

No. 752,758.

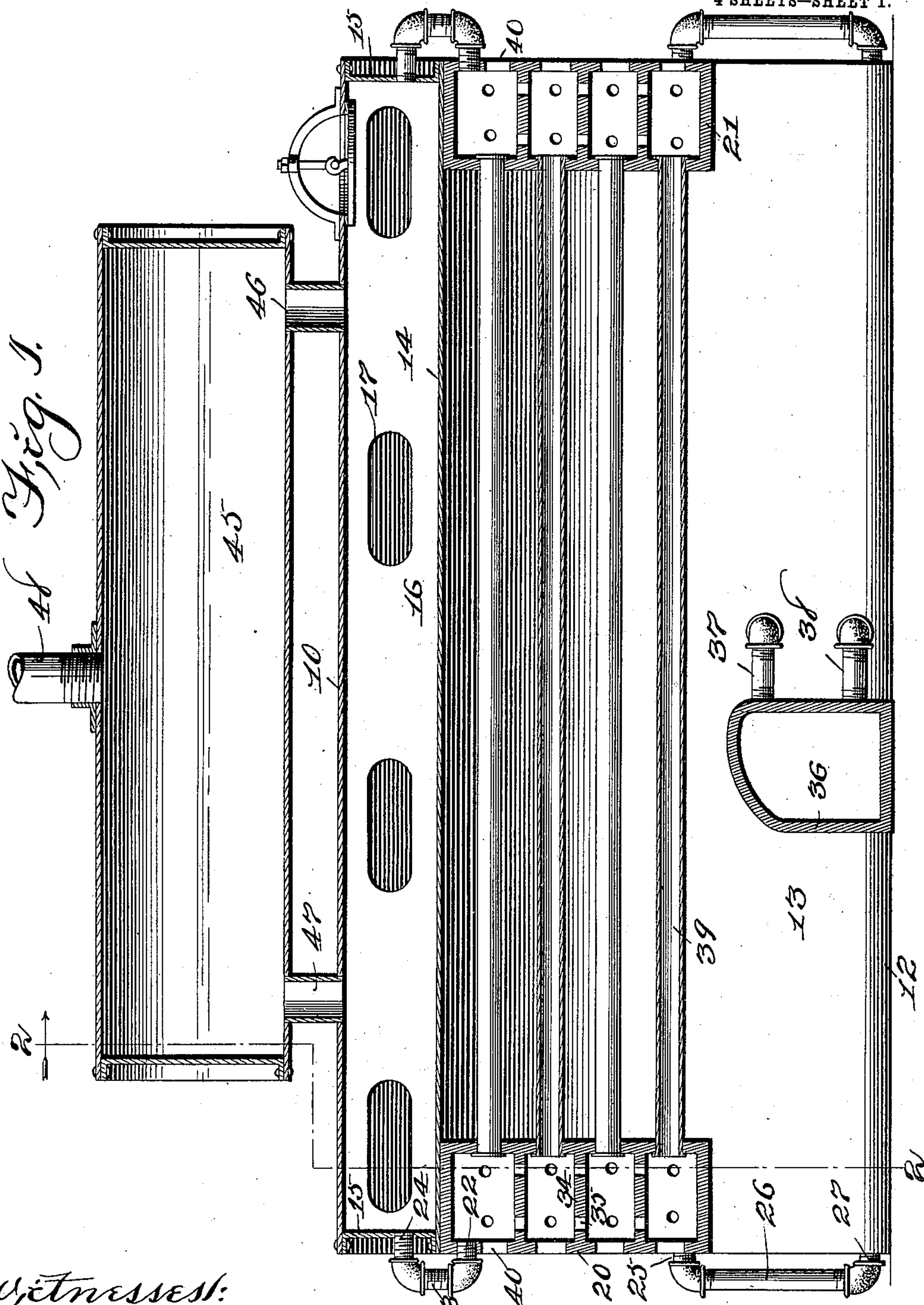
PATENTED FEB. 23, 1904.

J. COLLIS.
BOILER.

APPLICATION FILED JAN. 20, 1903.

NO MODEL.

4 SHEETS—SHEET 1.



Witnesses:
R. S. Orwig.
L. H. Orwig.

Inventor John Collis
by Orwig & Lane Attys.

