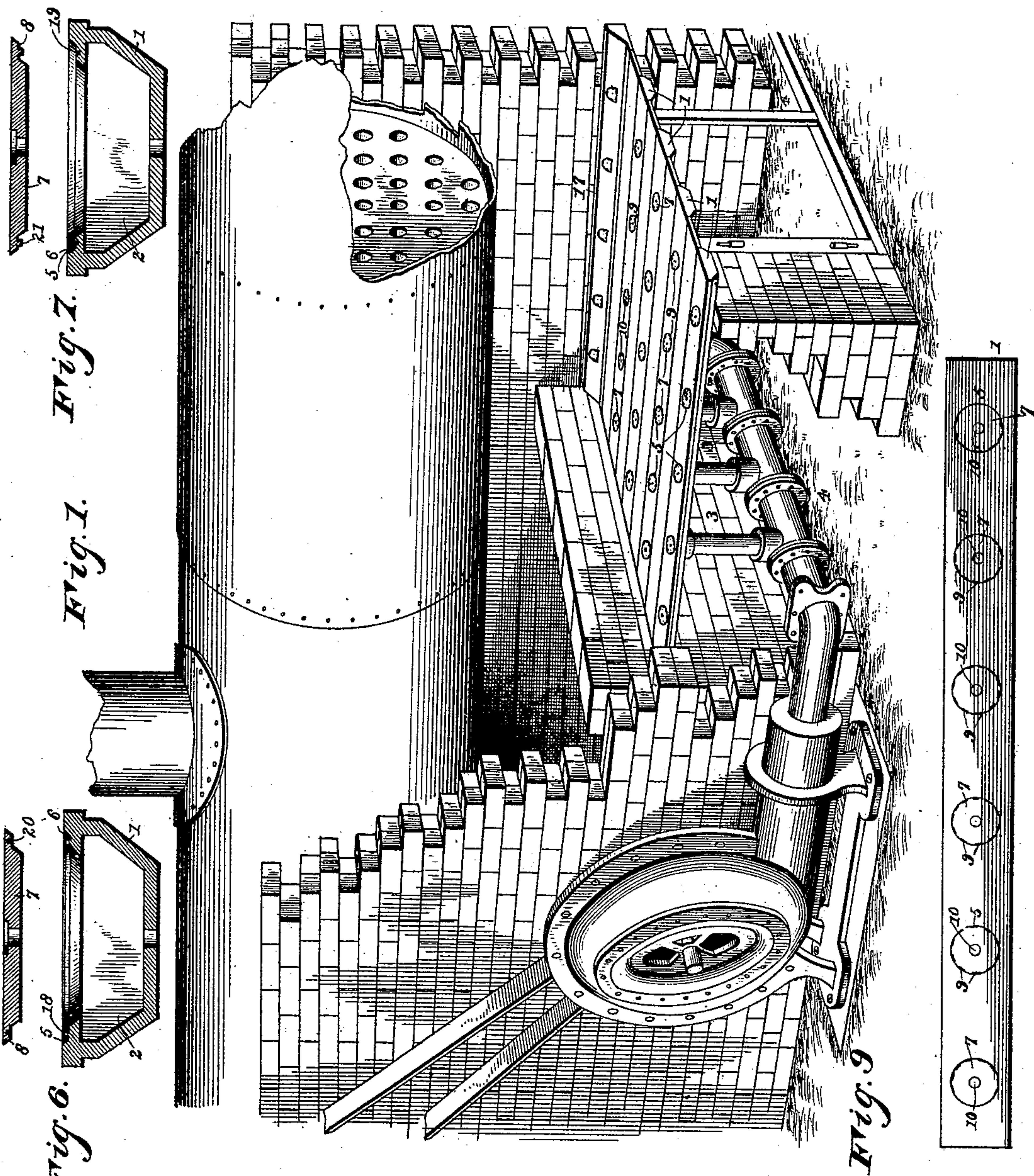
(No Model.)

2 Sheets—Sheet 1.

E. J. GORDON.  
GRATE.

No. 465,431.

Patented Dec. 15, 1891.



