

G. J. McPHERSON.
BURNER.

APPLICATION FILED JULY 16, 1909.

Patented June 28, 1910.

2 SHEETS—SHEET 1.

962,971.

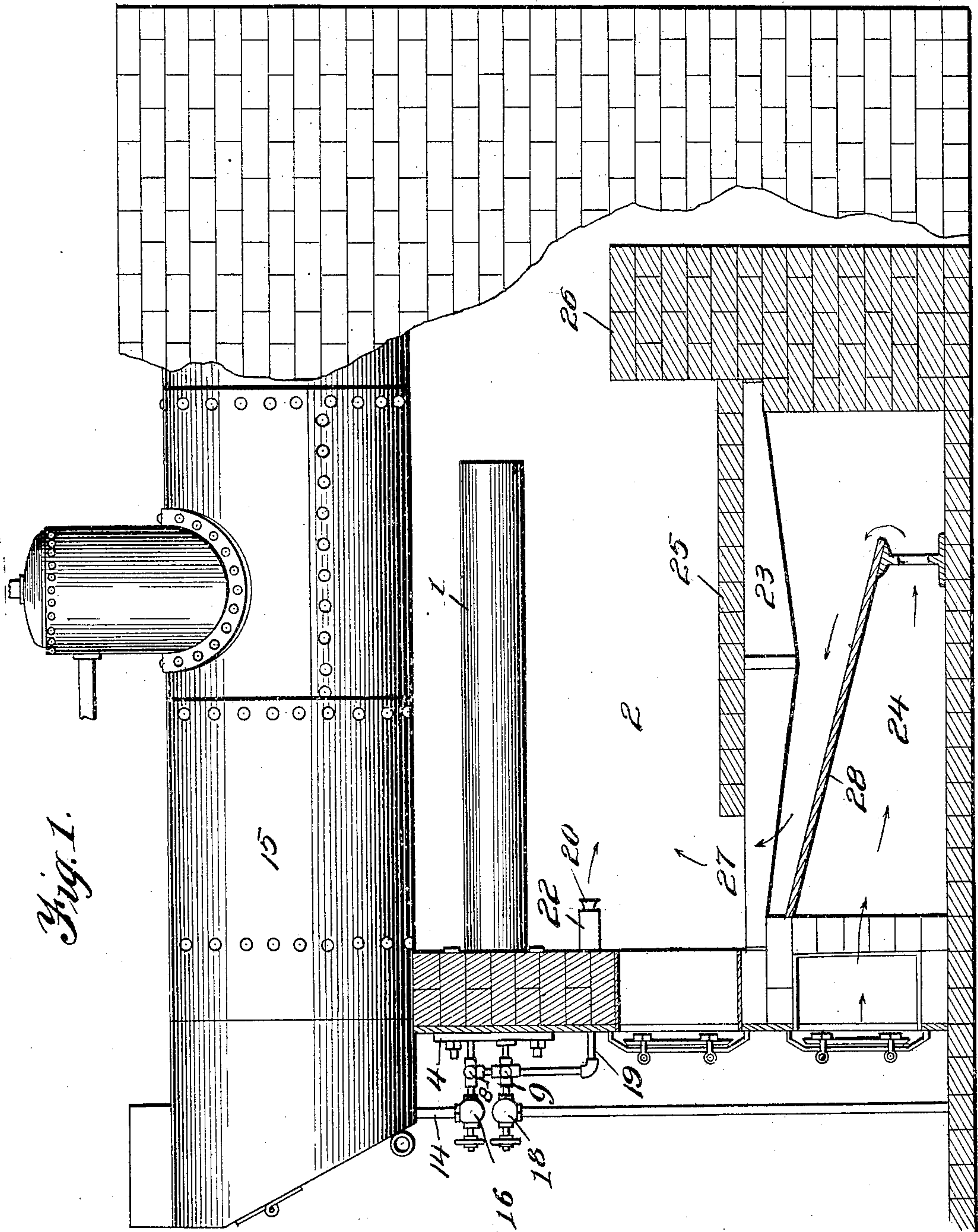


Fig. 1.