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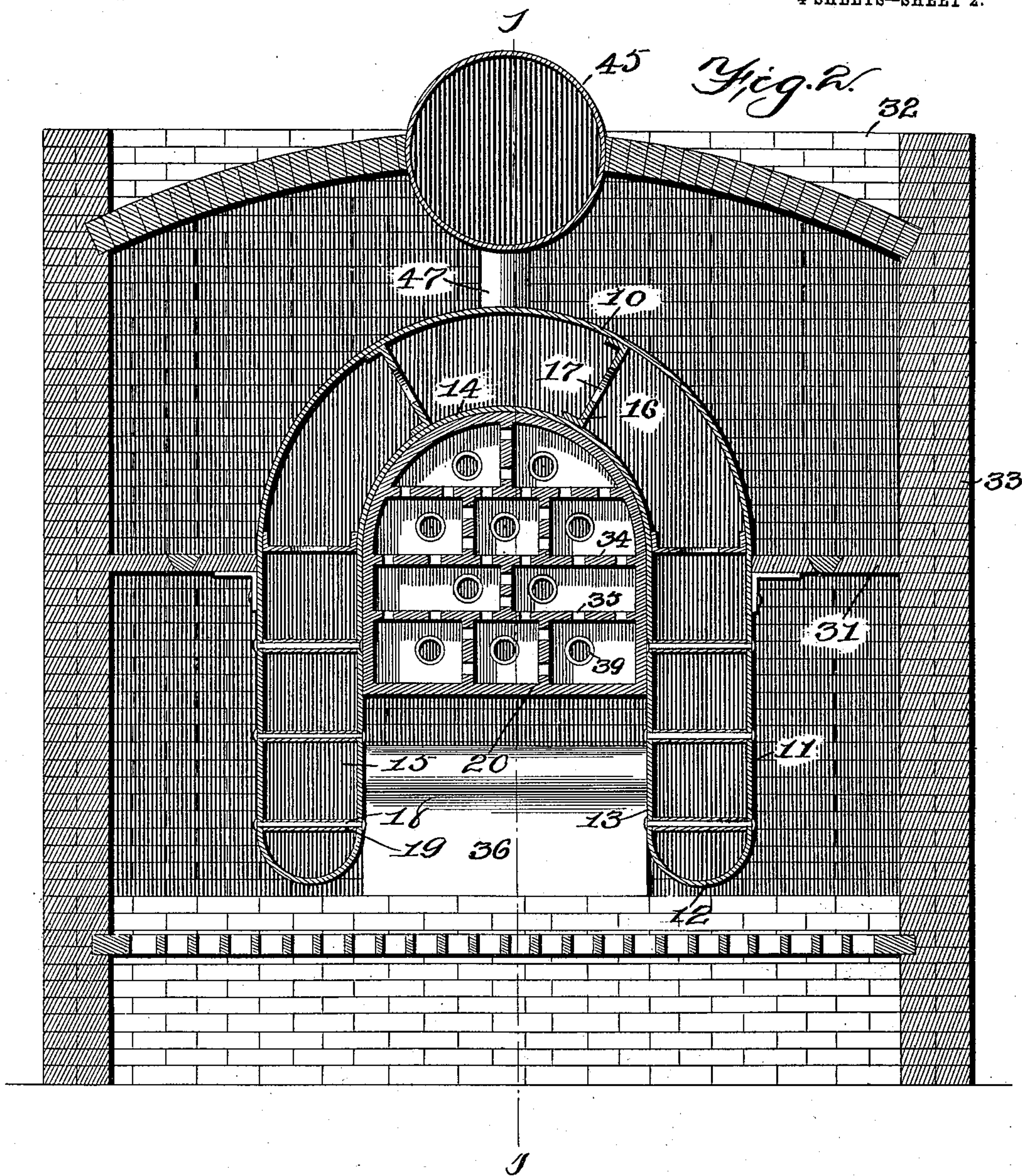
