

No. 894,362.

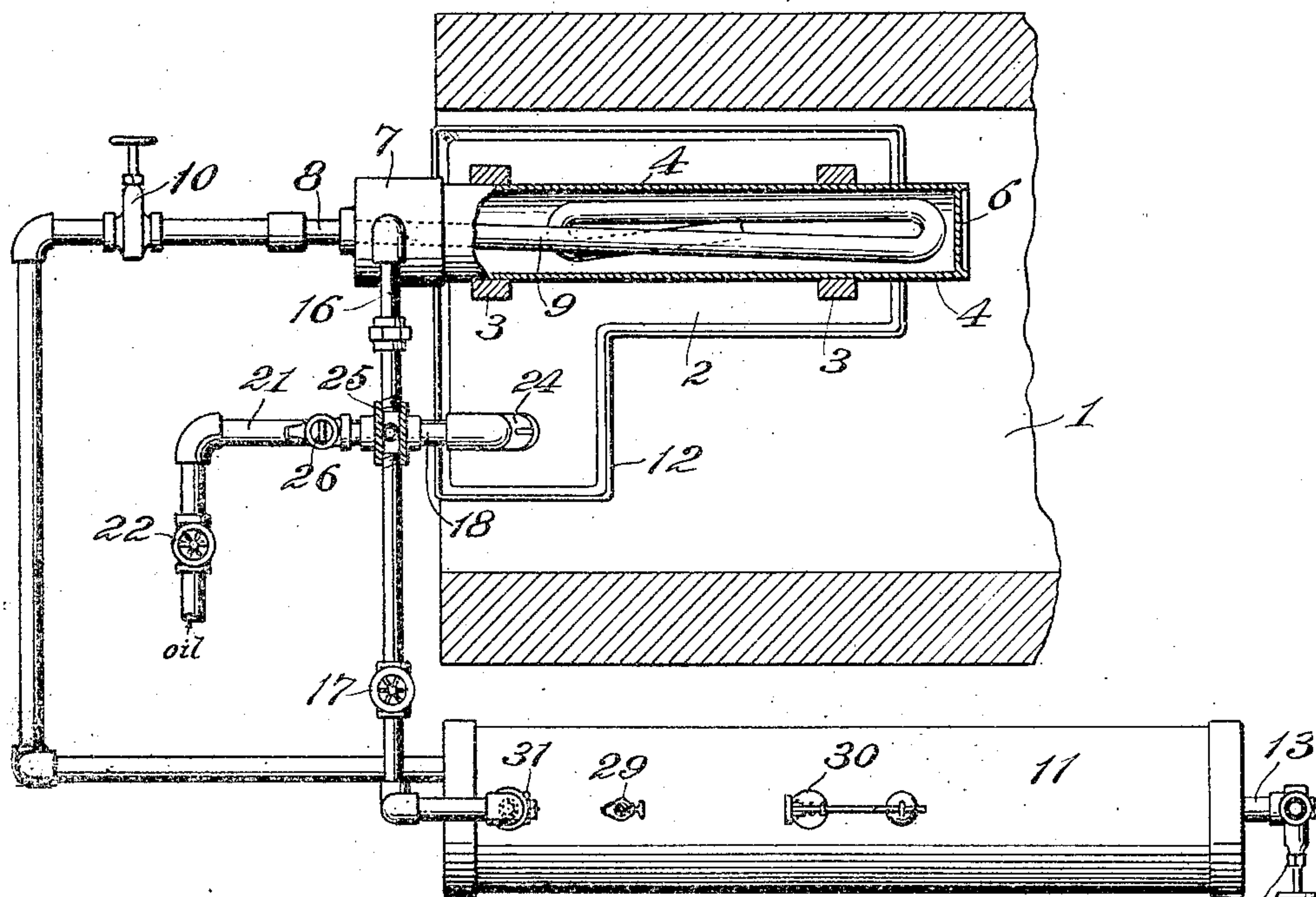
PATENTED JULY 28, 1908.

