

No. 779,985.

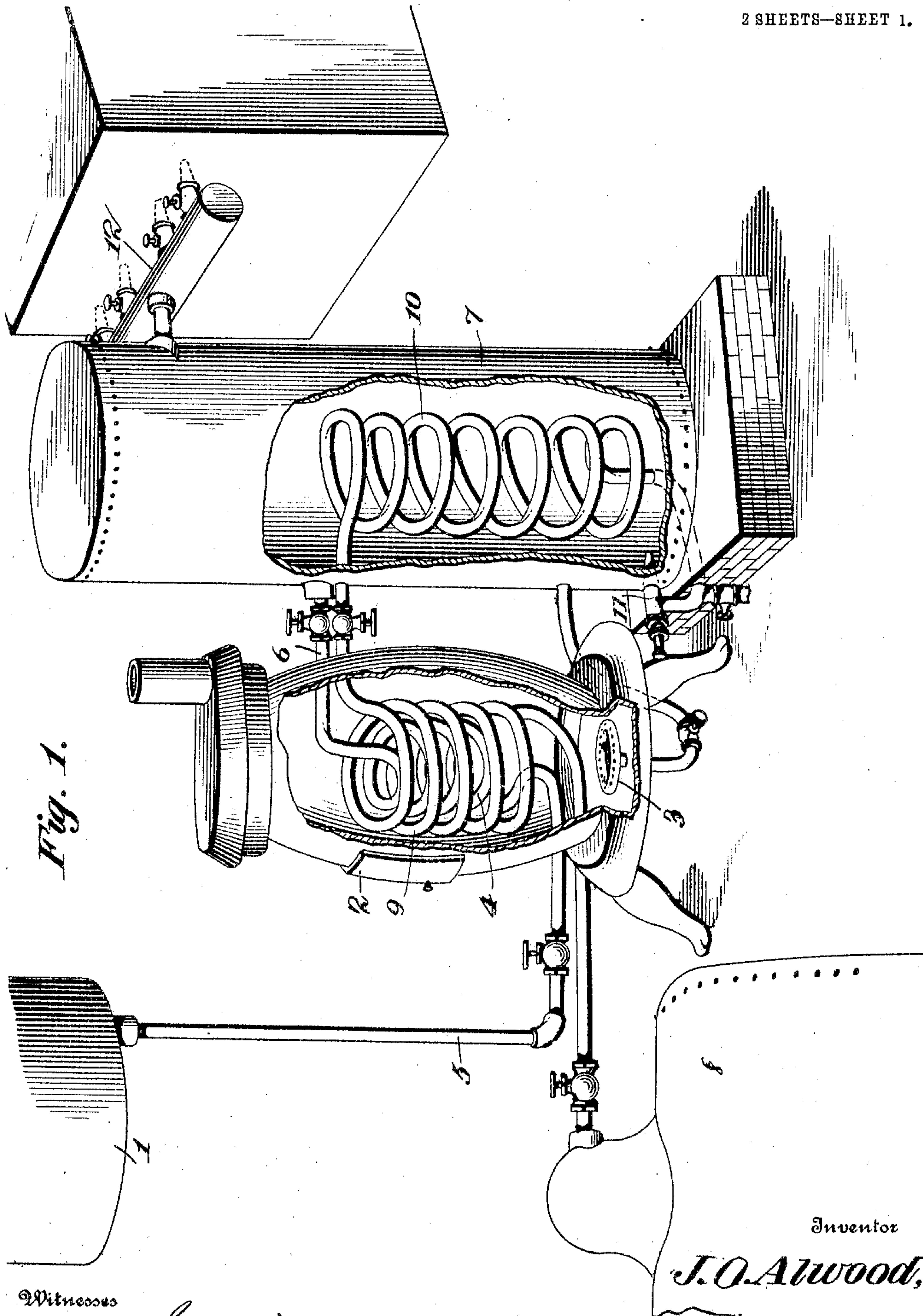
PATENTED JAN. 10, 1905.

J. O. ALWOOD.

MEANS FOR THE UTILIZATION OF CRUDE OIL AS FUEL.

APPLICATION FILED MAY 7, 1904.

2 SHEETS—SHEET 1.



Witness

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2 SHEETS—SHEET 2.

Fig. 2.

