

No. 751,395.

PATENTED FEB. 2, 1904.

A. W. HESS & A. S. WILLIAMS.

OIL BURNER.

APPLICATION FILED MAY 23, 1903.

NO MODEL.

3 SHEETS—SHEET 1.

Fig. 1.

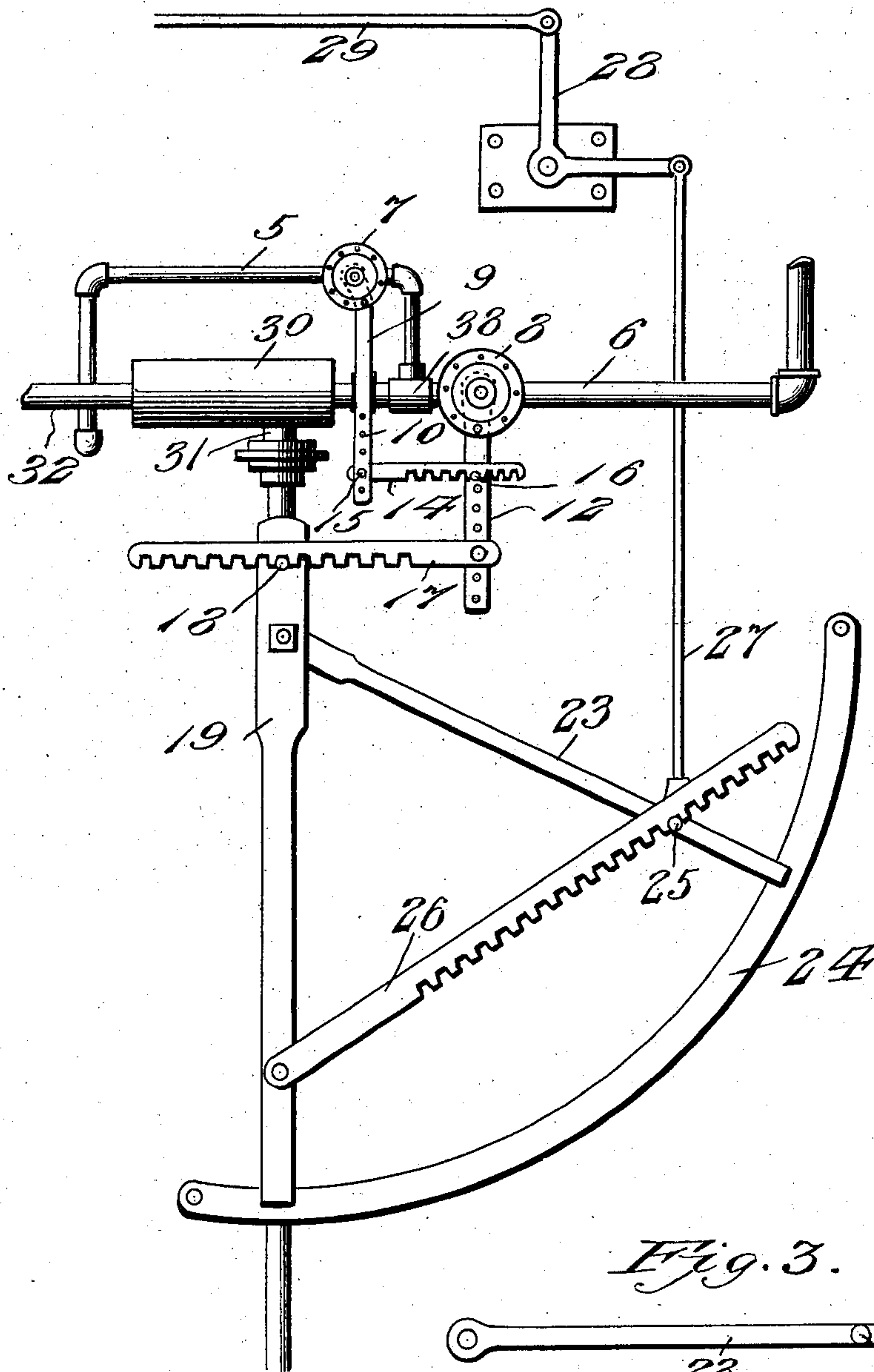


Fig. 2.