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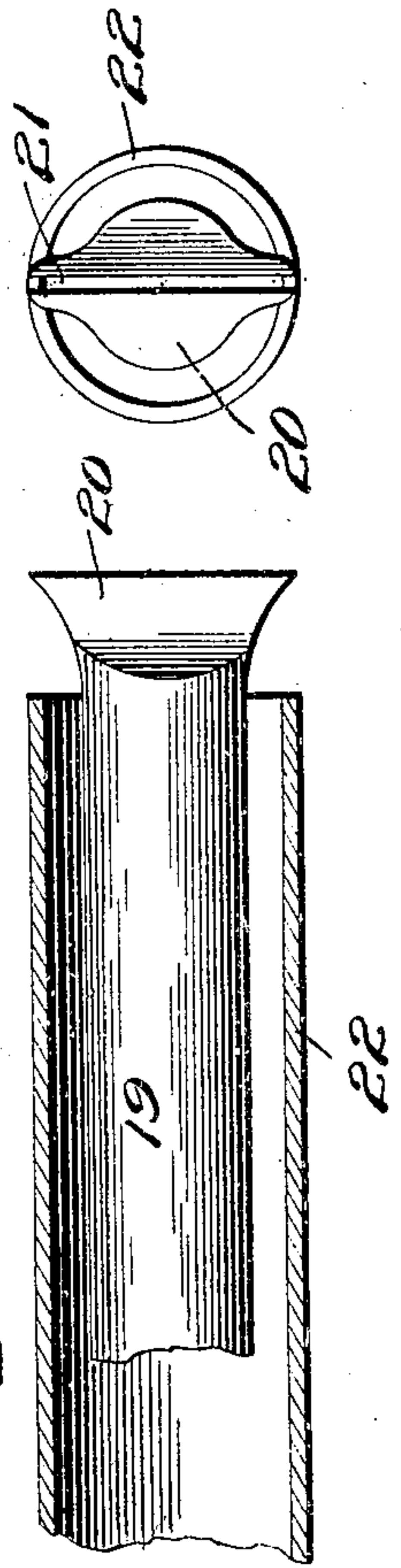
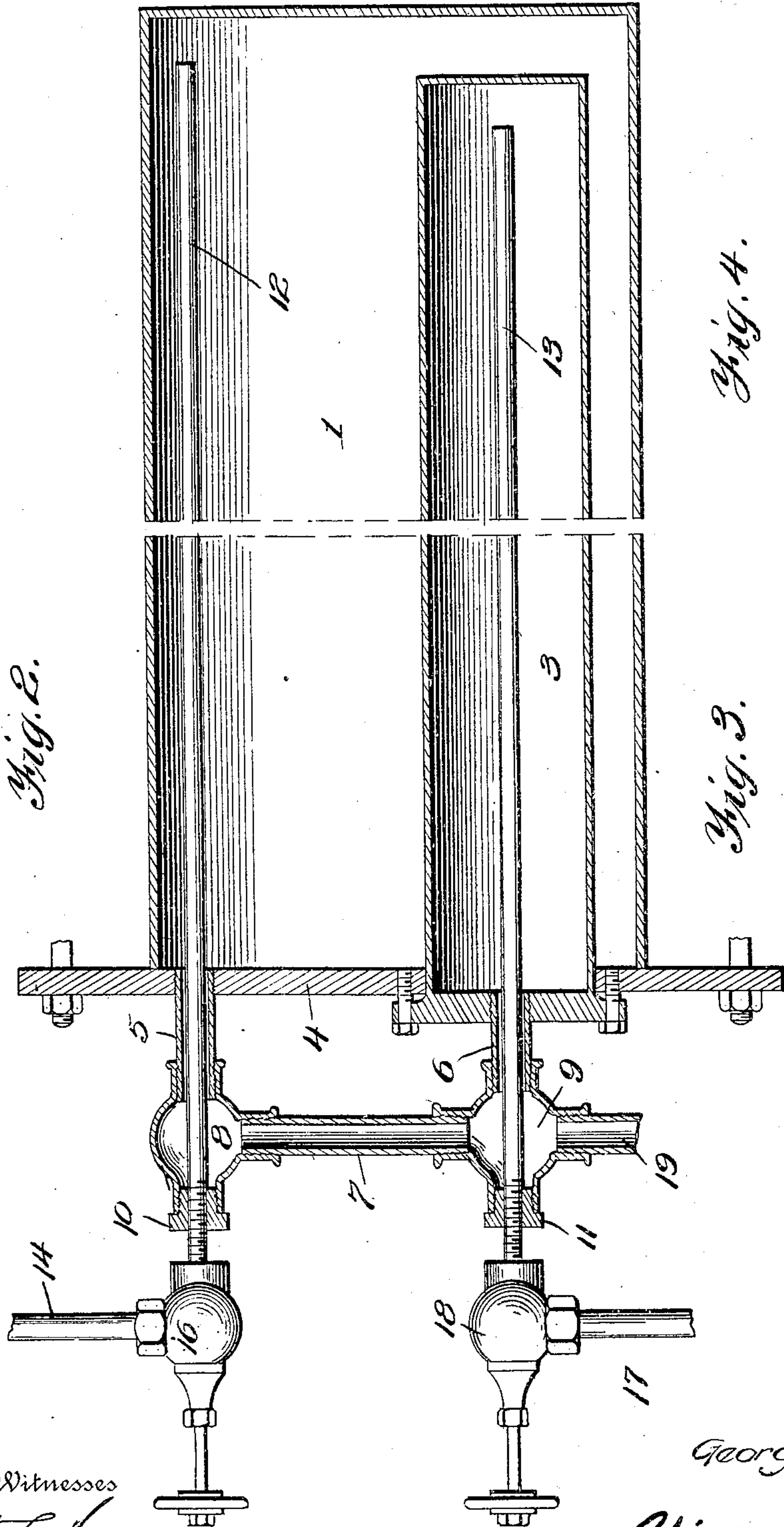
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UNITED STATES PATENT OFFICE.