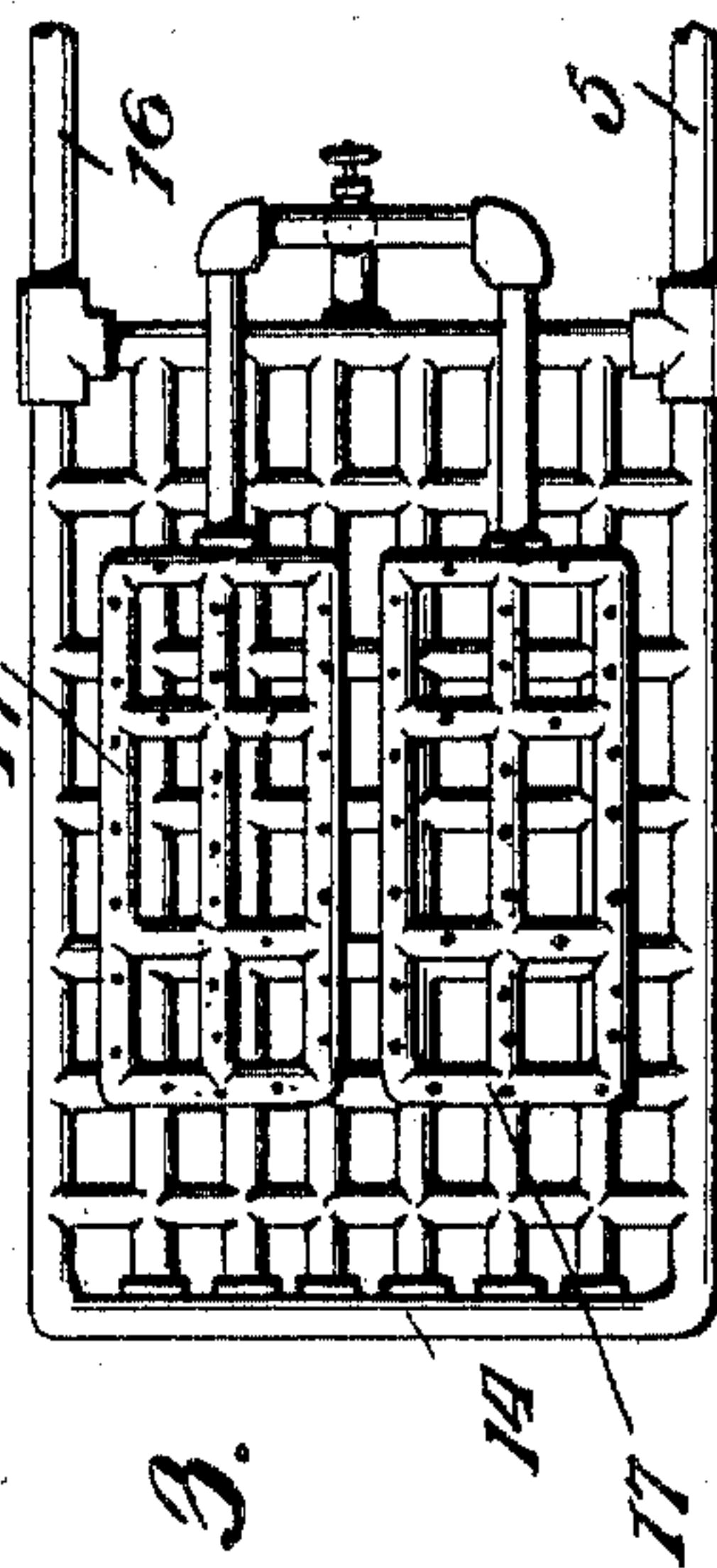
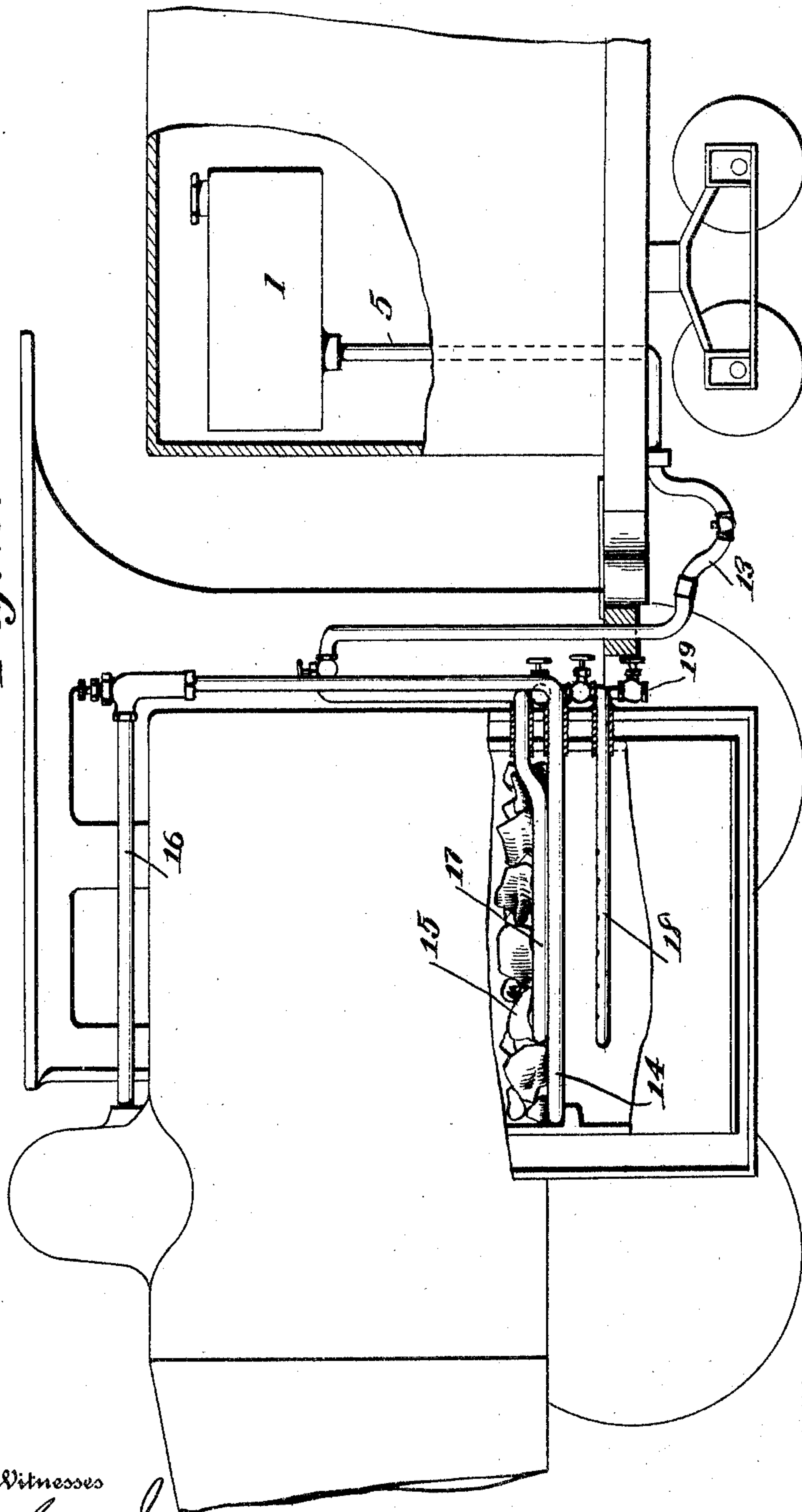