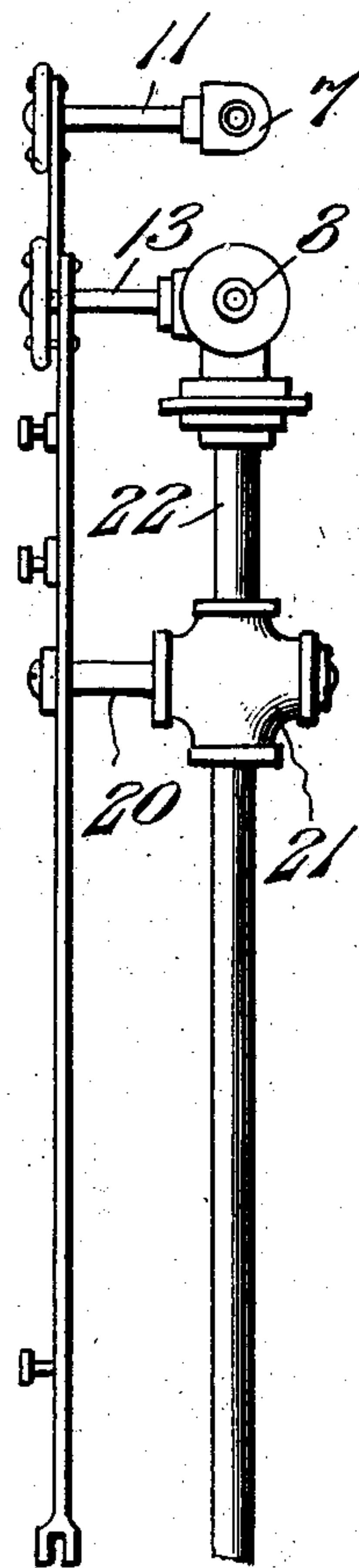
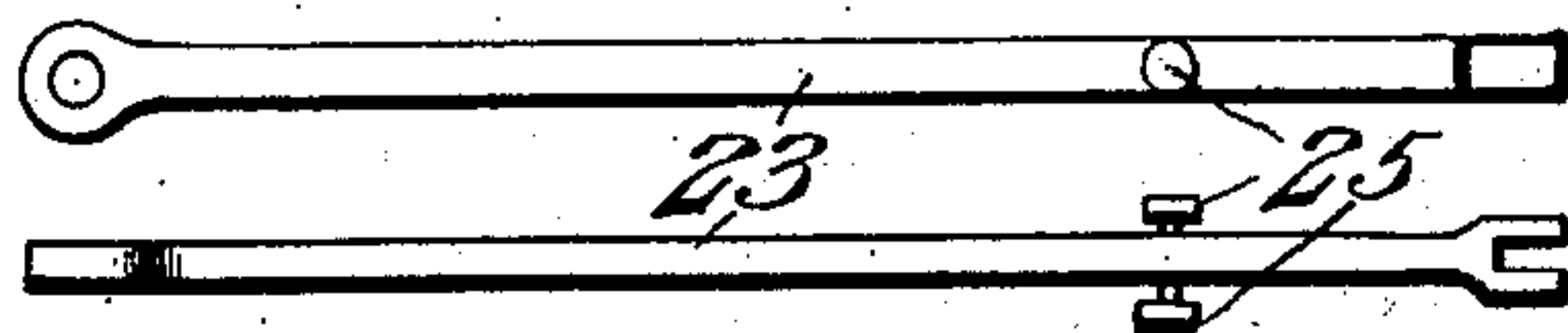


Fig. 3.