Witnesses;

*Wm. Withersow.*

*Wm. Bagger.*

By *his* Attorneys,

*C. A. Snow & Co.*

Inventor  
*Elonso J. Gordon,*



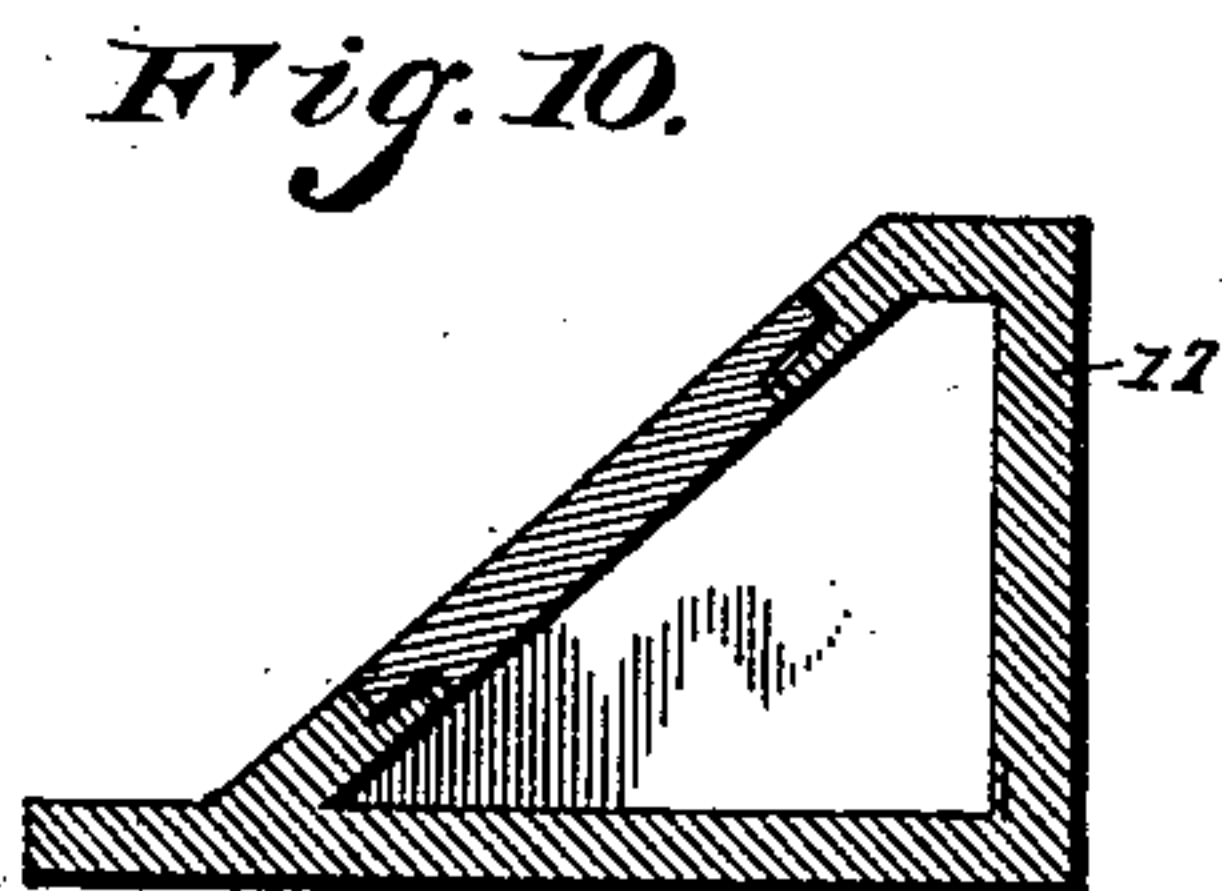
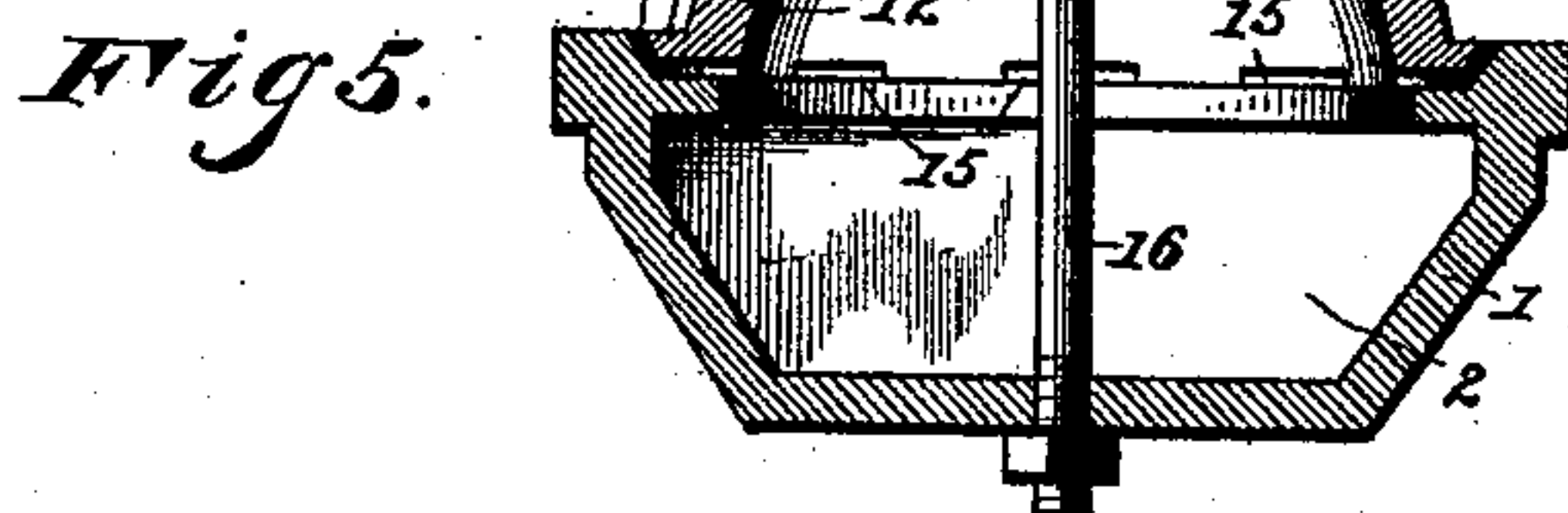