W. N. BEST & B. F. MEARS.

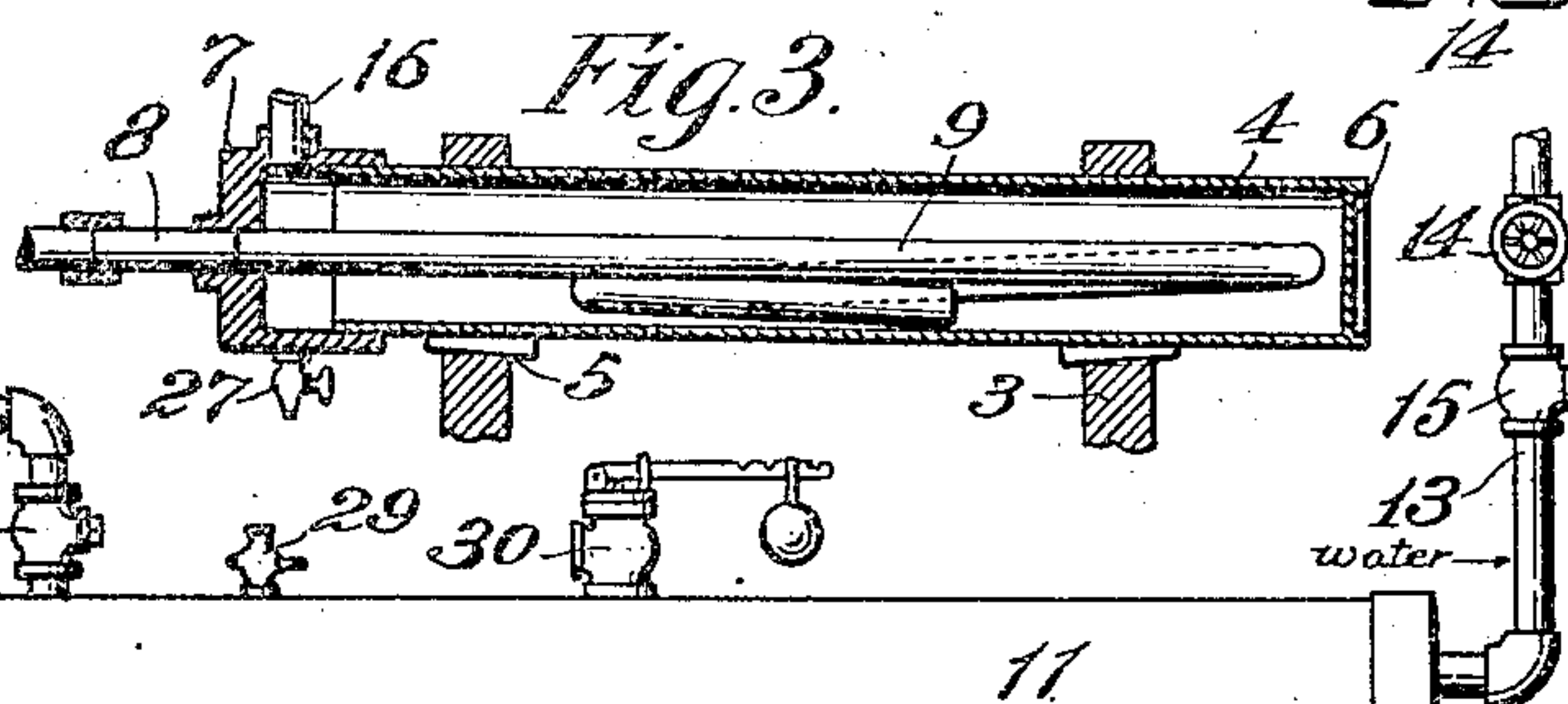
# OIL BURNING AND STEAM GENERATING APPARATUS.

APPLICATION FILED NOV. 25, 1904.