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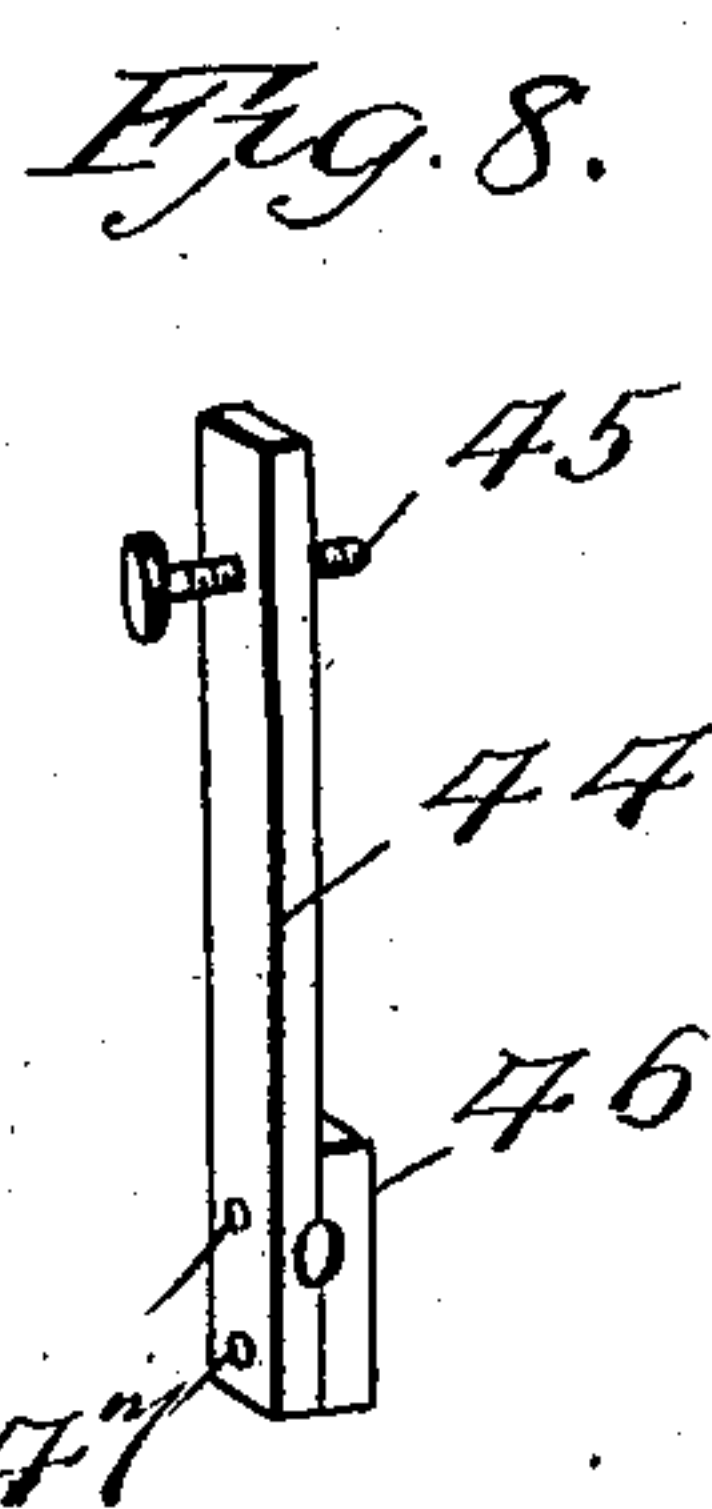
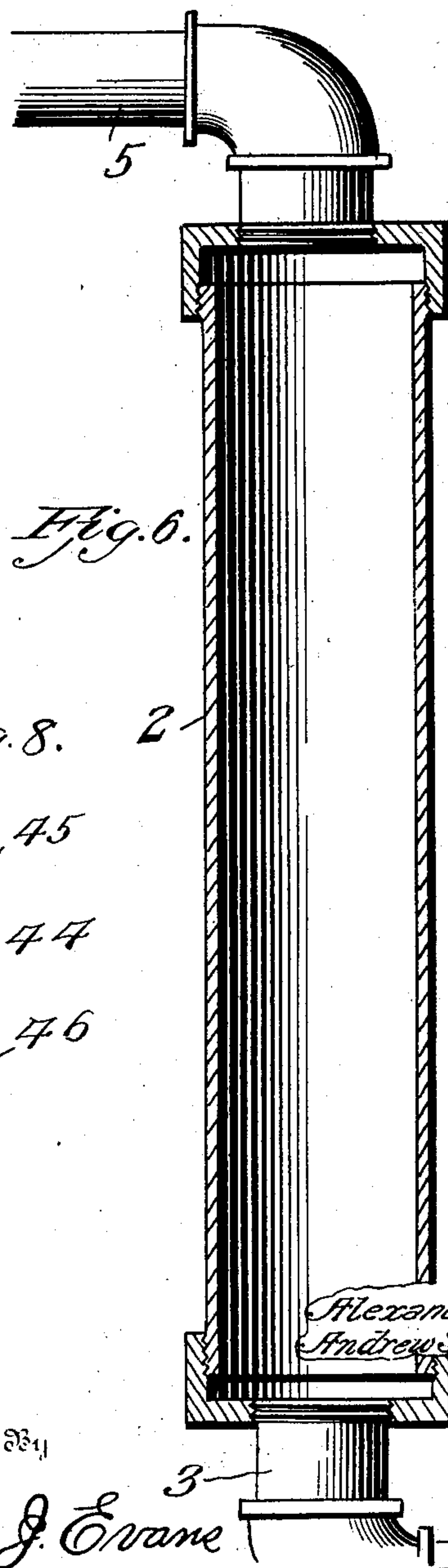