GEORGE J. McPHERSON, OF SALT LAKE CITY, UTAH, ASSIGNOR, BY DIRECT AND MESNE ASSIGNMENTS, TO INTERNATIONAL OIL GAS PRODUCER COMPANY, A CORPORATION OF UTAH.

BURNER.

962,971.

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To all whom it may concern:

Be it known that I, GEORGE J. McPHERSON, a citizen of the United States, residing at Salt Lake City, in the county of Salt Lake and State of Utah, have invented new and useful Improvements in Burners, of which the following is a specification.

This invention relates to improvements in burners for liquid hydrocarbon, especially crude oil, and also relates to improvements in furnaces in which said burners are adapted for use, the said invention consisting in the construction, combination and arrangement of devices hereinafter described and claimed.

In the accompanying drawings:—Figure 1 is partly an elevation and partly a sectional view of an oil burner furnace constructed in accordance with this invention. Fig. 2 is a detail sectional view of the devices for converting the crude oil into gas. Fig. 3 is a detail longitudinal sectional view of the burner tip. Fig. 4 is a detail end elevation of the same.

In the embodiment of the invention, a retort 1 is provided which in practice is disposed within the fire box 2 of a steam boiler or other type of furnace. Within and preferably in the lower portion of the retort 1 is a much smaller retort 3. The retorts are here shown as secured at their front ends to a plate 4 which plate is secured on the front wall of the furnace. A pipe 5 leads from the retort 1 and is connected to the front end and near the upper side thereof. A pipe 6 leads from the front end of the retort 3. The said pipes 5—6, are connected together by a pipe 7 and by globe couplings 8—9. Said globe couplings are respectively provided at their outer sides with screw plugs 10, 11, through which extend pipes 12, 13, respectively, the said pipes being of less diameter than the interior diameters of the pipes 5, 6, and passing respectively through said pipes. A steam pipe 14 which leads from the boiler 15 is connected to the outer end of the pipe 12, preferably by a globe valve 16. An oil feed pipe 17 is connected to the outer end of the pipe 13, preferably by a globe valve 18. A mixing duct or pipe 19 leads from the globe coupling 9 and discharges into the front side of the fire box through a discharge or burner tip 20 which is provided with a narrow discharge or jet slot 21. The burner tip passes

through and is of less diameter than the internal diameter of a jacket 22 which is made of highly refractory material and secured to the front wall of the furnace, the office of the refractory jacket being to protect the burner tip from the injurious effect of the intense heat in the fire box.