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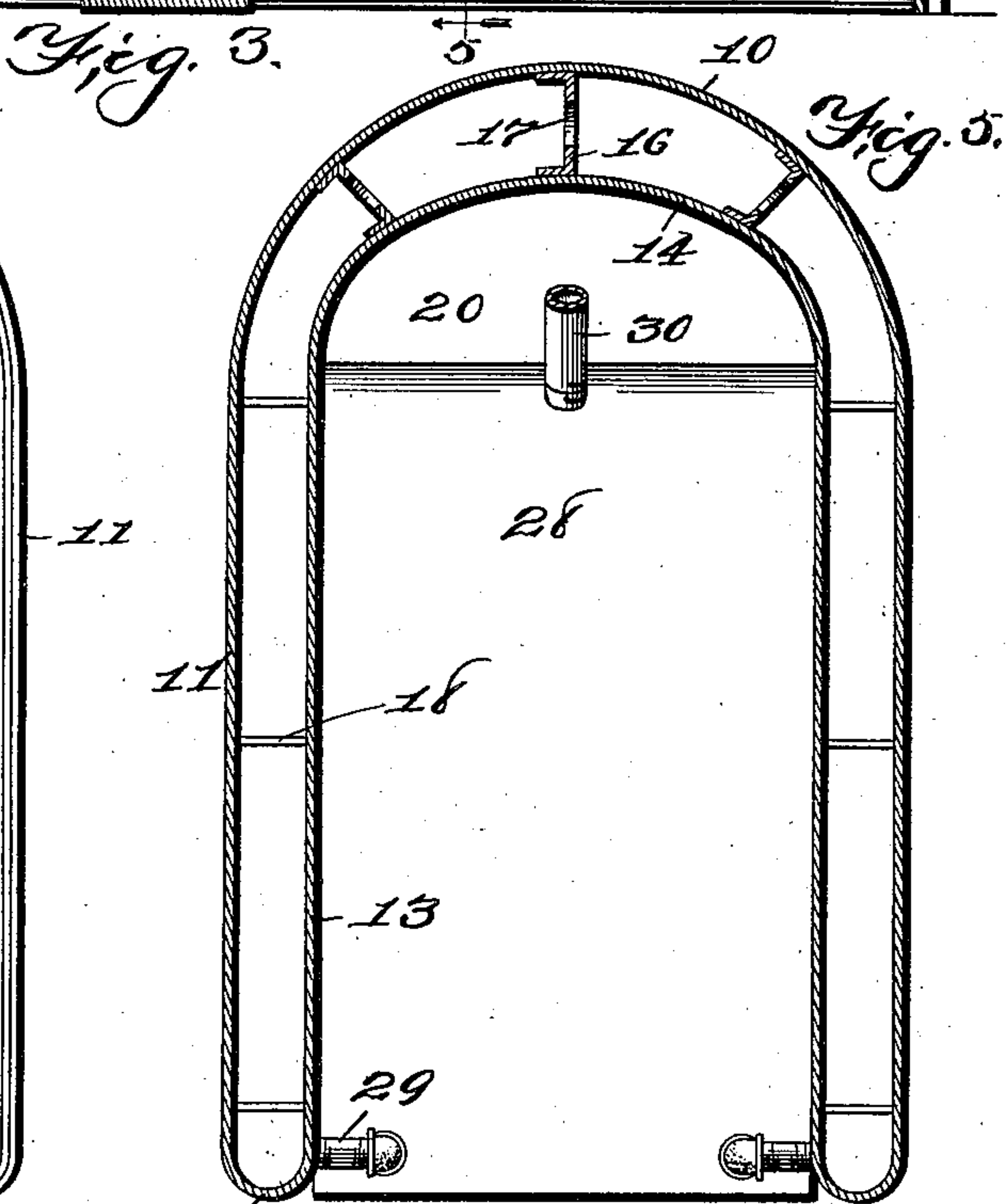
