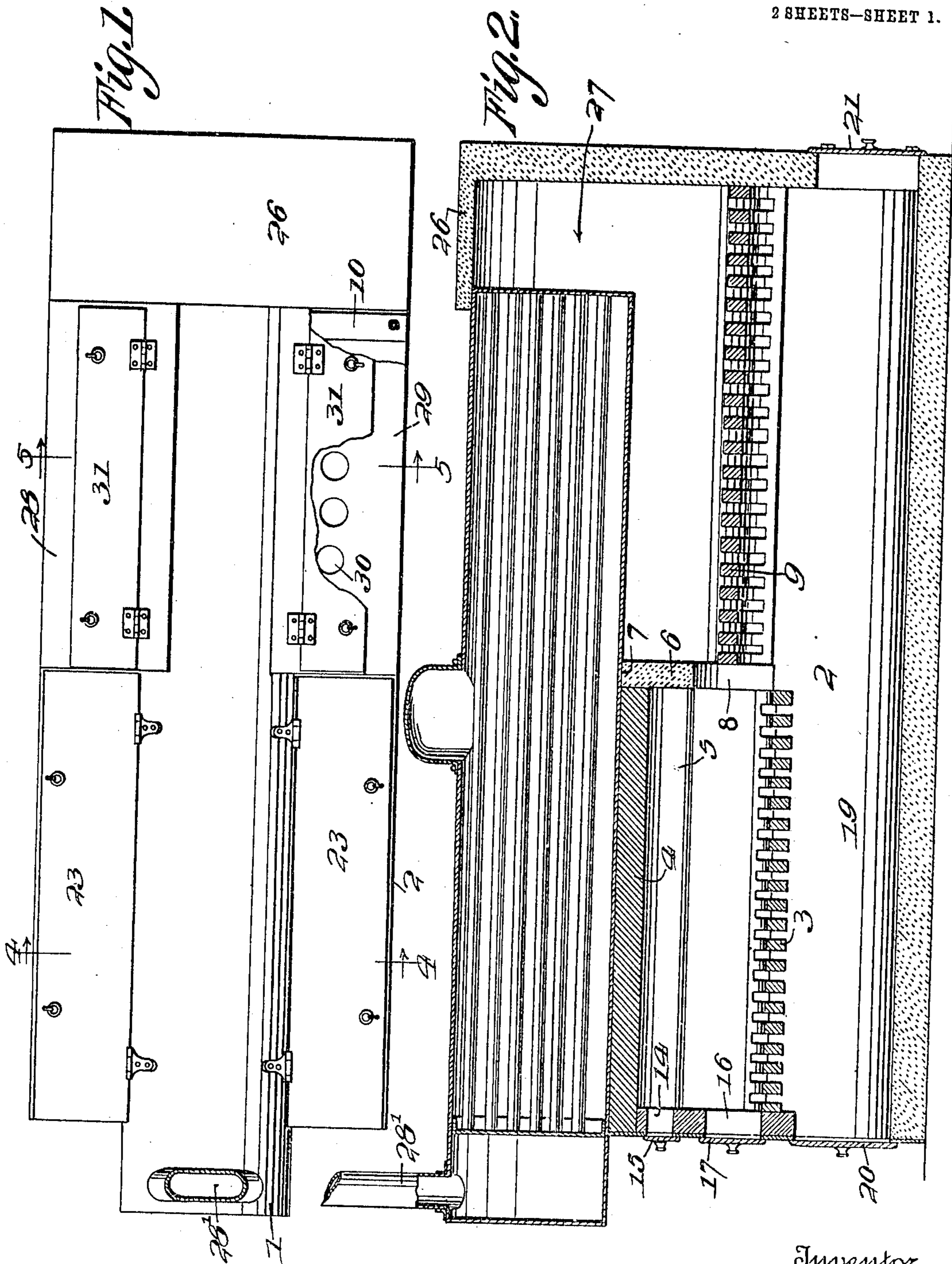


W. J. ELLIS.
STEAM BOILER FURNACE.
APPLICATION FILED NOV. 9, 1909.

950,664.

