

No. 854,794.

PATENTED MAY 28, 1907.

J. BOYD.
SMOKE PREVENTER.
APPLICATION FILED JUNE 18, 1906.

2 SHEETS—SHEET 1.

Fig. 1.

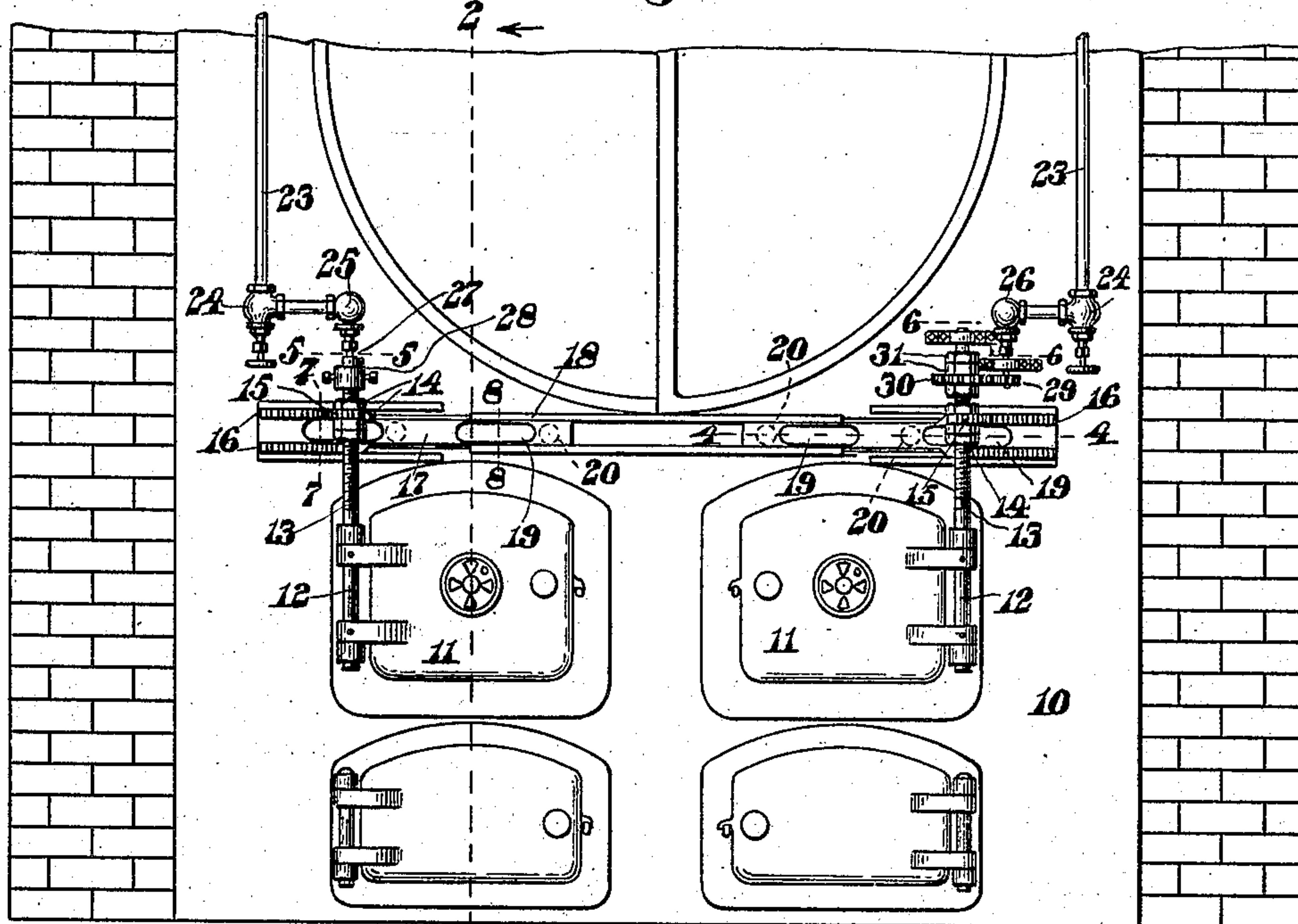


Fig. 3.