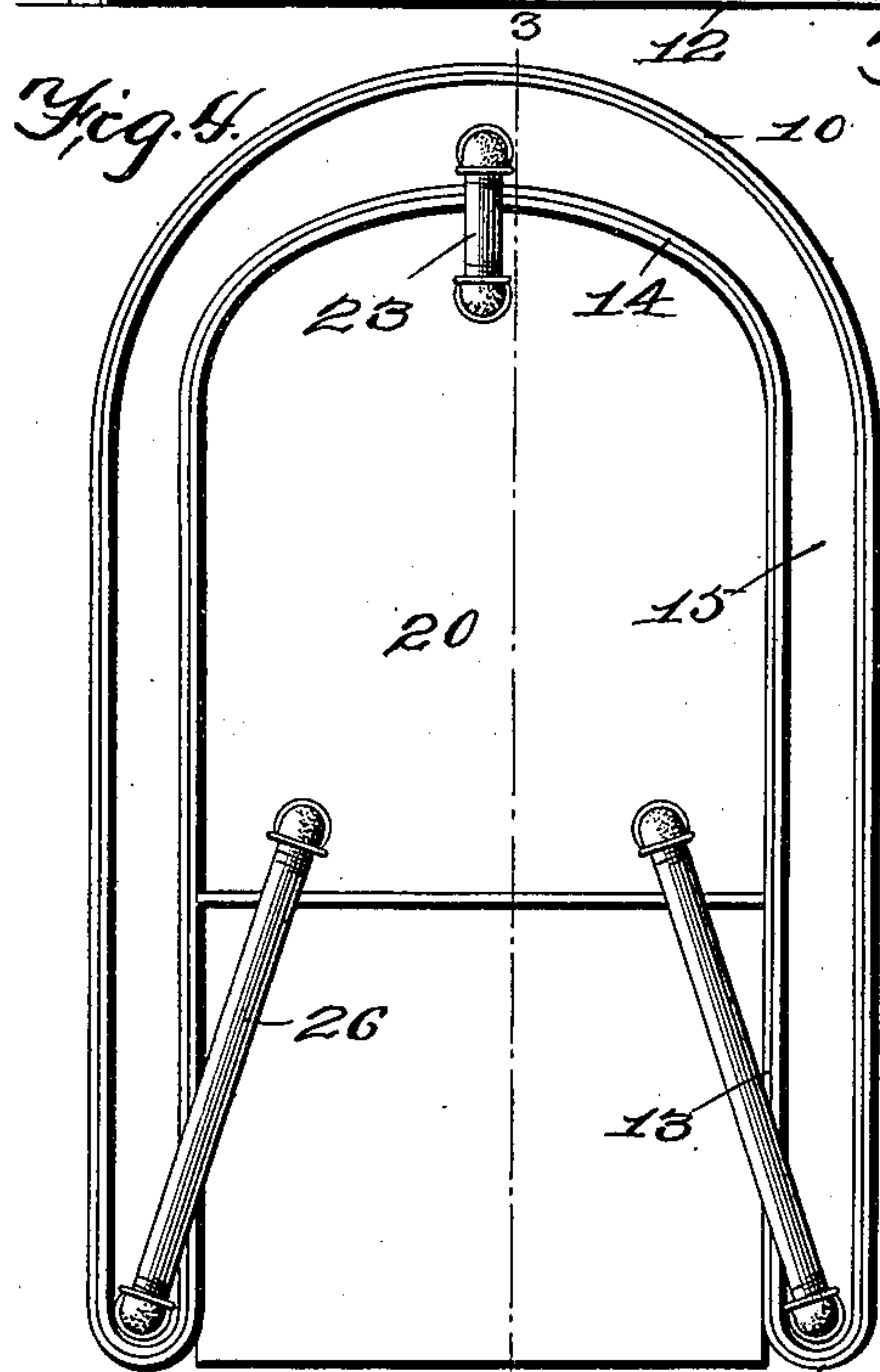
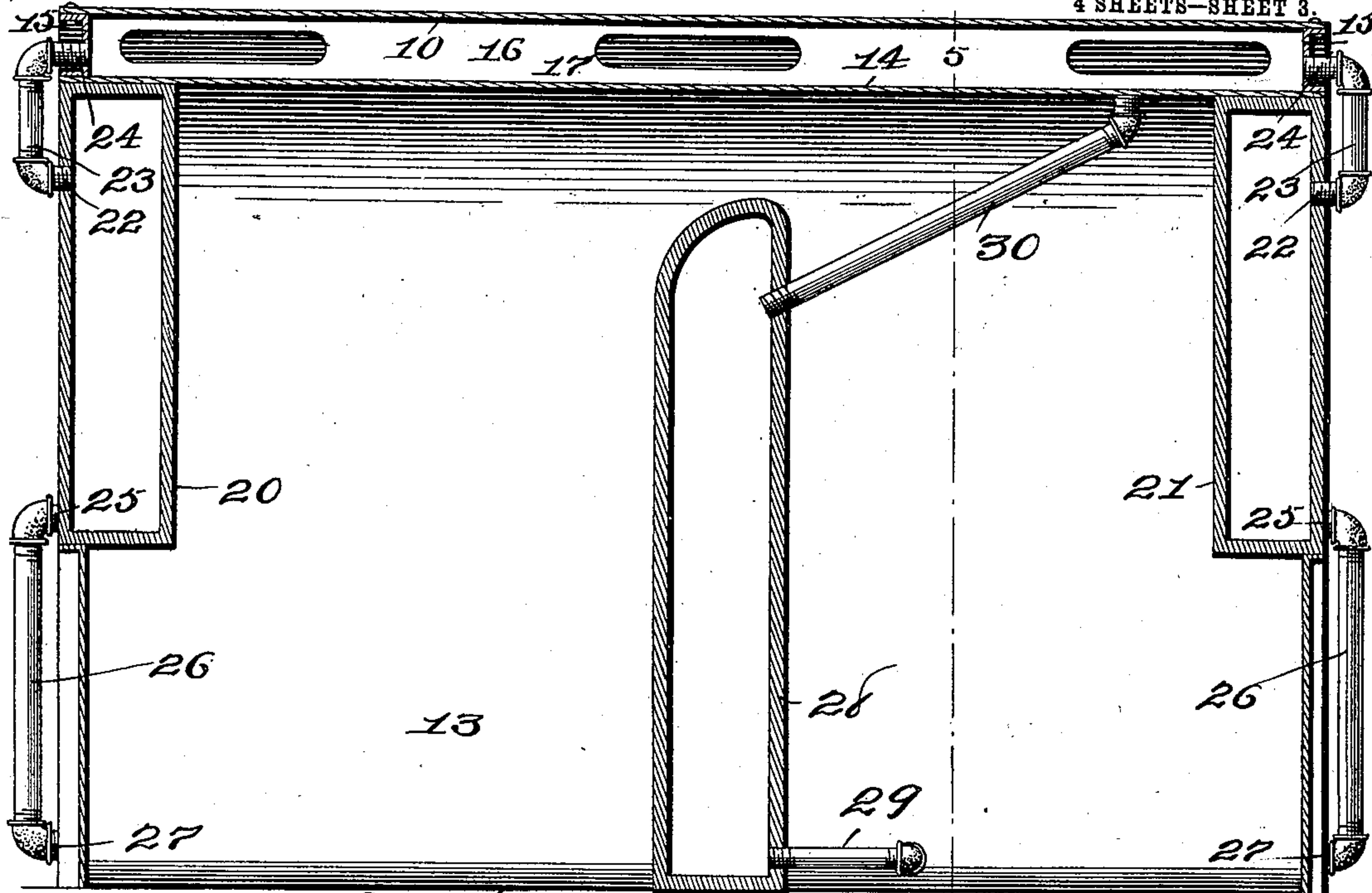
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