Patented Mar. 1, 1910.
2 SHEETS—SHEET 1.



Witnesses
C. D. B. Brown.
C. S. S. S. S.

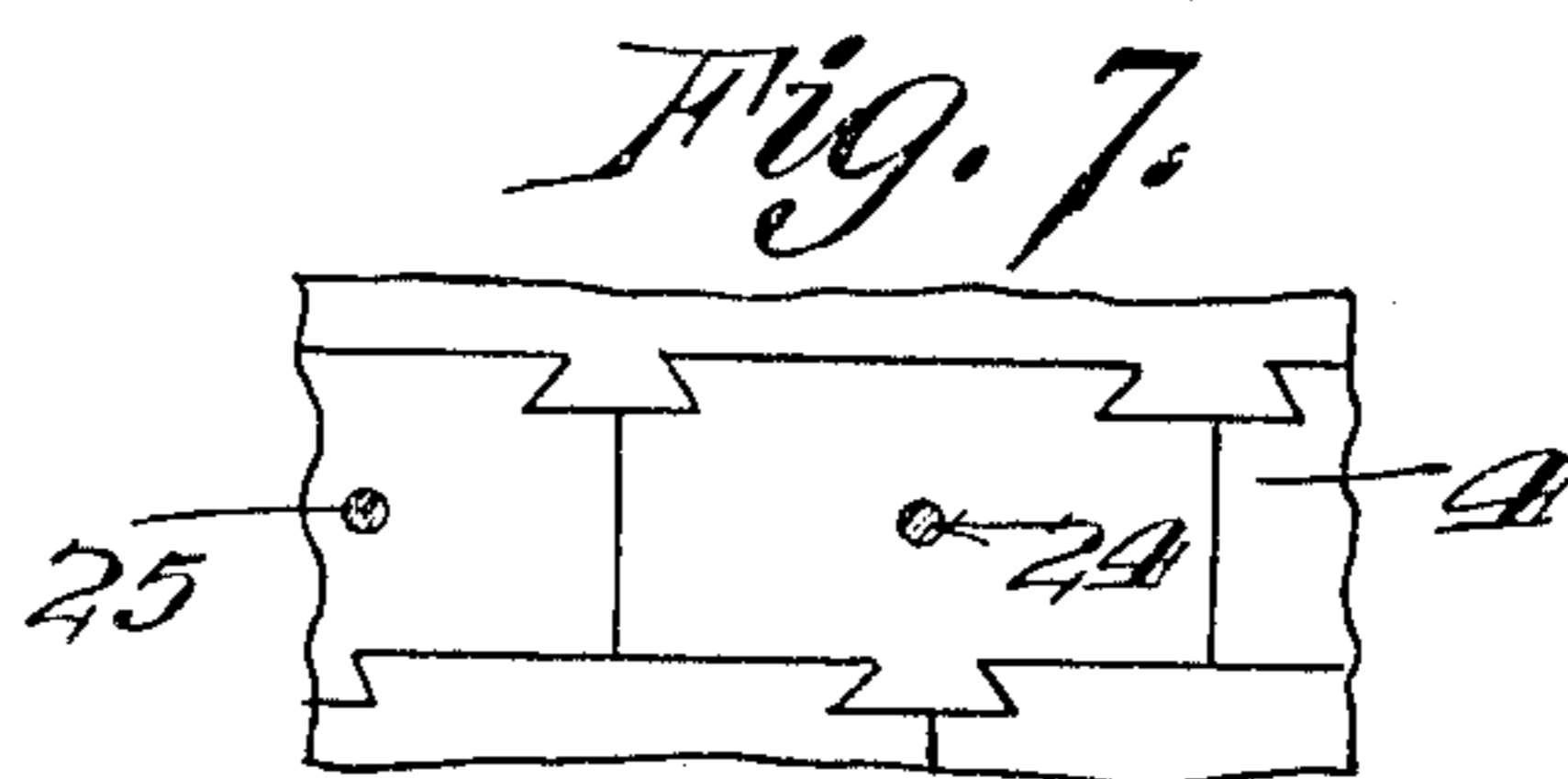