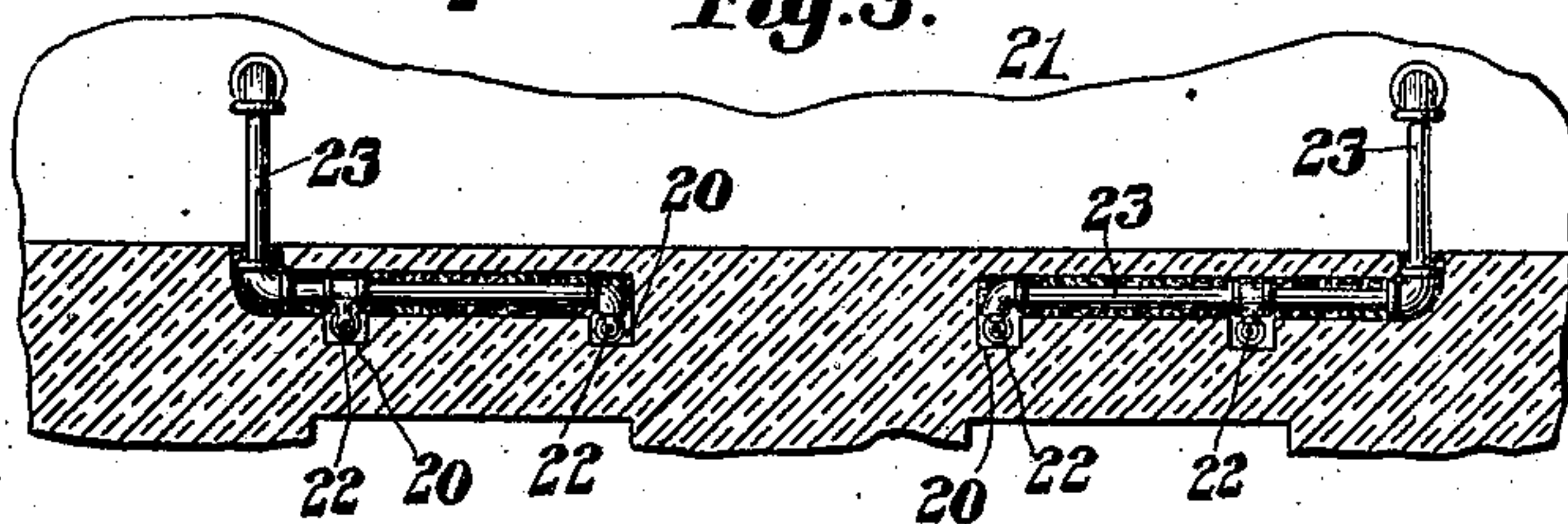
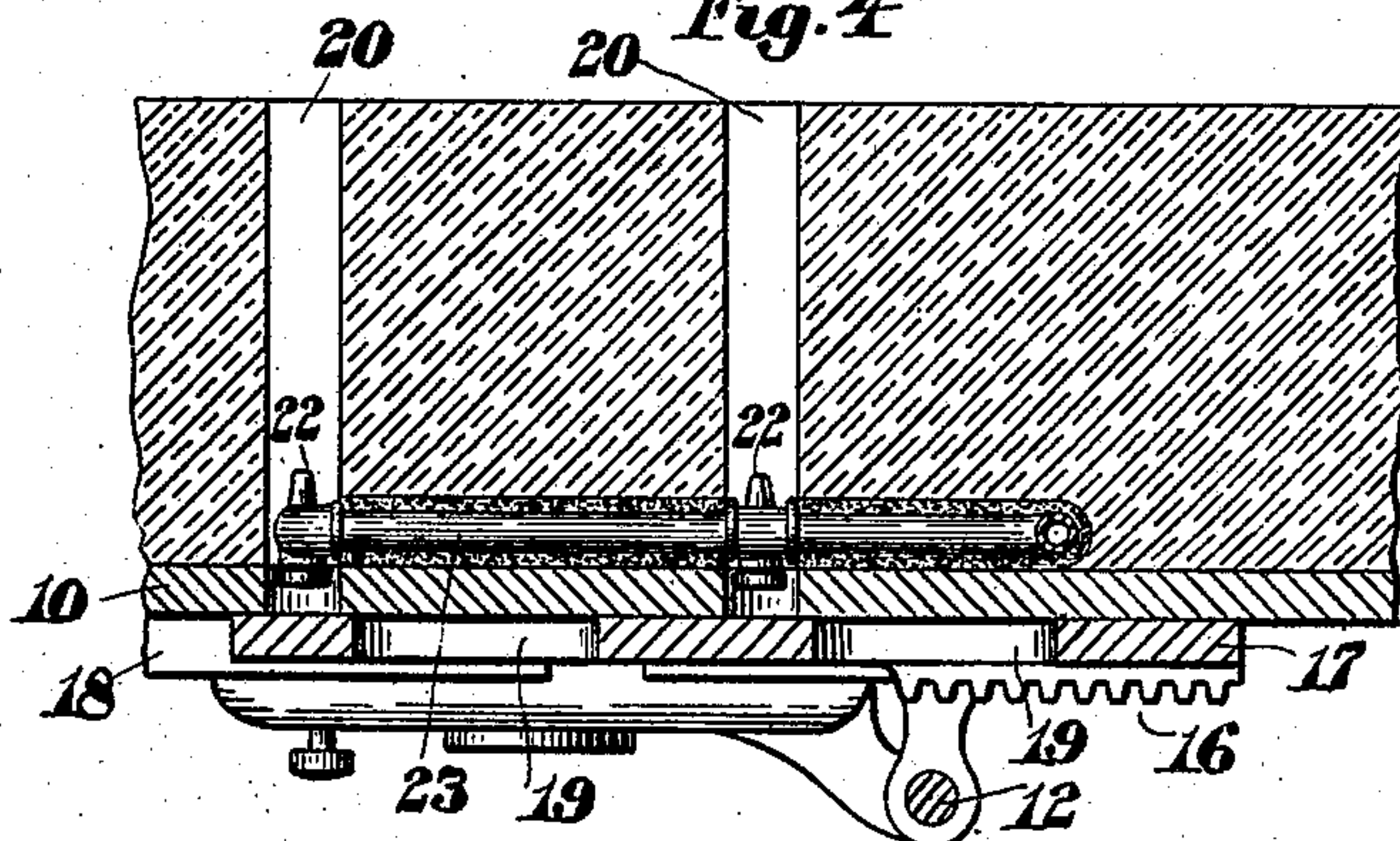