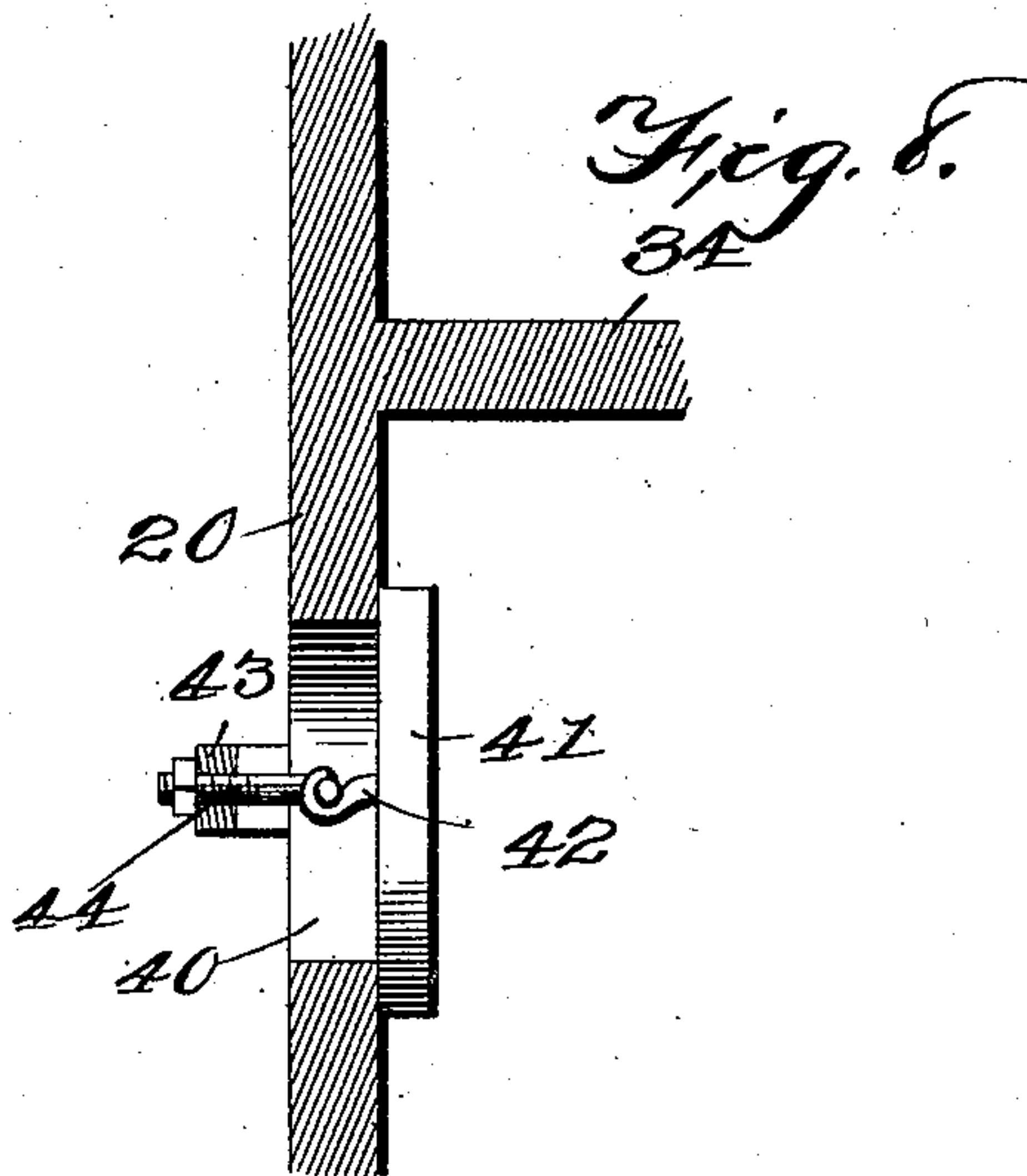
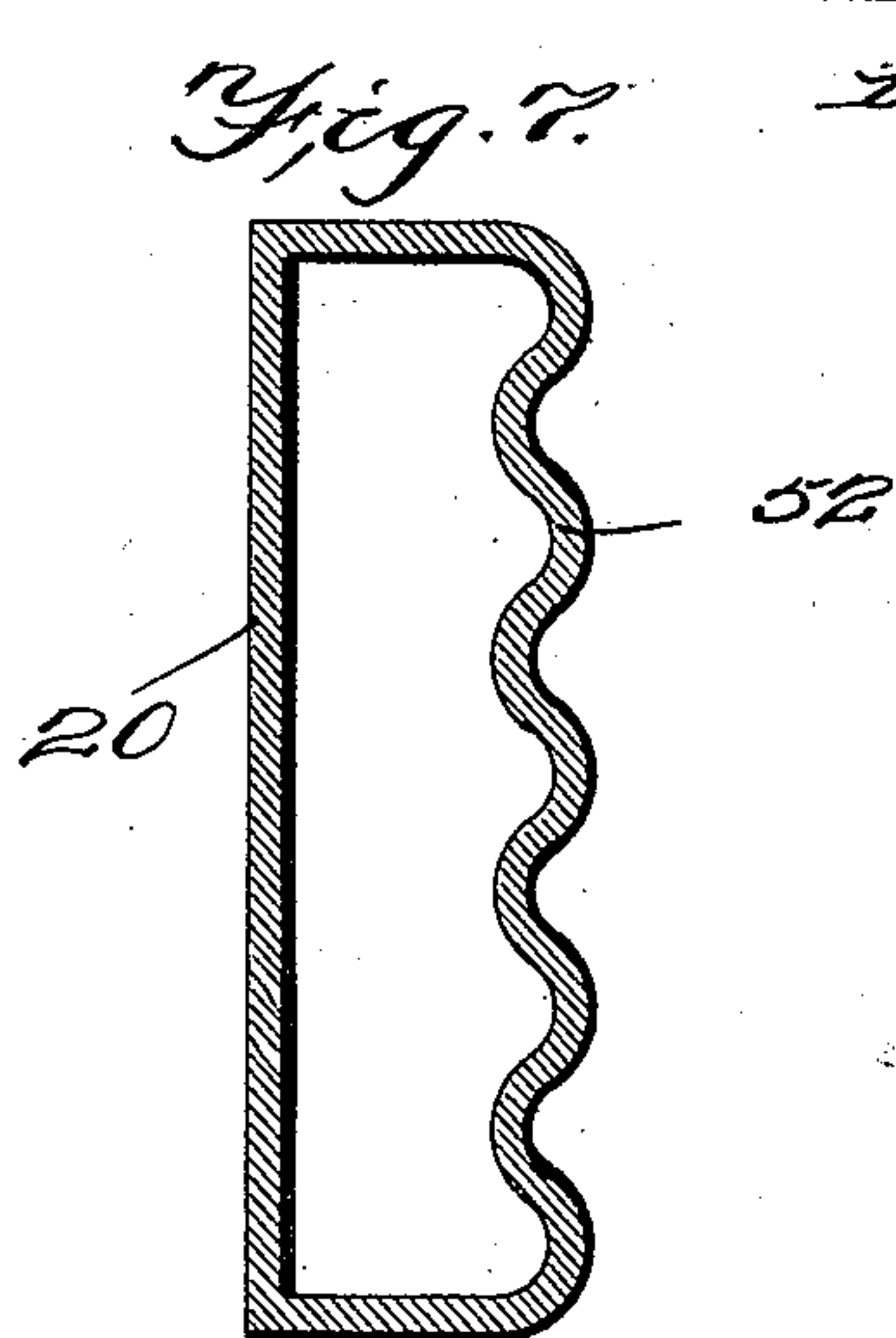