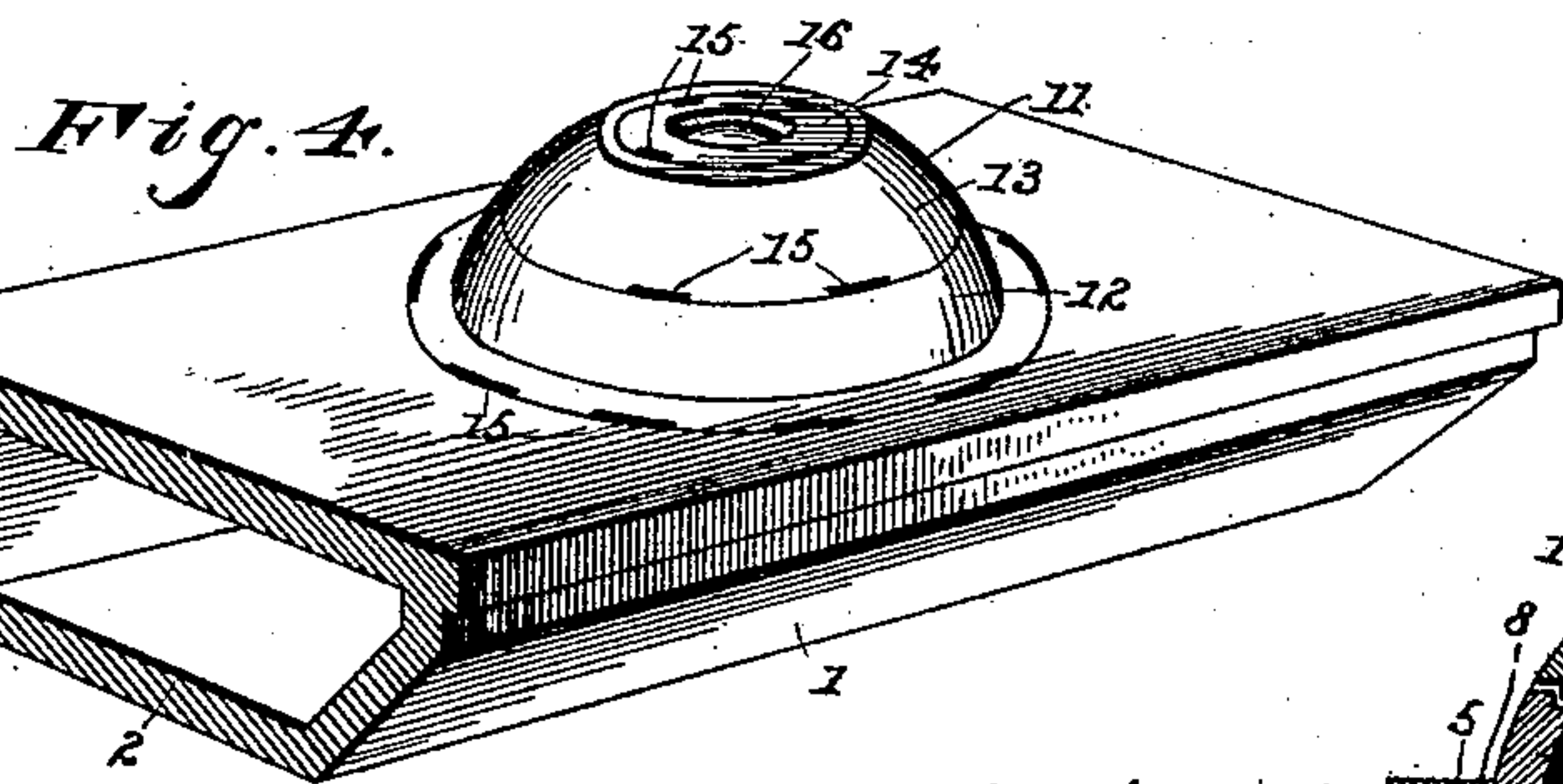
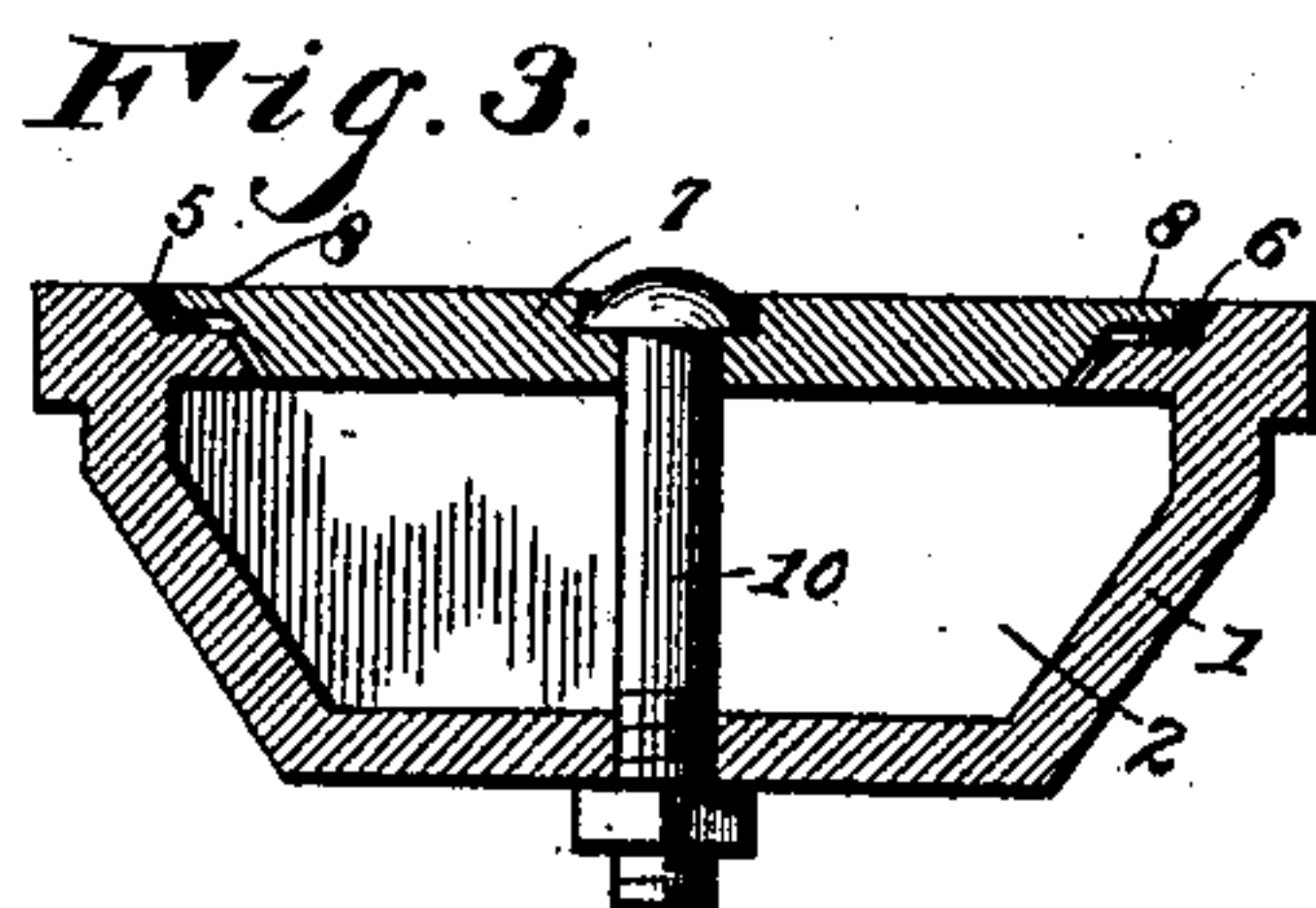