Fig. 4.



Witnesses:

Nathan C. Lombard
Edna C. Cleveland

Inventor:

John Boyd,
by Walter E. Lombard
Atty.

No. 854,794.

PATENTED MAY 28, 1907.

J. BOYD.
SMOKE PREVENTER:
APPLICATION FILED JUNE 18, 1906.

2 SHEETS—SHEET 2.

Fig. 2.

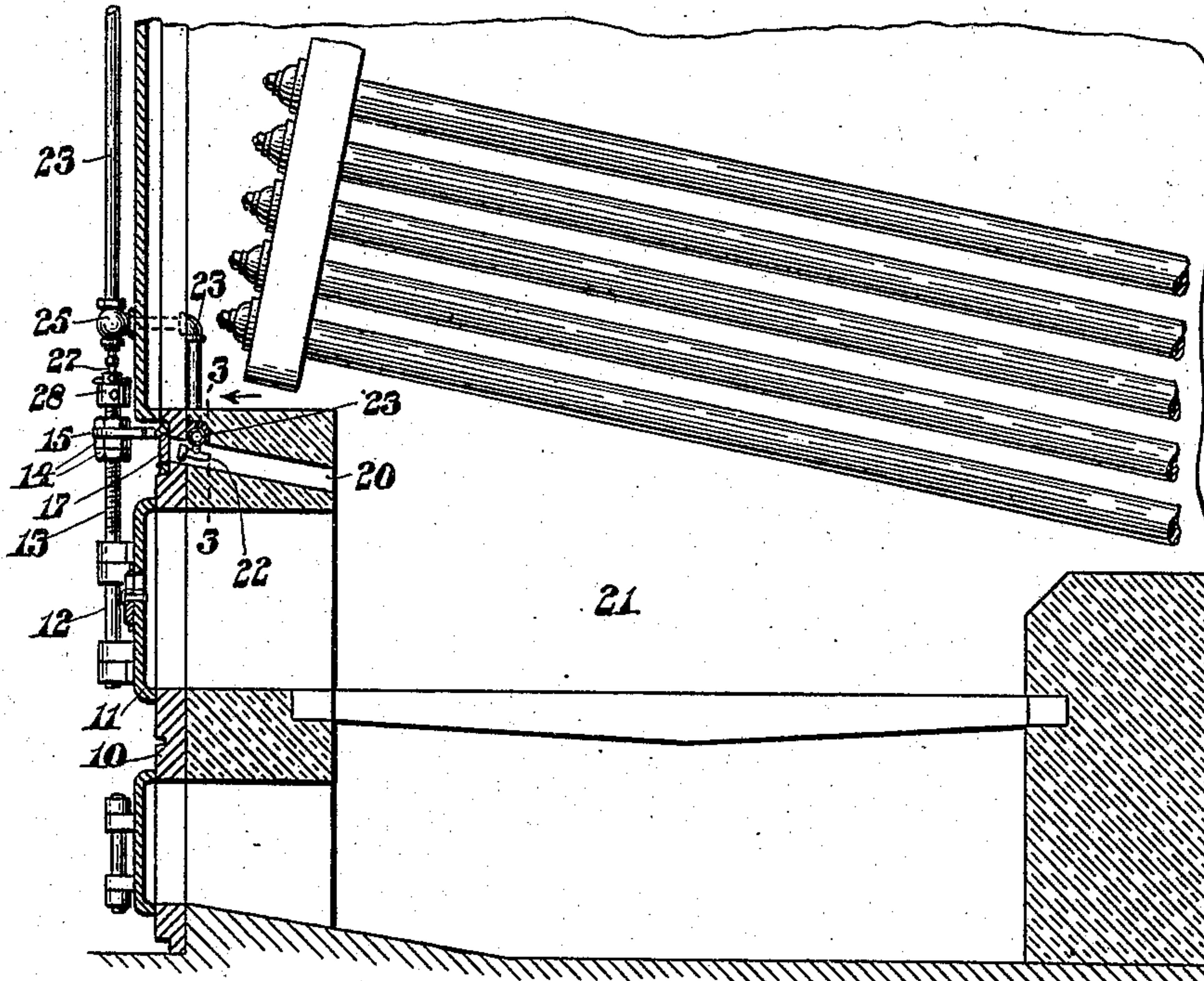


Fig. 5.

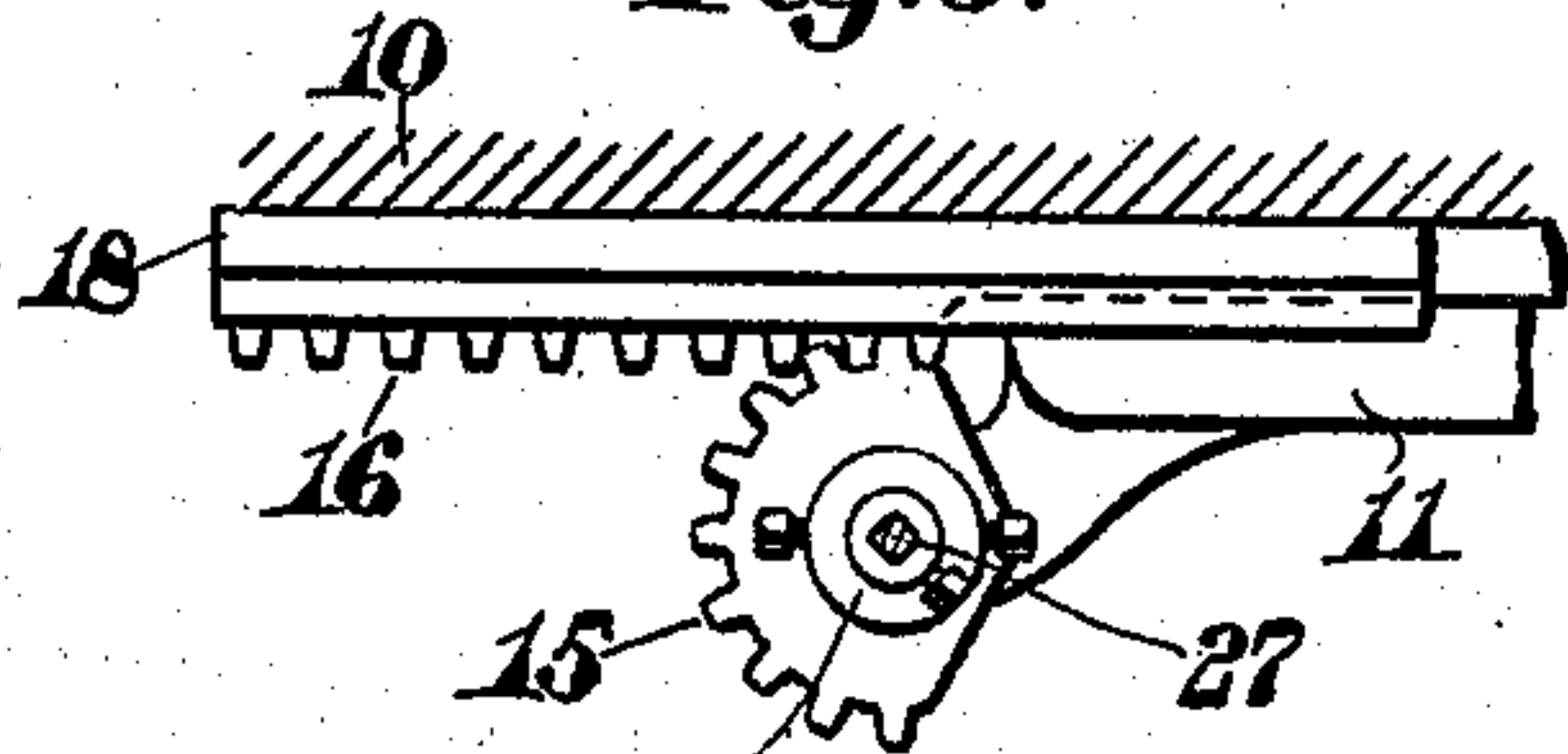


Fig. 6.