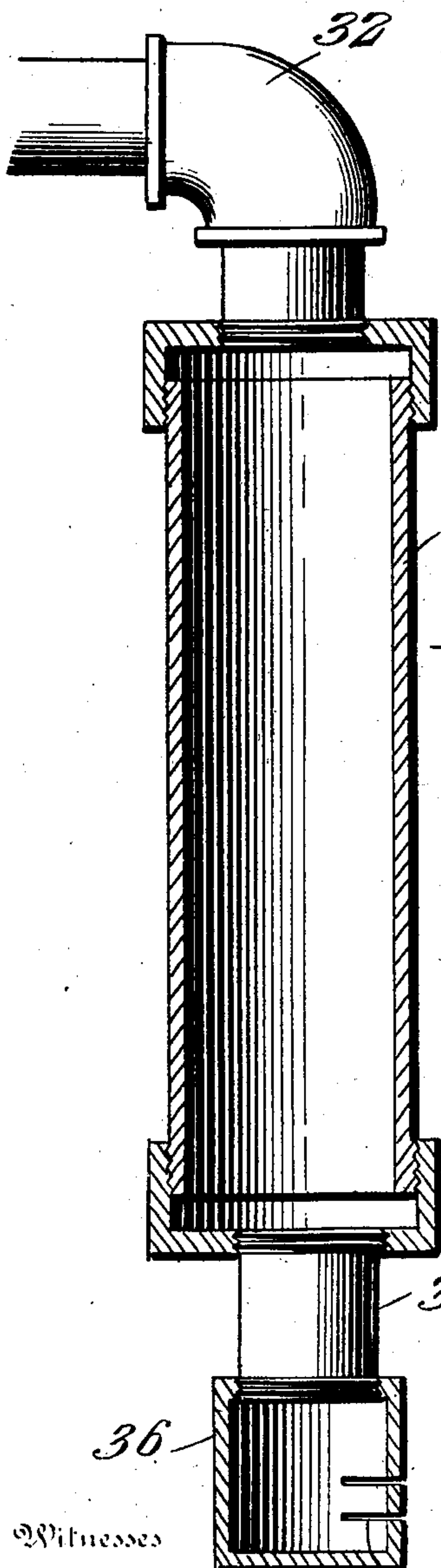
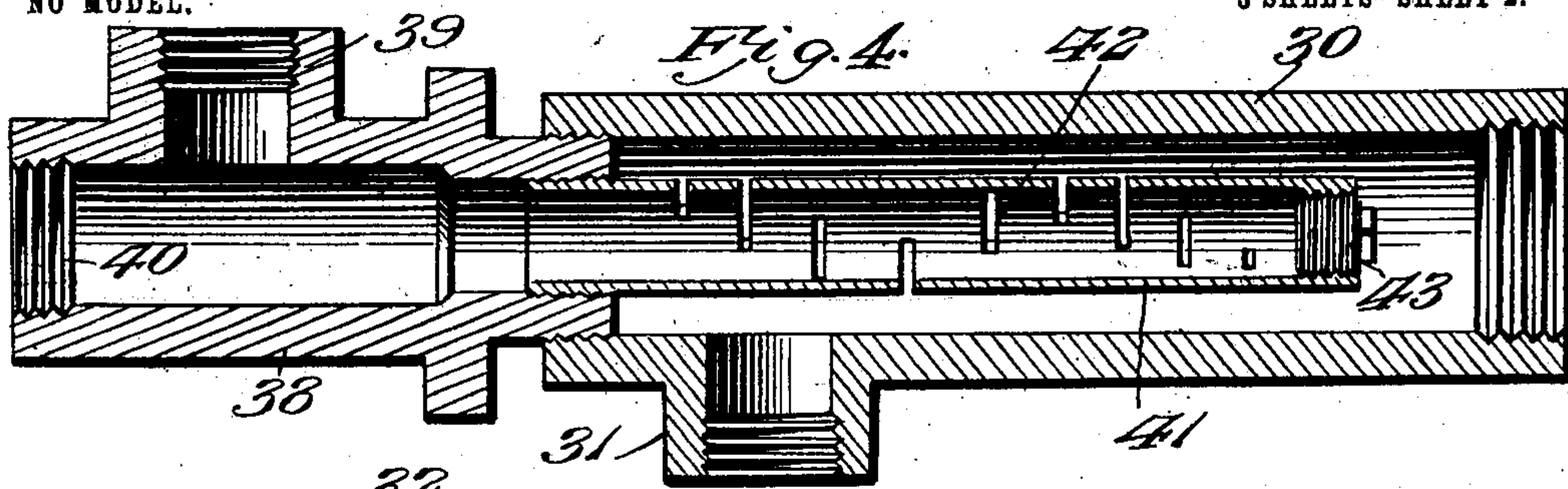
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