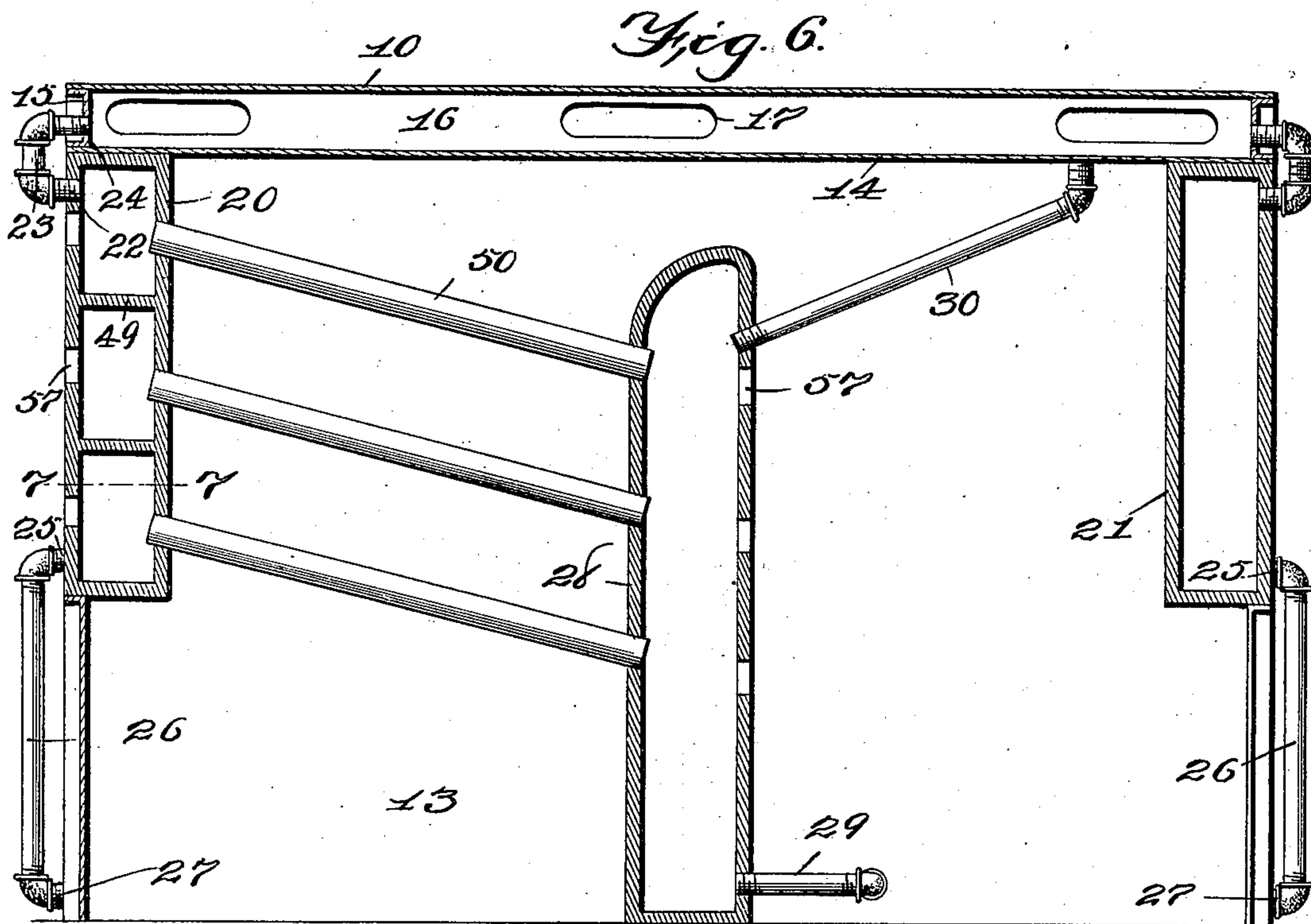
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4 SHEETS—SHEET 4.