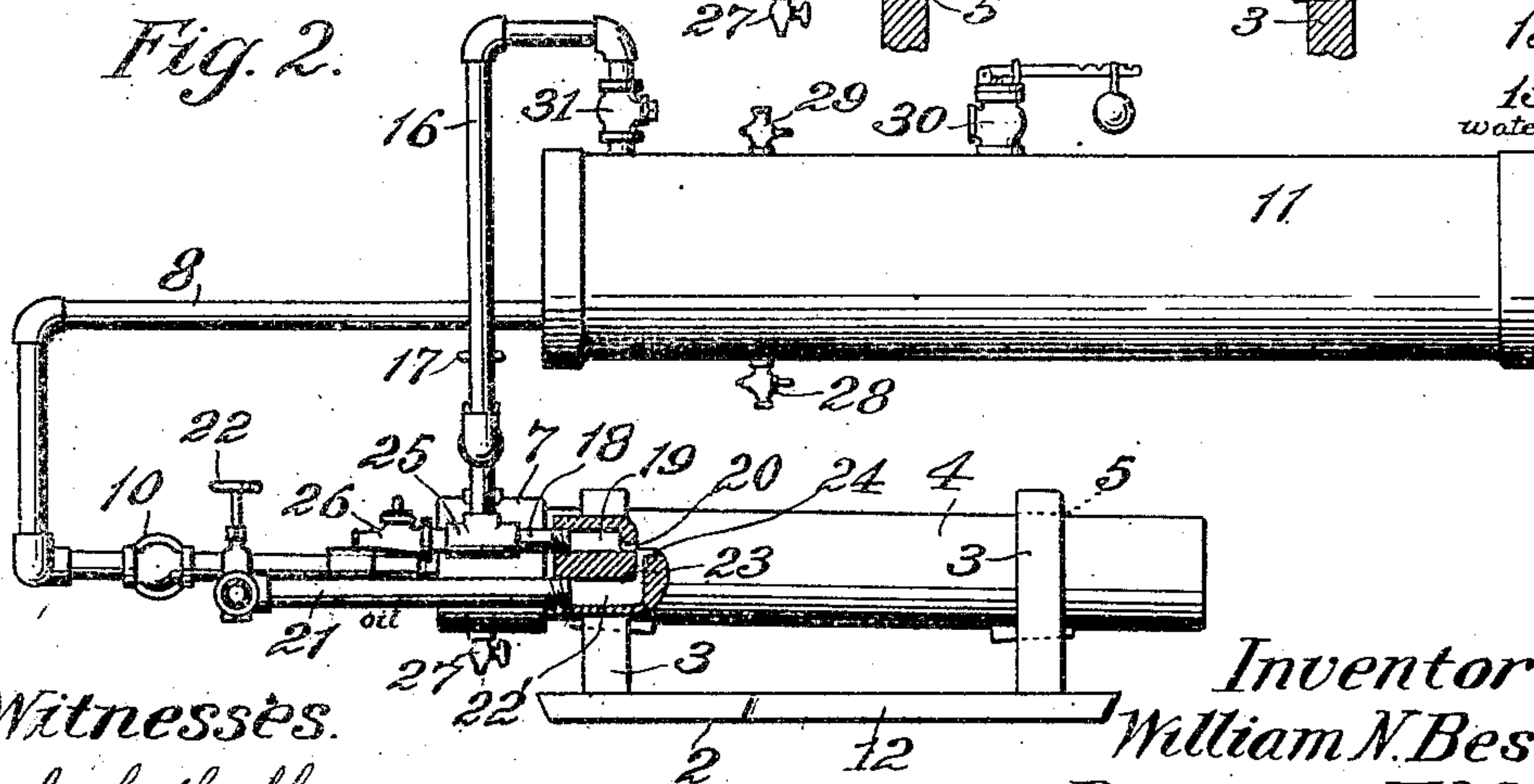
*Fig. 1.*



*Fig. 3.*



*Fig. 2.*



*Witnesses.*

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# UNITED STATES PATENT OFFICE.