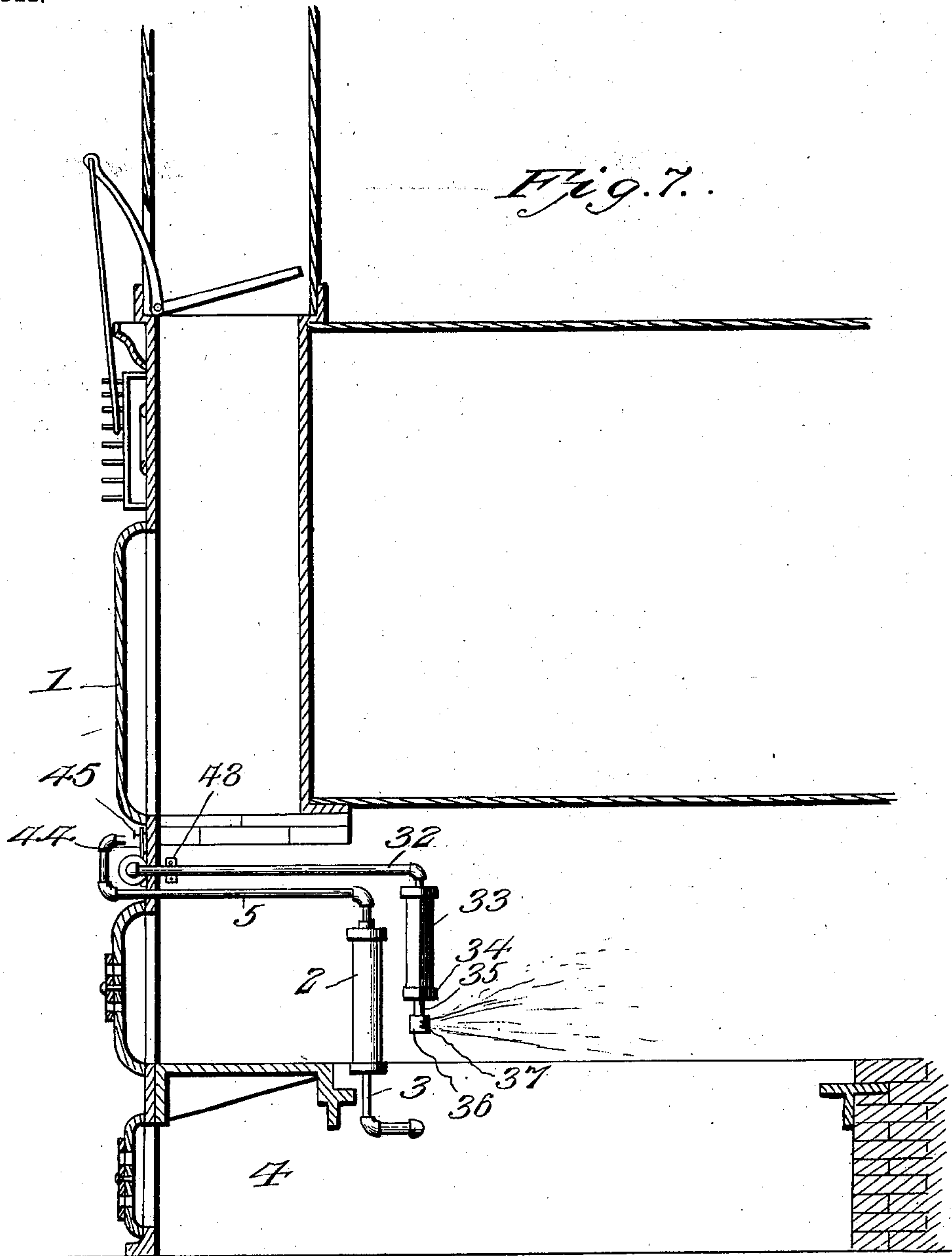
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3 SHEETS—SHEET 3.