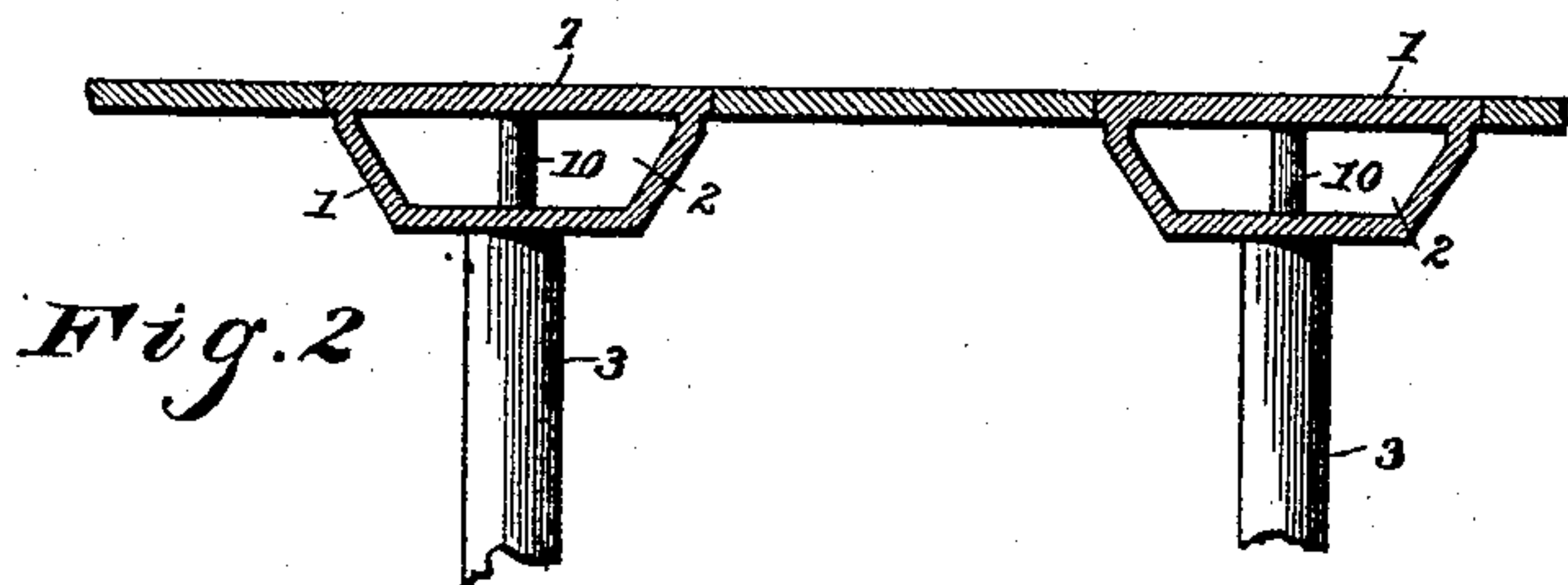
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2 Sheets—Sheet 2.