Fig. 3.

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UNITED STATES PATENT OFFICE.

JAMES O. ALWOOD, OF RICHMOND, VIRGINIA.

MEANS FOR THE UTILIZATION OF CRUDE OIL AS FUEL.

SPECIFICATION forming part of Letters Patent No. 779,985, dated January 10, 1905.

Application filed May 7, 1904. Serial No. 206,880.

To all whom it may concern:

Be it known that I, JAMES O. ALWOOD, a citizen of the United States, residing at Richmond, in the county of Henrico and State of Virginia, have invented certain new and useful Improvements in Means for the Utilization of Crude Oil as Fuel, of which the following is a specification.

The primary object of this invention is to devise novel instrumentalities whereby the use of crude petroleum as fuel for steam-boiler and other types of furnaces may be effected in an economical and advantageous manner. The benefits resulting from employing liquid fuel, and particularly crude oil, in the industrial arts as a substitute for coal and like solid fuel are many and well recognized, and this invention is designed to overcome existing difficulties and provide a mechanism that may be under control at all times.

For a full description of the invention and the merits thereof and also to acquire a knowledge of the details of construction of the means for effecting the result reference is to be had to the following description and drawings hereto attached.

While the essential and characteristic features of the invention are susceptible of modification, still the preferred embodiment of the invention is illustrated in the accompanying drawings, in which—

Figure 1 is a perspective view of a system or apparatus for burning crude oil embodying the vital features of the invention. Fig. 2 is a detail view showing a modified form of the invention adapted for and applied to a locomotive. Fig. 3 is a plan view of the burner and combined mixer, generator, and superheater.

Corresponding and like parts are referred to in the following description and indicated in all the views of the drawings by the same reference characters.