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UNITED STATES PATENT OFFICE.

ALEXANDER W. HESS AND ANDREW S. WILLIAMS, OF SAN JOSE,
CALIFORNIA.

OIL-BURNER.

SPECIFICATION forming part of Letters Patent No. 751,395, dated February 2, 1904.

Application filed May 23, 1903. Serial No. 158,509. (No model.)

To all whom it may concern:

Be it known that we, ALEXANDER W. HESS and ANDREW S. WILLIAMS, citizens of the United States, residing at San Jose, in the county of Santa Clara and State of California, have invented new and useful Improvements in Oil-Burners, of which the following is a specification.

Our invention relates to new and useful improvements in oil-burners especially adapted for use in connection with furnaces, &c., and is more especially an improvement on that described and claimed in the application of Alexander W. Hess, filed December 24, 1902, Serial No. 136,485.

An object of the invention is to provide means whereby a mixture of oil and steam, air, or both, may be supplied to a burner of novel construction.

A further object is to provide means for heating the air prior to its admission to the mixing apparatus.

A further object is to employ a superheater for the reception of the combustible mixture immediately prior to the ignition thereof.

A further object is to employ an atomizer or mixer of novel construction whereby oil may be thoroughly mixed with either steam or air, or both, as desired.

With the above and other objects in view the invention consists in the novel construction and combination of parts hereinafter more fully described and claimed, and illustrated in the accompanying drawings, showing the preferred form of our invention, and in which—

Figure 1 is a detail view of the mechanism detached. Fig. 2 is an end elevation of the valves and the arms extending from the stems thereof, the quadrant and the operating mechanism being removed. Fig. 3 is a plan and edge view of the swinging guide-bar. Fig. 4 is a longitudinal section through the atomizer or mixer employed in connection with this apparatus. Fig. 5 is a longitudinal section through the superheater. Fig. 6 is a similar view through the air-heater. Fig. 7 is a vertical section through the front portion of the furnace and showing the positions of the air-heater and the superheater for the com-

bustible mixture, and Fig. 8 is a detail view of a lever for adjusting the burner within the furnace.