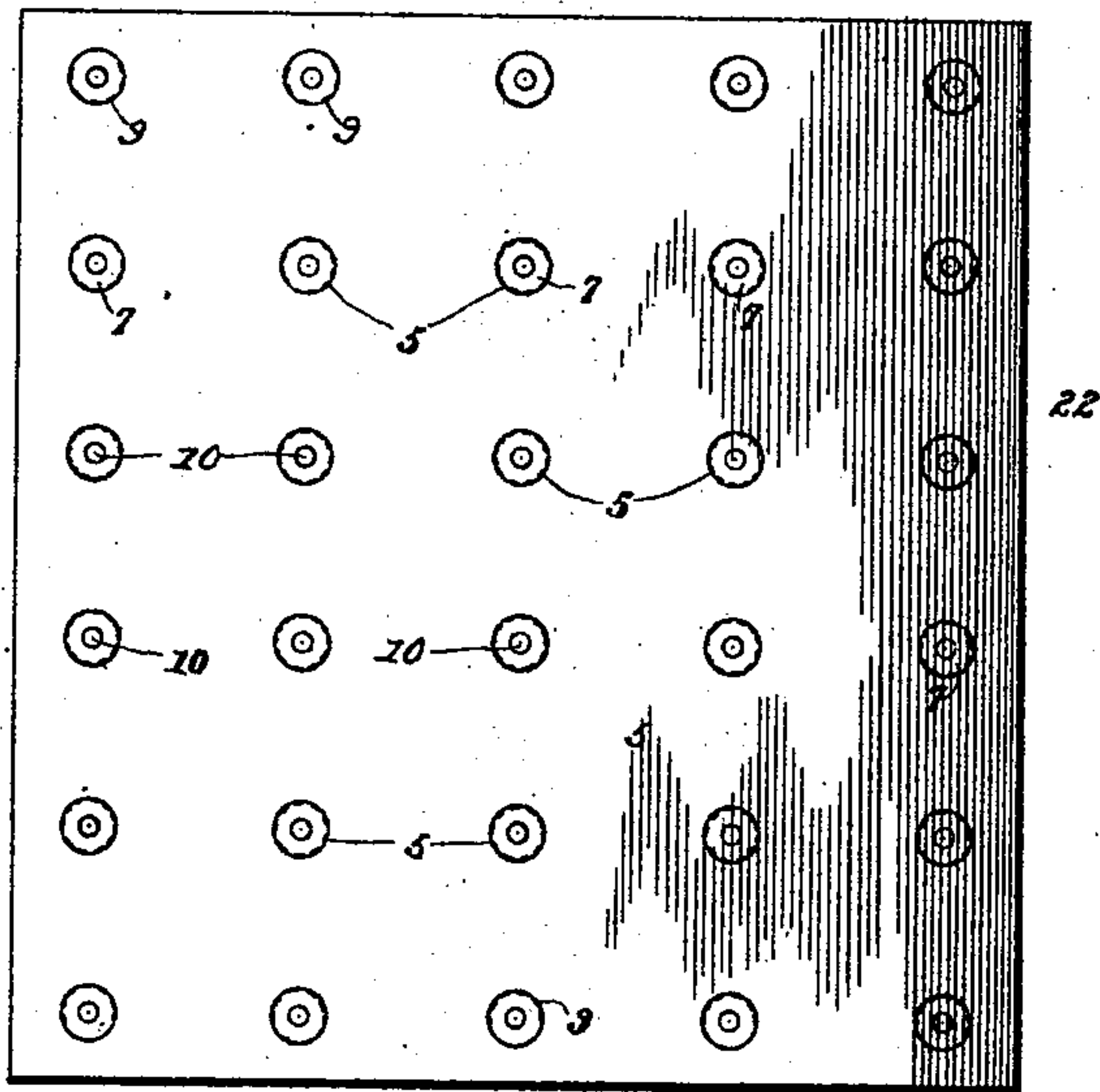
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*Fig. 8*