The operation of the oil burning mechanism is as follows:—The retort 1, being exposed to the heat in the fire box is highly heated. Steam which is discharged into the retort 1 from the boiler or other source of steam through the pipes 14, 12, becomes superheated in the retort 1 and passes therefrom through the pipes 5, 7, into the pipe 19 which leads to the burner or jet tip. Crude oil which is fed to the inner end of the retort 3 through the pipes 17, 13, is converted in the said retort 3 into hydrocarbon gas, which gas passes through the pipe 6 also into the pipe 19 and is mixed in said pipe 19 with the superheated steam and rendered highly combustible. The mixture of hydrocarbon gas and superheated steam is discharged through the burner tip into the fire box and burns in the latter, producing flames which in practice entirely fill the fire box and operate efficiently to maintain steam in the boiler.

In practice, this improved crude oil burner may be installed in an ordinary furnace and requires but very slight modification of the construction of the furnace. In Fig. 1, it will be observed that the usual grate bars 23 of the furnace, between the fire box 2 and the ash pit 24 are covered by a hearth 25 of fire brick, the hearth extending from the usual bridge wall 26 forwardly nearly to the front wall of the furnace so that an opening 27 is formed in the hearth at the front side of the fire box. In the ash pit a downwardly or rearwardly inclined baffle plate 28 is located which extends from the front wall of the furnace to a point a suitable distance from the bridge wall, the said baffle plate having its front end under the opening 27 in the front side of the hearth so that the said baffle plate operates to provide a tortuous passage for the air to support and maintain the combustion in the fire box, the course of the draft to the fire box being indicated by the arrows. It will be understood that owing to the provision of the opening 27, and the proximity of the baffle plate to the

fire box, the baffle plate as well as the hearth becomes highly heated with the result that the air supplied to the fire box and maintaining combustion therein is highly heated prior to its introduction to the fire box and hence the efficiency of the burner is greatly increased.

What is claimed is:—

1. An oil burner of the class described, comprising a superheating retort, a steam supply pipe extending thereinto and discharging at the inner end thereof, a gasifying retort located within the steam superheating retort, a feed pipe for liquid hydrocarbon extending into and discharging at the inner end of the gasifying retort, a mixing duct and connections between said mixing duct and said retorts to cause the superheated steam and gases to become mingled to produce a combustible mixture.

2. A furnace comprising a fire box, a hearth therefor having an opening, a draft passage discharging into the fire box through the said opening in the hearth and a burner comprising a steam superheating retort located in the fire box, a gasifying retort in the said superheating retort, means to respectively supply steam and liquid hy-

drocarbon to the said retorts, a mixing duct connected to the said retorts and a burner nozzle fed by said mixing duct, said burner nozzle being located also in the fire box.

3. A furnace having a fire box, an ash pit below the fire box, a hearth forming the bottom of the fire box and provided at its front side with an opening communicating with the ash pit, a baffle in the ash pit extending rearwardly from the front wall thereof and disposed below the hearth and the opening at the front side of the hearth, and a burner comprising a superheating retort located in the fire box, a gasifying retort located in the superheating retort, means to respectively supply the said retorts with steam and liquid hydrocarbon, a burner tip or nozzle discharging into the fire box and a mixing duct connected to and discharging in said burner tip or nozzle, said mixing duct being connected to the said retorts.

In testimony whereof I affix my signature in presence of two witnesses.

GEORGE J. McPHERSON.

Witnesses:

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A. B. ALTREE.