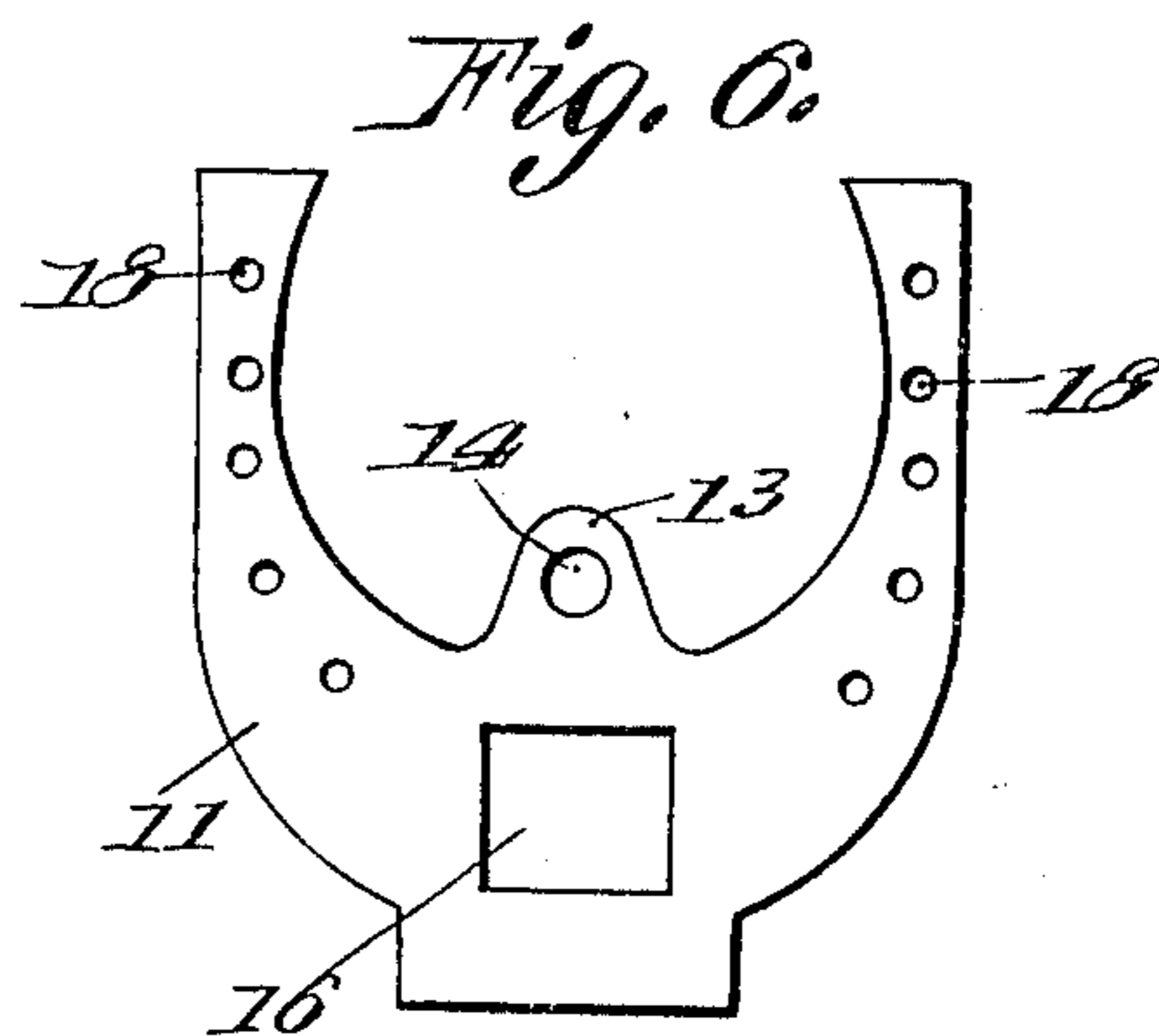
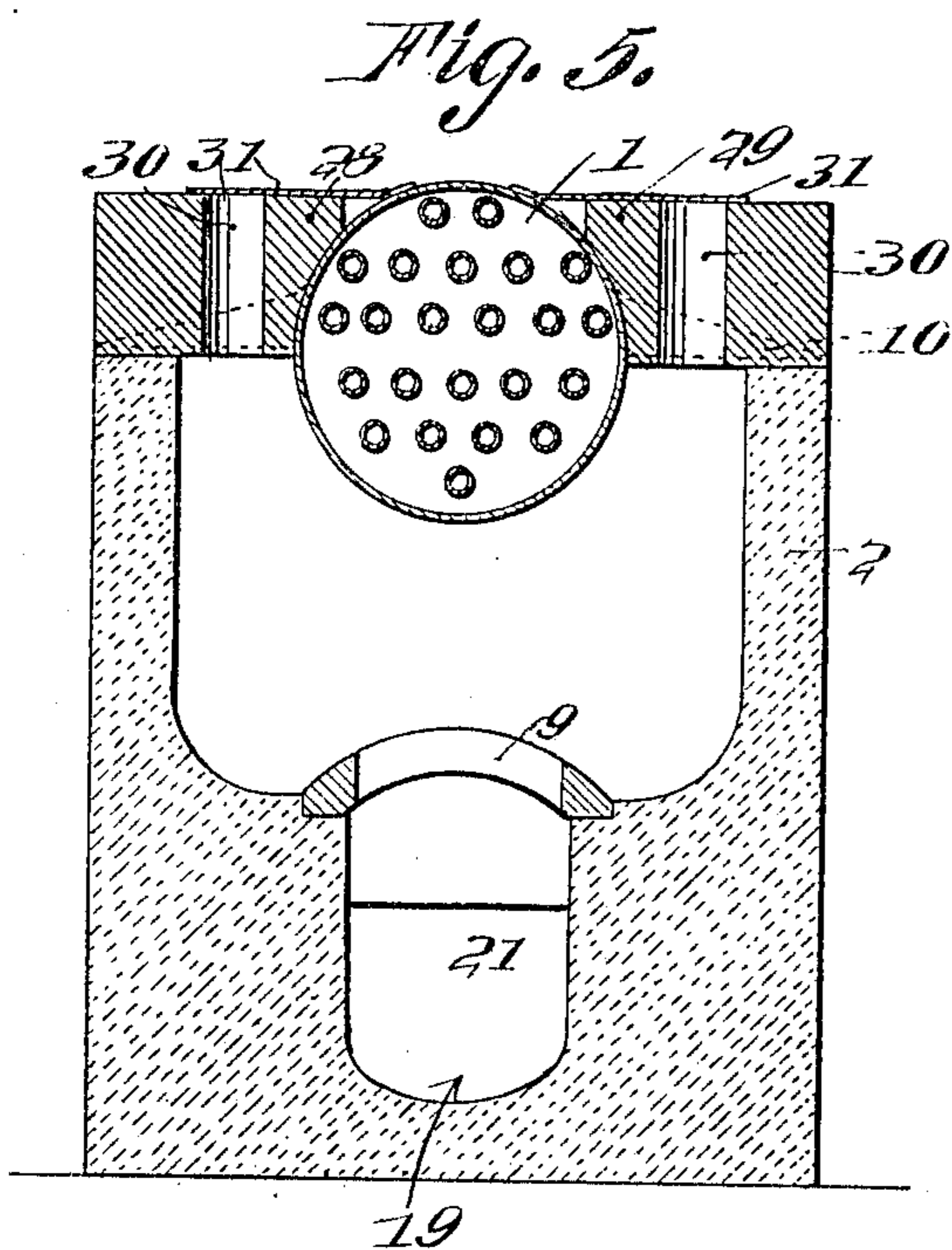