Witnesses;

*Wm. Withers.*  
*Wm. Baggett*

By his Attorneys,

*Chas. Snow & Co.*

Inventor,  
*E. J. Gordon*



# UNITED STATES PATENT OFFICE.

ELONSO J. GORDON, OF GREENVILLE, MICHIGAN, ASSIGNOR TO THE GORDON  
HOLLOW BLAST GRATE COMPANY, OF SAME PLACE.

## GRATE.

SPECIFICATION forming part of Letters Patent No. 465,431, dated December 15, 1891.

Application filed March 31, 1891. Serial No. 387,155. (No model.)

*To all whom it may concern:*

Be it known that I, ELONSO J. GORDON, a citizen of the United States, residing at Greenville, in the county of Montcalm and State of Michigan, have invented a new and useful Grate, of which the following is a specification.

This invention relates to furnace-grates; and it may be described as being an improvement on the device of this class for which Letters Patent of the United States No. 411,379, were granted to myself on the 17th day of September, 1889.

My present improvement consists in the construction, arrangement, and combination of parts, which will be hereinafter fully described, and particularly pointed out in the claims.

In the drawings hereto annexed, Figure 1 is a perspective view of a boiler-furnace equipped with my invention. Fig. 2 is a transverse sectional view of a portion of the same. Fig. 3 is a sectional view, on a larger scale, of one of the hollow grate-bars with the cap in position. Fig. 4 is a perspective view illustrating a modified form of the invention. Fig. 5 is a transverse sectional view of the device shown in Fig. 4. Figs. 6 and 7 are sectional views illustrating modified forms of the cap-seat. Fig. 8 is a plan view illustrating a modification which consists in applying the caps to a furnace-bed or solid plate instead of to hollow grate-bars. Fig. 9 is a plan view of one of the grate-bars illustrated in Fig. 1, showing the caps in position. Fig. 10 is a sectional view of one of the grate-bars that are used at the sides of the furnace.

Like numerals of reference indicate like parts in all the figures.

The grate-bars of my invention, which are designated by 1, are provided with longitudinal openings or recesses 2, and are connected by means of pipes 3 with the casing of a rotary fan, by means of which a blast of air may be forced into said grate-bars. The latter are provided with openings 5 in their upper sides, said openings being surrounded by annular recesses 6, forming the seats for the caps 7. In the several figures of the drawings hereto annexed these caps have been shown as being circular in shape; but I de-

sire it to be understood that they may be made elliptical, oblong, square, semicircular, or of any other desired shape without departing from the spirit of my invention.

The caps 7 are provided with circumferential flanges 8, extending around the same and adapted to rest upon the seats 6. Said flanges are provided with notches or recesses 9 for the passage of air. Said notches may be formed around the entire periphery or circumference of the caps, or only around a portion of the same. The latter will be preferred when the caps are arranged at the front and rear ends of the furnace-bars, as will be seen by reference to Fig. 1 of the drawings, the solid portion being at the front and rear, so that the blast of air shall be directed into the furnace. The caps may be mounted loosely upon their seats, so as to be readily removed, when desired; or they may be secured by means of bolts extending through the grate-bars, as shown at 10. The caps at the front and rear ends of the grate-bars are preferably not secured in place, thus enabling them to be readily removed for the purpose of removing from the interior of the grate-bars any obstructions—such as sand and ashes—which may sift through the cap-openings and settle therein.