WILLIAM NEWTON BEST AND BENJAMIN FRANKLIN MEARS, OF LOS ANGELES, CALIFORNIA.

## OIL-BURNING AND STEAM-GENERATING APPARATUS.

No. 894,362.

Specification of Letters Patent.

Patented July 28, 1908.

Application filed November 25, 1904. Serial No. 234,292.

*To all whom it may concern:*

Be it known that we, WILLIAM NEWTON BEST and BENJAMIN FRANKLIN MEARS, citizens of the United States, residing at Los Angeles, county of Los Angeles, and State of California, have invented new and useful Improvements in Oil-Burning and Steam-Generating Apparatus, of which the following is a specification.

10 The main object of the present invention is to provide an oil burner suitable for bake ovens, low-pressure heating plants for apartments, and the like, of great simplicity of construction and efficiency in operation.

15 Another object of the invention is to provide an oil burning apparatus, having its own steam generator, with means for most effectual and economical heating and superheating of the steam.

20 Another object of the invention is to provide for the generation of steam for atomization of the oil, without any jar or vibration due to contact of water with highly heated surfaces.

25 Another object of the invention is to provide means for producing and maintaining the requisite pressure in the atomizing steam supplying system, independently of fluctuations or deficiency of pressure in the water supply.

The accompanying drawings illustrate the invention.

35 Figure 1 is a plan of the apparatus certain parts being broken away. Fig. 2 is a vertical section thereof with parts broken away. Fig. 3 is a detail section of the generator.

1 designates the chamber of a bake oven or any chamber to be heated and constituting a combustion chamber.

40 2 designates a suitable base or support, preferably formed as a plate having a raised edge or wall 12 to form a firing pan, said plate having standards 3 extending upwardly therefrom to receive and support the steam generator.

45 The steam generator comprises an outer tube 4, passing through perforations 5 in said standards, with its forward end closed by a plate 6 secured therein, in any suitable manner as by means of upsetting the ends of the tube thereon, and having a head or reducer 7 at the rear end to receive the water supply pipe 8, which is screwed thereinto. An inner pipe or tubular member 9 also screws into said head and is coiled back and forth within the outer tube, so as to present suffi-

cient heating surface to convert into steam all of the water passing therein before it reaches the end of said pipe.

The water supply pipe 8 is provided with a valve 10 and is preferably connected with a reservoir or tank 11, the said pipe 8 leading preferably from the lower portion of said tank the generator being at a lower level than the water tank. Said tank 11 may be of any suitable form but is preferably closed so as to maintain the proper pressure on the water supply. A pipe 13 leading from any source of water supply such as a water main connection leads into the upper part of tank 11 and is provided with a cut-off valve 14.

15 indicates a check valve to prevent back pressure in the water supply pipe 13.

16 represents a steam pipe which is connected with the generating chamber 4 preferably at the top of the reducer 7. The pipe 16 is connected with the top of the tank 11 and a valve 17 is interposed in this pipe. A connection is also made from the pipe 16 to the steam supply pipe 18 leading into the steam chamber 19 of the burner tip. Discharge from this chamber 19 is through a slot 20.

21 represents an oil supply pipe connected with a suitable supply of oil under suitable pressure and having a shut-off valve 22. This pipe 21 opens into the oil chamber 22' of the burner tip, which as shown discharges through the duct 23 onto a ledge 24 parallel with the outlet 20, but slightly below the same.

At the upper end of the T 25 is a cock 26 which may be open to allow the insertion of a rod to clean out the pipe 18 and the outlet 20.

27 represents a blow-off cock by means of which the generating chamber may be blown clear of sediment etc.

The tank 11 is provided on its underside with a cock 28 through which any mud or sediment may be discharged from the tank 11.

29 represents a blow-off cock at the top of the tank 11 by which air may be permitted to escape from the tank, as it is displaced by the water when the tank is filled.