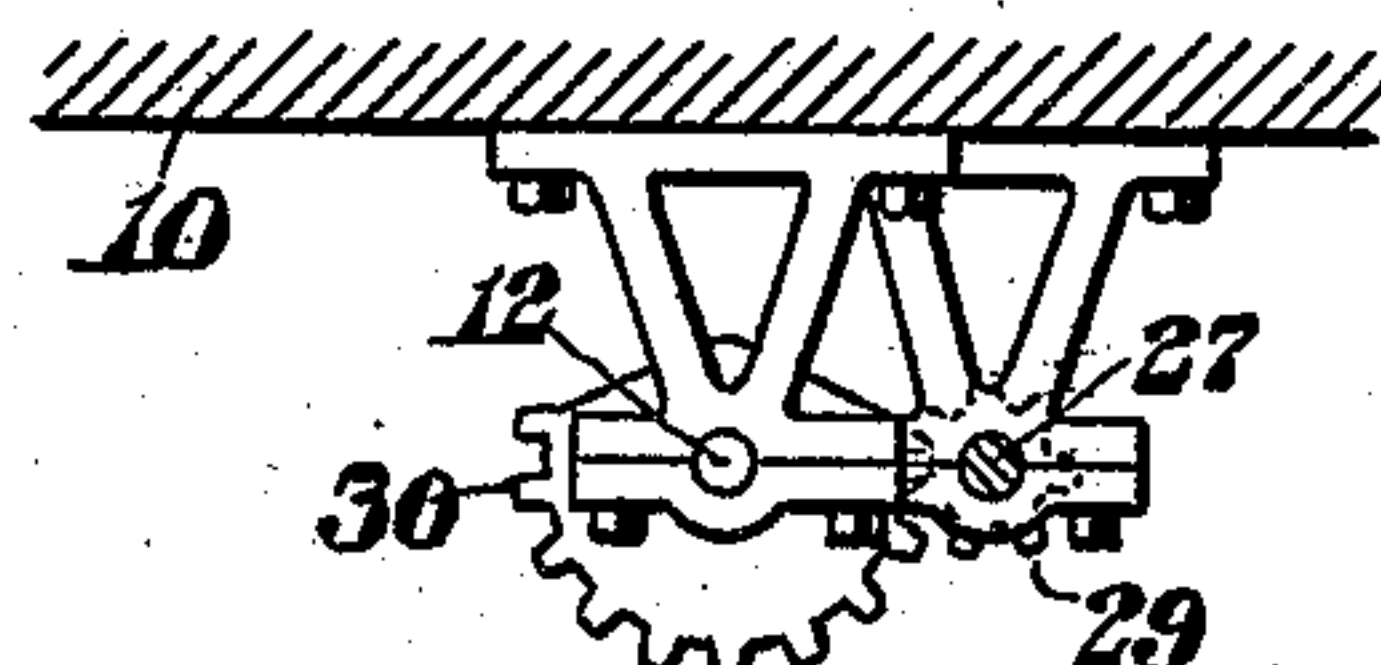


Fig. 7.