Ordinarily it is preferred to make the caps flat, as shown in Fig. 1 of the drawings; but it may be sometimes found desirable to make said caps bulging or approximately conical in shape, as shown in Fig. 4. The said bulging or conical cap, which is designated by 11, may be made in a single piece and provided with perforations or blast-openings; or it may, as shown in the drawings, be composed of a series of concentric rings 12 and 13 and a center piece 14, said rings or caps being provided with notches or draft-openings 15. The several parts are connected with each other and with the grate-bars by means of a bolt 16. This construction of the cap is deemed preferable when fine fuel—such as culm, slack, or sawdust—is to be employed, inasmuch as the air by this construction will be more widely diffused and the blast-openings are rendered less liable to become clogged or choked with the fuel.

At the sides of the furnace I prefer to use



the grate-bars shown in Figs. 1 and 10 at 17. These grate-bars are provided with inclined sides facing the furnace and thus tending to throw the blast inwardly into the latter and  
5 assisting the combustion at the sides, where the fuel in furnaces of ordinary construction is not readily consumed. Similar grate-bars may, when desired, be arranged at other points in the furnace; or grate-bars may be  
10 made having oppositely-inclined sides, both of which are provided with notched caps for the passage of air.

In Figs. 6 and 7 of the drawings I have illustrated modifications in the construction of  
15 the cap-seat, which consist in providing the latter with an annular rib 18 or with an annular groove 19, the cap being provided with a corresponding groove 20 or rib 21, thus forming a guard to prevent sand, ashes, and  
20 the like from sifting through the opening and obstructing the blast.

In some furnaces, and especially when fine fuel—such as culm, slack, or sawdust—is to be employed, the grate-bars may be entirely  
25 dispensed with, and the furnace-bed may be composed of a solid plate, as shown in Fig. 8 at 22, said plate being provided with any desired number of notched caps for the passage of air, as will be readily understood.

30 From the foregoing description, taken in connection with the drawings hereto annexed, the operation and advantages of the invention will be readily understood. The construction is simple and inexpensive, and a  
35 furnace constructed in accordance with my invention is capable of consuming such fuel as culm from anthracite or slack from bituminous coal, sawdust, and green wood, which cannot otherwise be readily used.

40 While I have in the foregoing described the preferred construction of my invention, I desire it to be understood that I do not limit myself to the details of construction herein described, but reserve the right to any  
45 changes and modifications to which recourse

may be had without departing from the spirit of my invention.

Having thus described my invention, I claim and desire to secure by Letters Patent of the United States—

1. In a furnace of the class described, the combination, with a hollow grate-bar having an opening in its top and the walls of which are provided with a beveled seat, of a removable cap adapted to be secured stationary  
55 within said seat and having its edges beveled to fit the said seat and provided with a series of circumferential notches or openings in its periphery for the escape of the air that may be injected through the bottom of the grate-bar,  
60 substantially as set forth.

2. In a furnace of the class described, the caps seated in suitable openings in the furnace-bed or grate-bars and having notches or openings for the passage of air, the said cap-  
65 seats being provided with guards to prevent ashes and the like from passing through the openings under the caps, substantially as and for the purpose set forth.

3. In a furnace of the class described, the  
70 combination of the furnace-bed or grate-bars having openings provided with circumferential recesses, the caps having flanges fitted to said recesses and provided with notches or openings for the passage of air, and ribs or  
75 grooves to prevent ashes and the like from sifting through the openings under the caps, substantially as set forth.

4. In a furnace of the class described, a cap composed of a series of concentric rings and  
80 a center piece, said rings and center piece being provided with notches or openings for the passage of air, substantially as set forth.

In testimony that I claim the foregoing as my own I have hereto affixed my signature in  
85 presence of two witnesses.

ELONSO J. GORDON.

Witnesses:

JOHN H. C. VAN DEINSE,  
PAUL VAN DEINSE.