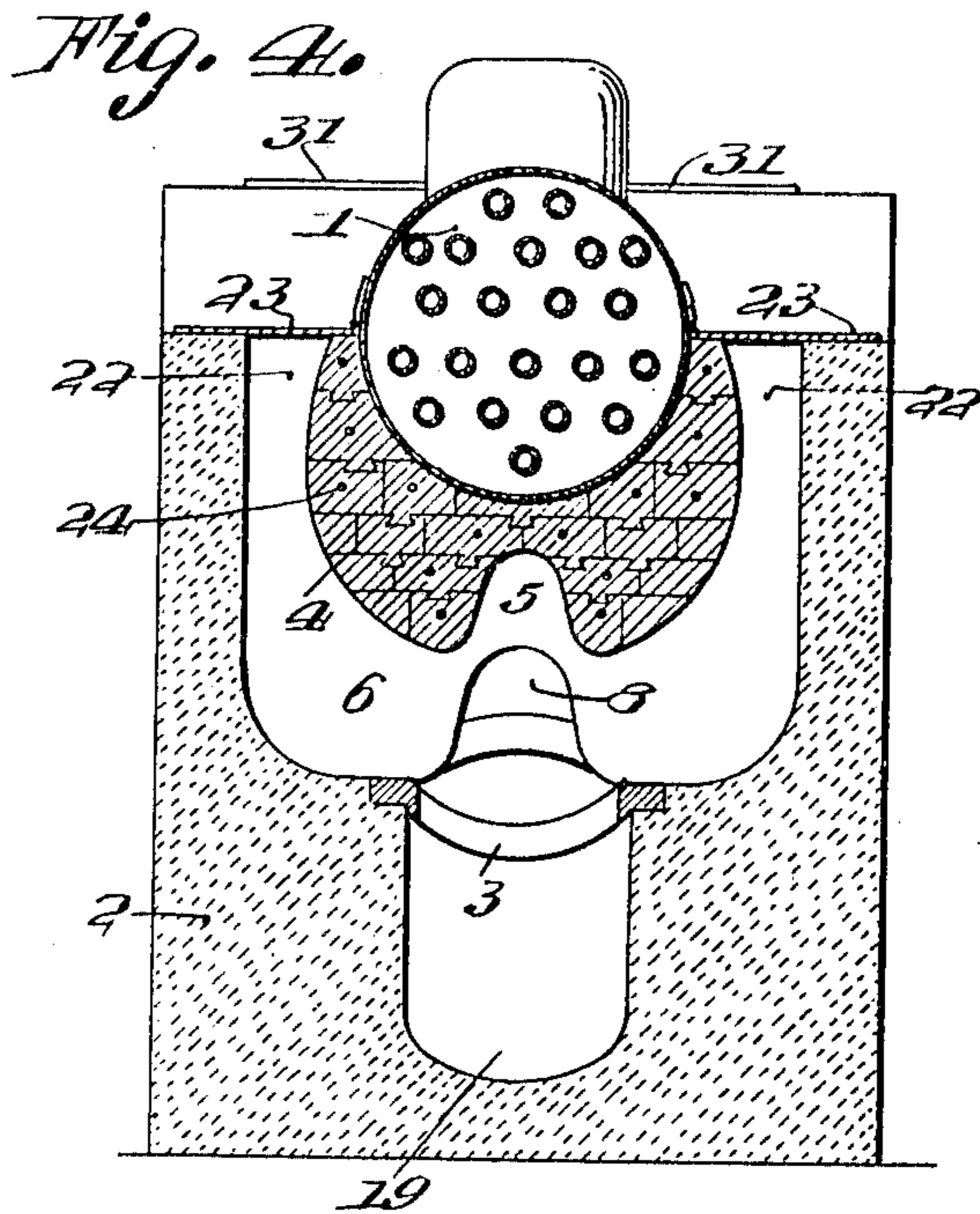
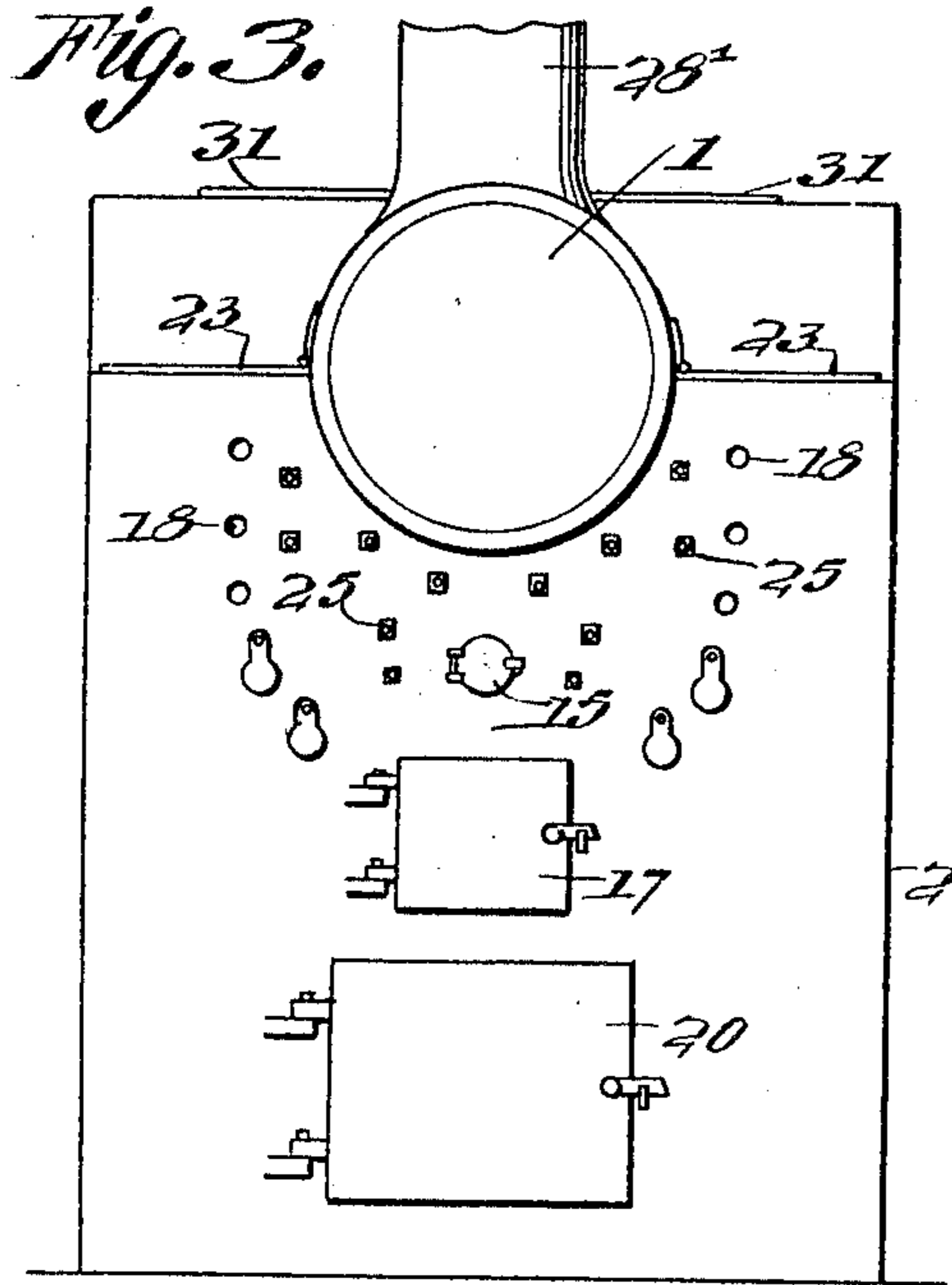
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Inventor