Referring to the figures by numerals of reference, 1 is a furnace of any suitable form, within the forward portion of the fire-box of which is arranged a cylinder 2, having an air-inlet pipe 3 at its lower end, which extends through the ash-pit 4 and is adapted to be connected to a suitable air-compressor. (Not shown.) A pipe 5 extends from the opposite end of this cylinder 2 and through the front of furnace 1, and this pipe opens into one end of an atomizer near which is arranged a pipe 6, which extends from a boiler (not shown) and is adapted to conduct steam to one end of the atomizer or mixer, which is of novel construction. A valve 7 is arranged within the pipe 5 at a point adjacent the atomizer, and a similar valve 8 is arranged within pipe 6 at a point removed from its junction with pipe 5. An arm 9, having a series of apertures therein, extends downward from the stem 11 of valve 7, and a similar apertured arm 12 is arranged on the stem 13 of valve 8. A notched strip 14 is mounted upon a pin 15, arranged in one of the apertures 10 in arm 9. A notched strip 17 is fulcrumed to the arm 12 and is adjustably connected thereto, and this strip engages a pin 18, which is located at a point adjacent the upper end of an arm 19. This arm is secured at a point intermediate its ends to the stem 20 of a valve 21, arranged within an oil-inlet pipe 22. Loosely mounted upon stem 20 is a guide-bar 23, one end of which is forked and adapted to travel upon a quadrant 24, secured in any suitable manner to the front of the furnace. Pins 25 extend from opposite sides of the guide-bar, and one of them is adapted to be engaged by a notched strip 26, pivoted to arm 19 near its lower end, and a rod 27 is connected to the other pin and extends upward to a bell-crank lever 28, to which is secured a rod 29, which extends to a suitable damper-regulator. (Not shown.)

The atomizer or mixer used in connection with this apparatus is shown in detail in Fig. 4. It comprises a casing 30, having an inlet

31 in one side thereof, in which is arranged the end of the oil-supply pipe 22, and both ends of the casing are internally screw-threaded, and to one of these ends is fastened an outlet-pipe 32, Fig. 2, for conducting the combustible mixture from the atomizer to a superheater arranged within the front end of the fire-box of the furnace and comprising a cylinder 33, having an internally-screw-threaded cap 34 upon one end thereof. Extending from this cap is a tubular extension 35, which opens into a burner preferably formed of a cylindrical cap 36, closed at its outer end and having a desired number of parallel slots 37 in one side thereof to permit the discharge of the combustible mixture therethrough. Within the other end of casing 30 of the atomizer is arranged the end of a casting 38, having an inlet 39 in one side thereof, in which is secured the air-inlet pipe 5. An inlet 40 is formed at the outer end of this casting, and within this inlet is secured the steam-supply pipe 6. A tube 41 is fastened within the inner end of the casting 38 and extends longitudinally of the casing 30 at the center thereof, and slots 42 are formed within this tube in a spiral in order that the steam and air admitted through the inlets 39 and 40 will be evenly distributed within the casing 30. A plug 43 is arranged on the free end of the tube 41.

In operation a desired quantity of steam or air, or both, is admitted to the atomizer by opening either or both the valves 7 and 8, and oil is also admitted to the atomizer preferably under pressure by swinging the arm 19 toward the guide-strip 23. When the oil-valve 21 has been opened sufficiently to admit a desired proportion of oil to the atomizer, the notched strip 26 is placed into engagement with its pin 25, and the notched strips 14 and 17 are also placed into engagement with the pins 16 and 18, respectively. The valves are thus locked together, and one cannot be opened or closed without a corresponding movement of the other, and therefore the proportion of oil and steam or air, or both, will remain unchanged until one or the other of the strips 26, 17, and 14 is disengaged from its pin and readjusted. By pulling upward upon the rod 27 the valves may be opened in unison, thereby increasing the quantity of the combustible mixture supplied to the burner, and this supply will be diminished or cut off when the guide-strip 23 is swung downward. By connecting the guide-strip to the damper-regulator the flame can be so controlled as to produce a uniform heat.