30 represents a safety valve which may be of the ordinary or preferred construction.

31 represents a check valve to prevent back pressure from the tank 11 through the pipe 16 and into the generating chamber.

It is thus seen that with our apparatus we first open the valve 14 and fill the tank 11



with water. The valve 10 is then opened and the generating chamber 6 is filled with water after which, if desired, the valve 10 may be closed until the burner is in operation. The valve 22 in the oil pipe 21 is then opened and a quantity of oil permitted to flow out into the generating pan 2. When the valve 22 will be closed and the oil in the pan 2 ignited in the usual manner, the ignition of the oil is sufficient to convert the water in the chamber 6 into steam and when the steam commences to flow through the pipe 16 and out to port 20, the oil is again turned on through the valve 22 and the burner is in operation. The valve 17 would then be opened so that the steam in the chamber 6 may also pass into the tank 11 heating the water therein. The valve 10 is now open and the circulation of water is through the tank 11, pipe 8, coil 9 and as the chamber 6 is substantially exhausted of its water, the same having been converted into steam under considerable pressure, the water flowing from the pipe 8 into the coil or member 9 is converted into steam before its discharge therefrom into the chamber 6, and this steam is superheated in the chamber 6. In order to maintain an equal supply of steam at all times the operator may if he desires shut off the valve 14 and rely upon the supply of water in the tank, which supply is being heated by the steam from the chamber 6, back pressure in the chamber 6 being prevented by the valve 31. As the water from the tank 11 is converted into steam in the internal member or coil 9 before being delivered therefrom into the chamber 6 the heating of the burning oil at the side of this chamber 6 superheats the steam and the steam from this chamber passing out the pipe 16 to the burner tip is of exceedingly high temperature and substantially dry, thus effecting the most effectual atomization and combustion of the oil.

If it is desired, the apparatus being connected with a water supply under pressure, the valve 14 may be kept constantly open and any excess of steam pressure in the tank 11 will be prevented from backing up in the water supply pipe 13 by means of the check valve 15 and a suitable supply of water is thus at all times insured for the production of steam requisite for atomizing the oil.

With this apparatus no water at any time comes in contact with any highly heated dry surface, as the conversion of the water into

steam takes place in the coil or internal member 9 and no water ever strikes the inner surface of the tube 4 after the tube 4 has been heated.

Difficulty has heretofore been experienced with atomizing apparatus connected with a fluctuating pressure water supply system and embodying means for generating its own steam, in maintaining the requisite pressure in the atomizing steam supplying system and we have avoided this, as heretofore explained, by the arrangement of the automatically equalized water and steam supply apparatus and by this arrangement of apparatus are enabled to avoid the puffing and roaring incident to and heretofore common in the use of such oil burning apparatus so generating its own steam.

What we claim is:—

1. The combination with a combustion chamber of a water tank external thereto and having a valved water supply, a steam generator in the combustion chamber at a lower level than the water tank, a pipe connected to the lower part of the water tank, a coil connected to said pipe and extending within the generator, and opening at its end into the generator, a burner extending in the combustion chamber, a steam connection from the top of the generator to the burner and to the top of the water tank, said connection to the water tank being provided with a check valve to prevent steam pressure passing back from water tank to the generator, and an oil supply for the burner.

2. The combination with a combustion chamber of a water tank external thereto and having a valved water supply, a steam generator in the combustion chamber at a lower level than the water tank, a pipe connected to the lower part of the water tank, a coil connected to said pipe and extending within the generator, and opening at its end into the generator, a burner extending in the combustion chamber, a steam connection from the top of the generator to the burner and to the top of the water tank, and an oil supply for the burner.

In testimony whereof, we have hereunto set our hands at Los Angeles California this 18th day of November 1904.

WILLIAM NEWTON BEST.

BENJAMIN FRANKLIN MEARS.

In presence of—

FREDERICK S. LYON,  
JULIA TOWNSEND.