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UNITED STATES PATENT OFFICE.

WILLIAM J. ELLIS, OF ANDREWS, NORTH CAROLINA.

STEAM-BOILER FURNACE.

950,664.

Specification of Letters Patent.

Patented Mar. 1, 1910.

Application filed November 9, 1909. Serial No. 527,000.

To all whom it may concern:

Be it known that I, WILLIAM J. ELLIS, a citizen of the United States, residing at Andrews, in the county of Cherokee and State of North Carolina, have invented certain new and useful Improvements in Steam-Boiler Furnaces; and I do declare the following to be a full, clear, and exact description of the invention, such as will enable others skilled in the art to which it appertains to make and use the same.

This invention relates to an improved boiler furnace.

The object of the invention is to provide an improved boiler furnace designed to be attached to any tubular boiler already installed which has a down draft, said furnace being so constructed as to consume all the smoke and other combustible products of combustion, thereby saving a large percentage of fuel and labor.

This furnace is especially designed for use in tannery and other plants to burn the chips or other waste without deadening the fire and by the consumption of which a large percentage of fuel is saved.

With the foregoing and other objects in view, the invention consists of certain novel features of construction, combination and arrangement of parts, as will be more fully described and particularly pointed out in the appended claims.

In the accompanying drawings, Figure 1 represents a top plan view of this improved furnace with an ordinary boiler installed therein; Fig. 2 is a longitudinal vertical section thereof; Fig. 3 is a front elevation; Fig. 4 is a vertical transverse section taken on the line 4—4 of Fig. 1; Fig. 5 is a similar view taken on the line 5—5 of Fig. 1 and looking in the direction of the arrow. Fig. 6 is a detail sectional view. Fig. 7 is a detail sectional view through the fire-proof member arranged around the bottom and sides of the boiler.

In the embodiment illustrated, a tubular boiler 1 of ordinary construction is shown installed in a furnace 2 which is also of ordinary construction. Fitting closely around the bottom and sides of this boiler 1 within the front portion of the furnace 2 above the grate 3 is a fire proof member 4, preferably composed of fire brick and secured to the boiler by any suitable means. This member 4 is provided in its lower face with a longitudinally extending recess 5 of inverted U-

shape in cross section to form a combustion chamber in which the smoke and other products of combustion are consumed. A partition 6 is arranged transversely across the furnace 2 at the rear of the member 4, preferably bearing against the rear face of said member. This partition 6 is provided in its upper edge with a recess 7 to receive and support the middle portion of the boiler 1, and it is also provided in its lower edge with a recess 8 arranged to form an opening communicating with the combustion chamber 5 in the member 4, said recess 8 extending partly above and partly below a grate 9 arranged above the furnace ash pit at the rear of the partition 6 for a purpose to be described. This grate 9 is preferably made arched or with a convex upper face on which the chips or other waste are designed to rest.

Arms as 10 are secured to the opposite sides of the rear end of the boiler 1 and extend laterally therefrom and are designed to rest on the upper edge of the furnace 2 and be secured thereto by any suitable means to support the rear end of the boiler above the grate 9.

A plate 11 is arranged in the front end of the furnace to form a closure therefor and is substantially U-shaped in form, having an upwardly extending projection 13 designed to fit within the recess 5 in the member 4 and form a closure for the front end thereof. This projection 13 is preferably provided with an aperture 14 to form a peep hole for investigating the condition of the fire. A suitable closure as 15 is provided for this opening 14. Another aperture 16 provided with a removable closure 17 is also arranged in the plate 11, preferably below the opening 14 and is designed for use in stoking the fire. This plate 11 is also preferably provided on opposite sides with a plurality of vertically spaced draft openings as 18 closed by any suitable means. These openings 18 may also be used for stoking the coal on the sides of the boiler when desired. The ash pit 19 of the furnace 2, which extends the full length of said furnace is preferably provided with doors 20 and 21 arranged at the front and rear of the furnace, respectively, to provide for the cleaning out of the pit from either end.