When oil is admitted to the casing 30 of the atomizer, it will be promptly brought into contact with either or both the air and steam admitted through the inlets 39 and 40, respectively, because this air or steam will be forced outward under pressure through the slots 42. The parts will be thoroughly mixed within the casing 30, and then discharged

through the pipe 32 into cylinder 33, where the heat of the furnace will superheat the mixture prior to its discharge through slots 37 and its ignition.

By employing valve mechanism of the character herein described the proportion of oil and steam or air, or both, can be readily regulated and a practically smokeless flame or perfect combustion produced. By means of the notched strip 26 the guide-strip 23 may be locked in any desired position in relation to arm 19, and in this way the movement of said strip and arm, and obviously arms 12 and 14, may be increased or diminished, thereby regulating the amount of mixture supplied to the burner. If desired, the connections between the valve-operating mechanism and the damper-regulator may be dispensed with and the valve opened or closed by hand simultaneously.

As it is often desirable to adjust the burner within a furnace so as to keep the flames from coming in direct contact with boiler, we preferably employ an adjusting device, which is shown in detail in Fig. 9. This consists of a lever 44, having an adjusting-screw 45 in its upper end, while its lower end has a clamping-block, 46 adapted to be secured to the lever by means of bolts 47. The pipe 32 is adapted to be clamped between the block 46 and the adjacent end of lever 44, and a suitable collar 48 is secured to the pipe 32 near the inner surface of the front of the boiler.

In operation the inner end of the adjusting-screw 45 is in contact with the outer face of the boiler-front. By turning the screw 45 inwardly the upper end of the lever 44 is pulled outward, thereby raising the burner-lip 36, and vice versa.

In the foregoing description we have shown the preferred form of our invention; but we do not limit ourselves thereto, as we are aware that modifications may be made therein without departing from the spirit or sacrificing any of the advantages thereof, and we therefore reserve the right to make such changes as fairly fall within the scope of our invention.

Having thus described the invention, what is claimed as new is—

1. In mechanism of the character described, the combination with an atomizer having an outlet and a superheater, and a burner connected to said superheater; of steam, air and oil inlets in the atomizer, and a valve in each of said inlets, an arm extending from each of said valves, an adjustable connection between the arms, whereby the arms may be operated in unison, a fixed quadrant adapted to engage and guide one end of one of the arms, a swinging guide-strip adapted to be connected to valve-operating means and engaging and slidably mounted upon said quadrant and an adjustable connection between said guide-strip and one of the arms of the valves.

2. In mechanism of the character described,

the combination with valved air, oil and steam supply pipes, and means for operating the valves in said pipes in unison; of an atomizer comprising a cylinder having an inlet connected to the oil-supply pipe and a casting opening into the cylinder, inlets within the casting for the reception of the steam and air supply pipes, respectively, a tube secured within the casting and extending longitudinally within the cylinder, said tube having spirally-arranged slots, an outlet-pipe extending from the cylinder, a superheating-cylinder connected thereto, and a burner at one end of said superheating-cylinder.

3. In mechanism of the character described, the combination with air, steam and oil supply pipes, valves therein, and means connecting the valves whereby the same may be opened or closed in unison; of an atomizer comprising a hollow cylinder having an inlet connected to the oil-supply pipe, a casting secured to the cylinder and having inlets therein, an air-supply pipe opening into one of the inlets, and a heating-cylinder connected to said air-supply pipe, a steam-supply pipe

opening into the casting, a spirally-slotted tube secured to the casting and extending longitudinally in the cylinder of the atomizer, said tube being closed at one end, an outlet-pipe extending from said cylinder, a superheating-cylinder connected thereto, and a burner communicating with the superheating-cylinder and comprising a cap having slots in one side thereof.

4. In mechanism of the character described, an atomizer comprising a hollow cylinder having an inlet for the reception of oil, a casting opening into said cylinder, having air and steam inlets, a tube secured within the casting and extending longitudinally within the cylinder, said tube having a spirally-arranged series of slots and closed at one end, and an outlet in the cylinder.

In testimony whereof we affix our signatures in presence of two witnesses.

ALEXANDER W. HESS.

ANDREW S. WILLIAMS.

Witnesses:

WM. B. HARDY,

THOS. W. HARDY.