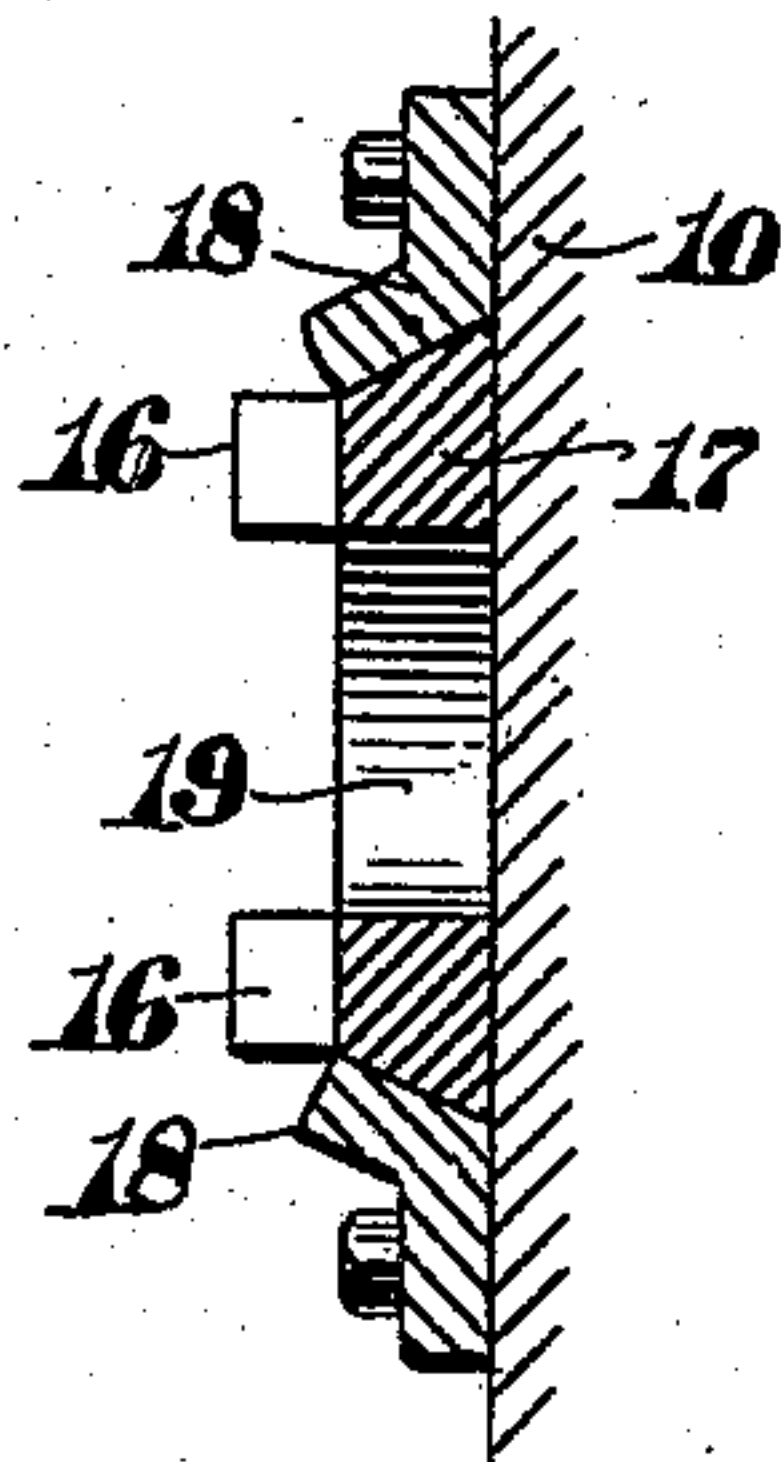
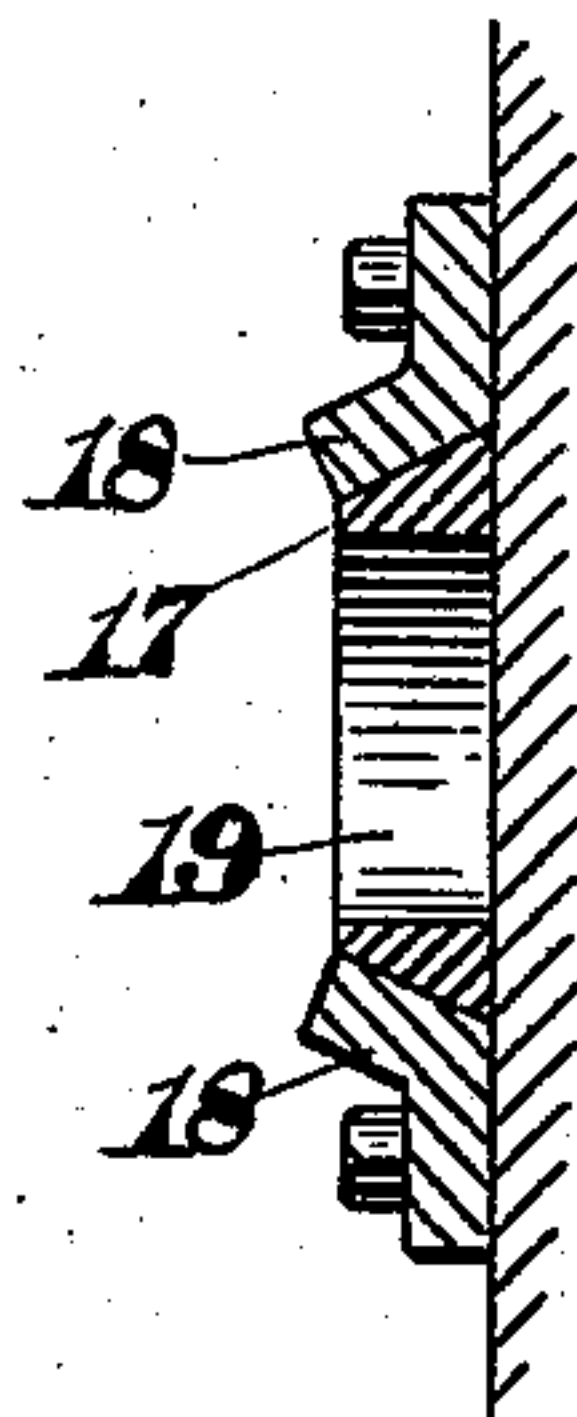


Fig. 8.