The apparatus comprises a storage-tank 1 for containing the liquid fuel, such as crude oil, and which tank may be of any capacity and located so as to supply the generator with the gas-producing agent by gravitative force. At a convenient point a heater 2 of any type is arranged. This heater may consist of a

stove or drum, and the fuel consumed in production of the heat may be coal, wood, hydrocarbon, or the like, as may be elected to meet the requirements of the case. As shown, a burner 3 is the means for heating the generator and the superheater. The generator is indicated at 4 and consists, preferably, of a coil of pipe arranged within the heater 2 and connected by pipe 5 with the tank 1 and by pipe 6 with the mixer or chamber 7. Each of the pipes 5 and 6 is provided with a valve for regulating the flow of the fluid therethrough.

A steam-generator is designated at 8 and may be a boiler or other contrivance, and the steam therefrom is discharged into the mixer or chamber 7 in regulable quantity for commingling with the gaseous vapor to produce the mixture for subsequent combustion either for heating or illuminating purposes. The steam is superheated in its travel from the generator 8 to the mixer 7, the superheater being represented at 9, and consisting, preferably, of a coil of pipe which is concentric with the generator 4, so as to receive the benefit of the heat employed for converting the hydrocarbon into gaseous vapor. The superheated steam is not discharged directly into the mixer or chamber 7, but circulates through a radiator 10, located within said mixer, thereby equalizing as nearly as practicable the temperature of the two vapors preliminary to commingling thereof. A needle-valve 11 controls the discharge of the steam into the mixer or chamber 7. The mixture from the tank 7 is conveyed to the point of use, where it is consumed by means of a burner 12 of the Bunsen or other variety.

It is not contemplated to decompose or dissolve the steam into its constituent elements. Hence the temperature of the superheater must be so regulated as to fall short of that at which decomposition of the steam takes place. By having the generator and superheater of the coil type every portion of the fluid passing therethrough is subjected to the heat radiated from the inclosing walls. Hence these parts need not be excessively large, and a great amount of fluid is not required for the generator and superheater. The apparatus shown in Fig. 1 is designed most especially

for stationary plants and systems and may be modified according to location and the special work for which it may be designed, such changes being within the purview of the skilled artisan and readily suggesting themselves to the constructor or designer.

The type of apparatus shown in Fig. 2 is designed more particularly for locomotives and furnaces of the locomotive and marine variety. The storage-tank is designated at 1 and is preferably located upon the tender, the pipe 5 for conveying the hydrocarbon or crude oil to the generator having a flexible connection 13 between the locomotive and tender to admit of relative movement of said parts without impairing or interfering in the least with the circulation or supply of the gas-producing agent to the generator. Within the fire-box of the boiler-furnace is arranged the generator 14, the same consisting of a multiplicity of hollow bars connected in such a manner as to insure circulation of the media therethrough, the same consisting of the hydrocarbon and the steam. In its preferable construction the generator and superheater 14 consists of a rectangular frame and a series of longitudinal and transverse bars, the several elements having intercommunication, so as to form a maze of passages or ducts through which the fluids circulate, while at the same time being subjected to the action of the heat which is essential for converting the hydrocarbon into a gaseous vapor. The generator and superheater 14 is arranged to take the place of the accustomed grate-bars and forms a support for refractory material 15, which in the operation of the apparatus becomes incandescent, and the heat reflected therefrom reacts upon the part 14 and is equalized and prevented from concentration upon the crown of the fire-box to the detriment thereof. The oil-pipe 5 connects with the generator 14 at one side and the steam-pipe 16 connects therewith at the opposite side. The gaseous mixture resulting from the combination of the steam and vaporized

oil is conveyed to one or more burners 17, arranged, preferably, above the generator 14 and which, as shown, consist of a series of connected pipes perforated in their length to form a series of gas-outlets. A heater 18 is arranged below the generator 14 for supplementing the action of the burner or burners 17 and is supplied with gas derived from the generator 14. A draw-off 19 is connected to the burner 17 and generator 14, so as to draw off any condensation or accumulation of water or residue of oil.

The relative disposition of the parts comprising the apparatus in its adaptation, as shown in Fig. 2, is not essential to the operativeness of the mechanism or to the scope of the invention, and the same may be varied within certain limits without departing from the nature of the principle sought to be protected.

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

In combination, a vapor-generator coil, a steam-superheater coil concentric with the vapor-generator coil, means for supplying a hydrocarbon to the vapor-generator coil, means for supplying steam to the steam-superheater coil, a heater common to both coils, a mixing-chamber independent of said heater and coils, a radiator-coil within the mixing-chamber, connecting means between the vapor-generator coil and the mixing-chamber, a connection between the said steam-superheater coil and the radiator, a valved connection between the opposite end of the radiator and the mixing-chamber, and a burner for the aforementioned heater receiving its supply of gaseous mixture from said mixing-chamber, substantially as described.

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

JAMES O. ALWOOD. [L. s.]

Witnesses:

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GEORGE G. WATT.