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UNITED STATES PATENT OFFICE.

JOHN COLLIS, OF DES MOINES, IOWA.

BOILER.

SPECIFICATION forming part of Letters Patent No. 752,758, dated February 23, 1904.

Application filed January 20, 1903. Serial No. 139,767. (No model.)

To all whom it may concern:

Be it known that I, JOHN COLLIS, a citizen of the United States, residing at Des Moines, in the county of Polk and State of Iowa, have
5 invented certain new and useful Improvements in Boiler-Furnaces, of which the following is a specification.

The objects of my invention are to provide a boiler-furnace of simple, durable, and inexpensive construction, in which the water is
10 contained between metal walls so arranged as to provide a maximum of heating-surface and yet to provide a structure that will have great strength in resistance of the internal
15 strains and all of the parts of the heating-surface will be readily and quickly accessible for purposes of cleaning or repairing.

My invention consists in certain details in the construction, arrangement, and combination of the various parts of the device where-
20 by the objects contemplated are attained, as hereinafter more fully set forth, pointed out in my claims, and illustrated in the accompanying drawings, in which—

25 Figure 1 shows a vertical central longitudinal section of the complete furnace with the inclosing walls omitted. Fig. 2 shows a vertical transverse sectional view on the indicated line 2 2 of Fig. 1 with the inclosing
30 walls in position. Fig. 3 shows a vertical longitudinal sectional view of a slightly-modified form of boiler through the indicated line 3 3 of Fig. 4. Fig. 4 shows a front elevation of the modified form of boiler shown in Fig.
35 3. Fig. 5 shows a vertical transverse sectional view on the indicated line 5 5 of Fig. 3. Fig. 6 shows a vertical longitudinal central sectional view of another modification. Fig. 7 shows a horizontal sectional view of
40 the boiler-front detached, said view being taken on the indicated line 7 7 of Fig. 6; and Fig. 8 shows an enlarged detail view illustrating the hand-hole covering for the boiler ends.

45 Referring to the accompanying drawings, I shall first describe the construction of the shell forming the body portion of the boiler. This shell is preferably made of boiler metal. The top sheet of it at 10 is semicircular in
50 cross-section and extends the full length of

the boiler. The sides of the outer portion are vertical at 11. These sides are turned inwardly at 12 and then upwardly at 13, parallel with the parts 11, and the top of the interior of the boiler is substantially semicircular at
55 14. The ends of the boiler thus formed between the inner and outer sheets are provided with boiler-heads 15, securely held in place by rivets or otherwise. I provide means for
60 bracing the sheets relative to each other by means of the partitions 16, which extend longitudinally of the boiler and which are arranged at suitable distances apart and are perforated at 17, so that the circulation of
65 water through the boiler is not impeded, and in addition to this I provide a series of transverse bolts 18, extending through the parallel parts of the boiler, and between the sheets of the boiler are tubular braces 19, the ends of
70 which engage the inner surfaces of the sheets, and the said tubes surround the bolts 18, thereby preventing expansion or contraction of the sheets relative to each other. I am aware that this portion of my boiler-furnace
75 is not new, and I do not desire to be understood as claiming this portion of the boiler by itself.

I shall next describe the means whereby the ends of the boiler are closed. The boiler ends are substantially independent boiler-sections, preferably made of cast metal and having an
80 exterior contour designed to fit inside of the inner sheet of the boiler ends. These are of a length, however, materially less than the vertical dimension of the body portion of the boiler. The boiler-front is indicated by the
85 reference-numeral 20 and is hollow. At the rear of the boiler is a corresponding part 21. I support these parts in position and at the same time provide for circulation from the boiler front and rear portions to the boiler
90 body portion as follows: The numeral 22 indicates a pipe communicating with the boiler-front. 23 indicates a pipe communicating with the pipe 22 and extending vertical, and 24 indicates a pipe communicating between the
95 pipe 23 and the body portion of the boiler. At the lower end of each of said front and rear boiler-sections are two pipes 25, communicating with the boiler-sections and also with the
100 pipes 26, which pipes incline downwardly and

outwardly and communicate with the pipes 27, which open into the body portions of the boiler, at the lower ends thereof. By this means the boiler-sections 20 and 21 are supported in position. The water in the body portion of the boiler may freely circulate through the boiler portions 20 and 21, and a contraction and expansion of the boiler parts will have no disastrous effects, because the communicating pipes are provided with elbows which may yield enough to permit such contraction and expansion of the boiler-sections.

In addition to the boiler-sections just described I provide a hollow cast-metal bridge-wall 28, shaped to fit the interior of the body portion of the boiler. This hollow bridge-wall is preferably of cast metal and is held in position by means of the pipes 29, communicating with its lower portion and extending rearwardly and then outwardly and entering the body portion of the boiler as near the lower end thereof as is practicable, and in addition to this a pipe 30 communicates with the upper central portion of the bridge-wall and inclines upwardly and rearwardly and enters the top portion of the boiler-body. Hence the bridge-wall is firmly supported, and the contraction and expansion of the parts will not operate to sever its fastening to the body portion of the boiler, and a circulation of the water through the bridge-wall is provided for. Arranged on the exterior of the boiler-body are the horizontal partitions 31, extending from a point near the front of the boiler-body to the wall 32, some distance in the rear of boiler, and the partitions 31 extend outwardly to the side walls 33. By this means the products of combustion are made to pass from the grate upwardly and rearwardly over the bridge-wall, then downwardly and rearwardly through the rear end of the boiler, then outwardly, laterally, and forwardly under the partitions 31 to a point near the furnace-front, and then upwardly and rearwardly between the partitions 31 and the top of the furnace to a point of discharge.