The fire box formed in front of the partition 6 is designed to be fired from the top of the box on opposite sides of the boiler as shown at 22 and these openings are prefer-

ably closed by damper doors as 23, which extend the full length of the fire box and are preferably hinged at the side next the boiler 1.

5 The fire brick 4 in which is formed the combustion chamber 5 is provided throughout its length with a plurality of spaced apertures as 24 in which are mounted rods or hollow pipes as 25 to support the brick
10 from which the member 4 is composed and which is preferably constructed of one or more pieces which are connected by dove-tail joints as shown in Fig. 7. The furnace 2 extends beyond the rear end of the boiler 1
15 and is provided with a suitable cover as 26 whereby a smoke box 27 is formed at the rear end of the boiler and which receives the smoke from the furnace and from which it passes into the flues of the boiler at the rear
20 end thereof and then out at the smoke stack 28' at the front of the boiler.

Closures 28 and 29 are arranged over the fire box at the rear of the partition 6 and are preferably composed of fire brick having
25 longitudinally spaced apertures as 30 closed by any suitable removable means such as doors 31. These openings 30 are designed to feed chips or other waste material to the furnace which are consumed on the grate 9 by
30 the flame which passes from the fire box at the front of the furnace through the opening 8 which extends partly above and partly below said grate 9. It will thus be obvious that this consumption of waste at the rear of
35 the furnace will greatly increase its heating capacity without the use of any additional coal or other fuel in the fire box at the front of the furnace.

40 The combustion chamber 5 arranged in the brick member 4 at the front of the furnace over the fire box therein provides for the thorough heating of the boiler and the smoke and other products of combustion are also consumed within this chamber.

45 From the foregoing description, taken in connection with the accompanying drawings, the construction and operation of the invention will be readily understood without requiring a more extended explanation.

50 Various changes in the form, proportion and the minor details of construction may be resorted to without departing from the principle or sacrificing any of the advantages of this invention as defined in the appended
55 claims.

I claim as my invention:—

1. The combination with a furnace having a partition arranged therein intermediately of its ends and provided in its upper
60 and lower edges with recesses, of a tubular boiler arranged in said furnace with its

intermediate portion disposed in the recess in the upper edge of said partition, grates arranged in said furnace below said boiler in front of and at the rear of said partition, 65 a fire brick member arranged in the fire box in front of said partition and encircling the sides and bottom of said boiler and having a recess extending longitudinally thereof on its lower face and of inverted U-shape in 70 cross section to form a combustion chamber, said combustion chamber communicating with the recess in the lower edge of said partition.

2. The combination with a furnace having a partition arranged therein intermediately of its ends and provided in its upper and lower edges with recesses, of a tubular boiler arranged in said furnace with its intermediate portion disposed in the recess 80 in the upper edge of said partition, grates arranged in said furnace below said boiler in front of and at the rear of said partition, a fire brick member arranged in the fire box in front of said partition and 85 encircling the sides and bottom of said boiler and having a recess extending longitudinally thereof on its lower face and of inverted U-shape in cross section to form a combustion chamber, said combustion 90 chamber communicating with the recess in the lower edge of said partition, and apertured plates arranged over said furnace at the rear of said partition and provided with removable closures. 95

3. The combination with a steam boiler having a furnace arranged thereunder throughout its length, of a partition arranged intermediately of the ends of said furnace and having recesses in its upper 100 and lower edges, a fire brick member encircling said boiler on its bottom and sides at the front thereof and extending the full length of the fire box formed at the front of said partition and having a recess extending longitudinally thereof throughout 105 its length and communicating at its rear end with the recess in the lower edge of said partition, apertured plates arranged at the top of said furnace on opposite sides of said boiler provided with removable closures and a plurality of bracing members extending longitudinally through said boiler encircling member. 110

In testimony whereof I have hereunto set 115 my hand in presence of two subscribing witnesses.

WILLIAM J. ELLIS.

Witnesses:

CHELSEY TATHAM,
RALPH CHAMBERS.