Witnesses:
Nathan C. Lombard
Edna C. Cleveland

Inventor:
John Boyd,
by Nathan C. Lombard,
Atty.

UNITED STATES PATENT OFFICE.

JOHN BOYD, OF MALDEN, MASSACHUSETTS.

SMOKE-PREVENTER.

No. 854,794.

Specification of Letters Patent.

Patented May 28, 1907.

Application filed June 18, 1906. Serial No. 322,139.

To all whom it may concern:

Be it known that I, JOHN BOYD, a citizen of the United States of America, and a resident of Malden, in the county of Middlesex and State of Massachusetts, have invented certain new and useful Improvements in Smoke-Preventers, of which the following is a specification.

This invention relates to smoke preventers and has for its object the production of a device, in which, to secure the proper combustion within the furnace, oxygen and steam are admitted and thoroughly mixed with the gases arising from the introduction of fresh fuel upon a hot fire.

The invention consists in certain novel features of construction and arrangement of parts which will be readily understood by reference to the description of the drawings and to the claims to be hereinafter given.

Of the drawings: Figure 1 represents a partial front elevation of a boiler front embodying the features of this invention. Fig. 2 represents a vertical section on line 2—2 on Fig. 1, looking in the direction of the arrow. Fig. 3 represents a vertical section on line 3—3 on Fig. 2, looking in the direction of the arrow. Fig. 4 represents an enlarged horizontal section on line 4—4 on Fig. 1. Fig. 5 represents an enlarged horizontal section on line 5—5 on Fig. 1. Fig. 6 represents an enlarged horizontal section on line 6—6 on Fig. 1, and Figs. 7 and 8 represent vertical sections, respectively, through the slide and its guides on lines 7—7 and 8—8 on Fig. 1.

Similar characters designate like parts throughout the several figures of the drawings.

In the drawings, 10 represents any suitable boiler front provided with the fire doors 11—11 each of these doors being provided with a hinge pin 12 which oscillates or moves with said door in opening and closing the same. The upper ends of the hinge pins 12 are threaded as at 13 and have secured thereto by means of the nuts 14 a gear segment 15. This segment 15 may be adjusted lengthwise of the threaded section 13 of the hinge pin 12 by moving the nuts 14 lengthwise thereof and clamping the segment in its new position. This provides a convenient means of registering with either one of the parallel racks 16 projecting forwardly from a slidable member 17 mounted in any suitable guides 18 at the top and bottom thereof.

The slide 17 is provided with a plurality of openings 19 adapted in its movement to uncover the passages 20 extending through the front wall of the furnace into the fire-pot 21. In each of the passages 20 is located a steam nozzle 22 connected to a steam supply pipe 23, each of said pipes being provided with a hand valve 24 and an automatic valve 25 or 26. The stem 27 of the valve 25 is connected by a suitable coupling member 28 with the end of the hinge pin 12 so that as the door 11 is opened the oscillation of said hinge pin will cause a movement of the valve stem 27 to open the valve 25 and permit steam to pass through the nozzles 22 into the fire-pot. The same movement of the hinge pin 12 that operates the valve 25 to admit steam to the fire-pot through the medium of the gear segment 15 will move the slide 17 to cause the openings 19 therein to uncover the passages 20 in which the steam nozzles 22 are located so that as the steam passes from said nozzles a suction will be created which will cause the oxygen from the air to be drawn through the passages 20 into the fire-pot 21.

The openings 19 in the slide 17 are so constructed that the passages 20 will become uncovered by the slide 17 whenever the door 11 is opened sufficiently far to permit of the insertion of any fresh combustibles. It is obvious therefore that whenever the door is opened sufficiently far to permit the admission of fresh combustible the valve 25 will be operated to supply steam to the nozzles 22 in the passages 20 and at the same time the slide 17 will be moved sufficiently far to uncover the passages to permit a sufficient supply of oxygen to be admitted with the steam from the nozzles to create an intense heat in the fire-pot and cause the fresh coal to be quickly ignited.

The steam emitted from the jets or nozzles 22 is projected against the heated gases within the furnace, decomposing said steam into oxygen and hydrogen, thoroughly mixing the entering oxygen with the gases to effect complete combustion.

Should the teeth in either of the racks 16 be accidentally broken the segment 15 may be readily moved lengthwise of the hinge pin 12 and clamped in position to mesh with the rack still remaining intact.