In the form shown in Figs. 1 and 2 I have provided a number of partitions extending both vertically and horizontally, said partitions being indicated by the reference-numeral 34, and the said partitions are provided with openings 35, through which the water may freely circulate. In the form shown in Figs. 1 and 2 I use a comparatively low hollow bridge-wall, (indicated by the numeral 36,) and this bridge-wall is connected with the boiler-body by means of the pipes 37 and 38. This low bridge-wall leaves a space above the bridge-wall and between the boiler-heads for the tubes 39, and these tubes enter independent chambers in the boiler-heads formed by the partitions 34. In each of the boiler-heads I have provided an opening 40 in line with each boiler-flue, and these openings are de-

signed to be closed by an inside plate 41, provided with a hook 42. 43 is a cross-piece to extend across the opening 40 and rest on the outer surface of the boiler-front 20, and 44 is a bolt passed through the cross-piece and detachably connected with the hook 42. When it is desired to remove the plate 41, the nut on the bolt is loosened and the cross-piece 43 removed far enough to permit the plates 41 to be drawn, so that access may be provided to the interior of the boiler-front. This device just described is simply an ordinary hand-hole covering, and I do not claim anything new in its construction. It is obvious that by this arrangement of parts access may be had to the boiler-tubes to clean them. In the form shown in Figs. 1 and 2 I have also provided a superheating dome 45, arranged above the boiler-body and communicating therewith through the pipes 46 and 47 and having the steam-service pipe 48 communicating with its top.

In the modified form shown in Fig. 6 I have provided means whereby the form of boiler illustrated in Fig. 3 may be adapted for use in connection with the boiler-tubes, as follows: The boiler-front 20 is provided with a number of horizontal partitions 49 and boiler-tubes 50, communicating between the boiler-front 20 and the hollow bridge-wall 28. I provide openings 57 in the front of the boiler-section 20 and in the rear of the hollow bridge-wall 28 to provide access to the ends of the boiler-tubes. In other respects this modification (shown in Fig. 6) is the same as that shown in Fig. 3.

In Fig. 7 of the drawings I have illustrated in sections a slightly-modified form of the boiler-front in which the rear of the boiler-front is corrugated at 52, so as to provide a larger heating-surface.

It is to be understood in this connection that each of the several modifications of my improved boiler is to be used in connection with the ordinary inclosing furnace-walls and the horizontal partitions 31, so that the products of combustion from the grate will pass first longitudinally through the interior of the boiler and then in engagement with the lower outer surface of the boiler, and finally pass over the upper outer surface of the boiler before discharging into the flue. Furthermore, a strong and compact boiler is provided in which provision is made for a contraction and expansion of parts, so that such contraction and expansion will not tend to break the boiler-sections apart or to disconnect the pipes that provide for the circulation of the water between the various boiler-sections.

Having thus described my invention, what I claim, and desire to secure by United States Letters Patent therefor, is—

1. The combination with a double-walled, boiler, body-section having the top and sides, and end pieces for closing the space between

the walls at the ends thereof, of a hollow end boiler-section shaped to fit into one end of the boiler-body, and pipes communicating between the end boiler-section and the body boiler-section, one pipe projecting outwardly from the top portion of the end boiler-section then upwardly and then into the body boiler-section and two pipes extending outwardly from the lower end portion of the end section, then downwardly and outwardly and then inwardly to the bottom portion of the body portion, a hollow bridge-wall, a pipe communicating with the top portion of the hollow bridge-wall projecting upwardly and rearwardly and communicating with the inner top portion of the body boiler-section and two pipes communicating with the lower end portion of the hollow bridge-wall and projecting rearwardly and communicating with the lower portion of the body boiler-section.

2. The combination with a double-walled boiler, body-section having the top and sides, and end pieces for closing the space between the walls at the ends thereof, of a hollow end boiler-section shaped to fit into one end of the boiler-body, and pipes communicating between the end boiler-section and the body boiler-section, said pipes extending first outwardly from the boiler-sections then substantially parallel with the boiler end, a hollow bridge-wall and pipes communicating with the interior of the bridge-wall and projecting rearwardly and communicating with the body portion, and boiler-tubes communicating at their ends with the front end section and the bridge-wall, said front section and bridge-wall having openings therein in line with the tubes to provide access to the tubes.

3. The combination with a double-walled boiler body-section having top and sides, of a hollow end boiler-section placed in the upper portion of one end of the boiler, pipes attached to the end section extended upwardly and attached to the body portion and provid-

ing communication between said end and body portions, and pipes extended from the end section downwardly and attached to the body portion and also providing communication between said end and body portions, said pipes supporting the end in its elevated position.

4. The combination with a double-walled boiler body-section having top and sides, of a hollow end boiler-section placed in the upper portion of one end of the boiler, pipes attached to the end section extended upwardly and attached to the body portion and providing communication between said end and body portions and pipes extended from the end section downwardly and attached to the body portion and also providing communication between said end and body portions, said pipes supporting the end in its elevated position, a hollow bridge-wall and pipes communicating between it and the hollow body and supporting the bridge-wall in position.

5. The combination with a double-walled boiler body-section having top and sides, and end pieces for closing the space between the walls at the ends thereof, of a hollow end boiler-section shaped to fit into one end of the boiler-body, and pipes communicating between the end boiler-section and the body boiler-section, one pipe projecting outwardly from the top portion of the end boiler-section then upwardly and then into the body boiler-section and two pipes extending outwardly from the lower end portion of the end section, then downwardly and outwardly and then inwardly to the bottom portion of the body portion, a hollow bridge-wall, and pipes communicating between the bridge-wall and hollow body portion and supporting the bridge-wall in position.

Des Moines, Iowa, March 7, 1902.

JOHN COLLIS.

Witnesses:

J. RALPH ORWIG,
W. R. LANE.