The valve 26 has secured upon its valve stem a pinion 29 which meshes with the gear segment 30 upon the righthand hinge pin 12.

and clamped in position by means of nuts 31. This arrangement obviates the necessity of supplying a special valve for the righthand door as by this construction it is obvious
 5 that the valves 25—26 may be precisely alike; the proper movement of the valve stem being secured from a door moving in the opposite direction by means of the segment 30 and pinion 29.

10 It is obvious that with the full opening in the doors 11 the valves 25—26 will always be opened to the same degree but should it be desired to regulate the amount of steam passing into the nozzle this may be readily
 15 done by means of the hand valves 24. This makes a very simple construction, easily applied to any furnace and has been found in practice to be very effective in its operation.

It is believed that from the foregoing the
 20 operation of the invention will be thoroughly understood without any further description.

Claims.

1. In a furnace, a door therefor, a hinge pin moving therewith, a steam inlet pipe, a
 25 valve therein adapted to be operated by the movement of said pin, a plurality of nozzles in said steam inlet pipe extending into said furnace, a front wall to said furnace provided with a plurality of passages extending there-
 30 through for the reception of said nozzles, and means located in the rear of said nozzles upon said front plate for closing and opening said passages by the movement of the door.

2. In a furnace, a door therefor, a hinge
 35 pin moving therewith, a steam inlet pipe, a valve therein adapted to be operated by the movement of said pin, a plurality of nozzles in said steam inlet pipe extending into said furnace, a front wall to said furnace provided
 40 with a plurality of passages extending there-through for the reception of said nozzles, and a reciprocating slide located in the rear of said nozzles upon said front plate for closing and opening said passages by the movement
 45 of the door.

3. In a furnace, a door therefor, a hinge pin moving therewith, a steam inlet pipe, a valve therein connected directly to said
 50 hinge pin and adapted to be operated by the movement thereof, a plurality of nozzles in said steam inlet pipe extending into said furnace, a front wall to said furnace provided with a plurality of passages extending there-
 55 through for the reception of said nozzles, and means for automatically opening and closing each of said passages simultaneously with the opening and closing of said door.

4. In a furnace, a door therefor, a front
 60 wall to said furnace provided with a plurality of passages extending therethrough, a steam nozzle located within each of said passages, a sliding member for closing all of said pas-
 sages, and means directly operated by the opening and closing of said door for sliding

said member simultaneously with the move- 65
 ment of the door.

5. In a furnace, a door therefor, a hinge pin movable therewith, a front wall to said furnace provided with a plurality of pas-
 70 sages therethrough, a steam nozzle located within each passage, a toothed reciprocating slide for closing said passages, and a toothed segment secured to said hinge pin and mesh-
 ing with the teeth of said slide.

6. In a furnace, a door therefor, a hinge
 75 pin movable therewith, a front wall to said furnace provided with a plurality of pas- sages therethrough, a steam nozzle located within each passage, a toothed reciprocating
 80 slide for closing said passages, and a toothed segment adjustably secured to said hinge pin and meshing with the teeth of said slide.

7. In a furnace, a door therefor, a hinge pin movable therewith, a front wall to said
 85 furnace provided with a plurality of pas- sages therethrough, a steam nozzle located within each passage, a toothed reciprocating slide for closing said passages, and a toothed
 90 segment adjustable lengthwise of said hinge pin and meshing with the teeth of said slide.

8. In a furnace, a door therefor, a thread-
 ed hinge pin movable therewith, nuts thread-
 ed thereto, a gear segment mounted on said
 hinge pin and held in position by said nuts, a
 95 front wall to said furnace provided with a plurality of passages therethrough, and a reciprocating sliding member operated by
 said segment to close and open said passages.

9. In a furnace, a door therefor, a hinge
 100 pin oscillating therewith, a front wall to said furnace provided with a plurality of pas- sages therethrough, a steam nozzle in each of
 105 said passages, a reciprocating slidable member provided with a plurality of openings adapted to move across said passages to
 open and close the same, a rack secured to
 said slidable member, and a gear segment
 meshing therewith secured to said hinge pin.

10. In a furnace, a door therefor, a hinge
 110 pin oscillating therewith, a front wall to said furnace provided with a plurality of pas- sages therethrough, a steam nozzle in each of
 115 said passages, a slidable member provided with a plurality of openings adapted to move across said passages to open and close the
 same, a plurality of parallel racks on said
 slidable member, a gear segment mounted
 upon said hinge pin and adapted to mesh
 with one of said racks, and means for adjust-
 120 ing the position of said gear segment to
 cause it to mesh with either of said racks.

Signed by me at Boston, Massachusetts,
 this 16th day of June, 1906.

JOHN BOYD.

Witnesses:

WALTER E. LOMBARD,
 EDNA C. CLEVELAND.